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Logistics management in practice – towards theories of complex logistics
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Abstract
Purpose – The purpose of this paper is to present findings concerning what logistics managers perceive as being difficult and challenging, and what implications this may have for further advances in the logistics discipline.

Design/methodology/approach – The point of departure for this study was to reflect on perceived problems, uncertainties, trends, and solutions in logistics, and how they are handled in the everyday work. The study was exploratory, inspired by grounded theory and aimed at providing grounds for further theory building in the area of real logistics.

Findings – The findings of this study was related to human, organizational and social aspects, i.e. how understanding and sense-making can be accomplished in logistics efforts. A major outcome from this research endeavor was initial, empirically derived arguments toward theories of complex logistics.

Research limitations/implications – One primary finding of importance was the identification of understanding and sense-making of concepts, techniques and models in logistics. Thus, future research is needed to provide insights and guidance on how human factors can be considered and elaborated by management in logistics situations.

Practical implications – Logistics complexity needs consideration when logistics processes and phenomena are approached to ensure increase understanding for people involved and affected, and for the sense-making of logistics phenomena.

Originality/value – This paper contributes to knowledge and understanding of uncertainty and challenges in logistics with focus on human aspects and perception. Previously, most research has focused on structural aspects and quantitative factors.

Keywords Management research, Uncertainty management, Distribution management

Introduction
The perception of supply chains and logistics systems as being complex is emphasized by several authors (Bowersox and Closs, 1996; Christopher, 2000; Cox, 1999; Lambert et al., 1998; Lumsden et al., 1998; Tan, 2001). Furthermore, according to contemporary literature (Nilsson and Waidringer, 2004; Prater et al., 2001), the difficulties in controlling and coordinating logistics activities within and among firms are expected to increase, since the interdependence among interacting firms is intensifying. Axelrod and Cohen (2000, p. 26) expect:

… systems to exhibit increasingly complex dynamics when changes occur that intensify interactions among the elements.

Thus, managing logistics in supply networks will create new demands on logistics management. This could imply that new approaches and methods are needed for
managers to understand and deal with logistics processes. However, logistics research has not, as yet, developed its thinking and its methods accordingly.

The question for this paper is if contemporary logistics models and theories have kept up with the development demands perceived in everyday logistics work and in the number of changes affecting every business situation today. These changes can be related to market changes, i.e. increased customer demands, increased competition and globalization; novel strategies, i.e. customization, demand chain management, agility and lean concepts; and technological improvements, i.e. internet and electronic commerce, enterprise resource systems, and auto-ID technologies. As Prater et al. (2001, p. 827) state:

... the introduction of factors that increase supply chain agility may increase supply chain uncertainty and complexity.

Furthermore, Christopher (1998, p. 259) declares that:

The challenge to every business is to become a responsive organization in every sense of the word.

However, how is such responsiveness realized in the everyday work of logisticians? Indeed, what aspects are perceived as influencing this overall responsiveness? Furthermore, what do logistics managers perceive to be most challenging and problematic in their daily efforts of making their logistics processes responsive, agile, lean or what ever concept used?

This paper sets out to discuss what logistics managers are doing and facing in their everyday work, i.e. real logistics[1]. The point of departure for this study was to reflect on perceived problems, uncertainties, trends, and solutions in logistics, and how they are handled in the everyday work. This was done through an abductive qualitative method inspired by thoughts and insights from grounded theory (Glaser and Strauss, 1967). The study was exploratory and aimed at providing grounds for further theory building in the area of real logistics. Hence, the purpose of this paper is to present findings concerning what logistics managers in their everyday work perceive as being difficult and challenging, and what implications this may have for further advances in the logistics discipline.

As stated at the beginning of this paper, there are several authors who claim that logistics processes and phenomena are complex; however, it is not always clear what they mean with by such statements. Milgate (2001, p. 107), for example, observes that:

... complexity should be viewed as a deterministic component more related to the numerousness and variety in the system.

Hence, complexity in logistics is often defined out of quantifiable measures and based on the notion of numerous actors or parts which are interconnected. For clarity, in this paper, logistics phenomena are considered complex given that they involve interpreting interdependent actors who are interconnected and in their present situations transform their perception, update their goals, and adapt to the context, both individually and collectively.

The remainder of the paper is organized in the following way. First, a presentation of the methodology, i.e. a grounded theory-inspired explorative study is provided. Thereafter, major findings of the study are provided, giving the reader a comprehensive picture of the uncertainties logistics managers are perceiving, and
the challenges they are facing in their daily work. In the subsequent chapter these challenges are compared with what is provided in logistics literature. This is followed by the presentation of the developments for the logistics discipline suggested from the findings of this study, namely theories of complex logistics. Finally, conclusions are provided and further research is discussed.

Methodology

Grounded theory, as initially described by Glaser and Strauss (1967), is a qualitative, interpretive, discovery-oriented method which generates theory through field data. This means that grounded theory is inductive in nature and no theoretical propositions or deductively derived hypothesis should be formulated prior to the research endeavor. It has been developed for social science research and as such, it might be interesting for the socio-technical nature which logistics represents. The use of the method in logistics is rare, however, Flint and Mentzer (2000) report using the method when they examined logisticians’ roles when customers desired value changes. They conclude that grounded theory “offers significant opportunities for future logistics theory development” (Flint and Mentzer, 2000, p. 41). Furthermore, Pappu and Mundy (2002), in their study of transportation buyer-seller relationships, used a grounded theory approach.

While the grounded theory methodology offers several qualitative approaches for data gathering, the main method in this study was semi-structured interviews based on a number of topic areas, which evolved over time. The majority of the topics were areas to discuss, i.e. not specific questions to answer, while a small number were for the responder to fill in and comment on. While Glaser’s advice is to neglect literature reviews related to the area under study during the research process so that the researcher’s interpretation of the data is not “contaminated” others, such as Walsham (1995) and Strauss and Corbin (1998), suggest that a certain degree of theoretical sensitivity does not harm the study conducted. Rather, if some literature is studied the research can be helpful in focusing the study, and provides a framework for initial questions and discussion subjects (Hansen Hansen and Kautz, 2005). In this study, theoretical and literature-based thoughts have influenced the creation of topics as well as my perspective of the research phenomenon, making it an abductive research approach rather than a truly inductive one. Theoretical sensitivity has been striven for, and neither propositions nor hypotheses were formulated prior to the study of real logistics.

The people chosen for this study were mainly key individuals within large, international, sometimes global, companies (> 500 employees) who had worked with logistics issues on a daily basis. The interviewees have mostly been managers in different positions within the companies chosen, all with responsibility for logistics or supply chain-related issues. Interviewees were represented from inbound and outbound logistics operations and from production, procurement, and marketing departments. All of them had a minimum of four years experience in logistics, and some up to 40 years. The companies covered several industries ranging from telecommunication and automotive to medical equipment. All companies were beyond the first tier in their supply chains, i.e. none of the companies was directly in contact with the consumers; they were suppliers to retailers or industry. In total, 14 people were interviewed in ten companies, and all but one responded positively from the very
Each interview lasted one-and-half to two hours. The discussions were all recorded on mini-disks (MD) and transcribed in close connection to the discussions. While the number of discussions may seem small, it is sufficient for theory-building purposes since the study goal is to gain in-depth, comprehensive understanding of each individual’s perception and experience of logistics. According to Riley (1996), it is common to rely on a few informants in this type of research. Furthermore, while the generalizability of the results may be questioned because of the small number of informants, it provides a sufficient platform for further theory-testing research. Furthermore, combined with the literature study, theoretical generalizations can be provided and conclusions for the logistics discipline can thus be drawn from this study.

Most of the participants were found through personal contacts who worked at the companies involved in this study. This made first contact easier and the respondents felt comfortable, since they had been informed and were therefore prepared for me calling them. When no personal contacts were to be found in the organizations, company homepages and people on the switchboard helped out. The next step included a first contact by telephone. Guidelines for telephone interviews were constructed, reviewed and discussed by at least two academics with experience of “cold calling.” After this initial discussion a follow-up e-mail was sent and this included a project document (one page) containing a study description and a confirmation of what had been decided. All but one of the participants contacted agreed directly to a meeting, and most of them found it interesting and fun to discuss real logistics.

In exploratory qualitative theory-building studies, data analysis and data collection are often interwoven (Eisenhardt, 1989) and for grounded theory “the theory evolves during the research process itself” (Goulding, 1998, p. 51). Thus, initial indications and results guide the further development of the conducted study. This is the principle of theoretical sampling (Punch, 2001). The companies in this study were chosen based on theoretical sampling principles where the sample size and selection of further study participants were mainly driven by the need for further understanding of the issues involved. The idea behind theoretical sampling is that it continues until theoretical saturation is reached. The first “feeling” of theoretical saturation was gained after eleven discussions and after conducting an additional three, saturation was reached. Since, theoretical sampling is intrinsically subjective in nature it was difficult to know when saturation was reached, hence the reason for the additional interviews.

The analysis and synthesis of the data gathered were of an iterative nature, and were performed alongside the data gathering. This process involved several readings of transcripts, listening to the MDs again, organization of data into different topics and categories (coding procedures), from which patterns emerged as streams of thoughts and purposes. From that first interpretation and coding of the data, the next process further explored the categorized data and core categories were made. Major themes emerged from these categorizations, interconnecting the first categories and a comprehensive picture was built up.

In assessing the usefulness of this topical study Partington (2000) put forward four criteria (derived from Glaser and Strauss (1967)) for theory to be useful. These are: theories should fit the real world; they would work across range of contexts; they would be relevant to people concerned; and they would be readily modifiable. These criteria are used in the research valuation. Concerning fit, the results presented are contemporary and derived from studies on the field in discussion with logistics...
managers reflecting on their daily work (work). Hence, the suggested theoretical area fits well the empirical situation that has been investigated. Furthermore, the results are emergent concepts related to true issues of the logistics managers interviewed (relevance), and the suggested theoretical focus can be constantly modified to fit and work with relevance.

Findings

From this study several areas emerged which collectively provide insights into the work of logisticians and the challenges they describe themselves confronting. The presentation here of the results will provide four dimensions of uncertainty factors the logistics managers are facing. From a deeper analysis of the discussions, derived from the final synthesis, three dimensions of challenges the logisticians are facing in their daily work are presented. However, some interesting findings of the logistics managers’ impression of their logistics processes and activities are given as an introduction.

One initial finding of interest was that all the participants expressed an overall positive and optimistic view of their logistics operations, declaring that most things work fine. Henrik (all names used are pseudonyms), for example, expressed that “most of our daily efforts are good even though I believe they can become even better” Jenny stated that “our customers think we are good,” and Ola expressed the view that “there is very much that works really well.” Another participant, Mats, who represented a fast-moving consumer goods company, stated that “none of the FMCG companies can afford to be bad on logistics.” Furthermore, the participants presented a picture showing that logistics is gaining importance in their organizations. Daniel, for example, stated that “logistics is today not anything one performs in the basement anymore. It is gaining strategic importance,” and Robert claimed that “the world is spinning faster, logistics is gaining importance.”

Nonetheless, as the discussions proceeded, several areas of reflection came up and from the analysis concepts emerged. For each concept described and discussed in this paper, there are numerous passages, connections, and interpretations gained from various parts of the discussions. For example, the need for a holistic view of the logistics operations was expressed when discussing further developments, when reflecting on events which had been successful as well as events which had resulted in failure and in the initial discussions where the companies’ logistics operations were presented.

Logisticians perceived uncertainty

One of the topic areas discussed was uncertainty factors and in total it can be reported from this study that despite statements about most logistics activities proceeding rather well, all the participants felt that the perceived uncertainty was growing. This growth was due to an overall increased complexity which affected them in their logistics processes and activities. In the analysis these were grouped into four uncertainty dimensions:

1. customer demands and expectations;
2. internal processes;
3. human factors; and
4. general trends (Figure 1).
Customer demands and expectations
The first dimension relates to increasing and changing demands from customers, the impacts of which increasingly affect logistics. For all the companies the customer demands on logistics had both increased in scale and in scope, i.e., have become more diversified. The participants stated that the scope of the customer demands on logistics had increased and involved several factors such as: shrinking time-windows for deliveries, customized order bookings, increased number of packaging types, customized labeling, variations in number of products per pallet and per order, increased frequency of deliveries, JIT demands, increased product variants, and less volume per order. One participant explained that:

... if the time window for a delivery is 14.00-14.30, the truck has to wait if it arrives at 13.00 and generates sometimes complaints because of traffic stocking. And if the truck arrives at 15.00, the customers refuse delivery that day.

Several of the participants recounted similar experiences and believed that these demands on delivery precision were about to increase. The most important aspect of logistics, as expressed by the participants, was that of service levels, measured as on-time-in-full. One participant stated, for example, that “ deliveries are allowed to cost some more as long as service levels are met.” Another participant’s opinion, which reflects those of the whole group, was: “higher service, shorter lead times, those aspects are most important for our prosperity and survival.” However, as they all emphasized in one way or another, those are words which are easy to say but increasingly difficult to accomplish.

In order to meet these increasing demands and thus to keep the important measure of service levels high, one noticeable approach and strategy emerged in the analysis; that of customer involvement. One participant claimed that the customer’s awareness of logistics issues had increased and from that, their demands as well, while another
explained that “customer demands are surpassed by everyone.” Some of the participants claimed that the trend they perceived was increased focus on building relationships with customers. They also believed that logistics provided important aspects in relationship-building efforts since trust was gained from confidence on deliveries; as one participant expressed it, “what customers want they get – on time.” However, the understanding of logistics-related aspects in the relationships of today, despite increased awareness from customers, is perceived as rather small. As one participant expressed it:

At the customer’s procurement departments there are people that love to make good deals with our sales office. These people are often motivated by bonus systems that contradict discussions about expectations and future.

This should be considered together with the observation most participants make, namely, that the marketing and sales forces of their own organizations also lack any greater awareness and understanding of logistics.

A final notion concerning customer demands and expectation is that it interesting to note that only one of the participants mentioned the company’s consumers, and no one discussed or reflected on what connections their logistics processes and activities had with the consumers.

**Internal processes**

Despite numerous texts in the available literature about the importance of functional integration (Berry and Hill, 1995; Hill, 1995; Narasimhan and Das, 2001; Pagell, 2004), and the importance of integration of sales/marketing and logistics (Mentzer et al., 2004), several of the participants explained that the internal communication between sales/marketing and logistics is a source of great uncertainty in their daily logistics activities. One participant said that “sales and marketing have no awareness for how logistics works,” another statement was:

... the marketing function provides the worst demands possible on us and, of course we can comply, however no one is prepared to take the consequences of higher costs, the need for competence, etc.

In addition, the following observation was made by another participant:

... front-end have knowledge and competence about customer needs while the knowledge about logistics is often in the back-end.

Thus, the emergent picture in general was that the understanding of logistics in the organizations as a valuable activity was rather limited. The general picture was that logistics processes are supposed to work accurately and efficiently, but without associated costs. For the logisticians this internal factor provides them with unnecessary uncertainty based on the fact that in many cases they are invited into customer arrangements rather late. Hence, their function becomes one of complying with, rather than providing more effective solutions from the beginning. However, the marketing/sales – logistics interface was not the only area where discrepancy was perceived. One participant pointed to the relationship between IT departments and logistics and argued that IT tools which should benefit and assist logisticians were developed by IT people and best understood by IT people, not logisticians.
Human factors

Human aspects came up in the discussions in all areas discussed. Many felt that the human factor created uncertainty; “we are not robots, we do make mistakes.” One example was illustrated by the experience of some participants where the importance of meeting the “right” people when visiting customers was vital. However, from the discussions other aspects influencing the perception of human related uncertainty emerged, such as power, hidden truths, and protectionism. The issue of power was declared as an uncertainty factor since it hampered decision processes, and made communication more difficult, i.e. was merely an obstacle creating problems in several situations. As one participant expressed it “people are afraid of making decisions due to internal power structures.” Concerning hidden truths, another participant declared that there are many things we do for the simple reason that we have done them for a very long time. Another recounted that in improvement projects he had received answers such as “we have done that before, it did not work 24 years ago.”

General trends

The general trends appointed by the participants are related to general developments of technology, ideas, and concepts. The picture provided was of an ever-changing environment where it was continually necessary to check if improvements efforts were right. For example, several of the participants were involved in discussions about radio frequency identification (RFID) technology and about how it could be applied to their businesses. While no one stated that they were working concretely with implementations or pilots, several of them expressed uncertainties about what RFID would mean to their operations, when to start doing something concrete, and concerns about who should pay, how should any cost-sharing policies come about etc were apparent. Others expressed a notion of the increasing amount of ideas and concepts that are provided and made available on the market. Finally, an issue raised by several of the participants in relation to trends was “how do we prepare our coworkers for future demands and requirements?” This type of issue involved both a short-term and long-term perspective since efforts were needed relatively fast, while the results were to be gained later on, i.e. large investments with risks associated. It was declared by one participant that people was needed that “could both give gas and brake simultaneously” in order to meet and lead further developments of logistics.

Based on this discussion concerning perceived uncertainties, it is proposed that:

P1. Human factors are both the creators of value and the producers of uncertainty in the logistics context. The more awareness and understanding of human involvement the more leverage is to be gained in improvement efforts and the higher levels of integration with customers and internally, can be achieved.

Logisticians’ challenges

From this study emerged three challenges logisticians are facing and believe are of importance for keeping up with increasing complexity and further developments of their logistics processes (Figure 2). These are:

(1) holistic perspective;
(2) sensitivity to details; and
(3) understanding and sense-making.
A view which grew from the discussions in the synthesis process was the increasing need for a holistic perspective. All the participants expressed the need for a holistic perspective and that this need was something the whole organization needed not only for logistics operations. It was expressed by one participant that “the most difficult aspects of his logistics work was gaining a complete picture of the situation.” Another declared that “we have quite good control of the smaller parts of our business activities, but the big ones…” (emphasis added). However, while this need for understanding and awareness by people in the organization for the whole might not be a new issue, the participants reflected that this need was increasing, since the logistics systems had become much more volatile due to improvement efforts, rationalizations, and IT supporting tools. While the participants all had ideas of where improvement efforts could be targeted, they expressed less confidence in how to prioritize what to do. As declared by one participant:

Since, we have a positive flow right now there is no trouble in getting support in different kind of efforts, which makes life easy. However, at the same time it is troublesome how to make priorities, since we cannot be everywhere.

Hence, while the participants were of the opinion that today’s common logistics concepts, methods and tools had made it possible to control and monitor a great number of factors within and among firms, they were confronted by the difficulty of understanding and acting when things happen which are of an “unusual” character. This means that priorities are to be made between different improvement efforts and decisions need to be made instantly.

However, at some points in the discussions what was put forward about increased complexity, holism, and understanding of the whole, was interestingly colored by a wish for simplicity in models, solutions, and explanations. For example, one participant first declared that the complexity involved in logistics issues was increasing and that understanding for a comprehensive picture of operations was needed, “perhaps with better models for control, models based on several parameters.” However, during the discussion, the desire to find simple models or solutions to deal with logistics issues was voiced. Furthermore, the issues of simple models and simple frameworks were addressed and wished for by other participants as well; participants who during the discussions expressed perceptions of increasing complexity and uncertainty in their work:

P2. While the descriptions of holistic complex logistics situations and the wish for simple models and solutions may be regarded as paradoxical, those firms able to find some kind of balance between perceptions of complexity and a wish for
simplicity may increase understanding in their organizations, and thus improve internal processes and hence, business performance.

**Sensitivity to details**

One participant stated that “when it comes to accomplishment of customer demands, it is the details that make a difference.” The general picture, reflected by the statements from participants, was that due to increased interconnectivity and great rationalizations of both internal and external processes, i.e. increased delivery precision, decreased time-windows for deliveries, decreased inventory levels, integrated ERP systems, etc. the sensitivity to small disturbances could have devastating effects on the overall business performance. One participant expressed it the following way:

“... the situation is becoming more complex due to tighter margins, rationalization efforts, and increased cost efficiency demands. At the same time support systems are becoming more complex and since they are highly integrated and detailed it has become more and more difficult to get a holistic view and when something happens it is very difficult to understand what caused it to happen or where the outcome of it will have effects.

It was also declared by the participants, that in both internal processes as in relation to customers, it was often “hidden” details which made a major difference. This observation of hidden details was often derived from the reflection that even if situations could be perceived with collective clarity and consensus, under the surface there were always factors which made the situations more complicated than they were first thought:

P3. As sensitivity to details and small disturbances in logistics operations is perceived to be increasing, those firms able to identify areas where leverage can be found and have the willingness, support, and spirit for accomplishment, are better at conforming to customer requirements than those who do not.

**Understanding and sense-making**

Another finding is the identification of understanding and sense-making in logistics. However, this reflection came rather late in the discussions and was often initiated by need for information. Accurate, timely, correct information was initially regarded in the discussions as one of the most important aspects for improving logistics operations. One participant described the need to get information from all parts of the value chain, especially from the end-customer, in order to be able to control the whole system. Another participant declared that with improved information, increased visibility would be accomplished and this was from a global perspective. This was further anticipated by others expressing worldwide system solutions which would be easier to manage with increased visibility since this visibility would ease the information handling among the different parts of the organizations. On remark was that “people spend lot of time and effort on things that could be displayed on a screen.”

However, as discussions proceeded another reflection emerged; that while information was regarded as important, the real challenge was of a more subtle character, more related to the understanding and sense-making of the information generated and what to do with it. Several of the participants expressed the view that in
order to gain real benefits from new technology, new concepts and thinking, the 
processes of today need to be changed. One participant raised the question “how can 
knowledge be transferred to ‘John, the truck driver?’” Another participant pleaded that 
they needed to:

... introduce methods that help to solve problems, not just to fix them for the moment. We are 
increasing our awareness about this issue, have started to work, ... we could become much 
more effective then.

However, as he continued, a great deal of understanding is needed for this to be 
accomplished. Others claimed that “getting the information to people was one thing, 
however getting understanding of how to use it is much more difficult,” “the understanding is rather scarce [for logistics in our organization],” “it is difficult to get 
groups to use the logistics concepts and guidelines we provide them with.” In total, the 
logistics managers expressed that the real difficult aspects of their work were related to 
rather “soft factors.” One participant stated that “as much as 80% of the time and effort 
in improvement projects was related to soft factors” such as discussions, explanations, 
persuasion, etc. Furthermore, concerning unexpected events, someone else that:

... it is one thing is to make the firefighting requirement to meet the customers requests, the 
difficulties are in understanding what happened; the learning.

And it was declared by several that mind-shift changes were quite difficult in their 
organizations, sometimes more difficult internally than with customers. A lot of 
questions were raised by the participants concerning how the awareness and 
understanding of the individual’s activities and actions in relation to the whole could 
be approached and increased. Furthermore, as expressed by one participant, “we have 
models, and there are models to be found, but we lack the conviction,” i.e. the 
discrepancy between just information, and interpreted and understood information is 
an apparent problem logisticians are dealing with:

P4. Those firms able to focus on the understanding and sense-making aspects in 
logistics, and possible in the whole organization, and which have the 
motivation to put efforts into new ways of thinking, acting, informing, 
communicating both internally and externally, have the potential to achieve 
both increased efficiency and effectiveness in their operations.

Uncertainty and challenges in logistics – a theoretical perspective
When relating these findings to literature, there are, of course, several findings which 
have been identified earlier. For example, the trend in industry is that the requirements 
and demands from customers are increasing in scope (Caridi and Cigolini, 2002; Flint 
and Mentzer, 2000; Kehoe and Boughton, 2001). Furthermore, the statement made by 
Stock et al. (1999, p. 38) that “in this new competitive environment, logistics must be 
accorded a high strategic priority and cannot be viewed merely as a cost of doing 
business,” was also verified by some participants. However, the overall interpretation 
was that the identification of logistics as high priority was still in its initial stages. The 
recognition of logistics as strategically important was rather low, but growing.

Concerning the treatment of uncertainty in logistics, the overall message found in 
logistics literature is often of reducing uncertainty as much as possible. This type of 
reasoning, i.e. reductions of uncertainty, together with a striving towards states of
equilibrium and stability, is apparent in the logistics discipline, which Lambert et al. (1998, p. 453) emphasize by declaring that “an effective organization must exhibit stability and continuity,” and Lambert and Cooper (2000, p. 72) state:

… controlling uncertainty in customer demand, manufacturing processes, and supplier performance are critical to effective supply chain management.

In addition, the work by Childerhouse and Towill (2003) focuses on the concept of seamless supply chains, where simplifications and elimination of uncertainties in processes are argued for. However, other voices are raised concerning the issue of uncertainty, for example, Nilsson (2004, p. 543), who states that:

… one great challenge for logistics researchers and practitioners to reconsider, in developing the logistics discipline, is the need to recognize uncertainty and complexity and “go with the flow” instead of solely trying to remove and control uncertainty.

However, while the logistics literature provides theories, models, and tools for conceptual and technical aspects of logistics, i.e. tangible, technical, objective, value-free aspects, it provides little emphasis on soft factors related to human behavior, i.e. how concept and techniques should be operationalized. Russell and Hoag (2004, p. 102), for example, state that:

… social and organizational sources of complexity in IT implementations have thus far attracted little research attention from logistics and supply chain scholars.

Furthermore, Johannessen and Solem (2002) call for logistics research with a stronger focus on logistics organizational issues and especially for the emphasis on the human and social aspects of logistics to become a central issue. In a definition of logistics provided by Johannessen (2003, p. 87) the following is stated:

Logistics is complex processes of relations between humans, nature, technology and resources that interact and unpredictably self-organize into emerging paradoxical patterns with value creating potential.

The findings of the present study clearly show that the difficult aspects of the logistics managers work were related to soft factors and their integration with concepts, technologies, etc. While information was considered an important aspect by the participants, the fundamental issue was expressed as understanding and sense-making by people involved in the logistics activities as well as people in other functions. Thus, the findings from this study point to a complementary area to that of mainstream logistics, where human involvement and organizational aspects are considered, i.e. how individuals’ and organizations’ understanding and sense-making are related to logistical concepts and technical findings. As Kehoe and Boughton (2001, p. 587) concerning new paradigms in planning and control across manufacturing supply chains, state:

… although organizations will need to fundamentally change the way they do business, the barriers lie with the business processes rather than the technology.

Hence, the findings of this study point toward a need for the logistics discipline to focus more on complex theories of logistics. The following chapter will provide further arguments why.
Toward theories of complex logistics

The challenges derived from the situations and phenomena logistics managers are perceived as confronting are of a rather complex character. The managers’ expressed need for a holistic perspective in order to comprehend their logistics processes can be set contrary to the identified challenge they confront concerning the sensitivity to details that the processes are characterized by. This is a rather paradoxical situation where holism is set against details and the need of having both simultaneously. One traditional solution would be to rely on reductionism, i.e. decomposing the whole into simpler parts, and by doing so assess the details. However, this is not a valid solution since small disturbances can be amplified in non-linear fashions creating surprisingly different outcomes each and every time (Kauffman, 1995). Hence, there is no interest in finding single factors for complex problems (Nilsson, 2004). Thus, the paradox of holism and sensitivity to details prevails.

Another issue is derived from the expressions of increasing complexity and uncertainty, and the need and wish for simple frameworks and models. Hence, the approach or solution to handle the increasing complexity and uncertainty is to be found in simple models and frameworks! While simplified models could be regarded as drivers for rationalizations and efficiency improvements, these cause paradoxical situations since not only is the increased perfection of logistics making processes more volatile and vulnerable, it might constrain further developments, as risks of failure may be devastating for the company’s operations. This could mean that the logistics innovation potentials might be hampered by the volatility and the sensitivity to details apparent in the interconnected logistics systems of today. Hence, while this volatility of logistics processes may speak for incremental improvements, the increasing market demands may request radical improvement efforts in order to gain competitive advantage. This creates interpretation consequences for logistics managers since they are facing what could be defined as an efficiency/effectiveness paradox, i.e. doing things right vs doing the right things.

Finally, the finding involving information vs understanding and sense-making is another area making the situation for logisticians a rather complex one. As described earlier the shift from arguing for more information and visibility to putting emphasis on understanding and sense-making reveals another paradoxical situation. This is related to the underlying logic that more information would generate increased understanding and sense-making. The message from the participants was that while technological improvements in providing information contributed to making everyday work easier, they had made life more difficult when something unusual or new happens. And one thing that everybody agreed on was the fact that unusual and new things happened rather often. Hence, the statements in literature about reducing uncertainty by increased information have two dimensions which might produce contrary outcomes. For logistics routine work the increased information might be relevant, however, as the participants explained that they sense an increasing and rapidly changing complexity in their organizations’ contexts. It might thus be expected that unusual and unexpected things will happen. Consequently, other approaches, perhaps involving greater emphasis on understanding and sense-making of information than solely technical and conceptual related to information, might be relevant.
What the three paradoxical situations, derived from the findings of this study, provide might be arguments for research focused on human and organizational aspects in logistics processes and phenomena. What can be concluded is that the logistics of today is not about keeping to a straight line towards a predetermined goal where deviations and disturbances should be fixed in order for companies to go back to ordinary business. Instead, logistics can be interpreted as a paradox of transformative change processes where the future is filled with possibilities, and the only thing we can certainly know is that the future will not be like the past. At the same time, continuity is kept in the collective; in routines created by humans in the logistics day-by-day activities. Thus, logistics management is about how to handle the difficulties and complications which constitute logistical problems. Thus, logistics is about people, and people’s perceptions about changes. Their perceptions rely on their understanding and sense-making of the logistics activities needed for complying to customer demands and for the exceeding of these, on a daily basis.

Conclusions
This study explored the field of logistics management in practice, with the purpose of presenting findings concerning what logistics managers in their everyday work perceive as being difficult, and what implications this may have for further advances in the logistics discipline.

There were several areas raised which, to some extent, have already been addressed in logistics literature. These would be issues such as increasing demands from customer and the simultaneous overall increase in complexity and uncertainty. Furthermore, the issue of functional barriers, in this study found to be a problem in the relationship between marketing/sales and logistics, was also raised by the participants. However, what came to characterize the findings of this study was related to human, organizational and social aspects, i.e. how understanding and sense-making can be accomplished in logistics efforts. Hence, one primary finding of importance for further development of the logistics discipline, and thus of importance for logistics management, is the identification of understanding and sense-making of concepts, techniques, and models in logistics.

A major outcome from this research endeavor was initial, empirically derived arguments toward a theory of complex logistics. As companies are becoming more multifaceted themselves in their relationships with suppliers and customers, and in view of the increased turbulence facing almost all industries, the complexity facing logisticians is a clear fact. The need for theories of complex logistics originates from the challenges logistics managers are facing in their logistics work. These challenges are characterized by novelty (the type of problems are contemporary), and paradoxes which are of an "unsolvable character" and can only be handled by balancing efforts each and every day. This complexity needs consideration when logistics processes and phenomena are approached to ensure increase understanding for people involved and affected, and for the sense-making of logistics phenomena.

Future research
While this exploratory study has provided a reflective picture of logisticians’ perceived reality, it is only an initial contribution to the process of developing theories of complex logistics, i.e. concerning the paradoxical situations and phenomena logistics managers
are confronting in their daily work. The key contribution of this research is that it has taken a step toward increasing understanding of very complex phenomena in a manner that is only possible when using qualitative methods. Further research is encouraged to test the propositions stated to provide deeper understanding of the importance of each of the challenges and their interdependence. Thus, the research challenge is to provide insights and guidance on how rather soft factor can be considered and elaborated by management in logistics situations.

From a methodological standpoint, the provision of a grounded theory-inspired approach to logistics would hopefully encourage more researchers to apply the method and provide further evaluations of its use in logistics. This is especially the case for logistics focusing on human factors and organizational phenomena. Gammelgaard (2004, p. 479) argues, for example, that:

... application of more methodological approaches will strengthen the discipline in terms of new research questions and answers, just as it may have a practical relevance.

With the grounded theory approach the practical relevance of research is central, and the potential of providing the logistics discipline with new insights is high.

Furthermore, in order to gain even greater understanding of daily logistics, especially of how concepts such as agility and responsiveness are realized in everyday work, action research is suggested. By interviewing an active but reflective participant in everyday logistics, insights into how these concepts are being implemented, executed, and evaluated in practice, could provide the logistics discipline with further developments.

Note
1. The working name of the study has been real logistics.

References


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