QUALITATIVE RESEARCH IN LOGISTICS: THEORY AND PRACTICE

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INTRODUCTION

The discipline of logistics has entered a mature phase during the twenty-first century. Research in logistics as an independent discipline, latterly including supply chain management (SCM), has been conducted only since the 1960s (Stock, 1997). However, logistics and SCM are "*far too important to be considered either a temporary fad or parochial arena for a guild of specialist researchers*" and are "*suited to explanatory approaches which adopt multidisciplinary methodological pluralism*" (New, 1997: 15).

Kent and Flint (1997) examined the evolution of logistics thought and developed a chronology of major contributions through six different eras. Their sixth era, entitled Behavioural and Boundary Spanning, noted that for future logistics research "*there will be a search for deeper understanding of behavioral issues, specifically, customer perceptions of a firm's logistics systems and their related behaviors. Much of this work will build on marketing and behavioral research*" (1997: 25).

Kent and Flint's proposition suggests a need for more qualitative research in the discipline, and echoes a call by others; for example Ellram (1996), Hill, Nicholson and Westbrook (1999), Stock (2002), Näslund (2002) and Mangan, Lalwani and Gardner (2004). However, a majority of articles published in many logistics and SCM journals continue to use positivist and quantitative research approaches (Miyazaki, Phillips and Phillips 1999; Kotzab 2005).

The paper's objective is to highlight potential benefits of integrating qualitative and quantitative research for researchers and practitioners, and is organized as follows. Firstly, basic underlying thoughts of qualitative research relevant for the discipline of logistics and SCM are discussed.

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Next, the application of qualitative data collection, particularly interviewing, and analysis, including computer-aided analysis, are presented from two disparate quantitative studies in the UK and Austria. Finally, a synopsis reinforces the necessity for a coexistence of qualitative and quantitative approaches in logistics and SCM research.

THE NEED FOR QUALITATIVE RESEARCH IN LOGISTICS AND SCM

Mentzer and Kahn (1995) argued that logistics research was founded in the positivist or quantitative paradigm, and that future research should follow the scientific method inherent in it that seeks to provide explanation or causality regarding phenomena of interest. They also noted logistics research has lacked a rigorous orientation towards theory development, testing and application, and proposed a research framework that follows the scientific method. This framework is not unique and follows a basic format of idea generation, literature review, hypothesis formulation, data collection and analysis for conducting quantitative, empirical research.

Further, New and Payne argued that two issues affect the proper implementation of a positivist methodology and quantitative approach. The first issue is the notion that research is socially constructed, and leads to a dichotomy where "*it is possible to have academic research which scores high on 'rigour' and 'cleverness' but low on connection to 'real' problems*" (1995: 61).

An incremental, technical progress approach corresponds to a positivist or quantitative doctrine, while a managerial impact approach consists of broader 'soft' problem solving techniques for business practitioners that are usually prescriptive or normative. Thus, New and Payne's concern here is that the "*broader the question and the issues involved (e.g. the emergence of 'value-adding partnerships'), the more difficult rigorous research becomes*" (1995: 62).

Such different research approaches have also developed differently across research cultures. Voss (1995) noted that the technical progress approach is characteristic of US-based research in operations management while the managerial impact approach is characteristic of case study oriented research in the UK and Europe. This is not to say that logistics research in the UK and Europe is not as rigorous as the US; rather it illustrates a different approach regarding managerial relevance (Grant 2004b).

New and Payne's second issue is the formulation of presumed causal links which are important "*because they determine the underlying justification of research questions*" (1995: 64). They presented three possible frameworks with different a priori assumptions regarding three dimensions of logistics - practice, performance and environment - and delineated them

to demonstrate that the process of empirical research in logistics is not straightforward. New and Payne's frameworks "*each justify different types of research questions, and result in different types of knowledge*" being created (1995: 67).

These issues are acute in logistics and SCM research as such research has to "*address the issue of operational systems which span organizational boundaries*" and "*present a set of commercial and managerial issues which goes beyond the technical issues of material and information flow*" (New and Payne, 1995: 67). Logistics researchers are therefore challenged to properly design and apply units of analysis in complex logistics contexts and to properly delimit a study's boundaries.

Moreover, logistics research designs need to consider social and human involvement in logistics activities, and not just consider mechanistic modelling and simulation. Various qualitative methodologies have been proven to be useful tools for research in management and business subjects (Gummesson, 2000) and should be used more to investigate logistics and SCM issues.

Appendix 1 provides a comparison between quantitative and qualitative approaches. Basically, qualitative research can provide rich, deeper meaning of issues under consideration. Thus, it can be more seen to be an approach to discover new or unsought phenomena, develop and/or refine hypotheses rather than testing them (Kelle and Laurie, 1998). However, it is usually limited to subjects being researched and cannot be generalised to other contexts. Hence, qualitative research is primarily exploratory and consists of 'soft' measures that are difficult to quantify.

The measurement of key performance indicators is important across a firm's operations, including logistics and SCM (Grant, Lambert, Stock and Ellram, 2006a). Chow, Heaver and Henriksson (1994) argued that logistics performance research should include both 'hard' (quantitative) and 'soft' (qualitative) measures, but noted that the latter are difficult to select and analyse. For example, Lambert and Stock (1993) provided a list of both quantitative and qualitative channel performance measures, which are shown in Appendix 2.

In general, logistics faces a growing field of research with various facets. This can be seen from Kent and Flint's (1997) notion that the growing importance of behavioural aspects and dimensions, e.g. across logistics and SCM boundaries, requires a broader set of research approaches including qualitative ones. For all fields in logistics research the exploratory level of research using qualitative techniques proves to be the cradle to generate new ideas and insights and is thus a crucial prerequisite to push the discipline forward. The following sections present some aspects of qualitative data collection and analysis to demonstrate its potential application by logistics researcher and practitioners.

QUALITATIVE DATA COLLECTION AND ANALYSIS

Interviews

According to Marshall and Rossmann (2003), qualitative research comprises four major methods for gathering data and information: (1) participation in the setting (2) direct observation (3) in-depth interviewing and (4) analyzing document and material cultures. In-depth interviews are seen as a conversation with a purpose and an agreed topic and are extensively used compared to other methods (ibid.). Thus, we will focus on interviews in this paper.

An interview research design consists of five components: interview goals, interview type, the location of the informant or respondent, self-presentation and environment, and interview schedule (Robson, 1993; Fontana and Frey, 1994). Although interviews may be unstructured and free-flowing, a common type used is the semi-structured interview, which is a focused method containing a few guidance questions but is largely unrefined. It provides some structure to ensure important topic areas are covered, but leaves room for flexibility to go deeper in certain areas (Robson, 1993; Fontana and Frey, 1994; Rubin and Rubin, 1995).

An interviewer's presentation should be as a serious researcher (Fontana and Frey, 1994). Interviews should be recorded for ease of transcription and to allow the interviewer to concentrate on listening and conducting the interview (Robson, 1993), as well as observing non-verbal behaviour by the interviewee.

The interview schedule or topic guide should contain an opening engagement or gambit including an initial thank you and discussion of goals and interview confidentiality; the main research questions derived from the research goals; and an interview close with another thank you. Probes and follow up questions should be used where appropriate to stimulate deeper discussion (Robson, 1993; Rubin and Rubin 1995).

The interviewer's objectives are to create a natural environment, maintain a strict regimen regarding the structure, play a neutral role, never interject opinions to answers, and establish a balanced rapport to minimise this communication issue (Fontana and Frey, 1994; Rubin and Rubin, 1995).

In conclusion, interviewing is a bit of a contrived conversation (Robson 1993). It successfully follows a suggested format and elicits information concerning the research objectives. However, lack of interviewer experience and natural conservatism of respondents may impair the interview such that sufficient depth and information may be lacking.

Qualitative Data Analysis

Qualitative data analysis (QDA) can be defined as the craft of analysing data collected using qualitative sources such as personal interviews, focus groups, written text or even visual sources like photography (see for example Morse and Richards, 2002).

Qualitative data is different from quantitative or numerical data in that it is much richer and bulky (Kelle and Laurie, 1998). QDA does not utilise quantitative results from thin abstractions of numerical data sets to provide meaning and understanding. Meaning and understanding in QDA is developed through analysis of the data's contents and subsequent reflection to refine the analysis (Robson, 1993).

QDA is more difficult to undertake than quantitative data analysis, which has reasonably clear and accepted sets of conventions and techniques (Fielding and Lee, 1998:21). While there is a form of rigour in QDA, it has been classed as both a science and an art based on the researcher's skills and the analytical approach utilised (Strauss and Corbin, 1998). According to Huberman and Miles (1994) QDA comprises three linked sub-processes: data reduction, data display and conclusion drawing/verifying (see Figure 1).

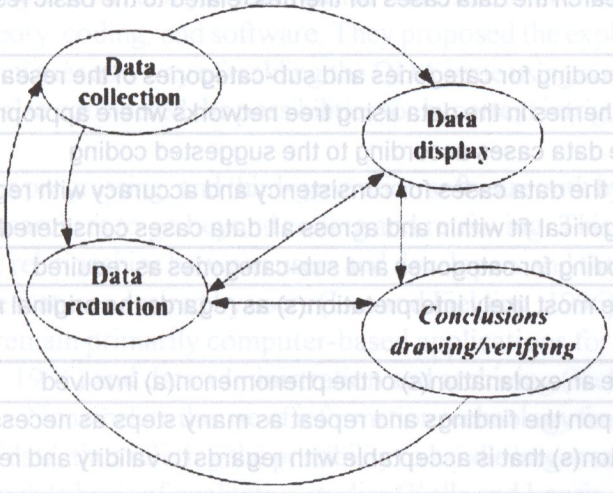

Figure 1: Sub-Processes of Qualitative Data Analysis
Source: Huberman and Miles (1994: 428)

QDA can be conducted in a systematic fashion using those three processes: structuring the material using common-sense concepts, coding the material according to codes developed from the first step, and comparing coded text segments to construct concepts, types and categories that form building blocks of an emerging theory (Kelle 1997).

Dey presents QDA as a circular process of "*describing, classifying and connecting data to obtain meaning and understanding*" (1993: 31) that helps systematise the QDA process and provide guidance for novice analysts. Other authors share this iterative viewpoint. Strauss and Corbin described QDA as "*interplay between the researcher and the data*" (1998: 13) while Bryman and Burgess considered that primary QDA research processes of "*analytic induction and grounded theory*" rely on some form of "*reflective interaction between data collection and hypothesis revision*" (1995: 4).

These and other themes in the QDA process have been synthesised into the eight steps shown in Table 1 that are recommended as operative steps for QDA adopted by logistics and SCM researchers. This process can be summarised into coding and indexing the textual data and recording theoretical ideas as memos. The first two sequences aim to reduce large amounts of textual data and make them manageable and/or comprehensible for researchers (Fielding and Lee 1998). These steps provide a good appreciation of the QDA process but can be quite labour intensive and time consuming. The computer can assist researchers here and the next section explores the role of the computer and qualitative research software in QDA.

Table 1: Steps in Qualitative Data Analysis

1.	Initially search the data cases for themes related to the basic research problem or issue
2.	Develop coding for categories and sub-categories of the research problem or issue and themes in the data using tree networks where appropriate
3.	Index the data cases according to the suggested coding
4.	Examine the data cases for consistency and accuracy with regard to the coding and categorical fit within and across all data cases considered
5.	Refine coding for categories and sub-categories as required
6.	Select the most likely interpretation(s) as regards the original research problem or issue
7.	Formulate an explanation(s) of the phenomenon(a) involved
8.	Reflect upon the findings and repeat as many steps as necessary to ensure an explanation(s) that is acceptable with regards to validity and reliability

Source: Authors

Qualitative Data Analysis and the Computer

There has been a significant increase in the volume of qualitative data and QDA available in all forms of research due to the impact of recording interviews. Use of the computer for QDA has now become widespread and has allowed researchers to easily and quickly code or index, retrieve, and manipulate or search and cross-reference qualitative data that comes in the form

of huge text segments (Coffey, Holbrook and Atkinson, 1996; Lee and Fielding, 1996; Kelle, 1997). Software packages of different kind can assist qualitative researcher to a considerable degree and lead to a "*...rapid development in the emerging field of computer-aided qualitative data analysis*" (Kelle 1998: 9).

Coding is seen as a form of data reduction that depends on creating categories from interpretation of the data (Lee and Fielding, 1996; Kelle, 1997). It is the key process for categorising and sorting data (Bryman and Burgess, 1995). But qualitative coding is often used not to denote facts but to break up data and thus represents perspectives of the researcher rather than clear-cut empirical, 'contentful' categories (Morse and Richards, 2002). The problem here is that coding done in this manner is not useful to empirically test statements about the relationships between two defined variables, i.e., provide a form of analysis (Kelle, 1997). Coding is therefore only the preliminary step for actual analysis in which the analyst tries to make sense of the data, in order to construct meaningful patterns of facts (Dey, 1993). Thus the computer remains restricted to an intelligent archiving or code and retrieval system and a human interpreter always does the analysis (Kelle, 1997).

There is an ongoing debate about the merits of software manufacturer claims that the computer can be used to actually perform QDA. Coffey et al. (1996) argued that coding data for use with computer programs is not analysis and warned that there is an unnecessarily close equation of grounded theory, coding, and software. They proposed the exploitation of hypertext and hypermedia techniques as a way of tackling the QDA issue using computer software. Lee and Fielding (1996) also considered the possibilities for hypertext intriguing and exciting.

Computer software is progressing, and third-generation software with hypertext type of algorithms will allow researchers to go beyond coding and retrieving. This progression is based upon generally close relationships between users and developers and the willingness of developers to incorporate features desired by users (Lee and Fielding, 1996). But at present software programmes remain primarily computer-based applications for data storage and retrieval (Coffey et al. 1996) and data administration and archiving (Kelle, 1997) rather than tools for data analysis. Nonetheless the use of information technology facilitates the processing of larger amounts of data, thus offering the possibility to handle larger sample size and consequently enriching the data basis of qualitative studies (Kelle and Laurie, 1998).

NVivo, the successor to NUD*IST, has become the most popular software programmes to use with qualitative data. Its advantages include the ability to handle large data sets and to perform coding and text searches and a structured organisation that allows hierarchies to be built and developed (MacMillan and McLachlan, 1999). Thus, information technology enables qualitative researchers to manage larger samples containing respective data volumes and retrieve all relevant information about the research topic by using codes and indexes which are comprehensible to other researchers, leading it a higher trustworthiness of qualitative findings

(Kelle and Laurie, 1998) and which leads to validity of the research, which is considered paramount in all research but particularly in logistics and SCM (Menzter and Flint, 1997).

Based on these theoretical notions concerning qualitative research, we next present two heterogeneous applications to demonstrate how these unconventional methods can complement quantitative methods in logistics research. The first application from the UK is considered as a grounding of a quantitative research instrument, while the second application from Austria presents a mixed approach where qualitative elements enrich quantitative ones within a web-based questionnaire.

APPLICATION IN A UK CONTEXT

The UK study examined customer service, satisfaction and service quality in UK food processing to determine which variables and constructs were important to this industry sector. The study followed a rigorous application of the Churchill (1979) and Dunn, Seaker and Waller (1994) two-stage frameworks for scale and construct development, hereafter referred to as the Churchill et al. framework. Sixteen variables developed from the literature were first examined in a pilot study of 380 firms that returned 105 usable responses for a 28% response rate.

Exploratory factor analysis (EFA) found four significant factors utilising all 16 variables. Factor loadings were greater than 0.50 and scale reliability coefficient alphas were greater than 0.70, thus the EFA was significant and statistically robust (Hair, Anderson, Tatham and Black, 1995). Since all 16 variables were utilised, no 'purification' of variables was proposed for the main study. The four variables considered the least important by respondents were contained in the first factor while four of the five most important variables were contained in the third factor and the remaining most important variable was contained in the fourth factor. Further, the five most important variables are transaction-oriented whilst the four least important variables are relationship-oriented.

This dichotomous finding that arose as a result of the pilot study required consideration of these issues and possibly amendments to the research design in the main study, which is the second stage of the Churchill et al. framework. However, inclusion of new variables in the second stage is not problematic, as they do not impair the existing research design. Such modifications are also consistent with Churchill's suggestions that researchers would "*probably want to include items with slightly different shades of meaning because the original list will be refined to produce the final measure*" (1979: 68).

Personal, semi-structured interviews were chosen to be conducted as a post-pilot study follow-up to confirm the findings of the pilot study and further investigate the emergent issue of

transaction variables versus relationship variables. A random sample of 11 respondent firms was selected and telephoned to solicit participation. This number represented just over 15% of the census and allowed for an appropriate number of interviews as well as potential respondent drop-out (Robson, 1993).

No contact was made with respondents in two firms, four firms declined to participate, and five firms agreed to an interview. Two firms cancelled their interviews owing to busy operations; thus only three firms were interviewed. This number of interviews was considered satisfactory for the exploratory nature of investigating the issues arising from the pilot study. Further, the interviews permitted the use of multiple research methods and thus provided research triangulation. Triangulation is "*a method of finding out where something is by getting a fix on it from two or more places*" (Robson, 1993: 290). It thus enhances research validity by drawing upon multiple-evidence collection methods and using multiple informants and cases in order to demonstrate a 'fit' between theory and reality.

Firm A is a Glasgow food manufacturer and processor of ready-made savoury snacks and meals for resale to retailers, and their operations manager 'Sally' participated in the interview. Firm B is an Edinburgh beef, lamb and pork processor and wholesaler, and their sales manager 'Tim' participated. Firm C is a gammon and bacon processor located near Glasgow supplying to wholesalers and retailers, and their export sales manager 'Jack' participated.

All interviews were conducted using a semi-structured interview schedule shown in Appendix 3. The interviewees were interviewed for a short time, e.g. one hour maximum. All interviews were taped and notes were transcribed. Analysis was conducted by patterning, which consisted of visually comparing responses to topic areas and noting any recurring patterns themes (Robson, 1993). Due to the small number of interviews and qualitative data, more elaborate coding and categorising techniques were not employed nor was QDA software used, e.g. NVivo.

Table 2 is a matrix displaying key comments by the three interviewees about the primary topic areas and any other pertinent comments. The comments were gleaned from listening to the tapes and from examining the notes. A matrix display has the advantage of providing comments in one place so one can see more readily what respondents are saying as opposed to individual narrative text that is "*essentially sequential - one thing dealt with at a time - with information spread over many pages*" (Robson, 1993: 390).

Table 2: Matrix Display of Key Interview Comments

Interview Topics	Firm A - 'Sally'	Firm B - 'Tim'	Firm C - 'Jack'
Customer Service and Satisfaction	"customer service is more about responsiveness and empathy on both sides; looking for added value; wants to be treated like she treats her customers; important factors vary by situation and thus event; getting good service, being responded to and working with supplier"	"customer service consists of on-time, good quality and delivery, price yes as business is a commodity but it can be more of a filter; satisfaction includes all these plus communication or market information and helping you out by going out of their way"	"customer service is continuity and quality, with availability and price being important factors; firms are very price conscious; satisfaction is about meeting our needs and communicating with us; we are small with only 30 employees and would like to remain small"
Suppliers and Relationships	"supplier qualities include responsiveness, professionalism, not cowboys, getting a response, items on time begin the definition of a relationship; she likes straight-line relationships; listening important on both sides, but finds industry a bit disappointing in not thinking 'big' and not pursuing relationship development"	"supplier qualities include ethics and integrity; new suppliers must also help solve problems, but it's hard for new suppliers to break in as there are a certain amount of relationships involved in the business; suppliers must maintain old-fashioned but flexible and responsive values but also have niche values and be able to customise"	"supplier qualities include honesty and telling the truth, doing what you say you will and consistency; relationships are important as is personal contact on an ongoing basis; values of quality and consistency derived from family, there are 5 brothers in the firm who handle different aspects of the business; look for suppliers who share the same family values"
Other Comments	"buying process is once a week, she does it, she is not sure how many suppliers are IT based but she wants to set up website as her customer ASDA is looking for her to be EDI compatible; however she prefers telephone and personal contact, business seasonal only with respect to certain product groups such as salads"	"have EDI but don't use it much, difficult to see its value at the sharp end; there is lots of 'chumminess' in the industry, which is particularly prevalent down south (England and Wales); some power or coercion exercised by the firm as it presently a buyer's market due to low commodity prices"	"we only have a computer for operations and maintenance; accounts are still done by hand, an abacus works ok with WD-40"

Source: Authors

Interviewees were first asked about the pilot study to confirm the appropriateness of the format and instrument, and were shown its findings to discuss their meaning. All three interviewees thought the instrument useful, easy to complete and thorough. None of the interviewees were surprised by the pilot study findings, especially 'Jack' who noted that availability and price are important to his firm. Interviewees were next asked about the topic areas of customer service and satisfaction, and suppliers and relationships, which are shown in Table 2. Important variables of on-time delivery and price featured in their comments, while all interviewees noted elements of communication in discussions about satisfaction. These comments were consistent with pilot study findings about these topics.

All three interviewees advised that relationships are important to them, and a theme of professionalism, honesty and integrity emerged from their comments. Regarding other issues, all three interviewees commented that EDI or other technological innovations were not being used at their firms. Technological adaptation in the food processing industry is important to large grocery retailers. However, the interviewees' comments support P-E International's (1994) survey of 260 food processors and retailers where 68% of respondents have no EDI links with suppliers and only 11% have more than ten links while 44% have no EDI links with customers and only 17% have more than ten links. There has been no recent evidence that these trends have changed (Grant, 2005a), and accordingly this issue was also investigated in the second stage or main study.

In summary, the pilot study findings, together with amendments emerging from the post-study qualitative data collection and analysis, confirmed the domain being investigated and variables generated for investigation in accordance with the first stage of the Churchill et al. framework (Grant, 2004a). The findings thus provided a substantive and rigorous set of results with which to proceed to the second stage of the Churchill et al. framework. The second stage consists of collecting new data from a fresh sample and analysing the data to assess reliability and various forms of validity (Mentzer and Flint, 1997).

APPLICATION IN AN AUSTRIAN CONTEXT

The Austrian study (Grant, Teller and Teller, 2005) focused on satisfaction of retail and wholesale general managers in the Austrian IT-sector with services provided by their professional representation, i.e. the Austrian Chamber of Commerce (ACC). The aim was firstly to evaluate existing services such as lobbying, information supply, procuration, funding etc. and secondly to explore any hidden needs of members in order to augment and/or revise the wide spread services portfolio. Membership in ACC is compulsory for all Austrian firms.

Findings from a quantitative preliminary study applying the face-to-face survey method showed substantial shortcomings regarding the identification of new ideas, dissatisfaction with single

services and the expression of needs. Because of those reasons it was necessary to combine qualitative with quantitative research elements. Based on the criteria in Table 3, the Internet was selected as a survey medium within the given research context. Additionally, perceived anonymity stemming from the nature of the Internet medium provided a crucial prerequisite to obtain honest and unbiased opinions (Hewson, Yule, Laurent and Vogel, 2003) on ACC-services from a compulsory member general manager's point of view.

Table 3: Internet Selection Criteria

Respondents have a comparably high affinity to the Internet medium.
All of them are expected to have access to and use the Internet including e-mail on a daily basis.
They can all be reached by postal contact and identified through the ACC membership list.
Austrian companies in general are highly involved in the topic regarding the ACC.

Source: Authors

The dramaturgy of the questionnaire was based on the notion to confront respondents with existing service-categories derived from the official service-portfolio of the ACC. All eleven categories were evaluated based on the similar structure, as shown in Figure 2.

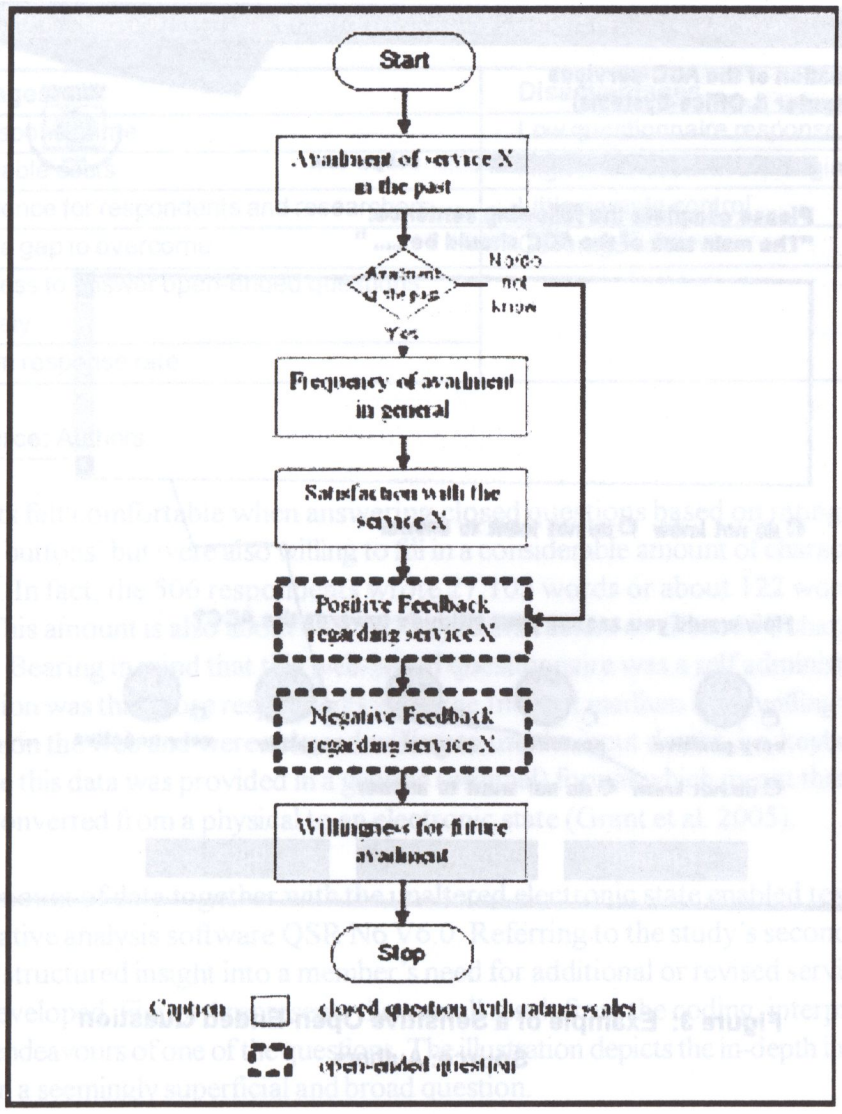

Figure 2: Evaluation Process of Single Service Categories
Source: Authors

This combination of quantitative and qualitative elements had the potential to describe the existing status including the opportunity to go into detail if necessary (Zikmund, 2000). All respondents were 'forced' to answer all questions being relevant for them by using alert pop-ups if any answer had not been given. Due to sensitivity of ACC requiring compulsory membership with membership fees based on sales, an open-ended question was added at the end of the questionnaire, as shown in Figure 3. This sentence-completion question was intended to give an insight into further potential service areas apart from those that were already being evaluated.

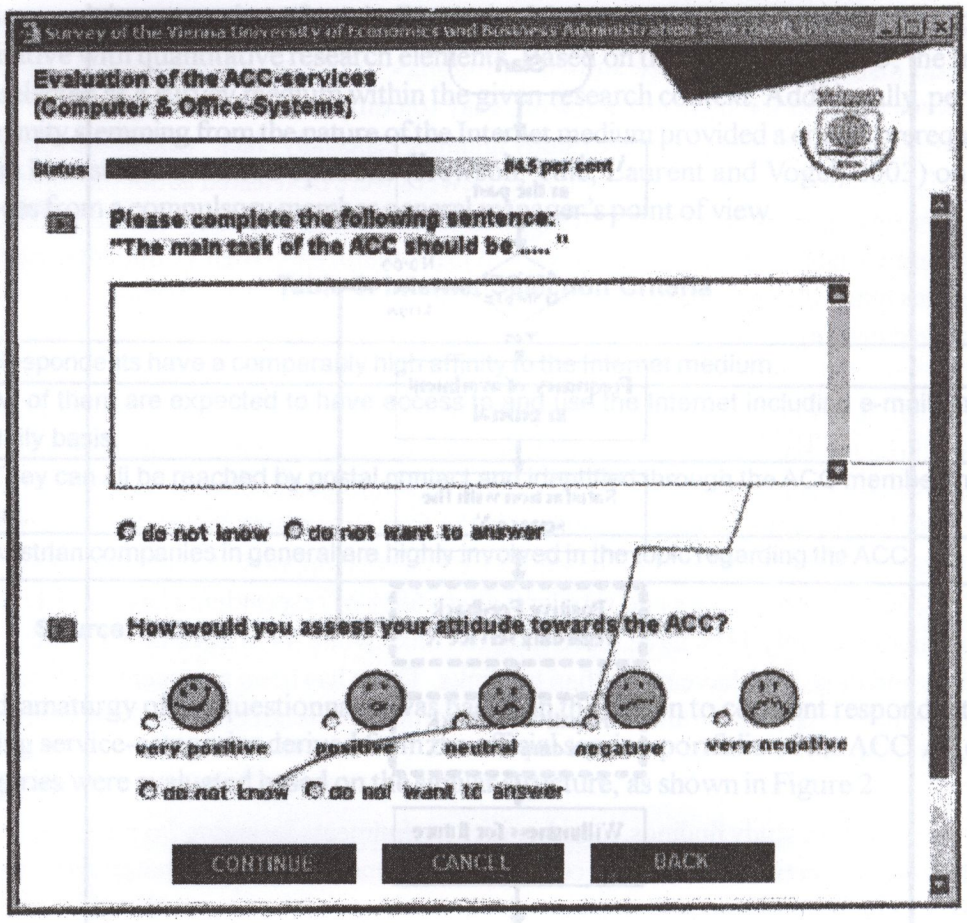

Figure 3: Example of a Sensitive Open-Ended Question
Source: Authors

Although all Austrian intermediaries in the field of IT were contacted, i.e. a census of 4,828, there were only 506 returns for an 11% response rate. Nevertheless the structure of respondents' firms represented the typical structure of firms in this sector in terms of number of employees, sales and exports. The detailed results of this study are outside the scope of this paper, however a good mix of answers was received regarding criticism, constructive improvement suggestions and negative notions that support the use of qualitative aspects in the study.

The choice of using the web for the study turned out to be appropriate, and the research experienced almost all advantages of web-based surveys (shown in Table 4) that have been discussed in the literature, for example Grant, Teller and Teller (2006b), Mehta and Sivadas (1995), Kent and Lee (1999) and Illevia, Baron and Healey (2002).

Table 4: Advantages and Disadvantages of Web-Based Surveys

Advantages	Disadvantages
Short response time	Low questionnaire response rate
Low variable costs	High fixed costs at the beginning
Convenience for respondents and researchers	Little sample control
No media gap to overcome	Coverage error
Willingness to answer open-ended questions extensively	
High item response rate	

Source: Authors

Respondents felt comfortable when answering closed questions based on rating scales by using 'radio buttons' but were also willing to fill in a considerable amount of characters in the 'text fields'. In fact, the 506 respondents wrote 27,105 words or about 122 words per respondent. This amount is also about 181,385 keyed characters or about 358 characters per respondent. Bearing in mind that this web-based questionnaire was a self administered one, the supposition was that those respondents using the Internet medium were willing to answer the question on the web and were able and willing to use the input device, i.e. keyboard. As a consequence this data was provided in a generic (original) format which meant that it did not have to be converted from a physical to an electronic state (Grant et al. 2005).

The large amount of data together with the unaltered electronic state enabled text analysis using qualitative analysis software QSR N6 V6.0. Referring to the study's second research objective, a structured insight into a member's need for additional or revised services of the ACC was developed. Figure 4 represents the overall result from the coding, interpreting and structuring endeavours of one of the questions. The illustration depicts the in-depth information derived from a seemingly superficial and broad question.

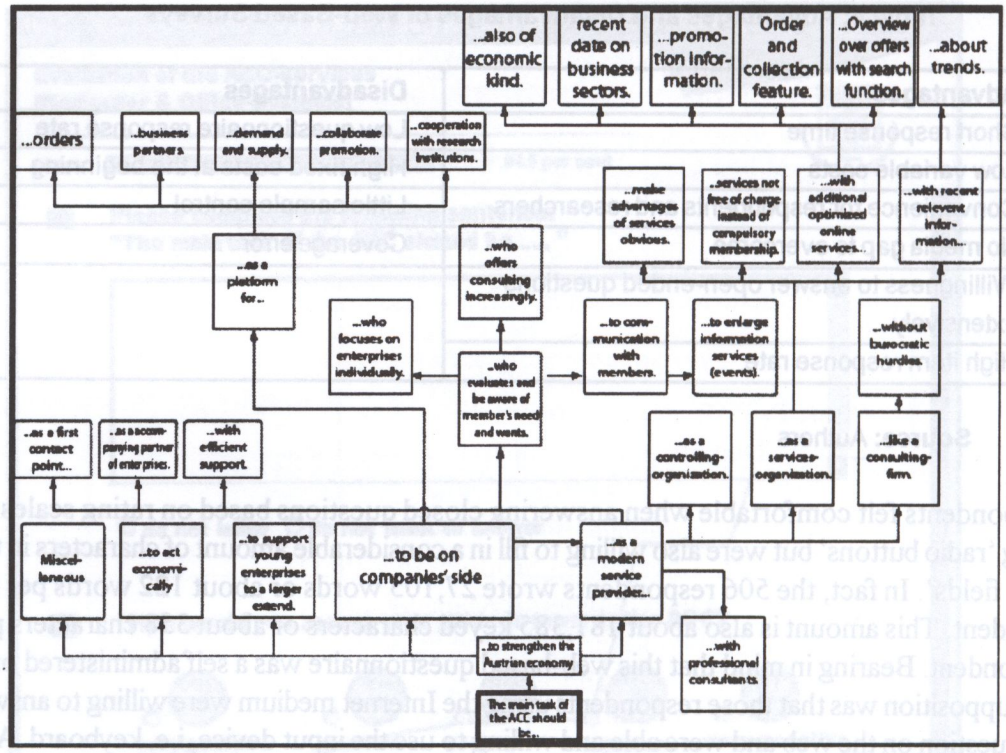

Figure 4: Schema of a Sentence Completion Question

Source: Authors

The methodological findings lead to the conclusion that qualitative elements were a crucial supplement to the study's research design. Further, these qualitative elements are capable of being included in web-based surveys since willingness to answer turns out to be comparably easier for those experienced with computer devices.

CONCLUSIONS

Logistics research faces two diametrical developments: the continuing dominance of the positivist research paradigm and the broadening of the research portfolio ranging from traditional operations management issues to more behavioural issues, i.e. sociological, marketing and/or psychological. Research problems thus diverge into many directions making it necessary to offer a broad set of research methods - qualitative and/or quantitative.

This paper focused on qualitative issues in logistics research, identified its need and the importance for specific research fields, and provided insight into specific features of qualitative interview-procedure and text-analyses. Based on that, two research applications were presented

integrating qualitative research techniques into primarily quantitative research problems. The first application showed the use of in-depth interviews in order to investigate the research problem on an exploratory level and using that information to build a basis for a follow up study. This procedure increased the nomological validity (construct validity) and reliability of the resulting quantitative survey.

The second application showed the potential of using qualitative elements such as open-ended questions within a quantitative web-based survey. This mixed-method approach enabled a gain in rich, in-depth information on the research subject. Both applications also demonstrated evidence of synergies between qualitative and quantitative research. Based on discussions in the literature and findings from the two examples, we support previous research and conclude that qualitative research has its place in logistics.

However, when merging the characteristics of the qualitative research approach and the development of the logistics in general, it can be assumed that following reasons lead to a stronger consideration of qualitative elements:

- The need for more research on an exploratory level, i.e. exploratory versus explanatory phenomena;
- Growing complexity of the problem set, i.e. enhancing diversity of the logistics discipline; and
- Synergistic power of diametric approaches, i.e. mixed method approaches and triangulation.

Further, we conclude that in many cases the nature of the research problem makes it necessary to at least think of non-conventional, i.e. non-positivist, research designs in order to help solve the problem.

Although this paper presents a more overall perspective of the qualitative side of logistics and SCM there should be more theoretical discussion and/or empirical endeavours as follows:

- Evaluation of the current state of the art of qualitative approaches in relevant logistics journals;
- Identify typical research fields where qualitative, quantitative or both approaches are applicable;
- Develop and discuss guidelines and/or decision support rules where and when to apply qualitative approaches;
- Investigate the potential of qualitative research in hard core quantitative logistics research areas; and
- Discover the major obstacles or motives for the a priori decision to apply the quantitative approach in logistics research.

As a closing remark we add that we did not intend to favour either of the approaches - quantitative or qualitative. Our aim was to appeal for the principle that the research problem is the primary basis for a decision as to what approach to use, and not the approach being the rule of what and how problems are looked at or investigated.

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APPENDIX 1

CHARACTERISTICS OF QUALITATIVE AND QUANTITATIVE RESEARCH

Quantitative Approach	Qualitative Approach
Advocates the use of quantitative methods	Advocates the use of qualitative methods
Logical-positivism, 'seeks the facts or causes of social phenomena with little regard for the subjective states of individuals'	Phenomonologism and verstehen: 'concerned with understanding human behaviour from the actor's own frame of reference'
Obtrusive and controlled measurement	Naturalistic and uncontrolled observation
Objective	Subjective
Removed from the data, the 'outsider' perspective	Close to the data, the 'insider' perspective
Ungrounded, verification-oriented, confirmatory, reductionist, inferential, and hypothetico-deductive	Grounded, discovery-oriented, exploratory, expansionist, descriptive, and inductive
More outcome-oriented	More process-oriented
Reliable, 'hard' and 'replicable' data	Valid, 'real' and 'deep' data
Generalizable, multiple case studies	Ungeneralizable, single case studies
Particularistic	Holistic
Assumes a stable reality	Assumes a dynamic reality

Sources: Adapted from and Reichardt and Cook (1979) and Deshpande (1983)

APPENDIX 2

EXAMPLES OF QUALITATIVE AND QUANTITATIVE MEASURES FOR LOGISTICS PERFORMANCE

Quantitative Measures	Qualitative Measures
Total distribution cost per unit	Degree of SCM coordination
Transportation cost per unit	Degree of cooperation
Warehousing cost per unit	Degree of conflict
Production cost per unit	Degree of domain consensus (role prescription and variation)
Costs associated with avoiding stockouts	Recognition of superordinate goals
Percent of stockout units	Degree of development of SCM leadership
Percent of obsolete inventories	Degree of functional duplication
Percent of bad debts	Degree of commitment to SCM
Customer service level by product, by market segment	Degree of power locus development
Accuracy of sales forecasts	Degree of flexibility in functional shiftability
Number of errors in order filling	Availability of information
Number of new markets entered	Assimilation of new technology
Percent sales volume in new markets entered	Innovation in distribution generated within the SCM
Percent of markdown volume	Extent of intra-brand competition
Number and percent of discontinued SCM intermediaries (distribution turnover)	Extent of routinization of SCM tasks
Number and percent of new distributors	Extent of use of optimal inventory standards
Percent of damaged merchandise	Relations with trade associations
Percent of astray shipments	Relations with consumer groups
Size of orders	
Ability to keep up with new technology-data transmission	
Percent of shipments	
Energy costs	
Number of customer complaints	

Source: Lambert and Stock (1993: 45)

APPENDIX 3

EXAMPLE OF SEMI–STRUCTURED INTERVIEW SCHEDULE

Preamble

Thank participant and assure confidentiality and anonymity.
Confirm recording for interviewer purposes only, instead of notes.
Review research to date and findings from pilot study.
Confirm nature of inquiry for this interview: discuss findings and probe customer service and satisfaction in more depth; and discuss supplier relationships.

Findings

How did you find the survey questionnaire? **[Show questionnaire, probe design, unclear concepts or questions]**
Were you surprised by the findings sent to you? **[Show findings, probe similarities and differences with their responses]**
Do they represent your firm's view?

Customer Service and Satisfaction

How do you define customer service? **[Probe for added-value, activities, performance measures, corporate philosophy]**
What factors are the most important for your firm when purchasing supplies? **[Probe for lowest level attributes as well as those in findings]**
How often do your priorities about these factors change? **[Probe seasonal, different suppliers]**
Do you consider price of supplies, product/product quality being supplied, and the customer service received from supplier as separate factors when selecting suppliers?
Is each of these factors equally important?
How do you define customer satisfaction? **[Probe for satisfaction as an output of customer service]**
Can a supplier let you down once of twice and still provide satisfaction for you?
How do you buy? **[Probe IT, webpage, number of people involved]**

Suppliers and Relationships

What are the most important qualities a supplier should possess? **[Probe honesty, ethics, dedication, and quality of service]**
What benefits do you receive from your suppliers? **[Probe for higher level benefits]**
How would you define a relationship with a supplier?
Do you have relationships with any of your suppliers? **[Probe how many, length of time]**
How did these "relationships" come about or develop? **[Probe who initiated]**
What are the most important factors for a successful "relationship"? **[Probe mutual benefits, power, reduced costs, trust, commitment]**
What are your company values? **[Probe for highest level values]**
Do any of your suppliers share them? **[Probe for those with whom they have relationships]**

Closure

Have I missed anything, do they have any other comments?
Thank participant and offer a copy of findings from the next phase.

Source: Authors