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**Logistics Service Innovation Management -
Evidence from Two Longitudinal Case Studies at Deutsche Post**

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**Logistics Service Innovation Management -
Evidence from Two Longitudinal Case Studies at Deutsche Post**

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ABSTRACT

This study aims at exploring ways to better manage organisational development and change in practice. For project managers like myself it is important to gain a solid understanding about the drivers or inhibitors in these developments and change processes. I was particularly interested in those development and change processes aimed at the achievement or maintenance of competitive advantage within an industry. One way of achieving or maintaining competitive advantage may be based on serving the customer's strategic needs through innovation (Chapman et. al., 2003).

Various process models propose how service innovation projects in general should be managed. However, large and mature organisations in particular may encounter difficulties in their implementation (Dougherty and Hardy, 1996). From a practitioner's point of view, this is an especially dire situation as service innovations, particularly those driven by strategic intent, are under great pressure from decision-makers to succeed. Along these lines Dougherty (1996) suggests a shift of focus, to a focus on the fact that innovation activities have inherent 'tensions'. She defines 'tensions' as challenges that have to be dealt with during an innovation project.

Drawing on the evidence of three sequential projects conducted at DHL Express, the parcel branch of Deutsche Post, I tried to investigate the nature of service innovations and their inherent tensions.

By longitudinally tracking the activities and their inherent tension's life cycle in an exploratory case study, I tried to get a better understanding of how tensions appear in innovation projects, as well as the dynamics of these tensions. The evidence of this first case study was used to theorise about an optimised sequence of activities, as well as first propositions about how tensions might be managed. The first set of propositions derived from the exploratory case was then given a trial in a second longitudinal case study.

The activities of the first logistics service innovation project included a major 'information engineering' component. According to Davenport (1993) 'information engineering' deals with description of an already conceptualised process in informational terms, such that a system can be rapidly and rigorously constructed to support the new process design. Hence, the set of activities proposed in this study include the capability to include an information system component as a service innovation deliverable; a capability long recognised to be essential for exhorting positive influences on the operation of logistics systems (Kent, 1996).

This research was conducted in the context of a number of unusual opportunities. First and foremost, both case studies had similar stakeholders and objectives. Secondly, all stakeholders contributing to the first case study were willing and able to collaboratively contribute to improvements in the management of activities and their inherent tensions. Finally, all inquiry participants then implemented those propositions into the following case study for inspection.

Based on the evidence of the second case study, I show how managing activities and tensions with congenerous dedication exploited all four tensions to improve the probability of innovation projects to deliver.

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PART I: RESEARCH OVERVIEW AND CONTRIBUTION

1 Introduction

It is proposed that strategy-led innovation should lead to fundamental changes in the way that a business competes (Markides, 1998). For example, companies may choose to innovate in order to develop an existing business (Mang, 2000), or to search for new opportunities in market positioning. Das and Van de Ven (2000) propose that innovation can be used to implement strategy and to compete through innovation activity outputs. Their focus was on new technologies development.

Given this idea of innovation activities as strategy implementation, one might expect that failing to innovate would be connected to the failure of a strategic component. In such a context the 'operational detail and tactical adjustments' (Pellegrinelli and Bowman, 1994) of the innovation activity gain a strategic dimension. Success of such an innovation activity may therefore enjoy the undivided attention of the related board member, in this case the chief production officer of DHL Express Germany.

A number of models propose how service innovation projects should be managed (Wilhelmsson and Edvardsson, 1994; Donnelly et. al., 1985; Johnson et al., 1986; Bowers, 1986; Scheuing and Johnson, 1989). However, the lack of a consistent record of success in service innovations projects in practice suggests that further aspects may lead to the failure of innovation activities (Dougherty, 1996).

Several authors (e.g Minkes and Foxall, 1980, or Dougherty and Hardy, 1996) voice the concern that large and complex organisation like Deutsche Post may encounter difficulties in operationalisation of 'technical, production or commercial steps necessary to transform a new idea or innovation into a marketable product or process' (Rothwell, 1973). Dougherty and Hardy take more than 96 years of age, more than 54,000 employees, and more than $ 9,4 billion as parameters for the terms 'large and mature'. Deutsche Post may be perceived as a large and mature organisation. Being founded in 1490[2] and having, according to its investors relations fact file[3] for December 31st, 2003 a workforce of 383,173, as well as a turnover of over € 40 billion Euro, all three criteria proposed by Dougherty and Hardy are fulfilled. This poses the question of what can be done to improve the likelihood of an innovation activity to generate stable and desired outputs.

I tried to address this set of problems within the management of innovation processes by theorising from a longitudinal exploratory case study at Deutsche Post. The findings of that study were used to collaboratively devise an optimised process model, rearranging the sequence of activities as well as ways of proactively managing tensions inherent to the optimised sequence of innovation activities. In a second longitudinal case study all propositions theorised from Project One were then exposed in an action research project. The exploratory case study aimed at understanding the nature of tensions and their life cycles. The action research project then aimed at testing propositions made, as

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[2] http://www.dpwn.de/dpwn?check=yes&lang=de_DE&xmlFile=300000002
[3] http://investors.dpwn.de/de/ueber_dpwn/aktuelle_kennzahlen.html

well as analysing potential changes in the occurrence of tensions or lifecycles if proactively managed.

As project manager and researcher I had detailed operational access to the people and processes involved at each stage of both innovation projects at DHL Express Germany, the parcel logistics branch of Deutsche Post. In this context I was able to study Deutsche Post's efforts to innovate in the area of loss prevention between 2001 and 2005. This included all efforts undertaken in the 'translation of strategy into action' (Pellegrinelli and Bowman, 1994). Innovation in the area of loss prevention was therefore used to analyse 'the enabling and constraining influences of various features of the inner and outer contexts of the firm upon the content and process of strategy development'. I would like to emphasise that strategic intent is the impetus of the innovation effort and hence, forms the context of the innovation. This implies that failure of this effort includes the failure to gain competitive advantage at a strategic level.

Based on the findings twelve propositions were articulated on how innovation activities and their inherent tensions could be managed in logistics service innovation projects in order to make such projects less turbulent.

The research is presented in four chapters, the first being a linking document forming the thesis. Chapters Two to Four contain the results of the exploratory case study, the results of all theorising activities, as well as the final case study.

1.1   *The impetus for this research*

As a practitioner I have been involved in innovation projects since 1994. In those eleven years I have seen many good innovations die because those executing such innovations, including myself, struggled in the analysis, formulation and/or implementation of innovation processes.

In 1994, when I was head of accounting, I discovered that the productivity of my department was one of the lowest in Germany. I found out that the quality of the accounting documents which we processed into our accounting system was next to miserable. Following this discovery I used our national suggestion scheme to launch the development of a software to be given to our debtors for processing the accounting documents. Even though the software[4] was a success, it took three years to get accepted in the suggestion scheme and had to be renamed to EASYLOG, standing for easy logistics, which was then outsourced to a development company. During this process various consultants earned a fortune in consulting the head office in this matter. Looking back, one might get the impression that the full potential of most innovation projects I was involved in were not unleashed. Furthermore, there was a failure to develop internal staff with the necessary skills to manage innovation initiatives like SEBULI, which this DBA has achieved as a side effect.

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[4] The software was called SEBULI for 'Selbstbucherlisten-Management-System' which can be translated as 'debtors' bookkeeping management system'.

As an academic I have always tried to enhance my managerial skills, especially those related to strategy, and to implement innovations. During my studies at the Federal College for Public Administration we were taught to work according to rules and procedures, ensuring that the Post Office worked as a 'well oiled machine'. The rules and procedures did not cover most of the questions I had at that time. After growing frustration, I started an executive MBA which was said to be the state-of-the-art education for managers. During the three years at the Open University Business School I even enrolled on a course called 'Creativity, Innovation and Change'[5]. Even though it was very helpful and provided a solid overview of innovation management, it still left gaps, and did not address many of the questions I had. I discovered that innovation management in terms of implementation in the field of logistics was not covered as a body of knowledge in itself. With most of the tools offered in the literature of adjacent fields like product, process or service innovation, none had been explicitly tested in a logistics environment.

With the area of my work being rarely penetrated by other scholars, and being driven by an intrinsic motivation to be able to complete any given task, I wanted to find out how to achieve better innovation activity results in terms of a process, as well as managing it.

Based on this background I started this self-funded research. I would like to emphasise that this research was not funded or hindered by the relevant executives at Deutsche Post. However, I was given total freedom to choose my research projects, as well as the freedom to approach the staff involved in this matter. The neutrality of Deutsche Post about this research included not influencing the choice of the research domain or any of its outcomes.

Undertaking this research thus satisfied my curiosity about the subject and exposed me to the challenge of completing a programme like the Cranfield DBA, especially with English not being my mother tongue.

Finally, it was my ambition to gain the highest level of education available in the field. The aim of this was learning and researching for the sake of the person I became in the course of events by gaining new skills and related recognition as a practitioner and academic.

1.2 Research question and research focus

It has been recognised that the interaction and communication between managers and coalitions of managers is perhaps the most significant informal process within most organisations (Workman, 1993). Noble (1999) proposes that research in this area should explicate some of the major reasons for failure of implementation efforts in relation to the Workman proposition.

Minkes and Foxall (1980) identify the complexity of 'interlocking individuals, groups and departments' as one source of problems in large and mature organisations. This takes us to the focus of this research, as one potential candidate for service innovation project failure might be found in the mismanagement of 'tensions'. Dougherty (1996)

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[5] Cf. http://www3.open.ac.uk/courses/bin/p12.dll?C02B822

proposes that innovation activities have inherent tensions. Tensions relate to challenges that have to be dealt with during an innovation project. Hence innovators may need to manage tensions in order to overcome the negative effects of such tensions, enhance their positive effects, or restore the balance between tensions at each stage of an innovation project in order to improve the achievement of project cost, schedule and technical objectives.

By tracking the origins and life cycle of tensions as they arose in an innovation project in practice, I sought to better understand the nature of tensions and to gain insights into how they could be managed. In the course of an innovation project different constellations of stakeholders contribute during a given phase. Within a given process and its phases, activities and tasks (Harrison, 1998), these activities and their inherent tensions occur in a given sequence. Hence innovators may not only have to manage the process, they also may have to draw on 'tension management' for overcoming tensions or restoring balance to tensions in each phase to ensure the success of an innovation activity.

This study tries to contribute to this field with the humble attempt to answer one single research question:

What tensions are experienced in the defined stages of the current innovation process at DHL Express?

This research question was the trigger of Project One. It aimed to be a first attempt to understand how tensions appear in practice, and their potential life cycle (Chapter Two). In the course of this study I started to theorise about their nature (Chapter Three) and to think about a more proactive approach than that taken in Project One. Finally, I started to collect potential indicators about differences between proactive and less proactive management of tensions (Chapter Four).

2   Theoretical background

2.1   *Mapping the field*

The research context in which this research was carried out draws on three major domains, namely logistics, strategic management and the management of innovation.

Logistics as a domain forms the context in which the organisation under research, Deutsche Post, operates. Innovation management as a domain informs the activity under research, being the development of a new logistics service. The final domain, strategic management, forms the context of the trigger of each of the innovation initiatives forming the case studies in this doctorate.

In this first section the domains of logistics, innovation management and strategic management are specified in two further steps. Firstly, the relevant overlap of the domains informing this research are defined. Finally, as a forth implicit circle, the inclusion of information system development is included.

During this study, originally driven by the strategic underpinning of the innovation activity, the dimension of the emerging imperative of having to include an information system development component had to be ensured. This was mirrored by exchanging Dr. David Partington as a project management panel representative. David was succeeded by Dr. Chris Hemingway from the Information Systems research group at Cranfield.

2.2   *Logistics*

The term logistics in this research is used to describe the management of materials, services[6], information[7] and capital flows[8] enabling a sender to send an item or service to a recipient. This working definition is provided as the term 'logistics' has not yet been determined and is still under discussion (Pfohl, 1999). The overlap of available definitions (Jünemann, 1989; Vahrenkamp, 1998; Gattorna, 1999; Pfohl, 1999; Harrison and van Hoek, 2002 and Council of Supply Chain Management Professionals, 2005[9]) includes either the optimisation or provision of flows of goods, material and information flows. None of them acknowledge monetary flows, which can be part of logistics services as in a cash on delivery parcel. Furthermore, all lack the speciality of logistics services in which the sender is the customer of the logistics service provider.

Logistics may be clustered into corporate logistics (Pfohl, 2000), postal logistics (Niegel, 1987), health care logistics (Ehrmann, 1999) and military logistics (North Atlantic Treaty Organisation, 1995), of which all but healthcare are proposed to fan out into sub categories, which are now epitomised in turn.

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[6] E.g. literature for the blind services transporting letters in Braille.

[7] E.g. tracking and tracing information.

[8] E.g. capital flows from recipients to senders like in a cash on delivery parcel or to third parties like in taxes or customs.

[9] Cf. http://www.cscmp.org/Website/AboutCSCMP/Definitions/Definitions.asp

Concerning corporate logistics, five sub-clusters can be found (Pfohl, 2000), namely procurement logistics, production logistics, distribution logistics and disposal or reverse logistics.

Deducted from Niegel (1987), postal logistics may include the transfer of goods and news under established national and international regulatory standards of dependability and security[10]. Such regulatory standards may include an infrastructural mission, which can also be shielded by a monopoly.

Military logistics may be divided into four subgroups concerning materials, troops, services and medical logistics (North Atlantic Treaty Organisation, 1995). Other less precise sources (Gerber, 1977; Krulis-Randa, 1977; Kapoun, 1981 and Idhe, 1991) summarise all activities 'supporting' armed forces as logistics, which differs from the current NATO logistics doctrine (1990). For this research the label 'military logistics' is used as proposed in the NATO glossary of terms and definitions.

Both military logistics and postal logistics may have, depending on the circumstances, aspects of procurement logistics, production logistics, distribution logistics and disposal or reverse logistics.

2.2.1   Logistics processes

Pfohl (2000) defines three types of logistics processes, namely core processes (transport processes, stock turn processes and warehousing processes), support processes (packaging and coding) and information flows (order placement and order execution). Opposed to the process level, a logistics service is the perceived performance of a logistics service provider's processes in terms of lead time, reliability, flexibility and quality (Schake, 2000).

2.2.2   Logistics services and logistics service providers

A logistics service provider is an organisation offering any sender the facility to send a letter, packet, parcel or service within the sending nation's product and service portfolio to any national or international recipient.

Logistics services are provided to the recipient in the expectation that they will be conveyed according to certain established national and international regulatory standards of dependability and security. Logistics services may include related flows of information and money.

2.2.3   Loss prevention in logistics[11]

Within logistics settings, logistics service providers may have to rely upon specialists taking care of loss prevention. 'Loss prevention' here aims at ensuring that senders comply with the general standard terms and conditions of the logistics service provider organisation, as well as paying the agreed price for the used logistics service. The other main area of concern is after sales activities. Currently it is possible to combine services

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[10] Examples of such regulatory standards are § 5 PostG, §§ 10, 11 FAG and Article 10 GG.
[11] The numbers and content are extracts from the executive summary in the project requirement statement for ESi DHL Express V 2.0 and are included by kind permission of the specialised department.

in such a way that over 44,000 different service features can be used. Considering the vast amount of logistics services that Deutsche Post has to offer, it is easy to understand that new customers in particular, are overwhelmed by the number of choices. Hence, loss prevention officers try to ensure a smooth start by giving them extended after sales support.

Loss prevention is a limited problem in relation to private-to-private logistics. Those items and services enter Deutsche Post's systems in retail outlets. Post officers in retail outlets process parcels individually. Within this processing activity service features, like weight, volume and extras are determined.

Enforcing loss prevention is an issue in high volume business-to-private or business-to-business logistics. Here senders get discounts for carrying out preparations for Deutsche Post by determining the weight, volume and extras of an item or service. Those preparations are regularly audited. Loss prevention officers audit more than 500,000 parcels out of the roughly 700,000,000 parcels per annum nationwide. This may be perceived as a low quote. Yet those audits mostly include 'black sheep', which are easily spotted. Those customers are audited as long as is necessary to enforce compliance with general standard terms and conditions or their contract is terminated.

2.3   Innovation management

Three separate themes have been identified for the management of innovation (Tidd, 1997):
1. the management of research and development of new technology,
2. new product development and marketing and
3. organisational development and change.

While 'research on the management of innovation has been highly fragmented, and non-cumulative', (Tidd, 1997) this research approaches the third of these themes, which addresses the organisational learning aspect of innovation from a logistician's point of view. Thus, this doctorate is positioned within the fields of strategic management, innovation management and logistics. This is congruent with the definition of an innovation process as 'the temporal sequence of events that occurs as people interact with others to develop and implement their innovation ideas within an institutional context' (Van de Ven et al., 2000). The implementation of innovation ideas has been proposed to be a strategic imperative in general (Tidd, Bessant, and Pavitt, 2001) as well as for logistics service providers in particular (Christopher, 1998). This view is supported by evidence of the ability of logisticians to provide substantial savings in cost while also improving service levels to end customers by co-ordinating and innovating logistics operations across international supply chains (Lieb and Randall, 1996; van Hoek, 2001).

Within this innovation context this study explores innovation with the example of loss prevention in logistics settings. Taking the 44,000 different types of logistics services possible it is a very complex environment in which to innovate. This number has to be reflected in appropriate auditing processes. Furthermore, it needs to enable relevant information processing with internal systems as well as the outside world.

Loss prevention in practice has a broad range. It may include fining a sender who has tied two exhausts pipes together, attached a label to one of them and tried to send it as a two kilo parcel. On the other hand, it may also include refunding customers who overpaid parcels just to be on the safe side. These two examples are not meant as 'war stories', but rather show that the range of processes is far from trivial, if they have to be watertight, should a sender take action for the annulment of a fine. In rare cases senders have recourse to law, ending in court.

One may further argue that depending on the launch frequency of new products or services, as well as the 'creativity' of senders in their attempts to save money, loss prevention is executed in a highly dynamic environment.

2.4   Strategic management

Welge and Al-Laham (1999) distinguish two distinct schools of strategy into which corporate strategy falls, having been spawned from military strategy. One, as defined by Chandler (1962), is 'the determination of the basic long-term goals and objectives of an enterprise, and the adoption of courses of action and the allocation of resources necessary for carrying out these goals'. The other school critiques the implicit premises of rationality in relation to strategic processes (Mintzberg, 1973; 1978; 1988 a, b; 1989; 1990 a, b; 1991 a, b, c; 1994 a, b, c; Mintzberg et. al, 1998; Mintzberg and Westley, 1992; Mintzberg and Waters, 1985; Mintzberg and Waters, 1990; Quinn, et al., 1988, Mintzberg et. al., 1976). Mintzberg expands this type of intended strategies with the possibilities of emergent strategies (Mintzberg, 1978). In cases of emergent strategies, once a chosen route is modified it develops an emergent character. This research is best matched by Mintzberg's notion of positioning, in which the competitive position may be both determined or emergent.

Corporate strategy may, as proposed by Ghemawat (1991), draw on three potential areas in which the company can outperform competitors, namely innovation, production and marketing. The role of innovation as a driver is highlighted by Johnson and Scholes (1999). They suggest that management of innovation is a strategic imperative as 'whatever strategic directions of development are being pursued, the organisation must have high levels of competence in the management of innovation'.

This research focuses on how this may be achieved by innovation by 'organic development'. This label is used by Johnson and Scholes (1999) in relation to An organisation building up its own resource base and competences. Organic growth has to be achieved through effective implementation, as without effective implementation, the best laid strategies are of little use (Grant, 1998). At DHL Express Germany innovations are managed as a programme. On their official website the UK Office of Government Commerce provides the following definition of Programme Management[12]:

> *Programme Management is a structured framework for defining and implementing change within an organisation. It provides a framework for implementing business strategies and initiatives through the coordinated management of a portfolio of projects that change organisations to achieve benefits that are of strategic importance.*

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[12] Cf. http://www.ogc.gov.uk/sdtoolkit/reference/deliverylifecycle/impplans/prog_mgmt.html#b41

The underlying process of programme management proposed by the UK Office of Government Commerce mirrors the activities undertaken in both case studies.

The strategic significance of loss prevention relates to loss prevention performance directly affecting the net income of the organisation.

Both projects in this study (cf. Chapters Two and Four) enabled Deutsche Post to raise its loss prevention accuracy by more the one and a half million Euro above business case. This raised the loss prevention income into a significant eight digit number.

2.5   Domain overlap

All three domains have intersections which inform this research. There seems to be a lot of consensus that logistics has evolved to be a source of competitive advantage (Porter, 1985; Achrol, 1991; Day, 1994; Stalk et. al., 1992). This competitive advantage relates to serving customers' strategic needs through innovation (Chapman et. al., 2003). This can be achieved through organic development (Johnson and Scholes, 1999). In a logistics context this relates to service innovations, which may be implemented in programmes. The interrelation is summarised in Figure One.
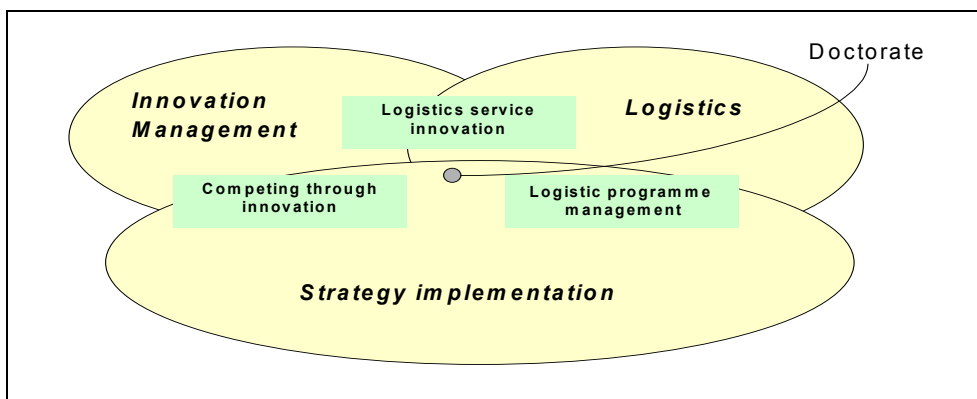
Figure 1: Mapping the field of research

2.5.1   Logistics service innovation

The label logistics service innovation is used in this research to denote the conceptualisation, development, operationalisation, manufacturing, launch and ongoing management activities (Cooper, 1983) of new logistics processes and their perceived service output towards senders, recipients or both.

Innovation means change (Titt et. al., 2002). One may assume that this change is rationalistically driven in achievement of a goal. Such change can be incremental or radical, evolutionary, enabling or disruptive (Pearson, 1991).

Such changes can be found in various forms in logistics settings, even though they are rarely labelled as innovations. Some are labelled 'new logistics concepts', like Just-in-Time, Quick-Response-Systems and Efficient Consumer Response (Pfohl, 1997). Then there is a stream in which logistics is improved by the application of algorithms (Bramel and Simchi-Levi, 1997). Rare cases do illustrate how logistics innovation has helped the

overall performance of companies (Dell, 1999; Womack, Jones, Roos, and Sammons, 1990).

More recent publications, of which only Chapman uses the label innovation in relation to logistics, focus on innovation through information technology (Schake, 2000; Harrison and van Hoek, 2002; Chapman et. al., 2003).

None of the reviewed sources provided process models for logistics innovations, let alone cover the tensions involved. Even the literature on service innovation as a whole in the area on implementing innovations is very limited (Johne and Storey, 1997 and Küpper, 2001).

2.5.2 Logistics programme management

The term 'implementation' is used in relation to all 'managerial interventions that align organisational action with strategic intension' (Floyd and Woolridge, 1992). At DHL Express Germany most initiatives, due to the inherent inclusion of an information system component, are managed by the information system programme management. In our case, this is the production programme management.

The programme manager is in charge of coordinating all projects in his area of responsibility. In the time of writing the production programme manager was in charge of over thirty projects. This approach is proposed to be able to operationalise strategy by creating a framework for the strategy implementation process and making project definition more systematic and objective (Pellegrinelli and Bowman, 1994). They argue that creating a framework for strategy implementation ensures that critical elements are identified and that a complete set of actions is specified and assigned without crucial interfaces being overlooked. Additionally, this is approach is proposed to be more systematic as having a higher degree of objectiveness enabling a reduction of the prevalence of long duration projects having a higher risk off failure or obsolescence. This is proposed to enable an organisation to replace long term projects with shorter sequential projects defined and managed within the project framework.

This concept of implementing strategy through projects has gained recognition and appreciation (e.g. Buchanan and Boddy, 1992).

2.5.3 Competing through innovation

In the previous two decades scholars have criticised companies for lacking strategic focus in relation to new service development. This is especially so since research suggests that companies in the service sector, using structured programme approaches, outperformed their competitors (Reidenbach and Moak, 1986; Johne and Harborne, 1985; Johne and Pavlidis, 1996).

This poses the question of how service companies, using structured approache,s may overcome inhibitors as successful innovations have been recognised as a source of competitive advantage. Two examples have already been discussed above (Dell, 1999 and Womack et. al., 1990).

Furthermore, there is a high degree of consensus that outperforming competitors through innovations may have noticeable benefits. Firstly, satisfied customers are willing to pay a price premium (Reicheld and Sasser, 1990). Secondly, satisfied customers will make repeat purchases (Grönroos, 1990). Finally, proven innovators may find their customer base more inclined to use radical innovations (MacMillan and McCaffrey, 1984).

3 IS development in logistics innovations

At this point I would like to highlight the treatment of information engineering. As many authors such as Davenport (1993) suggest that the use of new information technology is almost always part of innovation processes in logistics settings, soft- and hardware development is included as a natural part of an innovation process, as opposed to a standalone domain of knowledge.

3.1 Information engineering

The goal of information engineering, according to Davenport (1993) is to describe an already conceptualised process in informational terms such that a system can be rapidly and rigorously constructed to support the new process design. This approach is an imperative, with services being processes by nature (Johne and Storey, 1997).

The descriptions proposed by Davenport are called system specifications. Sommerville (2000) defines three levels of specification; a requirements definition, a requirements specification and a software specification. The three levels of specifications are the outputs of the first three phases of the V-Model.

The requirements definition is a statement, in natural language, of what user services the system is expected to provide. This should be written so that it is understandable by client contractor management and by potential system procurers and users. The requirements definition was labelled performance specification in Project One.

The second level of specification, a requirements specification, sets out the system in more detail. This document should be precise so it can act as a contract between the systems procurer and the software developer. This document was the technical specification in Project One.

Finally, a software specification is an abstract description of the software, and is the basis for its design and implementation.

3.2 IT as an enabler of process innovation

Subsequent to the process innovation, in which a future logistics process is designed, various products, especially related information systems, may have to be developed. Specific to logistics are generic applications which may include location systems, recognition systems, asset management systems, logistical planning systems, as well as telemetry systems (Davenport, 1993). More recent publications highlight the need of the logistics service providers to have transparent processes and to be linked to senders through IT interfaces (Pfohl, 1997; Christopher, 1998; Schake, 2000; van Hoek, 2001; Harrison and van Hoek, 2002; Chapman et. al., 2002).

This implies that a logistics innovation may have to include an information systems development methodology. Avison and Fitzgerald (2003) define such a methodology as a collection of procedures, techniques, tools, and documentation aids, which will help the systems developers in their efforts to implement a new information system. A methodology will consist of phases, themselves consisting of 'sub phases', which will

guide the system developers in their choice of the techniques that might be appropriate at each stage of the project, and also help them to plan, manage, control, and evaluate information systems projects. Even though Avison and Fitzgerald use the term 'sub phases', Harrison's definition of a process is used (Harrison, 1998), hence the term 'sub phases' will be used synonymously with an activity within a phase.

In his methodology overview on software engineering, Balzert (1998) introduces eight process models. Of all innovation activities only two are document driven, namely the Waterfall model (Bennington, 1956; Royce, 1987) and its advanced version, the so-called 'V-Model' (Boehm, 1981; Boehm, 1984). The V-Model is an advanced version of the Waterfall model, which includes verification and validation (Balzert, 1998). 'V-Model' is the abbreviation of 'Vorgehensmodell', meaning 'procedural model'. Verification is defined as a test of conformance of the product to its specification. Validation is suggested to be a test of the of operational readiness of an application.
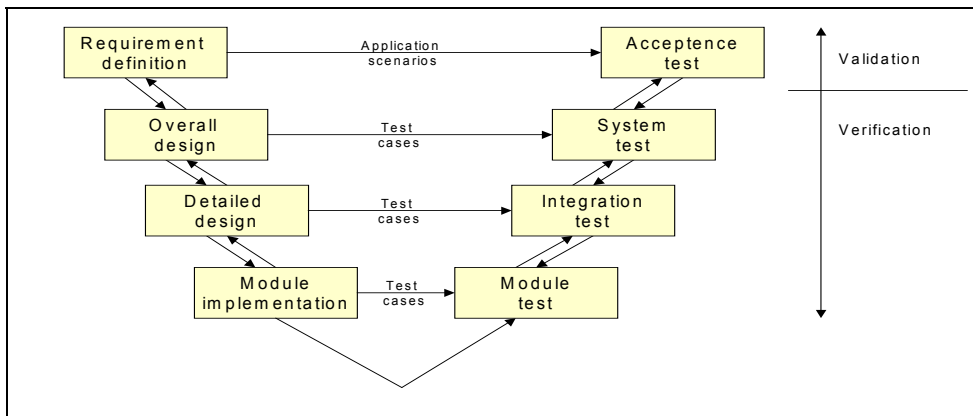
Figure 2: The 'V-Model'

In their original form they only aim at low involvement of end users (Balzert, 1998). With the need to transfer requirements into code the V-Model was chosen as a standard model at Deutsche Post IT Solutions. The view that this structural approach makes large software projects more manageable is also supported by Kan (2002).

A development process has to address requirements quality (Kan, 2002). Quality has two aspects; 'conformance to requirements' (Crosby, 1979) and 'fitness for use' (Juran and Gryna, 1970). Kan (2002) concludes that the two definitions are related and consistent. 'Conformance to requirements' implies that requirements must be clearly stated such that they cannot be misunderstood. Then, in the development and production process, measurements are taken regularly to determine conformance to those requirements. The definition 'fitness for use' takes customers' requirements and expectations into account, which involves whether the products or services fit their users.

Within a logistics innovation setting the service or process innovation and the product innovation, including a software application, are two separate developments, and their combined fitness for use should be tested in a field test in addition to internal software testing by developers.

3.3 *Joint logistics innovation development*

Originally the label 'joint application development' or 'joint application design' related to a facilitated meeting designed to overcome the problems of traditional requirements, in particular interviewing users (Avison and Fitzgerald, 2003).

As a spin-off of this basic idea 'joint innovation development' aims at the longitudinal involvement of relevant stakeholders managing the requirements of a logistics process and related product and application developments. As well as in a joint application development meeting, the proposed characteristics of an intensive meeting of business users (managers and end users) and information systems people, of a defined length, and using a structured meeting room, a facilitator and a note-taker are given (Avison and Fitzgerald, 2003). The longitudinal aspect of the meetings is twofold. Firstly, stakeholders may or may not be present depending on the issue or phase. The preliminary stance towards the term 'stakeholders' used in this paper is based on the definition used by Introna and Pouloudi (1999). They highlight two aspects. On the one hand, 'stakeholders are persons or groups with legitimate interests in the procedural and/or substantive aspects of the domain of concern. On the other hand, they stress that 'the ability, or influence, of the different stakeholders is unequal and the weaker should not be submerged by the stronger'.

This view, especially the second one, recommends that in the model building phase of Project Two of the Cranfield DBA stakeholders get an equal voice in the collaborative investigation as well as in the ability to shape aspects of the research outcome.

The 'core' constellation included a representative of the specialised department, representatives of the development unit at Deutsche Post IT Solutions and the IS programme manager of the corporate IT unit. Secondly, the meetings were held on a monthly basis at minimum and were called 'jour fixe'. Avison and Fitzgerald call this human-orientated approach 'consensus participation'.

4   The innovation process and its inherent tensions

Many service providers use a project team approach and employ project champions (Johne and Storey, 1997). This is suggested to be important in pushing a project through the development process (Dover, 1987). It is furthermore recommended that the service development is not dominated by a single party and should be truly cross-functional (Langeard et. al., 1986; Johne and Harborne, 1985; Johne and Pavlidis, 1996).

If, as given in this research, a democratic consensus-seeking development community starts a joint journey, one might still expect various other inhibitors on the way. Dougherty (1996) recommends focusing on the tensions underlying activities of the product innovation process. An innovation process may be defined as the temporal sequence of events that occurs as people interact with others to develop and implement their innovation ideas within an institutional context (Van de Ven, Angle and Poole, 2000).

This structure suggests that due to their function, process stakeholders like senior managers or works councils constantly evaluating and monitoring an innovation identify 'determined versus emergent' tensions at a time at which several other stakeholders with the task of carrying out market-technology linking activities struggle with unbalanced 'outside versus inside' issues.

The idea of tensions in management process as a whole is addressed by Huxham and Beech (2003). They frame the term in relation to tensions between apparently contradictory pieces of good practice advice. This view articulates one major feature of tensions. In two-pole tensions, like high speed of hardware and desired low costs on the other side, tensions are about mediating and optimising outputs towards both poles. The inherence of tensions, as descirbed by Huxham and Beech, is proposed to be a characteristic of inter-organisational situations (e.g. Eden and Huxham 2001; Huxham 1993a, 1993b; Huxham and Vangen 1996, 200s that Huxham and Beech draw is that collaborative arrangements are inherently difficult to manage and tend towards a state of collaborative inertia in which the rate of output seems slow, and even successful outcomes are achieved only after much pain or hard grind.

Drawing on Harrison (1998) the innovation process can be split up into activities, tasks and functions or steps which may lead to a given result. This suggests a hierarchical structure. A process step may consist of several related activities. An activity may be based on related tasks and functions. Steps are coherent clusters of activities undertaken in pursuit of a distinct milestone, like a performance specification.
Tasks are parts of an activity, like providing certain pieces of specialist information, within a specification. Functions are predefined roles within my organisation, like a specialised department or an IS programme management unit. This also adds further complexity to tensions.

Within this research innovation process, the underlying project 'ESi DHL Express' in its releases 1.0 (November 2003) and 2.0 (November 2004) were analysed.

The idea of tensions being a inherent component of innovation activities was first raised by Dougherty (1996). She proposes 'tensions' to be the challenges iterating between diverse activities, working around barriers, combining insights and resolving conflicts of seemingly opposing forces. Opposed to this definition Huxham and Beech (2003) propose 'tensions' to be 'apparently contradictory pieces of good practice advice'. As Huxham and Beech demarcate their research from existing definitions, the term tension in this research is used as proposed by Dougherty.

Dougherty describes four generic innovation activities with an inherent tension related to each activity. She states that these four tensions are not exclusive.

Activity	Definition	Tension
Market-technology linking	Conceptualising the product to integrate market needs and technological potential	Outside versus inside
Organising for creative problem solving	Organising the process in order to accommodate creative problem solving	New versus old
Evaluating and monitoring innovation	Evaluating and monitoring the innovation process	Determend versus emergent
Developing commitment to innovation	Developing commitment to the effort	Freedom versus responsibility

Figure 3: Overview of Dougherty's four generic tensions

Each activity has a related tension, which must be managed if the activity is meant to be enabled by better management towards an innovation project's objectives. Dougherty (1996) points out that 'research suggests that people have developed ways to handle these tensions effectively at project level, but not at organisational level'. However, taking into account the absent consistent success record of innovation projects in my organisation, this has to be analysed in detail.

A new product is defined as a package of features and benefits, each of which must be conceived, articulated, designed, and 'operationalized', or brought into existence (Burgleman, 1983)**,** known as market-technology linking (Bacon et al., 1994). These activities 'embody a tension between outside (market) and inside (the firm's operations and technology)'. The tension arises from the need to manage the multiple market-technology linkages that develop in different resources around the organisation, and the need to manage the innovation processes efficiently within the firm.

The definition of organising for creative problem solving given by Dougherty (1996) is based on the fact that during the innovation process it is inevitable that 'innovators solve complex problems to overcome surprises, work around barriers, merge processes

from different functions, and weave together resources from different locations'. This leads to 'tensions between the old and the new'. A new product may require new supplier relationships, new distribution systems and new merchandising – 'all of which may conflict with existing procedures designed for old products/[services]'.

Innovation activities need to be evaluated throughout the innovation process as they demand severe inputs with no sure payoff (Dougherty, 1996). Additionally she points out that evaluation requires multidisciplinary team work, because innovators must rely on one another to assess progress (Dougherty, 1996). The tension is between 'strategic emergence' and 'strategic determination'. 'If new products are forced to conform to top-down plans, they would not address new opportunities. But if the organisation relied strictly on bottom-up emergence, its innovations would not build on one another' (Day, 1990).

This progress is achieved at three levels. Monitoring stakeholders will per se constantly monitor and evaluate the process. On the innovation execution level the 'supreme' project manager will jointly and actively control and evaluate the process innovation with the specialised department. The IT solutions provider is excluded. After the hand-over and transfer of authority to the to the corporate IT unit the steering committee, led by the corporate IT unit, executes joint control and evaluation with the specialised department and the IT solutions provider.

This practise is supported by Brown and Duguid (1991). They suggest that a multi-functional 'community of practise' jointly selects possible courses of action and judges progress. At the strategic level, on occasion the board of directors implicitly or explicitly evaluates and monitors the current portfolio of projects.

The final generic tension is about the effects derived from how team members execute their responsibilities, varying over team members and over time (Dougherty, 1996). Innovation requires deeper commitment than regular work because 'the boundaries of responsibility must be broader and more inclusive in the rapidly changing, ambiguous conditions of innovation'. Commitment to innovation 'embodies the tension between freedom and responsibility, which is one of the most challenging tradeoffs'. Large organisations emphasise responsibility over freedom because accountability is 'defined in precise, legalistic ways'. Innovation is often 'not legitimate within the organisation'. She argues that an interdisciplinary team provides a comfortable sense of accountability and commitment for participants, because innovators share the work with others who can be trusted to do their part (Dougherty and Corse, 1995). Whenever a tension was coded towards this fourth generic tension, the latter argument was perceived as not being apparent.

Context specific activities and related inherent tensions are activities and tensions related to the German work council system, which are not covered in a model with Anglo-Saxon roots. All innovations at Deutsche Post are subject to the work council's co-determination rights (Deutsche Post, 2002). That means that an innovation faces a work council right to give its consent to certain matters of the innovation in question.

Within the logic of the Dougherty framework (Dougherty, 1996) all works council related activities were coded as 'developing commitment to innovation' activities as they aimed at legitimising the innovation by inclusion of the organisation's work force. Hence works council related tensions are 'freedom versus responsibility' tensions.

5 Methodology

5.1 Research paradigm

As a researcher has to understand the ontological, epistemological, and methodological assumptions underlying research paradigms (Guba, 1990), this chapter focuses on how ontological assumptions and epistemological positioning were used in this research and informed the chosen research philosophy.

I would like to highlight the word chosen in the last sentence. I do not believe that one research paradigm is superior to the other, yet depending on the research undertaken certain designs will work and others will not. This view is supported by Easterby-Smith, et al. (1991). The intra-paradigm analysis is based on the work of Denzin and Lincoln (1998) and quotes pages 204 to 220 as appropriate. The research philosophy proposed in this chapter overarches all three projects, yet each project has a separate methodology section in which the operationalisation of the project relevant research strategy is presented in detail.

5.1.1 Ontological assumptions and epistemological positioning

The preferred route of my research had to be chosen in light of the tenet that reality can only be grasped imperfectly. This was compensated for by subjecting this research to the widest possible critical examination to facilitate apprehending reality as closely as possible. This was operationalised by ensuring that this study was reviewed by all stakeholders to compare my interpretations with theirs. However, I still have to acknowledge that this is never perfectly achievable. This position may be labelled 'critical realism' (Cook and Campbell, 1979).

Pure positivists propose a dualist and objectivist stance, meaning that investigators ought to stay detached from the investigated 'object' without influencing or being influenced. This seems to be a 'regulatory' ideal. During this research findings were therefore exposed to the critical community, all being managers in charge of the operationalisation of innovation activities in one or both of the case studies. This implementation of so-called external 'guardians' enables an analysis of data which is 'probably true', but subject to falsification. It furthermore enabled me to learn from 'the special view of actors' (Erickson, 1986). Thus, the findings of the first case study were exposed to falsification in the second case study. This chosen stance towards epistemology may be labelled as 'modified dualist and objectivist'.

5.1.2 Choice of unique research philosophy[13]

In this research, aiming at the generation of hypothesis as well as their falsification, two approaches are possible. One, called experimental and manipulative, uses hypotheses stated in propositions, which are then tested. The second, labelled modified experimental/manipulative, enables the documentation of actions as well as the assigned meaning and purposes by those executing these actions. Modified experimental methodologies may also include the triangulation of data recorded through quantitative and qualitative methods.

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[13] cf. Table 6.2 on page 210 in Denzin and Lincoln (1998)

This research aims at identifying tensions in innovation processes as well as implications as to how tensions can be exploited for the benefit of innovation project outcomes. The preferred paradigms aiming at the prediction, and hopefully control of a phenomenon is positivism or post positivism (von Wright, 1971; Hesse, 1980). Both positivism and post positivism are also the preferred paradigms if one wishes to generalise cause and effect patterns, and achieve rigour in terms of validity, reliability and objectivity.

The role of value may depend on the ability to conduct value-free research, meaning the ability to exclude values as a potential disturbance of inquiry results. This may not be achievable, especially as the inquirer is both orchestrator and facilitator of the inquiry; a stance which may better be captured within a constructivist paradigm.

Ethics also play an important role in this research. In order to ensure ethical behaviour various measures were taken, described in the following section. The implementation of codes of conduct is suggested to be a positivistic or post positivistic approach.

A further issue may be the way in which my activities as a researcher were given voice. There are two polar positions to consider. One pole is the 'disinterested scientist' informing decision makers, policy makers, and change agents. The opposite pole is the one of a 'passionate participant' (Lincoln, 1991). I support the second pole as 'those people most likely to be affected by, or involved in implementing, these changes should as far as possible become involved in the research process itself' (Easterby-Smith et al., 1991). Yet there is a role duality which may be complementary. This research was conducted in a department in which each participant was free to adopt practices as a result of this research. On the other hand, this research led to publications and management presentations in which the results were neutrally presented. This neutral presentation was part of being a reflective practitioner about my work. In the subset of giving 'voice' to my activities I used practices assignable to positivistic, post positivistic as well as the constructivist paradigm.

Then there is the issue of training. As part of the Cranfield DBA participants were neutrally trained in quantitative and qualitative approaches. The post positivistic, critical theory or constructivist paradigms are the preferred paradigms if research is likely to be best captured through both quantitative and qualitative data. The positivistic paradigm is more likely to rely on quantitative methods only.
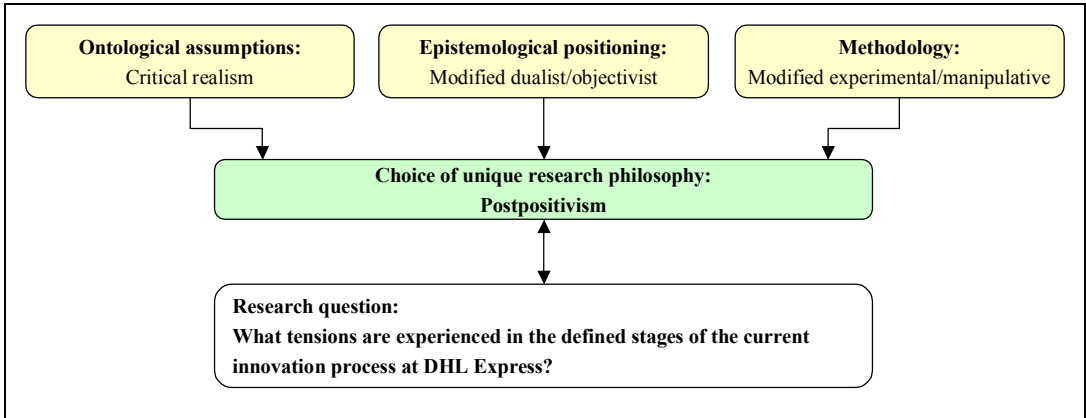
Figure 4: Deduction of chosen research philosophy

Based on the discussion above the preferred paradigm adopted in this research was post positivism, as depicted in the figure below. As the role of values had to be questioned as achievable as potentially an ideal at best and the potential issue of role duality, they are flagged as issues within the limitations section of this research.

5.1.3   Frame of reference

Within the systematic frame of reference for logistics based research proposed by Large and Stölzle (1999), research may be clustered by its research paradigm as well as the perception of reality. Based on Meredith et al. (1989) and Dunn et al. (1993), they suggest a classification in a matrix. This matrix distinguishes between axiomatic, positivistic and interpretive. The second form of classification is one of the ways in which reality is perceived, which can either be direct, through a third party, or by an artificial replica of reality.

Based on their findings Large and Stölzle stress that logistics dissertations often use a variety of approaches. Hence, they suggest that a dissertation should be positioned in more than one field of the matrix.

Figure 5: Frame of reference of this research

The positioning of approaches is not trivial, however. Large and Stölzle position case studies and action research as an interpretive approach based on direct observations.

Case studies, which can be action research, are a research strategy which may include various data collection methods (Harrison, 2002).

Structured interviews are positioned as the positivistic perception of reality through others. I challenge that classification as I used to collect data that I directly observed in the same interview form. Furthermore, they position questioning exports in the interpretive approach field related to the perception of reality through others. Again, a reflective practitioner may be an expert and conduct research through direct observations.

Based on the proposition that this research is based on sequential case studies utilising various data collection methods, I position this research as depicted in Figure Seven.

5.2 Overarching research design

The Cranfield DBA follows a modular structure with a core of three projects over the period of the doctorate. Each project involves empirical work, later forming a stand-alone section of the thesis.

Doctor Of Business Administration				
Developing the research issue	Project 1	Project 2	Project 3	Thesis
12 Month	8 Month	8 Month	8 Month	12 Month
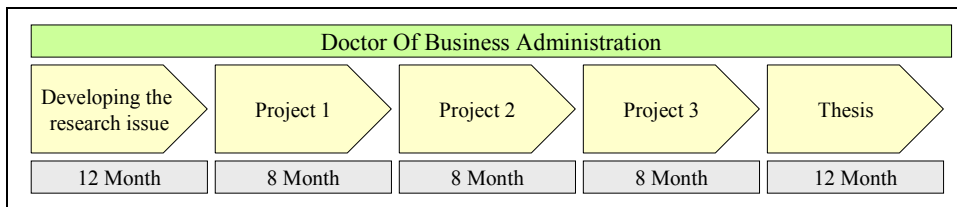
Figure 6: The Cranfield DBA roadmap

The projects were conducted in series, providing a chronological record of the progress of the study. The three projects are thematically based around the problem of managing innovation in a logistics setting. The Cranfield DBA is a 'practice based, professional doctorate, the candidate would be expected to demonstrate a clear contribution to knowledge in the context of practice and be able to articulate the impact of the research to organisation performance/and managerial effectiveness.'[14]

Each of the project reports formed a standalone document. The final version of Project One was finalised on December 9th, 2003 and included the exploratory case study. In Project Two the research team revisited the findings of Project One and shaped six propositions about the management of tensions, as well as a proposed sequence of activities for logistics service innovation projects. The Project Two report was completed on January 21st, 2004. In the final project of the Cranfield DBA, we exposed our propositions as well as the process model to a rerun of Project One. The final project report was closed on November 18th, 2004.

The final building block is made of the thesis (linking document), which was generated between November 19th, 2004 and February 9th, 2005.

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[14] Cf. Guidance Note for Examiners, Chairs, Supervisors and Candidates at viva voce examinations for Executive Doctorate (DBA) students in the School of Management.
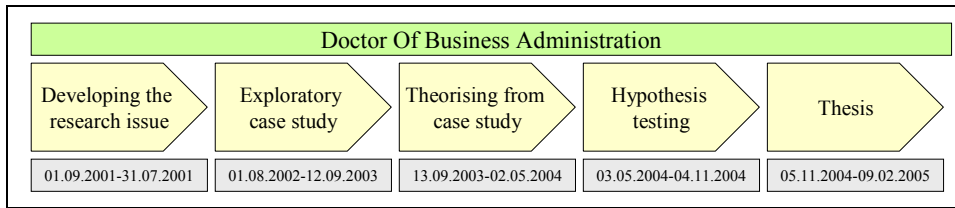
Figure 7: Modified roadmap

A summary of each project and its logic within the roadmap is now reviewed in turn, quoting from the project papers as appropriate.

5.3 Other methodological issues

5.3.1 The stage-gate innovation processes at DHL Express Germany

The innovation process at DHL is a so-called stage-gate process. Stage-gate processes divide the innovation process into a predetermined set of stages, themselves composed of a group of prescribed, related, and often parallel activities (Cooper, 1990). Stage-gates were found at the end of the pre-phase with a 'go' decision starting the project, the performance specification, technical specification, software specification, a contract at the end of the 'bargaining' phase, a finished system to be inspected, the inspector's clearance and a finished roll-out. Stage-gate processes are preferred if management wishes to have distinct deliverables which can be monitored. This is proposed to be a way of managing risks, as at each stage-gate an innovation activity can be aborted with a no-go decision. On the other hand, if outputs are perceived as satisfactory, a go-decision will allow innovators to continue.

5.3.2 The documentation of tensions as events, change and tracks

Van de Ven et al. (2000) suggest that there is a temporal sequence of events that occurs, therefore within an innovation process, each of those events has to be documented and analysed over time. Events are defined as instances when changes occur in an innovation process on ideas, people, transactions, context or outcome level (Van de Ven et al., 2000).

Change here relates to empirical observations of differences (Van de Ven et al., 2000); in this study, evidence of change recorded in interviews. Traceable patterns of change are consolidated into a track from interview to interview. In order to enhance the quality of the recorded data, a longitudinal approach was chosen, for prior knowledge of the success or failure of an innovation invariably biases a study's findings (Van de Ven et al., 2000).

5.3.3 Ethical treatment of research participants

The Cranfield DBA, as well as all other research based degrees at Cranfield University, requires the ethical treatment of research participants. Thus, various necessary arrangements were put into place, which are presented in turn in compliance with the Cranfield School of Management ethical approval form (2005), ensuring the required research ethics of research degrees.

All participants were briefed on all research procedures in advance in order to ensure that they were well informed about what to expect. After being briefed all participants gave their consent. The briefings were done orally if related to interviews. Regarding the research projects, all relevant decision makers were briefed separately and asked to give their consent in writing. These included the head of the specialised department, (Mrs. Weissmann), the director of the IS programme management (Mr. Schweighöfer) and the head of the general works council (Mr. Hantusch).

I also addressed any relevant legal aspects of data collection and storage. This was an issue as the research team agreed to include a separate folder in the overall project documentation in which the interview matrixes (cf. Appendix) and a final version of each Cranfield DBA project report was submitted to DHL Express for potential non-research auditing. Non-research auditing is potentially a duty of the DHL project support office in charge of optimising the project management handbook.

As there was a questionnaire based component of the case study research, a questionnaire was carefully developed. As previous work has tried to capture activities and inherent tensions, the questionnaire was developed in close co-ordination with my panel. The set of questions developed was piloted with Ingo Schmidt (as practitioner) and Christian Efstratiadis (as linguist during the translation process) in a separate project prior to project ESi DHL Express V 1.0. The set of questions developed produced a robustness enabling it to be used unchanged throughout this research. In all planned or opportunistic interviews, respondents has the option of omitting or declining questions they did not want or were unable to answer. Additional care was taken to assure privacy, especially as one of the research questions asked for the current state of feeling about the project at the time of writing the answer. This was achieved as answers were coded towards a track. In this way submitted documents only show that a participant said something in a question, without being able to trace the exact words.

I need to highlight that all participants were identifiable. All participants were fully informed and gave prior consent. This consent was based on the unanimous consent that names and roles would ensure a more interesting story about our journey, which was perceived as being necessary. It was hoped that a neutral reader would be able to envision how we struggled in each activity, and is hopefully drawn into the scene.

All participants were told that their participation was voluntary. Even though they were told of the option of withdrawal from the research at any time and for any reason, none of the interviewees withdrew their consent between 2001 and 2005. This included all opportunistic interviews.

All participants were debriefed and have access to any of the publications and to any Cranfield DBA documents. A debrief of all stakeholders, the global executive management board and the complete works council was held in the form of presentations.

6 Synopsis of research projects

6.1 Project 1

A service innovation project in this context was commissioned in 2002 to re-engineer the work flows in the loss prevention units in sorting centres in Germany. 'Project ESi V 1.0'[15], as it was called, had to meet new corporate requirements to integrate new codes, new product portfolios, adapting software to Microsoft Windows XP, Microsoft Office XP, a new Oracle version (9i) and to migrate the system to a new server environment. Project ESi was conducted between August 2002 and September 2003 within tight costing constraints.

The development of ESi V 1.0 was used as the context for an exploratory case study to gain a deeper understanding of service innovation management in logistics settings, and to build an improved model of the innovation processes at stake. Our research sought to track the origins and life cycle of tensions as they arose in the various stages of the project. At that time we started to be on a constant lookout for tensions. As tensions were said to be inherent to activities, and as not all activities were perceived as having an unbalanced tension per se, we developed a very reactive stance. As soon as a tension was perceived to be unbalanced we gathered and discussed ways to overcome whatever it was that had caused the imbalance.

In order to get a more detached and critical picture of how activities and tensions correlate, I first tried to track the sequence of activities and then in a second step, the life cycles of tensions. The first part was achieved within a longitudinal analysis of the project activities. As this was an exploratory case study this was done to record how innovation management was conducted. Over time I was able to sketch eight phases, which are depicted below.
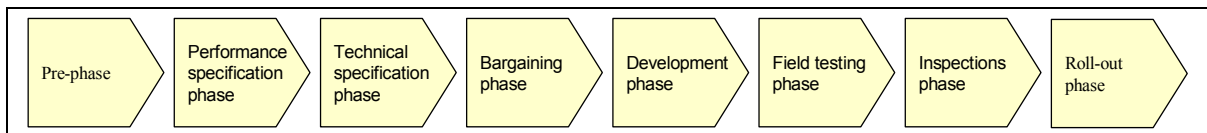
Figure 8: Overview of phases in project ESi DHL Express V 1.0

The details of each phase are addressed in part two of this thesis. In order to keep repetitions at a minimum an 'executive summary' level coverage of the phase content is now given.

6.1.1 Pre-phase activities

The pre-phase included all activities needed for project appraisals, separated into compulsory and desired requirements.

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[15] ESi is the abbreviation for 'Entgeltsicherung' meaning ‚loss prevention'.

6.1.2 Performance specification phase activities

The tenor of activities in the performance specification phase was related to all processes to be re-engineered. Each process ongoing at that time was scanned. Those to be innovated were tagged and scrutinised. Eight sub-projects were implemented to do that. Those eight projects specified all requirements regarding future processes and their parameters in light of products and codes, graphic user interfaces, databases, international loss prevention work flows, national loss prevention work flows, cross boundary work flows[16], after sales work flows[17] as well as loss prevention information system requirements[18].

6.1.3 Technical specification phase activities

In the technical specification phase the corporate IT department took over the lead. Mr. Jung's team at IT Solutions started to frame the system architecture, the necessary physical components, physical lines of communication, software components and interfaces to other systems.

6.1.4 Software specification phase activities

In the software specification phase the performance specification and the technical specification were translated into a software specification. This specification was about the design of a software package enabling our future system architecture documented in the technical specification to interact with its components in light of data flows within the system and to or from interfaces.

6.1.5 'Bargaining' phase activities

The 'bargaining' phase included all activities which were needed to design the scope of the innovation project towards available budgets.

6.1.6 Software development phase activities

The 'bargaining' phase was followed by the software development phase. From February 2003 to July 2003 we developed a software package ready for roll-out. Four sets of activities were key activities at that time, next to the pure development of the application.

Firstly, there was the need to define the scope of follow-up releases, as certain requirements did not make it into this release and were cancelled in the 'bargaining' phase.

Then a service level agreement with the solution support department was finalised.

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[16] All transfer of information and fiscal claims towards a sender who has been caught red handed by a loss prevention officer.
[17] Monitoring senders are senders newly acquired to the organisation and get loss prevention support aiming at troubleshooting related to handling parcels, packets and so on and the way in which they are paid for.
[18] The loss prevention information system is a message board for loss prevention officers, on which they can post and discuss loss prevention related issues.

Thirdly, we monitored the development process and changed the application if needed via change requests. Four change requests were submitted in this phase. Three of the change requests were completed. One had to be withdrawn as an automated accounting interface had to be postponed to a later release. This later release was ESi DHL Express V 1.1. This was not part of the research and was implemented in parallel with research Project Two.

Finally, an additional cluster of activities in this phase was centered around the acquisition and deployment of all hardware needed in the field test phase and for the final roll-out.

6.1.7   Field test phase activities

This field test included exposing the new application, peripheral items and all newly designed processes to its future real life environment. This phase was thus the first time that the new processes, new software and new hardware were used together as intended.

6.1.8   Inspection phase activities

The inspection phase was composed of a user acceptance test in which all functionalities were tested as described in the user manual. In a second parallel test, the so-called technical acceptance test, all performance parameters, as well as the ability of the application to be installed and de-installed were tested. All errors found were then corrected until clearance for roll-out was given by the inspection team.

6.1.9   Roll-out phase activities

The roll-out phase was the shortest of all phases. As nothing went wrong it was simply composed of communicating the new link of the application.

6.1.10   Tensions

From the core stockholders' interviews I was able to extract thirty tracks of tensions. Each track is addressed in detail in part two of this thesis.

6.1.11   Constellations of tensions

The exploratory case study identified the fact that tensions are inherent in activities within four generic tension types as proposed by Dougherty (1996). Tensions could also be traced and were related to the stakeholders involved in that specific activity. Traceability showed that tensions develop over time within a phase, and as a worst case triggered new tensions. The most outstanding finding was that tensions need to be managed with the same level of commitment as their parent activities. Next to traceability, stakeholder involvement could be clustered within three distinct constellations, namely bi-polar, multi-polar and proxy tensions. Bi-polar tensions involve two stakeholders, multi-polar tensions involve three or more stakeholders, and proxy tensions are tensions between core team stakeholders and a third party. The proxy component was included as a core team stakeholder may have to access a third party via another core team stakeholder. Details of each are described in the relevant section of Project One.

6.1.12　Tension management

In this exploratory case study we started to manage tensions. Tension management relates to managing an activity and the inherent tension in an emancipated manner. At this early stage we framed tension management into 'reconnaissance', tracking and restoring unbalanced tensions.

6.1.13　Tension 'reconnaissance'

The approach was very reactive and included a high degree of communication. In this sense tension reconnaissance labels all activities undertaken to gain knowledge about tensions with the potential to become unbalanced, those which are becoming unbalanced, or which are already unbalanced. In a non-research setting this may be highly problematic, but I was able to draw on interviews to look for hints of tensions.

6.1.14　Tension tracking

The idea of tracking tensions has three aspects. One is that tensions are different in their duration. Certain tensions, like track 10 in Project One, may continue throughout a project, while others are one-off situations. As a worst case, tensions may even trigger new tensions, as seen in track 2 and 19, especially track 19. There is also the potential for tensions to develop spin-offs. Finally, tracking includes a depiction of which stakeholders may be affected. Hence, tension tracking relates to recording the development of a tension over time, the spin-off of derivatives, and stakeholder inclusion.

6.1.15　Restoring Balance

The ability to restore balance has two aspects, one being the ability to actively manage participants executing an innovation towards a common goal. In this case study, the latter was achieved in all cases. On the other hand, to manage external resources, especially in bureaucratic settings via proxy tensions is a problem which needs further investigation as this may have a lethal impact on innovation activities.

6.2　Project 2

Following the exploratory case study, the research team revisited the project, using the findings of the exploratory case study to theorise about processual sequences of innovation processes (Eisenhart, 1989). In this approach we theorised from the data gathered in Project One and shaped the implications into propositions (Glaser and Strauss, 1967).

In this way a process model was developed which included the contribution of all stakeholders involved in Project One. Inherent to the process model and its activities in each phase are the tensions that managers will have to deal with.

The findings impose a two-way approach, one being the management of activities in an optimised sequence, as well as any tensions unbalanced in the process.

6.2.1   A seven step logistics service innovation process model

Based on the perception about how Project One would have been managed in an optimised sequence, a seven step service innovation process model was developed. These seven steps may overlap, depending on the size of the project.

The process model is based on the following phases:
1. Pre-phase
2. Business requirement statement phase
3. System requirement statement phase
4. 'Bargaining'
5. Development and field testing
6. Inspections
7. Roll-out

Each of the steps has a distinct set of underlying activities which are addressed at length in part four of this thesis.

6.2.2   Tension management

As tensions are enabling to innovation processes (Dougherty, 1996) one might expect that innovators may wish to attend to them much like a farmer does his crops. In order to be able to harvest enabling outputs of tensions, they need an environment to grow. In cases of unbalanced tensions innovators will have to commit a significant effort to ensure that their crop is not spoilt. Taking that metaphor, Project Two was used to re-energise the strength and weaknesses found in Project One. The methodology applied to do so was based on the roadmap proposed by Eisenhardt (1989).

Next to the innovation process model for logistics settings, six additional propositions were made:

Proposition 1:
Tensions exist and can be tracked.

Proposition 2:
Tensions are inherent to innovation management activities, tasks and functions or steps.

Proposition 3:
Tensions may be clustered within four generic activities, namely market-technology linking, organising for creative problem solving, evaluating and monitoring, and finally commitment to innovation.

Proposition 4:
Tensions can be managed.

Proposition 5:
Tensions can be described as 'bi-polar', 'multi-polar' or 'proxy' in nature.

Proposition 6:
Core tension management can be tension 'reconnaissance', tracking and restoring unbalanced tensions.

An extended extract of the findings was presented at the 2004 British Academy of Management Annual Conference, winning the best track paper award in the category 'Entrepreneurship and Innovation'.

6.3 Project Three

Project Three was our 'playground' for ideas on how to better manage the innovation process, as well as re-balancing the tensions perceived. Having generated six propositions and a generic process model for logistics innovation projects, Project Three was hand picked for hypothesis testing. DHL decided to introduce a new coding system, making a rerun of project ESi DHL Express (ESi DHL X) an imperative, as all designed loss prevention activities were identified as impossible with the new coding system.

ESi V DHL X V 2.0 was based on business requirements from a project called 'Licence Plate'. Project 'Licence Plate' was aimed at the introduction of a common transport label in accordance with ISO 15394[19]. This label uses an item identifier which is globally unique in accordance with ISO 15459 (Licence Plate)[20] for any item-related transport process[21]. At Deutsche Post World Net this common label will be usable for any parcel and shipment above postal letters and below full truck loads. This effort includes the implementation of various licence plate related business requirements derived from each product, service and region on a common basis. An executive committee decision in May 2001 decreed that all applications at Deutsche Post Euro Express and their partners had to be adapted so that any partner would be able to handle licence plates, which are either EAN 128 or ANSI/FACT. In other words, the application developed in ESi V1.0 had to be adapted to achieve exactly the same objectives under new conditions. ESi V 2.0 therefore had similar objectives to ESi DHL X V 1.0. A few changes from the original project team provided an excellent opportunity to test conclusions drawn from the first project.

6.3.1 The innovation process

The innovation process was based on the proposed seven step logistics service innovation process model, which as described in detail in part four of this paper was amended to size the project. All activities were scaleable as desired. All but one activities were undertaken as planned. The specialised department did not include the general works council as it should have done, but this was corrected in last minute rush activities.

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[19] Cf. ISO/IEC 15394 (Packaging - Bar codes and two-dimensional symbols for shipping, transport and receiving labels)

[20] Cf. ISO/IEC 15459-1 (Unique Identification of Transport Unit – Part 1: General and ISO/IEC 15459-2 (Unique Identification of Transport Unit – Part 2: Registration procedures)

[21] DP Euro Express decided to use the Multi Industry Transport Label standard; this label uses the ISO standard (ISO 15394); ISO 15394 = EN 1573

Overall the process had the following phases:
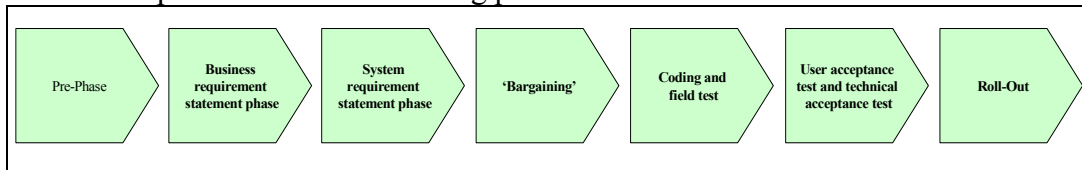
Figure 9: Process framework in Project Three

6.3.2   Step 1: Pre-phase

The pre-phase was used to build a process vision on how each of the existing processes conducted by a loss prevention officer would appear in a licence plate scenario, especially which old processes needed to be amended and which new processes needed to be introduced. The phase ended with the final project agreement, including all associated documents proposed in Project Two.

6.3.3   Step 2: Business requirement statement phase

Within this phase all requirements were fixed and described in detail. Furthermore, one additional activity was the inclusion of the domain steering group as the project needed clearance due to its budget. This activity was not part of Project One, and is a new stage gate introduced at DHL. This activity will apply for any organisation using distinct limits for certain bodies to be allowed to release certain funding. In my case the domain steering group's approval was needed to start a project above 250.000 €.

6.3.4   Step 3: System requirement statement phase

The system requirement specification was a much larger software specification. Next to the planning of the pure 'code poetry' this document also included all necessary system components as well as their future interaction.

6.3.5   Step 4: 'Bargaining'

As in project ESi DHL Express V 1.0 this phase, even though being a parallel activity more than a distinct phase (cf. part four) of the project was designed to budget.

6.3.6   Step 5: Development and field testing

Nearly all activities proposed in Project Two for a coding and field test phase were undertaken. Only three were discarded as the field was obsolete and the 'old' hardware could still be used. Hence all hardware procurement and field test related activities were redundant.

6.3.7   Step 6: inspections

Again, as in Project One, the inspections were undertaken at user acceptance and at technical acceptance level. At that time the general works council's consent for roll-out was needed, which we did not have due to the lack of inclusion. As the general works council was not pleased to get the list of new features within the regular codetermination process, the specialised department had to negotiate an agreement for this case.

6.3.8   Step 7: Roll-out

Once the application was installed, the link for the new application was sent to loss prevention officers to start their work with the new set of features.

6.3.9   Tensions in project ESi V DHL X V 2.0

This project was conducted under a more informed basis about how tensions appear and how to identify them. Within the proposed set of approaches of 'reconnaissance', i.e. tracking and restoring unbalanced tensions, we were able to decrease the number of tensions having to be balanced, as well as gaining skills in the management of the underlying process. This led to a high consensus of having found a way of better managing processes and their inherent tensions (cf. tracks 14 A and 14 B in part four).

6.3.10   General remarks

Within the design of the Cranfield DBA this project was treated as a standalone case study. Relevant cross-case comparisons were postponed to this linking document forming Chapter One of this thesis. From the researcher's point of view, there was an important change in role. This change was from passive observer (Project One) to active participant (Project Three). In the new project, I was helping to implement a new process model and new ways of managing tensions. Thus the research strategy in Project One was case based, and in Project Two was theory development based on case one. The research strategy in Project Three was action research, were the role of the researcher was to gather data while actively implementing a new process and managing tensions.

All propositions made in Project Three are based on three proceedings. They are either treated as tested, propositions being made from a more informed view or as disproved. Any further claims seemed to be problematic.

7 Cross-case comparison

The similarities and dissimilarities of Projects One and Three need to be discussed in order to enable a better understanding of the implications of the evidence found. The cross case comparison is split into two sections; one presents the types of new service developments and the other one lists performance indicators at project level.

In their review of the new service development literature and annotated bibliography Johne and Storey (1997) provide a new service development classification scheme. It uses the ideas of Booz et al. (1982) and Lovelock (1984) to classify innovation activities pursuing new service developments.

The two frameworks are now used to organise the similarities and dissimilarities of the two projects. As the two frameworks use different levels of comparison they are clustered in sections. The structure of the clusters is summarised in the figure below.

Cross-case comparison	
Innovation level (Johne and Storey, 1997)	**Project level (Pfeiffer and Goffin (2000)**
1. Product development 2. Process development 3. Product augmentation development 4. Market development 5. Conventional/'New Style' product development 6. Types of offer development 7. Innovation categories after Lovelock (1984) 8. Innovation categories after Booz et. al. (1982)	1. Project characteristics 2. Project quality 3. Project costs 4. Project timing 5. Project debriefing

Figure 10: Structure of the cross case comparison

7.1 Innovation level cross-case comparison

This classification scheme is now used to address the similarities and dissimilarities of both case studies on innovation level, quoting Johne and Storey as appropriate.

Johne and Storey distinguish six new service development characteristics, namely:
- ➢ product development
- ➢ process development
- ➢ product augmentation development
- ➢ market development
- ➢ conventional and 'new style' product development strategies as well as
- ➢ types of offer development

Each will now be discussed for ESi DHL Express V 1.0 and V 2.0 in turn.

7.1.1 Product development

The term product development is used to describe all improvements and radical alterations to product or service performance attributes.

Booz et al. (1982) suggest six main types of product development efforts:
1. Product improvements including revisions to existing products
2. New product lines and frequently 'me-too' products
3. Product line extensions of existing product lines
4. New-to-the-world products, which are new to the market and new to the supplier
5. Cost reductions
6. Repositioning

The classification under one single label was problematic, as each innovation project was based on a heterogeneous set of requirements. Additionally, the labels suggested by Booz et al. as well as Lovelock overlap, and the classification provided in this section reflects the agreed view of the specialised department and the development team as well as the programme management.

One might question whether cost reductions and repositioning are standalone efforts, as they are likely to occur as a result of one of the top four activities. Hence, they are discussed under the label process development and product augmentation development below, as suggested by Johne (1996).

ESi DHL Express V 1.0 was perceived as both, a new-to-to-the-world product as well as a revision of an existing product. During the specification every existing loss prevention process was revised. As a result the antecedent of this application, ESi Euro Express V 3.6.5 was changed to a degree such that only 20%[22] of the original functionalities were maintained. Hence, the new application had a different look and feel in 80% of its content. This required various training efforts for its future users, in our case internal customers.

Matching the Booz et al. listing with activities, having been part of ESi DHL Express V 2.0, I would argue that this project was an effort to improve an existing product including related revisions as well as a product line extension. This is related to the objective of revising existing loss prevention processes and implementing revision outputs. Furthermore it had to be achieved such that version 2.0 was able to handle both 2/5 interleaved labels as well as licence plates.

7.1.2   Process development

All product developments can benefit from process development in the form of achieving reductions in costs. These 're-engineering' efforts have enabled various benefits, such as changing distribution channels (e.g. Dell, 1999) or the transformation of retail logistics in the United Kingdom (Fernie et al., 2000). I do not claim that our achievement was of comparable significance. Yet process development as demonstrated in the two cited sources suggests that, if done properly, it may have the potential to unleash benefits for senders, providers and recipients. In both cases all processes prevailing at the time of analysis received a general overhaul. Based on the evidence of both projects in light of the highly dynamic environment, all product development

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[22] The exact figure is company confidential. Visual basic source codes, interfaces and reporting components were reusable.

activities should have a revision component as a result of revisions in underlying logistics processes in order to avoid maintaining outdated processes as well as not including forthcoming processes. This approach has been identified as the chief driving force behind reducing costs and improving customer service (Drew, 1994). Morris and Westbrook (1996) were able to relate process development as a source of competitive advantage and a door opener for strategic opportunities.

7.1.3   Product augmentation development

Johne (1996) proposes product augmentation development to involve changes to the way core product features are promoted and made available to customers. This was achieved by superseding the client server application by a web-based application.

Balzert (1998) defines client/server-applications as an application which runs on a client, which in turn communicates with a server via a network. The server offers services which are used by the clients. In the case of ESI 3.6.5 the services provided had to be spread among thirty-four servers. Hence, any new release included an update of the roughly fifty clients as well as the thirty-four servers.

The new approach uses an intranet application. According to Balzert (1998), the basic concept of such a web architecture differs from the client/server architecture as the client is exchanged for a web-browser. This browser communicates with a web-server containing the relevant information pool accessed by the browser. This is achieved via the hypertext transfer protocol. This approach is marshalled by Balzert (1998) as it entails less training, lower maintenance, easier access with externals, and lower hardware requirements.

Both projects included an appraisal of whether available state-of-the-art technologies could be implemented to enable the harvest of benefits. Only ESi DHL Express V 1.0 included the implementation of new technologies. As stated in the general remarks of project ESi DHL Express V 2.0, new technologies had to be postponed to follow-up releases.

7.1.4   Market development

Market development is achieved both by amending core product attributes in addition to amending the interaction with the customer. So on the one hand, we have the internal customers, the loss prevention staff, using this application, and on the other hand there is the indirect interface between the loss prevention staff as well as the outside world.

This interface towards senders relates to either alerting senders to the fact that there are terms and conditions to comply with and hence, to ultimately cut out those who are irreformable. Alternatively, it includes accompanying a new business partner in the early stages of the business relationship. Being effective in both spheres of activities is the aim of market development. One may argue that in developing the internal market by enhancing loss prevention staff capability, the external market is also developed.

7.1.5   Conventional and 'New Style' product development

New style product development is proposed to aim at exploiting market potentials, in other words, re-evaluating how existing markets can be served better. This was achieved

by the merger of DHL Deutsche Post and DANZAS. Hence, at the time of the first case study, the application had to be amended to gain organisational fit within the new DHL. New style, as proposed by Johne and Storey, was an issue in the first project only. Once this was achieved, the follow-up projects have to be classified as conventional product developments.

7.1.6   Types of offer development

Offer development is suggested to be a set of business activities undertaken by suppliers acting in their own interest. Hence Johne and Story argue that those activities should be studied from a supplier perspective.

Within the supplier perspective they distinguish between newness of the offer and newness of the augmentation. The remarkable similarity of both projects may be noted in the fact that all offers implemented in version 1.0 for 2/5-interleaved coding had to be amended to fit licence plate coding. Hence, identical offers had to be amended.

7.1.7   Categories as suggested by Lovelock (1984) and Booz et al. (1982)

In addition to the discussion above, the following tables code both case studies towards the original sources of the Johne and Storey paper:

Categories	Definition	Source	ESi DHL Express V 1.0	ESi DHL Express V 2.0
Major innovations	New products for markets as yet undefined and undimensioned.	Lovelock, 1984		
Start-up businesses	New products for a market that is already served by existing products that meet the same generic products.	Lovelock, 1984		
New products for the currently served market	New products that attempt to offer existing customers of the organisation a product not previously available there.	Lovelock, 1984	X	X
Product line extensions	Represent an augmentation of the existing product line or different way of service.	Lovelock, 1984		
Product improvements	Changes in certain features for existing products currently on offer to the currently served market.	Lovelock, 1984		
Style changes	Highly visible changes to existing products.	Lovelock, 1984	X	
New-to-the-world products	New products that not only represent a major new challenge to the supplier, but which are also seen to be quite new in the eyes of customers.	Booz et. al., 1982		
New product lines	New products that represent major new challenges to the supplier.	Booz et. al., 1982	X	
Additions to existing product lines	New products that supplement a company's established product lines, so rounding out the product mix.	Booz et. al., 1982		X
Improvements and revisions to existing products	New products that provide improved performance and so replace existing products.	Booz et. al., 1982	X	X
Repositionings	Existing products that are targeted to new markets or market segments.	Booz et. al., 1982		
Cost reductions	New products that provide similar performance at a lower cost of supply.	Booz et. al., 1982	X	X

Table 2: New service categories

7.2 Project level cross-case comparison

Pfeiffer and Goffin (2000) propose a range of units of measurement which enable the comparison of new service developments at a project level.

Clusters of measurements are:
- ➢ Project characteristics
- ➢ Project quality
- ➢ Project costs
- ➢ Project timing
- ➢ Project debriefings

7.2.1 Project characteristics

Proposed project characteristics at the level of the unit of measurement are complexity and percentage of new developments, as opposed to the previous generation. Complexity is measured in the function point count in Chapter Four, which resulted in an adjusted function point count of 1,333 for version 1.0 and 1,517 for version 2.0. The difference in features between ESi Euro Express V 3.6.5 and ESi DHL Express V 1.0 was estimated to be 80%. Even though this value is based on a high consensus in the development team it is used with extreme caution. The difference of function points between version 1.0 and 2.0, however, was higher than just the pure increase in function point count. Various functions were newly developed. The pure function point count difference between version 1.0 and 2.0 was 184 function points. The calculated real difference was 674, which takes the changes from version 1.0 to 1.1 into account. Due to the insecure number base from version 3.6.5 to version 1.0 this parameter should just be used to state that the changes between version 1.0 and 2.0 were substantially lower than those from version 3.6.5 to version 1.0.

7.2.2 Project quality

The quality of a project may, as suggested by Goffin and Pfeiffer, be calculated in terms of technical success, real development costs as opposed to development cost targets, commercial success, technical changes after implementation, production scrap rate and warranty claims.

The technical success was measured in terms of mistakes found during inspections. Taking the underlying function points and the accumulated mistakes in the table below, there has been a significant improvement based on the errors per function point.

	ESi DHL Express V 1.0	ESi DHL Express V 2.0
Class 1 errors	28	1
Class 2 errors	20	3
Class 3 errors	0	0
Σ	48	4
Developed function points	1333	674
Errors per function point (%)	3,60%	0,59%

Table 3: Cross-case inspection result comparison

The original classification is a long list of parameters and is company confidential. Roughly speaking, class 1 errors are minor flaws such as misprints. Class 2 errors are medium spots of bother which have to be removed in follow-up release. Finally, class 3 errors are major problems, impeding roll-out prior to their correction.

There is a high degree of consensus at first tier stakeholder level that the low number of errors, and not having to implement patches for correcting development errors, is directly related to 'consensus participation'. It was perceived as being a result of the enhanced capability of all stakeholders to develop a common understanding of deliverables, accompanied by improved skills of the development team to contribute to the process innovation. The latter statement led to the perception that 'consensus participation' flanked by tension management improves outputs and makes the process easier to manage. This view was supported in the inspection team's opportunistic interview in Project Three.

Development costs, as opposed to available budgets, was 99.92 % for version 1.0 and 90.50 % in version 2.0, thus, both were within available budgets. The detailed calculation is presented in the project cost section below.

Commercial success within this project was a problematic feature to measure, as it involved internal customers, yet no implicit or explicit complaints were raised from any of the users within project debriefings of both projects.

A further measure proposed is the number of changes after the release. Corrections of a release are implemented in patches. Implemented patches of ESi DHL Express Version 1.0 were versions 1.1, 1.2 and 1.3. Even though there were five patches in version 2.0 they were related to an update of the underlying Oracle version from 9.2.3 to Oracle 9.2.5, which necessitated minor corrections of the ESi application. Implemented patch levels for version 2.0 were 2.01, 2.02, 2.03, 2.04 and 2.05.

As this was a new service development project there is no comparable measurement for a production scrap rate.

Finally, warranty claims were not an issue in either project.

7.2.3   Project costs

The proposed units of measurement are overall costs and costs opposed to available budgets.

Project costs at Deutsche Post are measured in man-days. This is as accurate as we are allowed to get, as the costs per man-day are confidential.

Version	Budget	Final amount	Δ
1.0	602,5	602	99,92%
2.0	331,5	300	90,50%

Table 4: Cross-case cost comparison

The overall amount is the 'final amount' in the table above. The budget of the project is equivalent to the offer of Deutsche Post IT Solutions. Overheads at Deutsche Post are discarded in the budget as well as in the final amount as they are confidential.

However, there is a severe lack of comparability which has to be noted. This limitation of applicability is based on the different types of underlying contracts with Deutsche Post IT Solutions. ESi DHL Express V 2.0 has an additional margin of safety for warranty claims included as so-called 'contracts for work'. The first project was made using a contract for services in which one party delivers services which are paid for individually (cf. §§ 611 ff German Civil Code (BGB)). This does not include warranty claims. In the case of the follow-up release, the developments were made as a contract for work (§§ 631 ff German Civil Code (BGB)). In this contract constellation one party, the contractor, promises to produce a work for an agreed price. Here warranty claims are possible. The underlying calculation mechanisms are not to be made explicit.

7.2.4   Project timing

This category was the most problematic to measure. Units of measurement are proposed to be time-to-market, break-even-time, development hours per phase, time per phase, final percentage opposed to predictions. It is not possible to present any of these figures.

Time-to-market, time per phase and final percentage opposed to predictions, even on a per function point figure, do not reflect realistic time frames. Firstly, there were differences in the setting of phases, in between Project One and Project Three. Then, at activity level certain activities were obsolete or simply different. One example is the specification phase. In project ESi DHL Express V 1.0 all loss prevention processes were newly specified, due to a abysmal process documentation level at that time. This took roughly five months. In version 2.0 we just screened each process, then documented at a high level, and had to identify each process affected by the introduction of the license plate. To rewrite the affected processes only took one week. It is perceived as problematic to compare the two projects taking such differences into account.

Break even time is also problematic to compare, as at the time of writing the project has not even run a full quarter of a commercial year after roll-out.

Development hours per phase would also be falsified due to the differences in the phase sequence. Furthermore, they are not measured at Deutsche Post IT Solutions.

7.2.5   Project debriefings

This final cluster of units of measurement may be accessed on the basis of an analysis and learning curve per project, as well as the transfer of knowledge to other teams.

The analysis and the learning curve of project cannot easily be compared to other projects as it has been part of a study in which the results were exposed to stakeholders. This is not common. Both the analysis and the learning curves at project level are discussed within Chapters Two and Four.

As this research is available to anyone interested, anyone is free to read and draw their own conclusions.

8 Conclusions

The conclusion section covers four main areas. One is about the management of innovation processes (propositions one and two), which is followed by a section about the management of tensions inherent to innovation activities (propositions three to ten). The third section covers the discussion of the implications for information systems development within innovation processes. Finally, I propose issues which should be subject to future research.

8.1 Propositions

8.1.1 Proposition 1

A logistics service innovation process model should be made up of seven steps.

The first proposition made on the basis of this study is a seven step innovation process (cf. Chapter Two), which is based on the following steps:
1. Pre-phase
2. Business requirement statement phase
3. System requirement statement phase
4. 'Bargaining'
5. Development and field testing
6. inspections
7. Roll-out.

There is a high consensus in the research team that this process is the preferred sequence of steps in both developments made from scratch or in legacy developments.

This process has underlying prerequisites. The most important one is that the whole process is centred on information engineering derived from a process vision. All following developments aim at supporting the process vision as well as possible.

The next prerequisite is that all stakeholders in charge of operationalising process vision support developments are treated as partners and not as suppliers. Hence, business requirements are articulated on a general level, and then each contributor proposes how his or her contribution may be applied. This proposition changes the role of two stakeholders significantly. Both works council and information system developers require a shift in their contribution. The works council here is shifted towards neutral auditors, which are supposed to ensure that the impact of an innovation is implemented in a way that the social charges an organisations' work force has to contribute is either minimised or socially cushioned. This shift is advocated by Springer (2004). He concludes that currently some works councils have not yet made the transition to 'social partners'. Project One in particular showed how 'social partners' can contribute to innovation outcomes.

In this same category a shift in the contribution of information technology development may be needed. The proposed seven step logistics service innovation process model differs from other service innovation model (cf. chapter two) as it is capable of delivering an information system component. Again with a shift of contribution. I

propose that information technologists are seen as partners. This differs from more traditional information system development models in which a client requires the commitment of a supplier (Balzert, 1989). The proposed procedure includes a partner to propose how a process can be supported and is allowed to influence requirements if this eases or optimises developments and deliverables.

8.1.2   Proposition 2

As projects vary in size modular amendments to the seven step logistics service innovation process model can be used to customise the process.

The set of activities proposed in the seven step logistics service innovation process model may by subject to amendments. As ESi DHL Express V 1.0 was a fairly large project, the proposed framework was customised in the second longitudinal project. As projects differ in sizes in terms of requirements, available budgets or timelines, the process model was designed to be applicable in a modular way, so activities may be added or omitted depending on the size of an innovation project. In large projects, like ESi DHL Express V 1.0, in which innovations are developed from scratch, all activities should be executed. In the case of legacy developments the project team proposes to revisit any running component. In a dynamic environment like Deutsche Post new processes are implemented on a regular basis, while old processes are deleted to avoid outdated processes being maintained.

Projects which are smaller than project ESi DHL Express should still have the basic proposed sequence. However, the field test would be the first thing a that smaller project might consider cancelling, which still gives a seven step approach. The model is modified activity level.
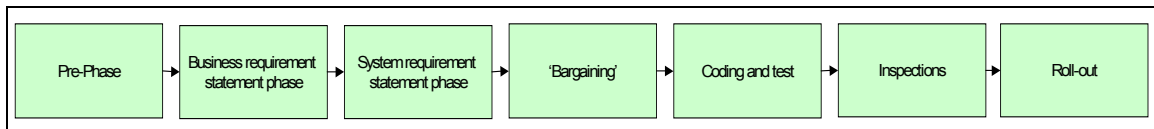
Figure 11: Medium sized innovation projects

Small projects, like three to six month long projects, may find that the pre-phase, requirement specification phase and 'bargaining' phase become one inseparable cluster. Here sketchy defined requirements may be directly transformed into a system requirement specification.
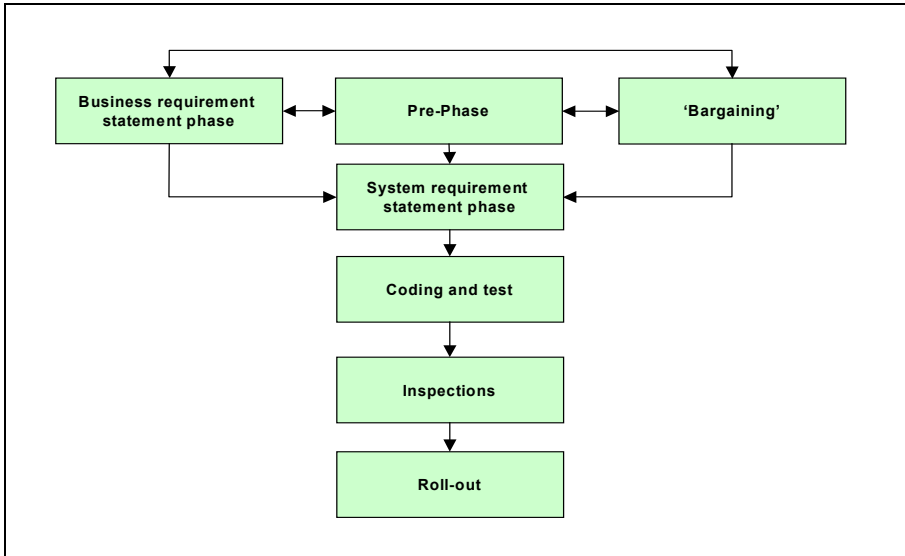
Figure 12: Small innovation projects

Very large projects may be tackled using four different approaches:
- ➢ Sequential multiple large innovation projects
- ➢ Programmes with multiple large innovation projects
- ➢ Programmes with multiple business requirement statements and one system requirement statement leading to a single release
- ➢ Programmes with multiple business requirement statements and multiple system requirement statements leading to a single release

All of the four proposed innovation process models have in common the fact that the field test is optional, although the internal IT tests within the development organisation still apply. The four workflows can be summarised in three frameworks.

Option 1:
Sequential multiple large innovation projects

This first option ties together a bundle of processes or requirements. These are then managed in one release and all remaining processes and requirements are postponed to a follow-up release. This option may be chosen if budgets are an issue and the follow-up release and budgets are available in the following year.

Option 2:
Programmes with multiple large innovation projects

The second option is to manage several innovation projects simultaneously as a programme. Each project is a large project in itself.

Option 3:
Programmes with multiple business requirement statements and one or more system requirement statements leading to a single release

Within stage gate innovation processes milestones can be used to re-evaluate innovation projects. This leads to the proposal to use business requirement statements and system requirement statements to carefully plan a new logistics system and present the results of each phase to get stakeholders' consent to continue.
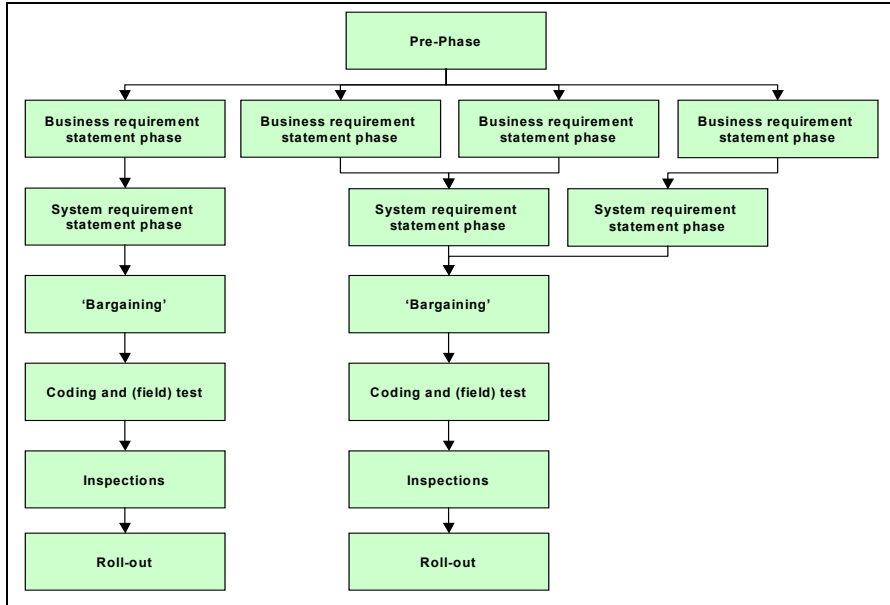
Figure 13: Large innovation projects

8.1.3   Proposition 3

Tensions exist and can be tracked.

This study identified tensions in fifty-eight tracks. Thirty-eight tracks were uncovered in project ESi DHL Express V 1.0 and fifteen in ESi DHL Express V 2.0. Tensions were perceived in both projects and we were able to track the life cycle of the tensions. Hence the proposition that tensions exist and can be tracked, made in Project Two, was not disproved and is hence maintained. As simple as this proposition may seem, it has noticeable consequences. The main consequence is that tensions are inherent to innovation activities. Hence innovators have to manage activities with the same commitment as the underlying activity. Organising for innovations now includes preparing a sequence of activities as well as a platform for stakeholders in which tensions can be managed. One example of a platform like this is the introduction of a meeting held on the first Thursday of the month, where stakeholders gather and manage current tensions.

8.1.4   Proposition 4

Tensions are inherent to innovation management activities, tasks and functions or steps[23].

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[23] Even though this proposition is made, this study discusses tensions at activity level as a matter of simplification. It was perceived as text inflation by always including activities, tasks and functions or steps instead of activities.

Dougherty (1996) proposed a change, criticising the 'anything goes' definition of innovation, which may be defined as a 'adoption of any device, system, process, problem, program, product or service that is new to an organisation (Downs and Mohr, 1976; Kanter, 1988; Damanpour, 1991). She requested a change in perspective based on activities of innovation organised in the organisation operationalising the innovation. I found this change to be very helpful., yet this shift in perspective requires a further extension.

Innovation activities may be organised in processes. As processes consist of activities, tasks and functions or steps (Harrison, 1998) tensions may not only be inherent to activities, as proposed by Dougherty (1996), but may be inherent at the level of the task, function or step (cf. conclusions in Chapter Three).

8.1.5   Proposition 5

Tensions may be clustered within four generic activities, namely market-technology linking, organising for creative problem solving, evaluating and monitoring innovation, and finally developing commitment to innovation.

In 'Organising for Innovation' Dougherty (1996) presented a table of tensions, what perpetuates balances, and how they may be restored. This table proposed a set of generic activities. The proposed set included market-technology linking, organising for creative problem solving, evaluating and monitoring innovation, as well as developing commitment to innovation. She explicitly states that this set is not exclusive, yet it has to be highlighted that none of the research participants felt that coding towards those four tensions was difficult, or that certain issues had to be 'crunched' into this list. No additional activities and related tensions are proposed in this study.

8.1.6   Proposition 6

Tensions can be described as 'bi-polar', 'multi-polar' or 'proxy' in nature.
Current literature on tensions discards the level of complexity found in Projects One and Three (cf. Dougherty, 1996 and Huxham and Beech, 2003). It was possible to identify constellations of stakeholder involvement in each activity which was either 'bi-polar', 'multi-polar' or 'proxy' in nature.

The working definitions underlying this proposition for all three constellations are now presented in turn:
1. Bi-polar tensions relate to constellation in which two first tier stakeholders collaborate in an activity and are therefore exposed to the inherent tension of that activity.
2. Multi-polar tensions are inherent to activities in which three or more first tier stakeholders are involved.
3. Proxy tensions are based on an activity in which a first tier stakeholder has to include a third party within an activity.

In Project Three it was possible to code all tracks towards one of the constellations above. Even though no additional constellations were found, this list may not be exclusive.

8.1.7 Proposition 7

Tensions can be and have to be managed.

Tensions are suggested to be enabling in innovation settings (Dougherty, 1996) and thus have to be nurtured. However, if a tension is unbalanced it has to be managed immediately in order to avoid disruptive effects. Managing tensions is time consuming and demanding. According to Huxham and Beech (2003) 'collaborative arrangements are inherently difficult to manage and tend towards a state of collaborative inertia in which the rate of output seems slow and even successful outcomes are achieved only after much pain or hard grind'.

Yet it is an obligation to do so in pursuit of the ultimate goal of optimising innovation outputs. This view is marshalled by Lawrance and Lorsch (1967), as they state:

> *'If managers involved openly exchange information about the facts of the situation as they see them, and their feelings about these facts, and work through their differences, the probability of reaching a solution that is optimal for the whole organization should be greatest.'*

In line with the perception of all stakeholders involved at first tier level, we were able to manage tensions. Despite the investment in time and effort, we were able to manage any tension involved and bring both case studies to a ending perceived as successful. Hence, even though managing tensions may include hardships, it can be done and it should be done.

8.1.8 Proposition 8

Core tension management can be tension 'reconnaissance', tracking and restoring unbalanced tensions.

Core tension management is the label given to a set of activities, which innovators include in their everyday work. It comprises tension 'reconnaissance', tracking and restoring unbalanced tensions.

Tension reconnaissance relates to gather information about potential sources of conflict derived from the different positions that stakeholders may have when contributing to an activity. Not all activities or tasks have a perceived tension, for even though it may be inherent, it may not actually surface as involved stakeholders may have common or alienable goals, for example. Thus, activities have to be reviewed individually to identify unbalanced tensions. This activity adds further complexity to the job of an innovator. At least at activity level it has to be anticipated which stakeholders are involved in terms of constellation as well as identifying potential hidden agendas. In case positions are explicit, as they were in this research, they can be nurtured in order to improve outputs.

The process of nurturing includes the tracking of tensions, as the life cycle of each tension track differed. Tracks were either recorded as one-off situations, or medium and long term tracks, which potentially cascaded into spin-offs, and keeping track helped the team to manage the life cycle of tensions. This included the review interventions of these tensions until a track was perceived to be resolved. Restoring balance to tensions

relates to the necessity to intervene in order to avoid tensions being unable to deliver their enabling benefits.

I propose to call tensions 'frictions', if the tension is unbalanced to such a degree that it can no longer be handled by a project team before the cascade into one or more spin-offs. Frictions here relate to any tension which could potentially develop into a 'show stopper', thus ultimately developing the potential to stop an innovation process for good.

The metaphor friction is derived from Chapter Seven in the first part of Carl von Clausewitz's book 'On War' (1832):

> *Everything is very simple in war but the simplest things are difficult. These difficulties pile up and the result is friction that no one who has not seen war can imagine. Imagine a traveller intent on covering another two legs of his journey before nightfall - four or five hours on the highway on horseback; it is not much. Then, when he comes to the penultimate leg of his journey, he finds that there are no horses or only poor ones, the countryside is hilly, the track in poor repair; darkness descends and he is happy to have completed this leg of the journey with great difficulty and to find meagre accommodation.*

This notion of friction sprang to my mind when living through track nineteen and its spin-offs in Project One. All we wanted was to buy hardware. Once we had defined the dimensions of the server, we ordered it for the first time. Then we had to order it again as the original order was missing. Then we had to borrow a spare server. Then the servers were delivered and six hard disks were missing. But much like the travellers, we were happy to get to our final station.

It was the development of spin-offs in tension tracks which was perceived as one of the worst things to happen in a project. Thus, in ESi DHL Express V 2.0, this was one of the issues which we tried to avoid. Whenever a track was perceived as having the potential to develop spin-offs by affecting other activities, which in themselves were mostly balanced at first, they then received my undivided attention.

8.1.9   Proposition 9

Tension management makes innovation processes easier to manage.

Managing activities and their inherent tensions proactively requires two mindsets. One is based on the notion that 'confronting conflict, however, requires a great deal of emotional and intellectual energy' (Lawrence and Lorsch, 1967) which should be spent on improving innovation outputs and not in 'repairing' activities. The second is that not all activities automatically have imbalanced tensions. Thus, only tensions which surface have to be handled and may even be anticipated. As oppposed to the exploratory case study, the second more proactive management of tensions was perceived as the less turbulent of the two. There is high consensus that the stance towards tension management in terms of tension 'reconnaissance', tracking and restoring unbalanced tensions is the preferred way of managing innovation. Project ESi DHL Express V 2.0 was perceived as the smoothest project managed by any first tier stakeholder. In track 14 A and 14 B of project ESi DHL Express V 2.0 one stakeholder after another started

to perceive the implementation of what is proposed as 'core tension management' as being a very efficient way to run a project. These statements were made independently from one another. Also, once it became an explicit part of each stakeholders' interview, it was part of every following interview until the project ended. The perception of being well managed was pointed out at board level in track 14 B, as monitoring activities at executive level were not able to find anything negative about ESi DHL Express V 2.0. This effect supports authors who suggest the potential benefits of this approach. Examples of this are team building effects with increased responsibility for performance and quality (Katzenbach and Smith 1993; Ulrich 1998), the ability to meet requirements of related stakeholders (Polley and Ribbens 1998; Stevens and Campion, 1994), the development of higher commitment (Parker et al., 1994), an increase in the flexibility of response (Bae and Lawler, 2000) as well as overall performance (Wood and de Menezes, 1998; Patterson et al., 1997; Huselid et. al., 1997).

8.1.10 Proposition 10

Dynamic management of requirements may improve market-technology linking.

The dynamic management of requirements aims at ensuring the optimisation of market-technology linking. As innovations focus on delivering to senders, as well as recipients of logistics services, innovators may wish to maintain flexibility for as long as possible. In both projects a final deadline was set, at which 'stop press' activities were considered. Thos activities included change requests, which were handed to the project manager IT for evaluation. Evaluation here means appraising how much this change effects budgets, timelines or whether the development process handled by the development team had passed a point at which the change request could no longer be implemented. After a certain timeline, 'point of no return' change requests were postponed for future releases (cf. Chapter One)
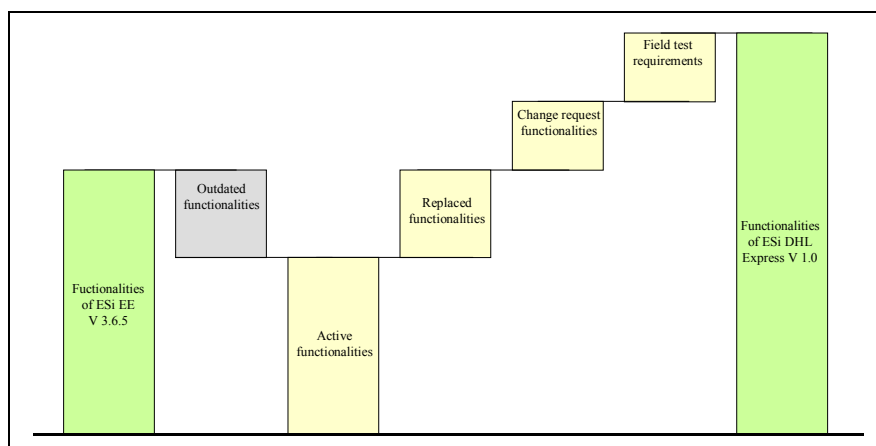
Figure 14: Requirement management in ESi DHL Express V 1.0

8.1.11 Proposition 11

Tension management differs from conflict resolution management.

Authors like Ury (1991), Ury and Fisher (1981) or Lawrance and Lorsch (1967) propose various ways for overcoming conflicts. Managing tensions is about extracting the creative potential of stakeholders. Thus, a tension should be nurtured to deliver

improved results. Conflict resolution is about 'negotiating mutually satisfactory agreements' as soon as possible.

8.1.12   Proposition 12

Tensions may have to be 'frozen' to ensure project objectives.

Even though a partnership is proposed in proposition eleven, the project manager is 'primus inter pares' and may have to 'freeze' a given state within a tension and live with the result achieved at that point in time. This deliberate freezing is comparable to the 'stone wall' problem proposed by Ury (1991). If innovations have deadlines for milestones one may have to use a suboptimal result to prevent speed losses in the innovation process.

Track twelve in Project One is a good example. The first proposal made by ITS regarding the dimensioning of hardware was perceived as oversized. The following argument had to be ended at some point to ensure that the procurement process could be triggered. This challenges the proposed preferred tension management theme in this study, as well as the propositions made by other scholars (Mattesich and Monsey, 1992). Any proposed good practice advice is preferred as long as it is affordable. There was high consensus in the project team that a 90% achievement should still be released and amended in a follow-up release. This proposal is made as it may ensure that the lion's share of an underlying business case may harvested.

8.2   Summary of contributions

The Cranfield DBA is about generating knowledge about theory, as well as about practice, and each proposition's contribution to either field is now summarised in turn.

8.2.1   Contribution of proposition 1

The seven step logistics service innovation process model challenges the content and sequence of activities in available service innovation. It furthermore allows information engineering in terms of the sequential management of a process innovation and related product innovations (e.g. software and hardware).

8.2.2   Contribution of proposition 2

Proposition 2 challenges the 'one-size-fits-all-approach' of available service innovation process models, as it suggests the need for scalability in light of available budgets and timelines.

8.2.3   Contribution of proposition 3

Proposition 3 challenges all service innovation models about discarding tensions as well as the literature on discarding tensions and their relation to innovation activities.

8.2.4   Contribution of proposition 4

Proposition 4 partitions tensions in the much higher granularity of activities, tasks and functions or steps, which was not anticipated by Dougherty (1996).

8.2.5 Contribution of proposition 5

Proposition 4 supports Dougherty (1996) regarding the proposed set of activities and tensions. Even though proposed as a non-exclusive list, this research did not impose the need to append additional generic activities and their inherent tensions.

8.2.6 Contribution of proposition 6

Tension specific literature lacks any acknowledgement of constellations of involved participants. Dougherty (1996) aimed at organisational design issues and Huxham and Beech (2003) argue at the bi-polar level at most. This is important due to the inherence of the much higher level of complexity. Examples are coordination activities within projects, which have interdependencies with your own or the feared proxy constellations.

8.2.7 Contribution of proposition 7

The proposition that tensions can be managed challenges statements by Huxham and Beech (2003) based on interviewees airing their grievances about tension management being problematic. After four years of practical engagement with these issues I am more inclined to relate to Lawrance and Lorsch (1967), as they suggest that dealing with tensions may even lead to improved outputs.

8.2.8 Contribution of proposition 8

The classification of core tension management as tension 'reconnaissance', tracking and restoring unbalanced tensions has considerable implications in practice. Since this set has been exposed to a full longitudinal project with documented consensus of benefits, it has demonstrated bright prospects in practice.

Since tensions may become unbalanced, a project team may not be able to handle them, and the label 'frictions' was introduced. As a demarcation from value adding tensions, frictions are those which may cause or unbalance other tensions. Current tension literature lacks this issue completely.

8.2.9 Contribution of proposition 9

The evidence of ESi DHL Express V 2.0 in which tension management was proactively introduced surfaced an awe-inspiring combination of effects in practice. It implied the ability to unleash benefits regarding team building, performance, quality, meeting objectives high commitment, increased flexibility overall performance. This set of benefits is especially important as one has to bare in mind that especially innovations with strategic intend are under a high pressure to succeed.

8.2.10 Contribution of proposition 10

The dynamic management of requirements sets out in full how a set of requirements is readjusted over time in practice, especially in relation to tensions. Balzert (1998) and Sommerville (2000) hint at the ability to use change requests as such. This study shows how market-technology can be achieved dynamically to avoid that once specified innovations are 'frozen' over fairly long development timeframes.

8.2.11 Contribution of proposition 11

This proposition demarcates tension management from conflict resolution management. Dougherty (1996) suggests that tensions are beneficial for innovation activities. This implies that using conflict resolution techniques to overcome tensions in general may be out of place; a notion that authors like Huxham and Breech (2003) only mention in passing.

8.2.12 Contribution of proposition 12

Once reaching friction status, or closing into stage gates, tensions may have to be 'frozen'. This is the only exception in which conflict resolution techniques are deployed in order to ensure project objectives. This is a necessary exception to proposition 11. In practice constraints like available timeframes or budgets require an emergency brake mechanism to ensure that a friction does not mutate into a show stopper, or that harvesting the optimisation potential of a tension regarding the final 3% to 5% is not achieved at the expense of an overdraft in timeframes or budgets.

9   Limitations

The limitations of this research are split into three sections. One discusses limitations in light of the chosen inquiry paradigm; the second discusses limitations of the research strategy, and the final section lists all other limitations I would like to highlight.

9.1   Inquiry paradigm limitations

Any research methodology has its merits and limitations. Depending on personal taste, other methodologies may have been preferred. Huxham and Beech (2003), for instance, used a social construction (Berger and Luckmann 1967; Gergen 1999) and discourse analysis (Oswick et al., 2000; Alvesson and Karreman, 2000) approach and applied it to situations where there was some intentional change (Beech 1998; Cairns and Beech, 1999). However, the choice underlying this research was made for the reasons presented in the research methodology section. Even though other paradigms may have been supported by other scholars, I would like to point out that any inquiry paradigm is fine to use as long as the inquiry is explicit about what falls within and outside the limits of legitimate inquiry (Denzin and Lincoln, 1998).

9.2   Research strategy limitations

One may further question the use of monthly interviews, which may have missed important activities and tensions in the meantime, in terms of their being particular snapshots in time.

All innovation activities in the loss prevention department were recorded between 2002 and 2005. Even though it has been suggested otherwise (Yin, 2003b) one may question the generalisability of the selected context for logistics in general. Hence, a more prudent approach was chosen by using the second case study to falsify or reshape propositions based on the exploratory case study, instead of expanding research objectives into other areas.

All limitations proposed in project Chapters One and Two regarding lingual limitations, research project awareness of stakeholders, interview delays and track assignment apply also for the generalisabilty of this research.

A further limitation may be assumed in a potential misconception of the set of questions of the monthly interview. Using this set in both planned and opportunistic interviews, I may have lacked the ability to extract subjective perceptions of all involved stakeholders in their interviews.

9.3   Cross-case comparison related limitations

Based on the differences found in this section, as well as the shorter time frame and lower budgets, any proposition aside from the propositions stated in the conclusions section were ignored, and were recommended for future research.

9.4   Other limitations

The project team was staffed by very a experienced representative for each role at first tier stakeholder level. None of them had been involved in project management activities

at Deutsche Post for less than five years. The results of Huxham and Beech (2003) may imply that if this study were to have been conducted with different stakeholders, tension management with the given results may not have been achievable. In addition to the argument of professionalism, the research team may have been subject to unintended manipulation because of the overall intervention of a doctorate in the research setting. This may have led to better research results, as the research community may have had a group dynamic which generated an awareness of tensions, but there may have been a faked willingness on the part of the research participants to manage tensions in light of a forthcoming publication.

Various sources provide practitioners with advice about how to enhance or inhibit the outputs of collaboration activities (Doz, 1994; Faulkener, 1995; Gray, 1985; Kanter, 1994; Lorange and Roos, 1993; Long and Arnold, 1995; Pearce, 1997; Sink, 1996). We were not able to disprove any of the proposed practices as this was not within the scope of this research. This should be the subject of further research, as the complexity found in this study suggests that scholars providing advice at bi-polar level only may oversimplify what is really needed.

10 Directions for future research

10.1 General directions for future research in logistics settings

As the research strategy allows the assumption of an external validity towards logistics service innovation as a whole (Yin, 2003b), any of the twelve propositions should be critically tested.

Further research should be conducted to identify the critical success factors that can aid practitioners in their daily struggle to try to innovate. Even though we were able to manage each tension, it was not recorded with sufficient rigour to document precisely how these tensions and frictions were tackled in detail. This was not within the focus of this research, as the notion of tensions had to be explored first.

10.2 Directions for future research in information engineering

The approach of joint logistics innovation development shifted the contribution of the information technology development team from subordination, in the form of a mere supplier, to that of an equal partner. This approach may question current IT development processes, which may not be optimised to deliver results when included in an innovation process which does not require a defined deliverable. Instead, information engineering requires the information technology development team to understand the process vision and then to develop functionalities supporting this new process. This raises the question of which procedure will ensure optimised results for such a setting.

Various models take different approaches, for example:
1. the waterfall model (Royce, 1970; Boehm, 1981; Boehm, 1984),
2. the V-model (Versteegen, 1996; BWB IT I5, 1997),
3. prototyping (Kieback et al., 1992; Budde et al., 1992),
4. the evolutionary model (Boehm, 1988),
5. the object oriented model (Henderson-Sellers and Edvards, 1990 and 1993; Pittmann, 1993; Davis, 1994; Lausecker, 1993 and Marty, 1994),
6. concurrent engineering (Eiff, 1991; Spectrum, 1991) or
7. the spiral model (Boehm, 1986 and 1988).

Further research should be undertaken to determine which of those models, given their individual limitations, is preferred in terms of flexibility in information engineering. This flexibility may have to include a high level of robustness during 'stop press' times in an innovation process. From an innovation point of view, market-technology linking might have to be ensured sometimes during the process by amending a specification through a change request. Our information technology solution provider asked for a point of no return, in which the concrete deliverables of a release are frozen. Any change request between the point of no return and the roll-out are postponed to a later release. If one of the approaches above is identified as a preferred approach, it should then be extended to include information technology specific activities, tasks and functions, or steps needed to cope with the shift of the role of the requirements definition. The requirement specification now includes all business requirements

regarding new processes. This may imply that current software development procedures may have to be modified.

11 PART II: PROJECT 1

11.1 *Introduction to research project 1*

In this study I longitudinally recorded and analysed perceived tensions during the conception, development, operation of activities, and launch of ESi DHL Express, an innovation project in the loss prevention department at DHL Express, between August 1st, 2002 and October 13th, 2003.

ESi DHL Express aimed at reengineering the work flows in the loss prevention units in Germany's sorting centres towards web enabled loss prevention. The latter activity is defined as being part of the innovation of new service development processes (Cooper, 1983). This project's innovation activities can be labelled as improvements and revision of an existing product (Booz et. al., 1982; Lovelock, 1984), cost reduction activities (Booz et. al., 1982) and style changes (Lovelock, 1984).

As a basis for clustering tensions perceived at the time of the study, being collaboratively inquired in project ESi DHL Express, Dougherty's model (1996) of generic tensions was used. Furthermore, the effects of innovation related codetermination was observed, which is not covered in Anglo-Saxon sources.
This research aimed at gaining a deeper understanding of innovation management in logistics settings, and building a better model of the current imperfect process.

11.2 *Methodology of research project 1*

11.2.1 *Case study research*

To understand the dynamics in innovation processes faced by myself as well as colleagues in similar situations, longitudinal real-time research from a management perspective was inevitable. This view is also supported by Argyris (1968, 1985) and Van de Ven et al., (2000). Case study research was the preferred research strategy as operational links had to be 'traced over time, rather than mere frequencies or incidence' (Yin, 2003). Bryman (1989) supports the view that all 'attempts to provide process models of organisations almost always derive from case studies'.

Additional merit of this research method can be found in the fact that case study research is 'of particular value where the theory base is weak and the environment under study is messy' (Harrison, 2002). The lack of a consistent success record for the implementation of large projects suggests a messy environment, which few scholars have penetrated so far. Another advantage is that within the case study it is possible to use multiple tools, such as direct observations, systematic interviews and archival data (Yin, 2003). All of these were available and were used in this study. I attempted to make no compromises in achieving rigour in this investigation by implementing the quality aspects of the case study research strategy proposed by Yin (2003).

11.2.2 *Case study selection*

The underlying issue of innovation management activities in logistics service provider organisations has only been partially exposed to research so far. On the contrary, to the

concern that researchers may only have limited access to organisations, I was able to choose from the whole portfolio of projects starting in 2002. ESi DHL Express was chosen because it was perceived by my superiors, my panel and myself as potentially covering most aspects of innovation management in the organisation under research, and thus producing what Yin (2003) calls an 'exemplary case study'.

Project ESi DHL Express covered what was for me well known domain as I had worked as head of loss prevention in the sorting centre at Krefeld (Germany) from 1995 to 1999. Apart from the academic interest, I had the rare opportunity to innovate in an area of the organisation which I knew at an operational level. My job at that time was at the same level as the lead user Mr. Krane, who was involved in this project. Additional suitability was seen in the timing of the project. According to the available long range release planning in the loss prevention environment, this doctorate was designed to cover innovation activities at DHL Express from 2002 to 2004 in parallel with the required project structure of the Cranfield DBA. This was supported by all stakeholders to whom I had been known for years. Most first tier stakeholders have been colleagues for two to ten years. Due to their awareness of my being a colleague doing a doctorate, all stakeholders perceived criticism to be constructive for the future process to be designed, and thus openly addressed issues which they concluded to be in need of improvement. This feedback was very fruitful.

11.2.3 Unit of analysis

The unit of analysis consisted of the innovation process itself and all related activities and their inherent tensions. Thus the borders of the phenomenon under research were drawn around all data considered to be needed to cover project ESi DHL Express, ending with the roll-out in October 2003. The project hence covers all documentation needed in an innovation process at DHL Express, from the pre-phase to the final roll-out. The focus of the research undertaken made it necessary to add research relevant information specific to each stakeholder's activities and tasks in the given project.

11.2.4 Collection of evidence

Yin (2003) suggests that including collected evidence as a whole 'dulls the content'. With the original project documentation being company confidential, the interview summaries were added, because of the wish to demonstrate the 'exhaustive effort in collecting the relevant evidence' (Yin, 2003) throughout the innovation process. Beyond the interviews all available archival data was used to triangulate the findings, in particular project minutes, status reports and other archival data against project phases and timings.

11.2.5 Absence of artificial conditions

Project ESi DHL Express was not subject to constraints relevant to the requirement that a case study must be designed such that it may not have been complete as research resources were exhausted. All Cranfield DBA related cut-off dates were moved in accordance to the case study of Project One.

11.2.6 Alternative perspectives

All stakeholders were included in planned interviews in light of the prerequisite that all major actors' views in a case need to be presented. Project ESi DHL Express was of a

size and timing that enabled stakeholders' contributions to be captured, either planned or opportunistic.

11.2.7 Evidence sufficiency

The evidence of project ESi DHL Express is neutrally presented in terms of supporting and challenging data. I included a project summary of all phases of the project's content and activities.

11.2.8 Composition in an engaging manner

Apart from the intended problem solving of the research aimed at enhancing innovation management capabilities, this is an exploratory case study within a rarely penetrated area of academic research. This research seeks to explore an area that has been difficult to penetrate because of the commercial sensitivity of innovation activities. It also links the innovation process with innovation project management.

11.2.9 Interviews

Within this research the main sources of data are monthly interviews with first tier stakeholders, archival data and peer review comments.

The stakeholders' input will be included in my research in three ways:
- ➢ Planned interviews
- ➢ opportunistic interviews and
- ➢ focus group interviews.

Planned interviews were conducted monthly and were related to all issues covered in the project report to the monitoring stakeholders, and include the perceived development of all first tier stakeholders. The interviews were conducted at regular intervals throughout the project life cycle in between the project's official start in August 2002 and the roll-out of the final application on October, in order to achieve the longitudinal picture that I was looking for. As I was also a stakeholder, I made my own field notes in the same interview template at the same intervals.

Planned interviews had to be undertaken via electronic mail as the various stakeholder groups are located in different parts of Germany (Bonn, Frankfurt and Trier). At the end of the month after the kick-off meeting between the head of the specialised department and myself, the first interview was conducted with the stakeholders involved.

Opportunistic interviews were held on emergent issues in the project. In all cases people from outside the first tier stakeholder level had to be involved. They were included in the monthly interview as they were asked to give their comments in the template of the planned interviews. One example was the award of the final development contract, which was negotiated with a key account manager (Mr. Brust). He was therefore included when the January 2003 interview templates were send out and his feedback was included. Another sub-type of opportunistic interviews was focus group interviews. By focus group, I refer to all participants included in unusual situations, for example in crisis meetings. Participants in such meetings were sent an interview template and were asked to comment on this special situation.

The set of questions asked was identical to the set of questions in the planned interviews.

Each template of planned interviews received this set of nine questions:

- ➢ Are you satisfied with the achieved level of performance of the project?
- ➢ What are the noticeable positive/negative developments?
- ➢ What are the noticeable current risks or deficits?
- ➢ What are the open unresolved topics subject to further decisions by superiors?
- ➢ Do you think that the current line-up of the project is able to deliver the necessary co-operation for creative problem solving?
- ➢ Do you feel that the current level of information enables you to monitor performance and carry out all activities in your area of responsibility?
- ➢ Do you think that the necessary commitment to innovation is being achieved?
- ➢ Do you think that it is necessary to enforce certain work results?
- ➢ What are your feelings about the project at this time?

11.2.10 Archival data

Within each project led by the business IT unit of Deutsche Post DHL Express, certain documents have to be produced (specifications, system interface agreements, business case, biweekly status reports, change request documents), and some documents are advisable. They included steering committee meetings and 'jour fixe' minutes. Finally, all electronic mails within the project team were available for reference. All of those data sources were selectively used to triangulate issues raised in interviews within overall development patterns.

11.2.11 Coding

During my research the stakeholders' input was included in my research. The input was extracted from the three types of interviews discussed above. The data collected was coded as follows:
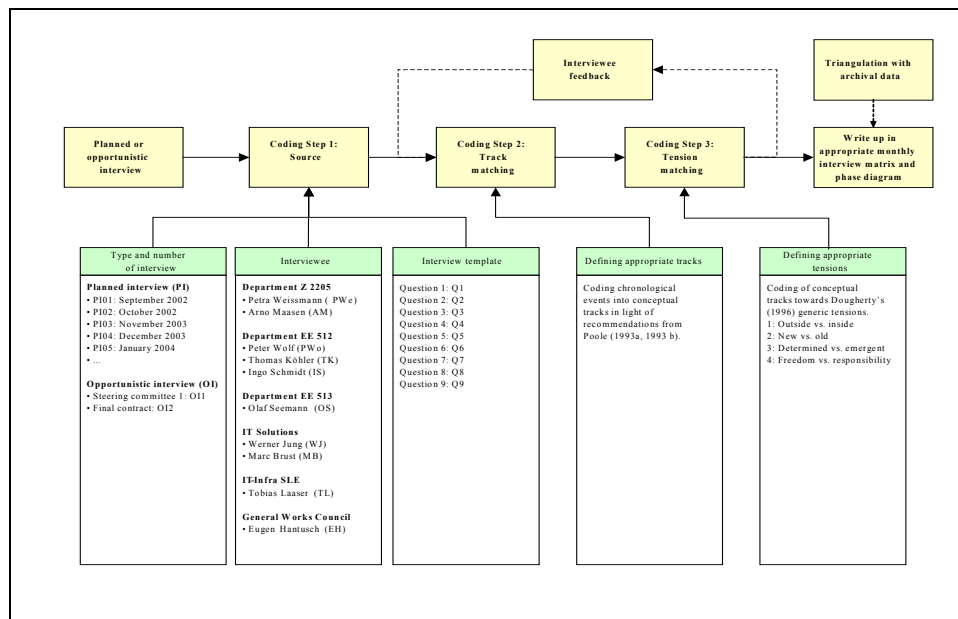
Figure 15: Coding work flow

In cases of doubt, the appropriate peer was asked to comment or specify data for the purpose of determining the original intent behind an interview statement.

11.2.12 Interview coding example

In his planned interview 05 dated from 04.01.03, Ingo Schmidt stated in Question 2:

'Die ITS und die Fachseite haben die Warnungen der BIT nicht ernst genommen, das ESi auf der Projekt Abschussliste steht. Die ITS hat eine freche Aufwandsschätzung abgegeben'.

Translated to English this means:

'IT Solutions and the specialised department did not take the corporate IT units seriously that ESi is on the project termination list. IT Solutions handed in an impudent cost appraisal.'

Within the coding scheme this quote has been coded by source. Hence, an answer from question 2 in Ingo Schmidt's (IS) planned interview 05 (PI05) would be coded as PI05ISQ2. This source would then be coded within an already existing track and the relevant activity or task within this track. Track 3, for instance, traces the development of the impact of strategic uncertainty regarding the integration of DHL, DANZAS and Deutsche Post Euro Express.

In a top management initiative DHL, DANZAS and Deutsche Post Euro Express were merged into a single organisation in April 2003. Hence, the impact of the future corporate strategy regarding the integration into DHL was uncertain. The project became subject to constant screening by corporate strategists.
Within their evaluation and monitoring role projects are confronted with a 'determined versus emergent' tension from outside the project team. This can be either implicit, in terms of strategic compliance, or explicit, in time of strategic change.

As we tried to keep out of trouble we tried to stay out of budget or timeline discussions with senior management. In that time IT Solutions handed in their cost appraisal for the project, which was higher than expected. The final overall coding is then summarised in Appendix I as shown in the track summary table below. The summary includes the relevant track, the relevant activity or task with the inherent tension, event, outcome, and the source.

Track	Tension	Event	Outcome	Source
3	3	The impact of the future corporate strategy regarding the integration into DHL was uncertain	In light of the tight IT budgets it was perceived as essential that all budget matters were resolved internally in order not to endanger the project, because of being judged as a project becoming potentially more expensive	PI05ISQ1, PI05ISQ2, PI05ISQ3, OI02MBQ6 and PI05PWoQ9

Table 5: Coding example

This example shows how tensions interrelate. In spite of the unanimous decision from all interviewees that this tension was seen as a 'determined versus emergent' tension, one could argue that the team's reaction was closer to a 'new versus old' tension. The reaction to try to keep the project out of the line of fire by trying not to raise any doubts about budgets and timelines is an attempt to 'overcome surprises and work around barriers', lying at the heart of organising for creative problem solving. Having confronted the interviewees (Mr. Schmidt, Mr. Wolf and Mr. Brust) with that discussion, it was said that the answers given aimed at the tension of ESi being a very expensive project, and the fear of all efforts being in vain. The project was perceived to be in danger of termination for monetary reasons. The tension was about being monitored by top management, and was thus a 'determined versus emergent' tension. The set-up project (determined) and the emergence of needing money for integration matters (emergent) were behind this tension.

11.2.13 Coding towards process patterns

Van de Ven and Poole (2000) recommend the tabulating of all qualitative data. Their recommended parameters of time, event and data source had to be only slightly amended to suit my purposes, and are listed in Appendix I.

This modified table of chronological listings has three more sets of information. The first is the coding towards a conceptual track. Van de Ven and Poole's recommended clusters of people, ideas, transactions, context and outcome are separated into various sections of this report. Within the chosen source coding, people or groups of people involved are made explicit. The ideas track is elaborated in the project phase section. The transaction track is discussed in the stakeholder section. The final two, being context and outcome, are not separated and are discussed together.

11.2.14 Coding towards Dougherty's generic tensions

Van de Ven and Poole (2000) suggest 'a coding 'of success criteria and ratings by innovation participants of how well the innovation is progressing'. This coding is changed towards a coding using Dougherty's (1996) generic tensions. Each tension is related to a given set of activities in an innovation process (Dougherty, 1996).

11.2.15 Data analysis

The analysis of all listed data is clustered towards the relevant 'period of unified and coherent activity that serves some innovation function', as suggested by Van de Ven and Poole (2000). This type of phase analysis aims at the generation of a process model with distinct phases and related tensions.

11.2.16 Research method validity enhancements

Based on Denzin and Lincoln's (1998) idea of the 'external guardians of objectivity', it will not only be me who gets involved in the research process. I interviewed my team as well as other process stakeholders to ensure a well 'balanced picture' (Miles and Huberman, 1994), as including all stakeholders in a project inevitably captures the views of 'supporters, opponents and doubters' (Pettigrew, 1990). This self-set benchmark exposed all findings, like activity sequences and their inherent tensions to the mentioned process stakeholders as professional peers and referees. This validity

enhancement aims at not having to interpret stakeholders' comments, and hence introducing researcher bias.

11.2.17 Research strategy validity tests

Research strategy validity was tested by means of four tests 'common to all social sciences', namely construct validity, internal validity, external validity and reliability. All four tests are based on Yin's (2003) summary description. The internal validity test is for explanatory or causal studies only and not for descriptive studies or exploratory studies (Yin, 2003). As this was a exploratory study, the latter test was discarded.

11.2.18 Construct validity

Construct validity is gained by 'establishing correct operational measures for the concept being studied. This test relates to the usage of multiple sources of evidence, a chain of evidence and having key informants review draft case study report' (Yin, 2003). The use of multiple sources, interviews and archival data described in detail in the methodology section.

A chain of evidence was to be made transparent, by describing the rational process underlying the transformation from interviews and archival data into the summary list of all events and their tracks in the appendix, as well as describing how this data then led to the conclusions drawn. The individual contributions were reviewed by the key informants separately.

All conclusions and lessons learned were reviewed by the steering committee of this project and are endorsed by all first tier stakeholders.

The longitudinal nature of the study helped to generate a continuous dialogue between evidence and emerging models of the innovation process from academics' and reflective practitioners' points of view.

11.2.19 External validity

External validity relates to a domain to which the study findings can be generalised (Yin, 2003). As Deutsche Post and their three brands in DHL apply loss prevention to all products in the network's German product portfolio, the findings of this study can be extended to the German logistics market covered by Deutsche Post.

The German logistics market can be clustered into corporate logistics (Pfohl, 1996), postal logistics (Niegel, 1987), health care logistics (Ehrmann, 1999) and military logistics (North Atlantic Treaty Organisation, 1995).
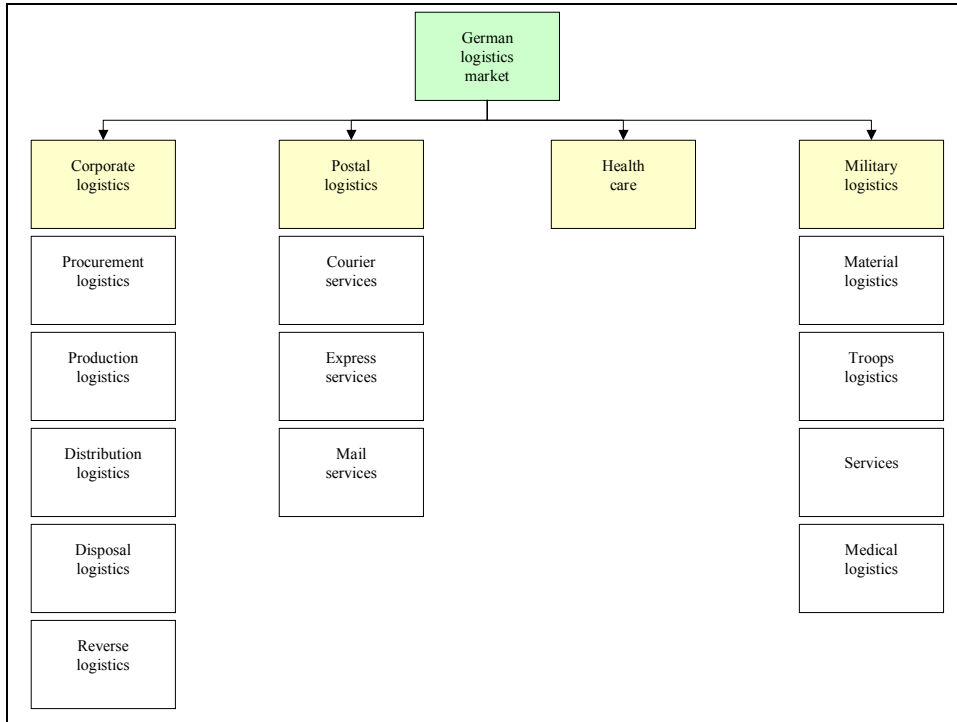
Figure 16: Overview of the German logistics market

Concerning corporate logistics, five sub-clusters can be found (Pfohl, 1996), namely procurement logistics, production logistics, distribution logistics and disposal or reverse logistics.

Postal logistics can be divided into two sub-clusters; courier logistics and express logistics, in terms of non-civil service obligatory services.

Military logistics can be divided into four subgroups concerning materials, troops, services and medical logistics (North Atlantic Treaty Organisation, 1995). Both military logistics and postal logistics may have, depending on the circumstancial aspects of procurement logistics, production logistics, distribution logistics and disposal or reverse logistics. Postal logistics may have an infrastructural mission for all supply chains in a sending nation. The infrastructural mission of Deutsche Post for any organisation in Germany makes it inevitable that Deutsche Post has to apply a process and tension management techniques suitable for any logistics setting, as the organisation operates in all five identified logistics settings.

Supply chain innovation is different from logistics innovation, as logistics is not synonymous with supply chain management as such, although some authors use the terms interchangeably, as demonstrated by Lambert et al. (1996). They see the confusion arising from 'the fact that logistics is a functional silo within companies and is also a bigger concept that deals with the management of material and information flows across the supply chain. This is similar to the confusion over marketing as a concept and marketing as a functional area.' To help to differentiate supply chain management from logistics, Cooper (Cooper et al., 1997) argues that there is 'no need to replace the word logistics with SCM. In fact, it creates more confusion in a still emerging field and distracts from the need to achieve the much broader level of

integration of firms', because logistics is not the only process that cuts across firms; most business processes do. In line with this argument, Pfohl (1997) concludes that logistics is cross boundary as the end customer's perception of the delivered end product or service is the sum of the performance of all supply chain partners. Therefore 'logistics' has been used in preference to 'supply chain management' in this project.

11.2.20 Reliability

In the data collection phase a case study database was set up with all archival data and the investigator report (Yin, 2003). The original database contains company confidential data and was set up in accordance with DHL project standards, including all the necessary documents for the Cranfield DBA programme.

This database was divided into eighteen clusters:
1. Development mandate
2. Tasks
3. Project organisation
4. Development activities
5. Software specification
6. Work flow inspections
7. Protocols
8. Status reports
9. Project developments
10. Controlling
11. Quality management
12. Codetermination activities
13. Change requests
14. Issue management
15. Presentations
16. Dissertation
17. Templates
18. System inspection

Most of the documents required in the Cranfield DBA programme made a separate case study protocol obsolete, as all case study planning was either covered in the research proposal or in this paper.

11.2.21 Role of the researcher

Within this research I had to bridge the gap between being a researcher and a manager at the same time. As project manager I had the deepest insight possible into the case under research. On the other hand, as a researcher I had to step back and painfully examine and reflect on my stakeholders and myself.

This research is self funded and is solely based on personal interest, and has been used to add something to the current state of the knowledge in service innovation, especially in the field of logistics innovation management.

In line with Swamidass' (1991) argument that 'field based research can narrow the gap between practice and research because it takes the researcher to the field for dialogue

and observation', I wanted to have this dialogue and observe what and how innovation activities are conducted.

This process was very fruitful as I gained insights into all stakeholders' work areas and reflections on related problems from various perspectives, which I would have never have gained otherwise, and visa versa.

11.3   Project ESi DHL Express V 1.0

The postal loss prevention system is an information and communication environment, in which relevant loss prevention customer data and operations data are recorded, stored and reported. Additionally, the system has to be able to initiate, support and carry out monetary claims from private and business customers of the organisation.

Project ESi DHL Express had to be initiated to meet new corporate requirements as well as striving to save costs by optimising current work flows. The new requirements in question relate to the need to have to integrate new codes, new product portfolios, adapting ESi to Microsoft Windows XP, Microsoft Office XP, a new Oracle version, and finally, having to migrate the system to a new server environment.

The cost dimension has to be seen in the light of taking the opportunity of centralising thirty-three databases into one intranet application. Cost saving potentials were seen in not having to develop, maintain and support thirty-three loss prevention officers all over the country in terms of leasing and administration costs, as well as lower development costs for updates and rollout costs, because of having just one central database.

Due to the scope of the project the headquarters' loss prevention department took the opportunity to rethink and appropriately optimise all loss prevention work flows. Prior to this, project loss prevention had a separate international and national dimension. Seeking to merge international and national loss prevention into one was appraised to have synergies, because of no longer having to support and train two different sets of staff doing the same thing. This merger enforced a redesign of current structures and work flows.

Finally, the software had to be changed from Deutsche Post Euro Express Intranet style guide standards to the standards at DHL.

11.4   Project stakeholders in project ESi DHL Express

The process to design, develop and implement a new loss prevention system at Deutsche Post was analysed, aiming at the optimisation of all participating components (people, hardware, software and peripheral equipment). The new system as a whole had to satisfy the requirements of various stakeholders, being specified in a performance specification, a technical specification and a software specification, and operating in an uncertain environment in a fifteen month period.

Including myself there were nine stakeholders having a direct involvement in the innovation under research in the given innovation process at Deutsche Post Euro Express in Germany. The stakeholders to whom I had to report can be clustered into

three groups, namely collaboration stakeholders, executing stakeholders (core stakeholders) and monitoring stakeholders.

11.4.1 Collaboration stakeholders

Due to the need for a trusting co-operation with the works councils, according to the German labour management relation regulation 6, works councils are an inevitable stakeholder in any innovation. Because of their role as a guardian of all rights and obligations related to organisational co-determination of a German workforce, works councils execute all rights and obligations related to organisational co-determination[24].

The second collaboration stakeholder is the IT systems department. This department is in charge of guaranteeing the maintenance and operation of applications, as well as the acquisition and administration of the company's software licences and hardware resources.

Finally, an organisation called Service Line Express ensures the transfer of a project into operations by managing the handover to inspections and the roll-out.

11.4.2 Executing stakeholders

The executing core team members are the project manager, an interface manager to liaise with other projects and databases, a loss prevention representative from the specialised department, and the project manager from the IT solutions provider, with his associated project team.

11.4.3 Monitoring stakeholders

Project monitoring stakeholders are the head of the specialised department in Bonn (Germany) and my superior, the multi-project manager in charge of all logistics and operations related projects at Deutsche Post Euro Express in Germany.

The specialised department for loss prevention is the initiator of this project in terms of being a sponsor and supervisor of the results. The head of the specialised department receives a bi-weekly status report and acts according to the information provided. The same report is also sent to my supervisor at the project management department at the corporate IT unit of Deutsche Post Euro Express, after it has been discussed in the weekly project management meeting, in which the results of the previous week are talked through and problems are reported up to appropriate higher management layers.

11.4.4 Stakeholder diagram

The stakeholder diagram below summarises the all relevant stakeholders and interface projects.

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[24] §§ 80, 87, 90, 91 BetrVerfG
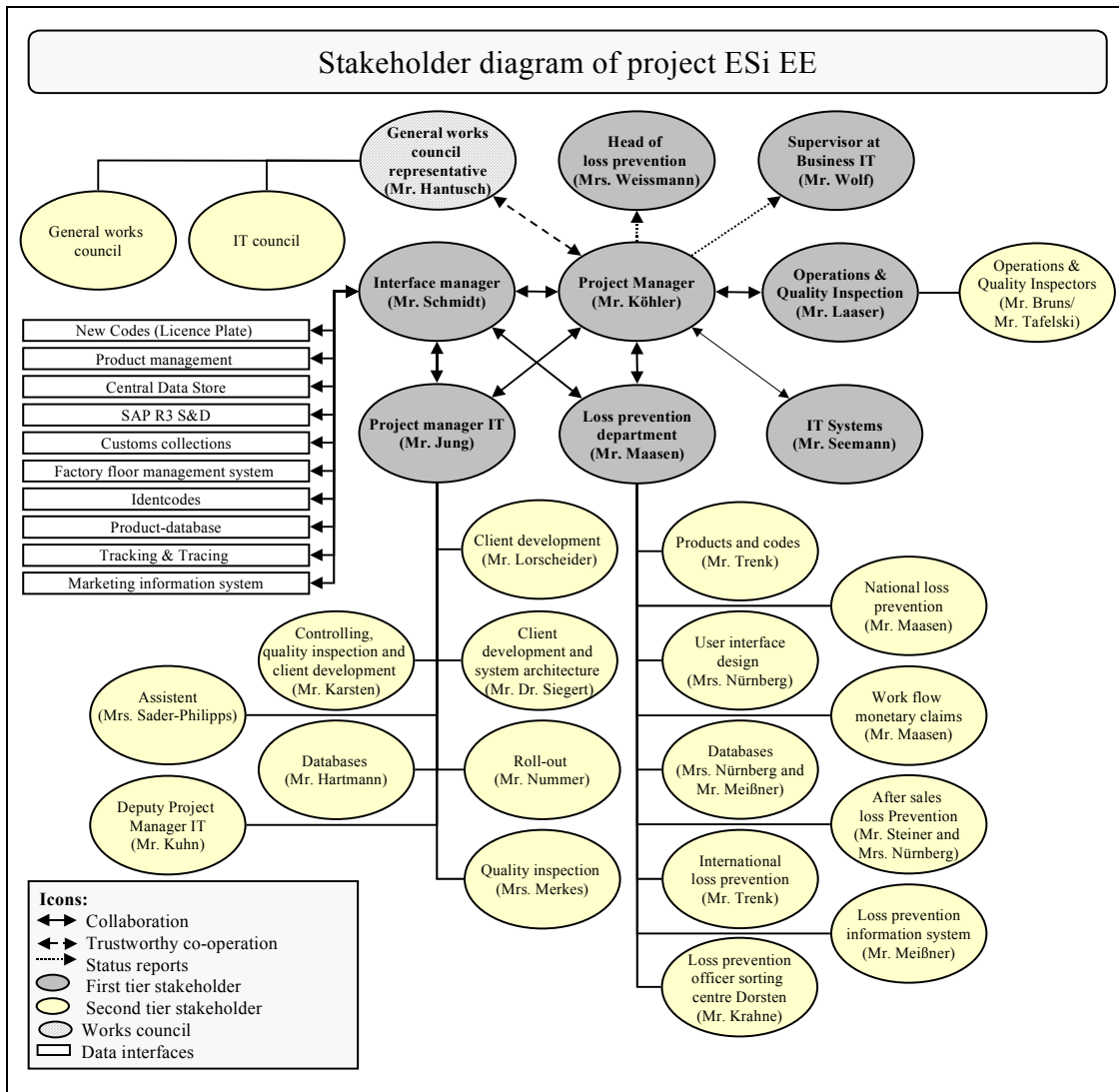
Figure 17: Stakeholders of project ESi DHL Express

All stakeholders (shaded in grey) are first tier stakeholders and are included in the operationalisation of the project, and are thus included in the research.

All second tier stakeholders (highlighted in yellow) report to one of the first tier stakeholders and are indirectly included as they contribute to the overall results in sub-projects.

The team at IT Solutions consists of nine people with various areas of responsibility, including databases, client development, system architecture, control, quality inspection and roll-out. The deputy IT project manager and the management assistant are not included, and are only named for completion.

Due to interpretative views of the stakeholders directly involved in operationalising innovation, each stakeholder had to be interviewed. All stakeholders having a supporting organisation will be able to report tensions in their area of responsibility.

Their subordinates are not included directly and are regarded as out of the scope of this research.

The general works council (shaded in grey and white) was included in accordance with current German law. All co-determination processes are not changeable within model building activities, for they are strictly and explicitly set in relevant regulations. Thus co-determination has to be discussed as a cause and effect pattern whose impact may influence a project.

11.5 Project phases

Within project ESi DHL Express, the project team worked its way through various phases. Each phase ended with a distinct milestone.
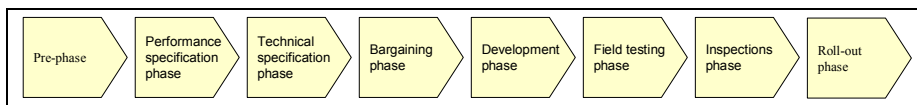
Figure 18: Overview of phases in project ESi DHL Express V 1.0

Each phase is described in detail below. Whenever a phase included a specification, crucial components are discussed in detail, and less relevant components are listed within each phase diagram. Each phase does not necessarily end at a distinct point of time and may in fact overlap, but each phase is depicted as a coherent set of activities necessary to be completed in a given phase.

11.5.1 Pre-phase

In late March 2002 the project appraisal was started. This included the financial appraisal as such, as well as the prioritisation of the various modules in terms of compulsory modules to be implemented. In late April and early May several additional workshops were conducted to prioritise all modules and highlight which modules were classified as compulsory and which were optional, as long as the project was on the waiting list. In June 2002 a change of management and the loss prevention project team occurred. The project reached a standstill. One month later I was asked to implement project ESi as project manager of the corporate IT department. On July 31st, 2002 I had my first meeting with the head of the specialised department. It took the specialised department three weeks to arrange the internal kick-off meeting on August 20th, 2002, due to various people being on summer holiday. Directly after this kick-off meeting the specialised department started to install various sub-projects, which had to work on the performance specification. The performance specification should have been finished at that time to prepare a feasibility study by the corporate IT department. The latter two documents are the final building blocks before the transfer of authority from the specialised department to the project manager, which should have been on August 1st, 2002. A fortnight later (September 2nd, 2002) a first co-ordination meeting with the IT solution provider was conducted to prepare all steps to ensure the project aims, which were give to me by the specialised department.

11.5.2 Phase I: Performance specification

Within the performance specification phase a specialised department picked one or more processes to be innovated. In this project all loss prevention work flows had to be re-evaluated. The managing director, Mrs. Weissmann, decided to organise eight sub-projects, gathering together all requirements regarding products and codes, graphic user interfaces, databases, international loss prevention work flows, national loss prevention work flows, cross boundary work flows, after sales work flows as well as loss prevention information system requirements.

All requirements defined in those eight sub-projects were aggregated into a performance specification outlining all future processes and related parameters.
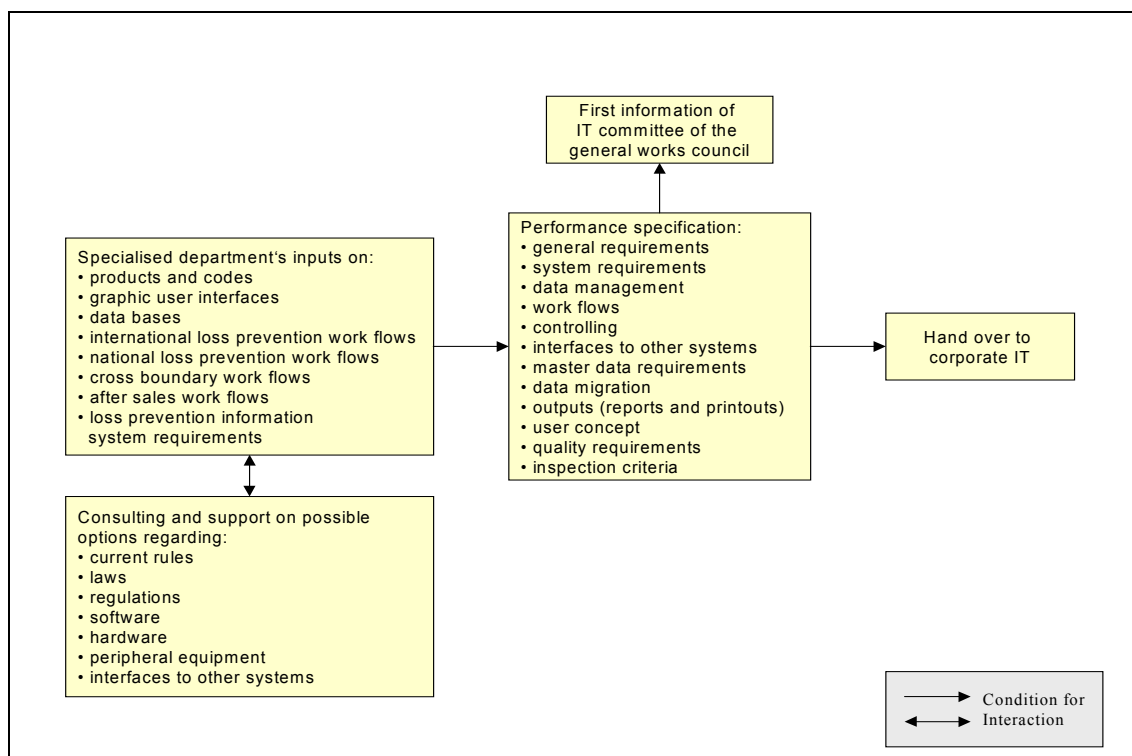
Figure 19: Performance specification phase

In order to enhance the quality of the sub-project's outputs, the corporate IT department consulted and supported the specialised department on current rules, laws, regulations, software development issues, hardware issues, usage of peripheral equipment and interfaces to other systems. Parallel to the final write up of the performance specification, the IT committee of the general works council was informed about the department's intent of changing current loss prevention work flows and related equipment. The final version of the performance specification was handed over to the corporate IT department on December 5th, 2002.

11.5.3 Phase II: Technical specification

Based on the newly designed process, the corporate IT department designed a system architecture, including physical components, physical lines of communication, software components and interfaces to other systems mirroring the specified requirements.

The technical specification elaborates on the performance specification and is heavily influenced by current technical and organisational prerequisites determining which current systems have to be changed in order to achieve the specialised department's requirements. Additionally, current service level agreements, licenses, rules, laws and regulations inform the project team's decision making on the level of changes achievable.
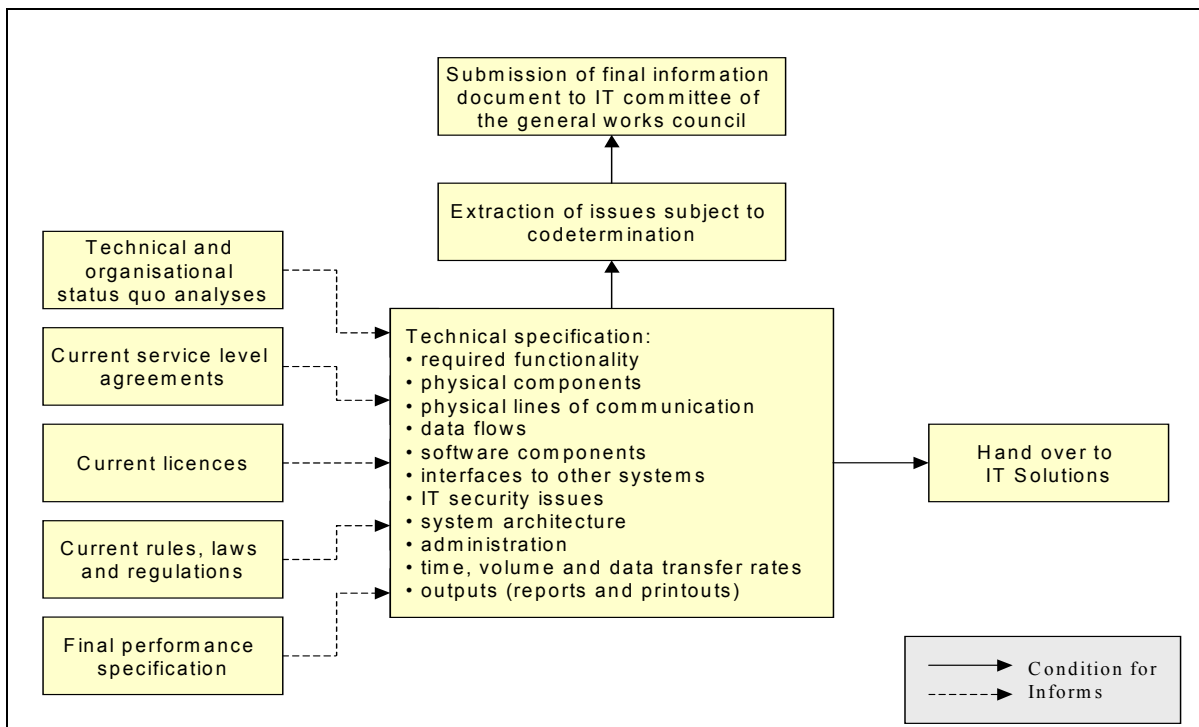
Figure 20: Technical specification phase

In addition, a logistics process is in line with IT supported physical lines of communication, data flows with specific time, volume and data transfer rates, and outputs such as reports.

After the completion of the technical specification, and before the hand-over to IT Solutions, all issues subject to co-determination are handed over to the IT committee of the general works council.

The final technical specification was handed over to a software developer to prepare a software specification for a piece of software enabling the interaction of all physical components on December 13th, 2003.

11.5.4 Phase III: Software specification

The software specification phase was about the design of a piece of software enabling our future system architecture documented in the technical specification to interact with its components in light of data flows within the system and to or from interfaces.

Furthermore, this phase had to cover the migration of old data and the adjustments of software components from the current system.
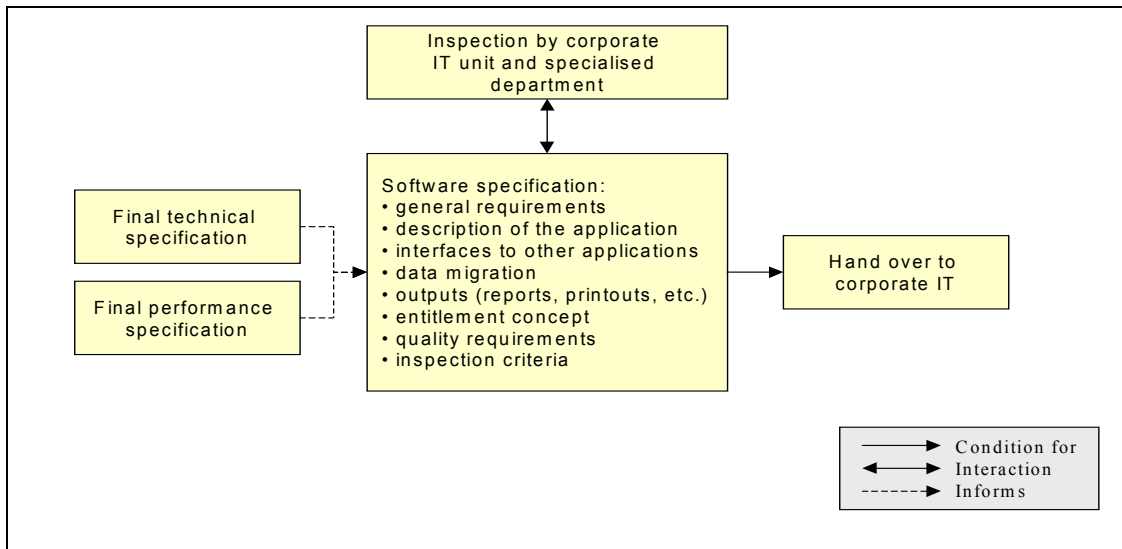
Figure 21: Software specification phase

This specification was inspected by the corporate IT unit and the specialised department. The final paper was submitted to the corporate IT unit on January 14th, 2002.

11.5.5   Phase IV: Bargaining

The so called 'bargaining' phase included all negotiations from the first project appraisal, based on the software specification to the final development mandate.

We started with an appraisal of the costs for the development mandate by the software development organisation. This appraisal includes necessary overall manpower, specialists and related costs, in accordance with the counter appraisal of the corporate IT unit and our fixed budget. IT Solutions' appraisal of the development unit was 36% higher than available budgets and 1481 project days[25] as opposed to the available 948 project days.

We had to bully them into price reductions until we reached overall costs of 97% (920 project days) of our budget. In order to gain a decent reserve, I requested the specialised department to delete or postpone modules of the application to a later release. This enabled me to submit a development mandate at 92% (872 project days) of our budget to my superiors. All postponed modules were prioritised as a guideline for the use of reserves or money saved during developments. The final content of the application to be put into the development mandate was presented to the IT committee of the general works council, triggering the decision phase of the general works council for project ESi DHL Express.

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[25] A project day equals the company confidential daily cost of one consultant per day.
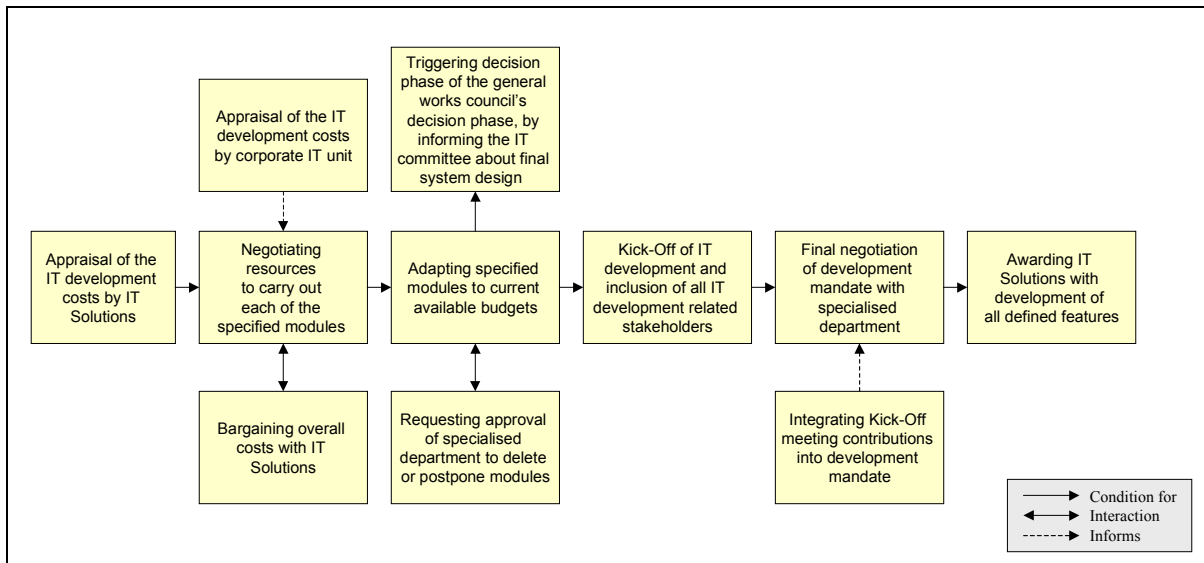
Figure 22: 'Bargaining'

On January 23rd, 2003 we held a kick-off meeting with all stakeholders needed for the development process. All contributions, main points of contact, milestones, and deadlines aiming at a roll-out in calendar week 40 of 2003 were finalised in the development mandate. For time boxing reasons the development team started with development activities on February 3rd, 2002 in anticipation of the development mandate. After collecting all necessary signatures the final offer was awarded in early March 2003.

11.5.6 Phase V: Development

All software development activities started on February 3rd, 2003 and ended on July 4th, 2003 with the hand over of the software, which theoretically had to be ready for roll-out. The application was then prepared for the field test for further 'bug hunting' and amendments, which were requested by lead users or work council members.

The development of the core application was flanked by three sets of activities.

The extraction of information about the future software was essential to determine necessary follow-up releases in 2003 and 2004 as well as service levels for the application. The definition of service levels included the finalisation of a service level agreement[26].

The second set monitored the development process and changed the application if needed via change requests. Altogether four change requests were submitted in this phase, three of which were completed. One had to be withdrawn as an automated accounting interface had to be postponed for a later release[27].

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[26] The service level agreement included the availability of the application during working hours, reaction times after which repairs have to have started, and maximum duration of repairs.

[27] The withdrawal of an automated accounting interface meant enabling automated monetary claims, which now have to be processed manually. This made several amendments necessary, as the specified printouts were not according to German accounting regulations as they were originally meant as a

This phase's final change request[28] was enforced by the loss prevention officer from Dorsten. During the first user training session several features were suggested which had not been specified previously. Those features were supported by the specialised department and still estimated as being within current budgets, and so they were implemented right away. As with the beginning of the field test, all co-determination rights were in the hands of the local works council and all changes from this change request were deactivated until permission for activation was granted by the local works council in the following phase's kick-off meeting.
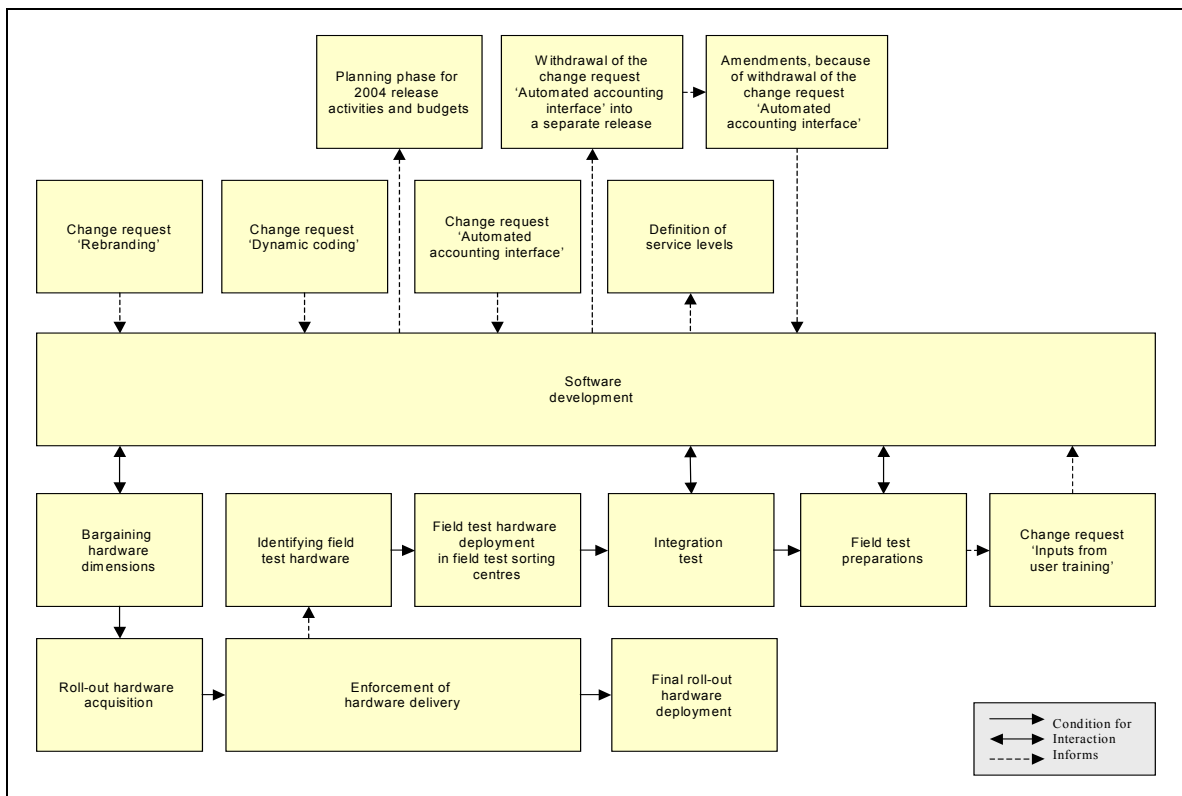
Figure 23: Development phase

Additional activities in this phase were centred around the acquisition and deployment of all hardware needed in the field test phase and for the final roll-out.

This set of activities later became labelled as 'the server wars'. This high tension block was about bargaining software dimensions, which were close to being a subject for escalation. The infrastructure department tried to save hardware costs, while the specialised department wanted superb hardware performance, the IT service provider wanted to earn money and I needed to stay in time and within budget. After a final agreement on hardware dimensions, the hardware delivery was delayed by eight weeks due to a procurement system breakdown in which the hardware request got lost. After a period of 'blame culture', which was escalated to board level from each side, an

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summary for loss prevention officers. These changes were also described in the relevant project documentation (change request, specifications and codetermination papers).
[28] Change request 'Inputs from user training'.

alternative server had to be found. This alternative server was then used for the field test. After three more weeks of delay, the final hardware was delivered for the roll-out in October.

11.5.7   Phase VI: Field test

The field test phase started after completing the core application and the activation of the change request from the user training. At this stage the application's basic functions were finished as specified, but one minor module which was finished a few days later.

The field test itself was an exception to the rule. As we negotiated support from local works councils in terms of execution of co-determination rights, we were able to implement a process in which lead users were allowed to submit improvement suggestions via their works council. This co-ordinated and thus co-determined improvement suggestion was checked to see whether it could be incorporated into the current version of the application. All suggestions were listed until the cut-off date (July 18th, 2003) and submitted in one single formal change request at the following steering committee meeting on July 25th, 2003. All features not included in this release were requested by the works council to be included in the very next release of the application.

All development activities parallel to the field test block were about 'bug hunting' and implementation of improvement suggestions from our lead users.
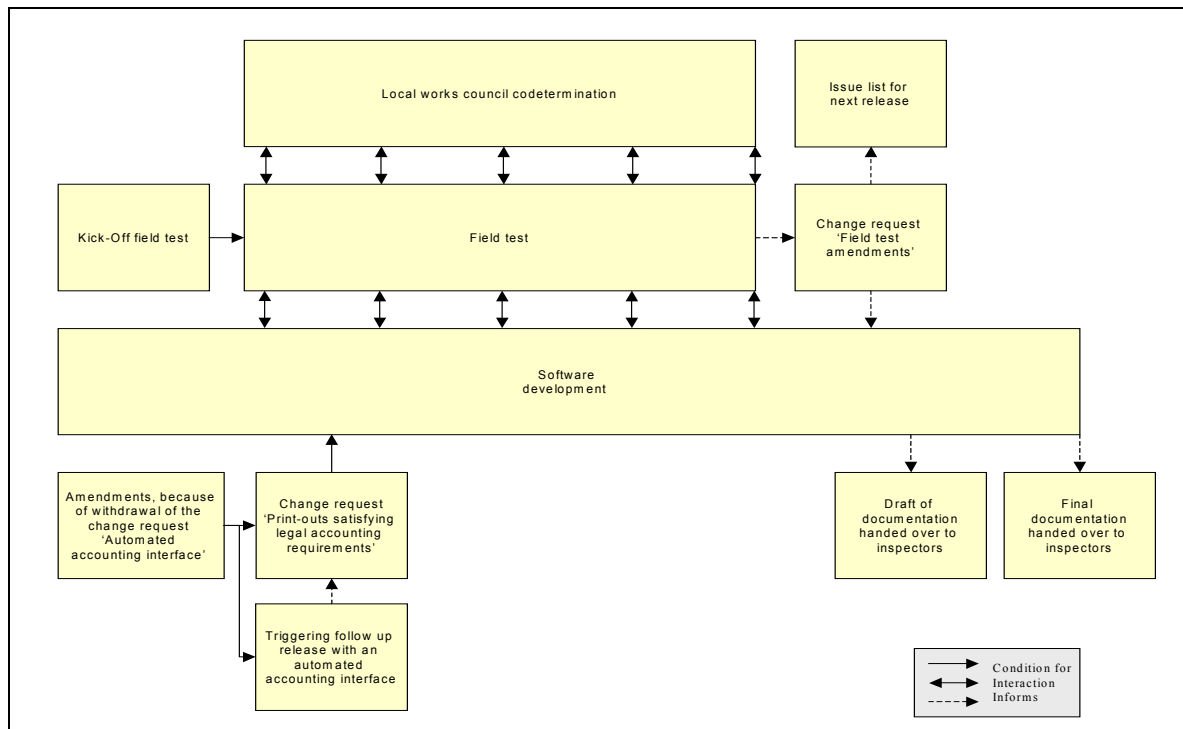
Figure 24: Field test phase

This following release was specified during this phase, due to the withdrawal of the automated accounting interface.

This field test included exposing the new application, peripheral items and all newly designed processes to its future real life environment. Hence it was possible to get a deeper insight into design weaknesses of this new system, both application and process wise.

The field test phase was completed by preparations for the following inspection, by handing over a draft of the project's documentation two weeks in advance of all inspection activities and the handover of the final documents on August 22nd, 2003, triggering the inspections starting on August 25th, 2003.

11.5.8 Phase VII: Inspections phase

Having cleared ESi DHL Express of all process and IT weaknesses, the system had to be handed over to the chief inspector of our application (Mr. Laaser).

He triggered two separate inspections, one being the operations inspection and the other being the technical inspection. The operations inspection was undertaken to ensure that ESI DHL Express operated in the narrowest sense. This includes the requirement that a simulated replica of the whole system including all hardware and software can be installed and made operational. A second parallel inspection was undertaken to identify any performance parameters specified which had not been fulfilled.
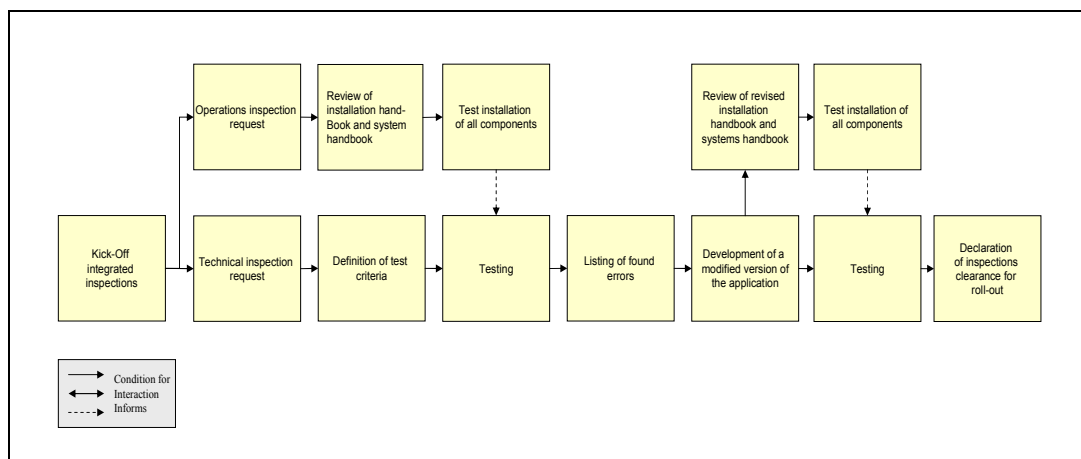
Figure 25: Inspections

Everything found in the operations inspection and the technical inspection was handed to the IT development team, which had to take care of the mistakes immediately.

After having revised the original version of the application an update was handed to the inspectors. This new version was confirmed by the inspectors to be ready for roll-out on October 10th, 2003.

11.5.9 *Phase IX: Roll-out phase*

Following the clearance from our inspectors the system was immediately set up for operations.
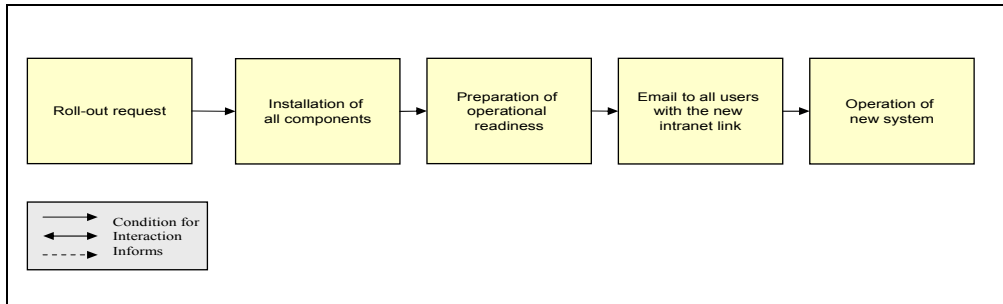
Figure 26: Roll-out

The final roll-out was completed after the specialised department informed all loss prevention officers about the new intranet link. This link was then used for all loss prevention activities from October 13th, 2003.

11.6 *Chronological overview of events and related tensions*

Aiming at the longitudinal research of tensions in project ESi DHL Express V 1.0, I suggest a combination of Van de Ven and Poole's chronological listing of qualitative events and the coding scheme for chronological events (Van de Ven et. al., 2000; Poole, 1983a and 1983b). With each interview being undertaken on a given date, a set of interviews relates to a phase in the innovation process, made explicit in the event and data source. Furthermore each event is analysed as it unfolds over time in a track, outcome and the appropriate generic tension.

Within each track's sequence timelines varied from one time event to medium or long duration tracks. Additionally, tracks interrelated in case and effect patterns.

11.7 Tensions from pre-phase to 'bargaining'
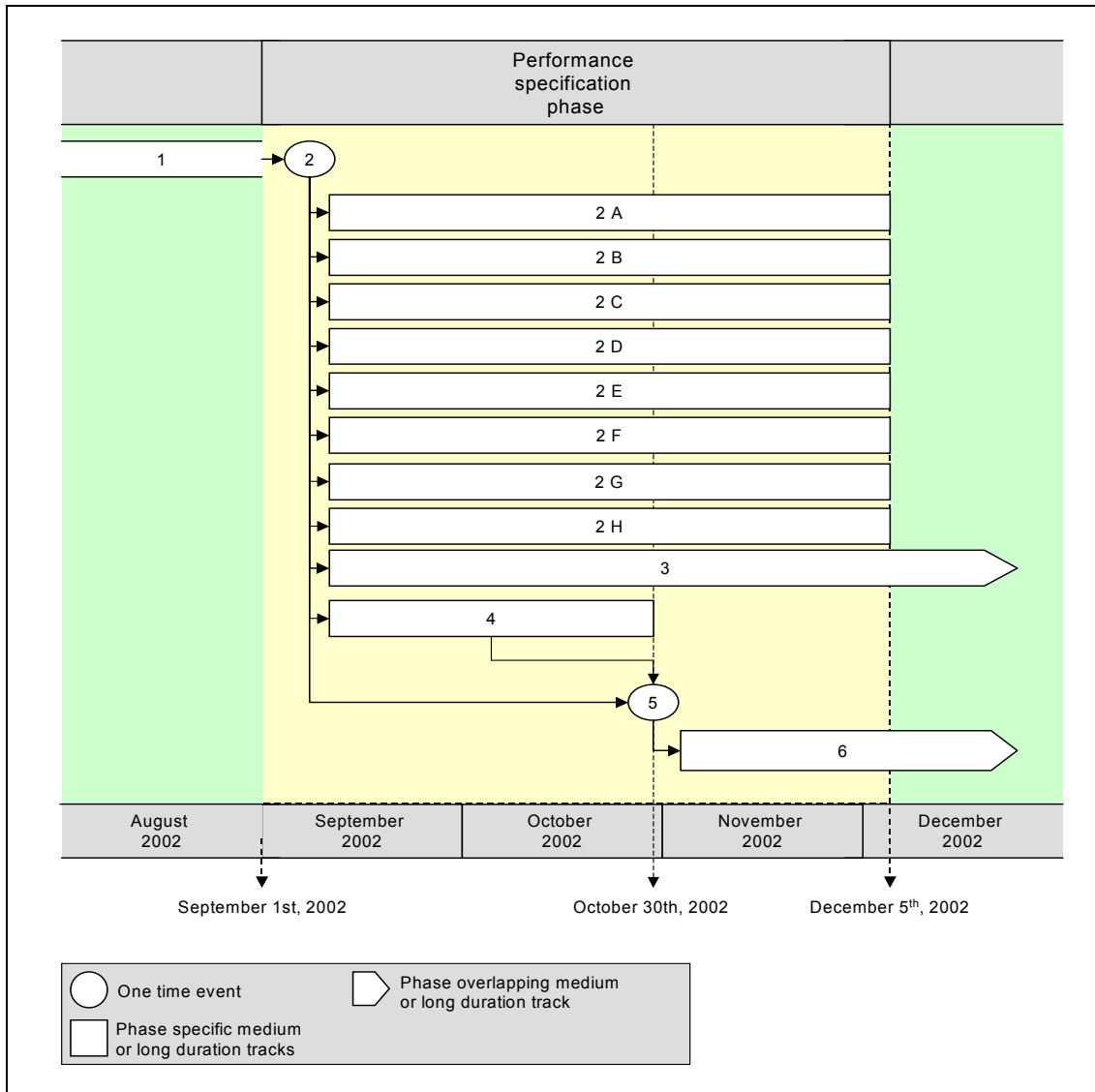
Figure 27: Tensions summary I

The tensions recorded suggest that tensions from pre-phase to 'bargaining' may be grouped, as all tensions are related to one or more specification activities. Track 1 determined how smooth the project hand-over was. Tracks 2 to 6 is a tension cluster triggered by the revision of the development mandate. This decision affected all subsequent work up until the final award of the development mandate to an IT development organisation. All tensions were resolved by reaching a certain milestone. This might imply that tensions are milestone specific. Hence, all activities needed to reach the end of a milestone, as the end of the milestone is also the end of the inherent tension.
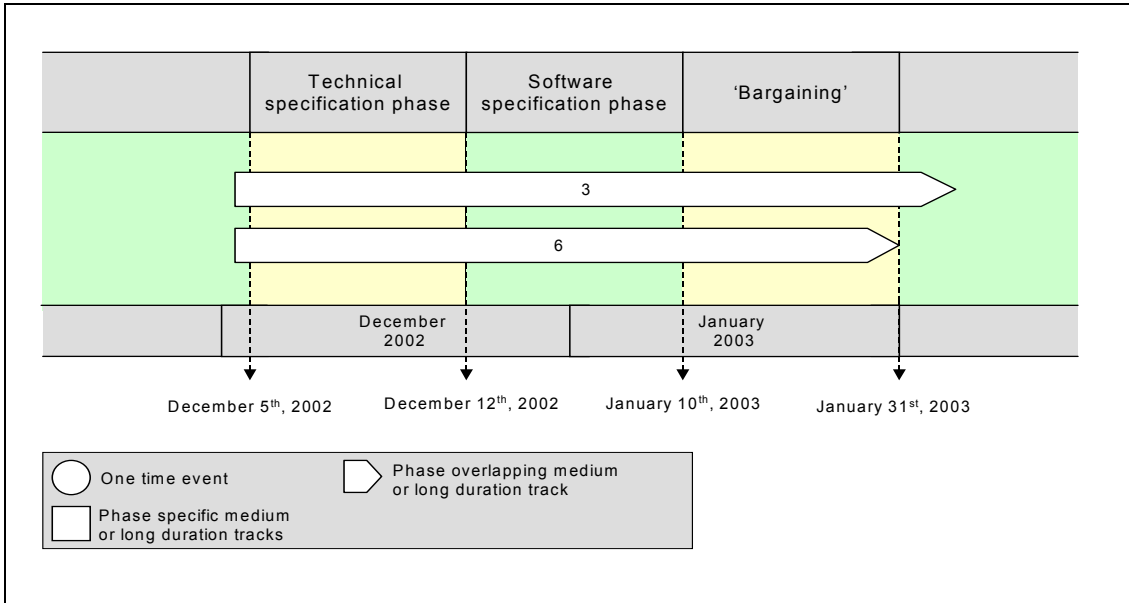
Figure 28: Tensions summary II

11.7.1 Track 1: Delayed project start

The pre-phase impact of a delayed overall project start was discussed in various interviews. Archival data suggests that the project start at the head office was delayed from May 2002 until August 2002 because of missing budgets. One effect of the delay was a specialised department and a corporate IT department not having prepared all necessary documents according to company standards. The specialised department and the corporate IT department were told on short notice that project ESi DHL Express had a go.

This track was coded towards tension 4 (freedom versus responsibility) as it was perceived as a result of the bureaucratic nature of our organisation and the complex administrative routines needed to get a budget for an innovation, even with a calculated payback of 5 month only.

11.7.2 Track 2: Revision of the development mandate

In the specialised department's internal kick-off meeting on August 19th, 2002 Mrs. Weissmann decided to revise the development mandate and all loss prevention processes.

11.7.3 Track 2 A: Sub-project set-up

As an immediate action the specialised department's staff were reorganised into nine sub-projects. Those involved in these projects had to focus on the new project with reduced line duties until the performance specification was finalised. This created an 'outside versus inside' tension, as the specialised department took the decision to deliberately set back current duties in favour of the innovation project.

In October 2002 track 2 A split into two multifaceted tensions. Within the 'outside versus inside' tension this track was perceived to develop fruitfully. Mr. Maasen reported work to be fulfilled, goal-directed and with enhanced dedication. Additionally,

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he felt that sub-project leaders had identified all unique features of loss prevention work to be innovated. The first few sub-projects were even able to hand over completed performance specification modules.

On the corporate IT side the main activity was to monitor and evaluate the outcomes of the specialised department's work. Mr. Schmidt stated that it appeared to him that although they were claiming to rework the development mandate, the specialised department was only copying old specifications. One reason for him was the fact that the specialised department was still perceived to be too involved in line duties to work on the performance specification properly. Next to that he feared that the new specification would be above our budget and too late. The delay then reached a point in which I was forced to approach the specialised department to change the deadline of the project from July 31st, 2003 to a date 'to be determined'.

Within the November interview this track started to split up into two main routes. One can be described as being within 'outside versus inside' tensions related to the specialised department's market-technology linking activities. All staff included in the project were perceived as showing above average effort and being goal-directed, in line with noticeable team building. All staff involved in line duties seemed to be suffering from stress, for even with extra effort they could not maintain even the necessary minimum support to all sorting centres needed in day to day business. For time boxing reasons Mrs. Weissmann recruited several consultants to support the specification work at the head office. This measure was intended to finish the specification faster in order to overcome this tension.

In contrast to the market-technology linking activities at the specialised department, the corporate IT unit faced various monitoring and evaluation related tensions. This cluster of 'determined versus emergent' tensions related to the uncertainty of whether the newly emerged set of specifications were worth the risks involved. One major risk was that all original project timelines were no longer achievable. This included roll-outs in or after calendar week 44[29]. In order to be safe, we had to enforce a project schedule ending in calendar week 40. Because of the need to save time wherever possible, we took the risk that all specified requirements might not have been of the necessary quality, securing efforts for time boxing reasons. In a worse case we risked that the specialised department's effort about reengineering current work flows to be so poor that we could not use them in the end. Within this dilemma the project was evaluated totally the opposite from key monitoring stakeholders. While Mrs Weissmann felt comfortable as the project was perceived to be progressing and was goal orientated, dedicated and fast, Mr. Wolf felt our progress to be too slow.

In January 2003, after the completion of the specification of the performance specification, Mr. Jung, Mrs. Weissmann and myself unanimously agreed that the project team had grown on the task achieved.

After awarding the development contract to Deutsche Post IT Solutions in Trier (Germany), Mr. Jung's key account manager, who negotiated the final contract, was

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[29] Calendar week 44 is the starting point of postal Christmas volume peaks. Roll-outs in the time corridor around calendar weeks 44 to 52 is a problem for sorting centres.

opportunistically interviewed. In his interview he criticised the fact that the overall process from the start of the project to the final contract had lasted far too long.

11.7.4   Track 2 B: Consulting the specialised department

Within the new sub-projects, roles and relationships among the sub-projects, as well as external consultants like the corporate IT department and IT Solutions, were defined. Within the definition of roles the corporate IT department was asked to assist the newly defined sub-projects by consulting loss prevention staff with IT know-how. Mr. Schmidt and I perceived that the loss prevention staff worked at an inappropriately high level and specified too deeply, thus causing time losses. Examples of this were requests at Oracle report generator level or how new data models should appear, instead of specifying what information was needed in a report or which parcel data needed to be documented (e.g. size and weight). Track 2b was perceived as a 'new versus old' tension.

11.7.5   Track 2 C: Re-evaluation of the development mandate

In line with the revision of the development mandate we saw the need to re-evaluate the new mandate in terms of whether the it was achievable within the current budget and time lines. The need to re-evaluate the project was seen as a 'determined versus emergent' tension.

11.7.6   Track 2 D: Perceived dangers

Within the various interviews many stakeholders expressed their concerns about redoing the mandate. All of them were about the uncertainty about the outcome of the new mandate, and especially about the unpredictability of budgets, timelines and the interfaces that the new application might need. Furthermore, the corporate IT department feared that the new application might not meet the expectations of various stakeholders in our organisation.

11.7.7   Track 2 E: Changes at the specialised department prior to the project

In summer 2002 Mrs. Weissmann became head of the loss prevention department in the head office of Deutsche Post. Within her new role she had to decide how to deal with project ESi DHL Express. On the one hand, she was perceived to be too unfamiliar with loss prevention processes to decide on their future, and on the other hand she expressed new ideas about the subject. Even though she was aware of and explicit about being new in her management role, she decided to re-engineer loss prevention procedures to current requirements. This decision was the key to the emergence of new requirements in ESi DHL Express and can be seen as a 'emergent versus determined' tension.

Five months later Mrs. Weissmann's interview indicated that even though she felt good about the project, this feeling was only conveyed to her via her close co-workers, and was not based on deeper insights.

11.7.8   Track 2 F: Up front definition of requirements

Mr. Jung at IT Solutions was glad about the up front definition of requirements. He said in his interview, 'I see the current procedure as a good thing. The specialised department generates a performance specification, defining all parameters to be

implemented. In former times many requirements and ideas were given to us, having to be integrated in an ongoing development close to finalisation on very short notice.'[30] This tension of restricting emerging ideas was coded as a 'determined versus emergent' tension.

11.7.9 Track 2 G: IT related risks of project ESi DHL Express

From an IT point of view the project was driven by the need to react to hardware and software no longer being supported. In the event of the new application being postponed or turned down for good, significant maintenance and leasing costs would have been inevitable. Ultimately the old application would have had to have been migrated to a new hardware system, as well as to a new software[31] version. With this being an important criterion for project appraisal matters, this is coded as a 'freedom versus responsibility' tension, as the team's freedom to innovate was limited by the need to avoid changes and delays causing costs which would no longer legitimise Mrs. Weissmann's decision to change the mandate.

11.7.10 Track 2 H: Expected quality of outputs

All first tier stakeholders were keen about the chosen route of redoing the mandate and the way in which it was done. The original mandate was a pure transfer of the old loss prevention application to an intranet application. The new mandate was about an intranet application, stripped of features perceived as outdated and enhanced by as many features as we were able to afford in exchange. With this intention in mind the specialised department was perceived by all first tier stakeholders as working very hard on the new mandate and the required performance specification. The perceived superior quality was seen as a legitimisation of the effort put into this new mandate and the reduction of line duties. Thus this tension is coded 'freedom versus responsibility'.

11.7.11 Track 3: Strategic uncertainty

Parallel to the ongoing project it became uncertain whether the ESi DHL Express application would fit future needs. In a top management initiative DHL, DANZAS and Deutsche Post Euro Express were merged into one single organisation, from April 2003 onwards. The impact of the future corporate strategy regarding the integration into DHL was uncertain. The project became subject to constant screening by corporate strategists. Within their evaluation and monitoring role projects are confronted with a 'determined versus emergent' tension from outside the project team, both implicitly, in times of strategic compliance, and explicitly, in terms of strategic change.

In November 2002 track 3 developed into a 'determined versus emergent' tension and a related 'freedom versus responsibility' tension. The specialised department delayed the handover of the performance specification aimed at reengineering current work flows. The original handover date had to be postponed to December 4th, 2002 and the delay made it impossible to roll the system out prior to July 2003.

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[30] Translated from Mr. Jung's interview. The German original was: ‚Als positiv würde ich die jetzige Verfahrensweise betrachten. Die Fachseite erstellt ein Grobkonzept, in dem die Anforderungen definiert sind die umgesetzt werden. In der Vergangenheit sind zahlreiche zusätzliche Anforderungen, Ideen von der Fachseite an uns heran getragen worden, die kurz vor Implementierungsende noch in die aktuelle Version integriert werden mußten.'
[31] From Oracle 7i to 8i.

A few days after the delay became public, the project became subject to new budget screening activities by the corporate IT strategy unit. All projects at Deutsche Post rolled out in Summer 2003 or later had to be re-evaluated as they have to fit into the integration strategy at DHL. The evaluation of whether or not ESi EE would fit future needs at DHL was totally unpredictable.

In January 2002 this track again became an issue. The overall IT budget situation at Deutsche Post made the closure of projects inevitable. The specialised department immediately started reconnaissance activities on how to enhance the project's future benefits for DHL's integration requirements. These activities turned out to be in vain. Afterwards, the only hope seemed to be to keep a low profile by avoiding any potential financial issues within the project. We thought at that time that the pure chance of approaching overdrafts of current budgets would be the end of the project.

11.7.12 Track 4: Inter network tensions

The decision to rewrite the development mandate had one further effect, mentioned in Mr. Jung's September interview. With IT Solutions only having maintenance budgets the desperately awaited new contract was delayed by the time the specialised department needed to rework the necessary documents. IT Solutions had to keep development specialists on stand-by without pay. Because of the collaborative atmosphere in the project we had to overcome the 'freedom versus responsibility' tension of giving the specialised department the freedom to rework with the danger of a potentially project endangering brain drain at IT Solutions. In order to secure specialist knowledge on stand-by and already on the organisation's payroll, I called up a steering committee meeting.

11.7.13 Track 5: First steering committee meeting

Tracks 2 and 4 forced me to call for a steering committee meeting on October 30th, 2002.

The organisation's fixed budget system prevents budgets from being carried from one year to the next. Thus unused forecasts expire, of which was forecasted 60% use of budget in 2002 and 40% use of budget in 2003. With the specialised department reworking the development mandate for nearly five months, hardly any budgets were used in 2002, inevitably leading to 60 % of the project's budgets to be due to expire on December 31st, 2002. This tension was seen as a 'determined versus emergent' tension as it allowed improvements of the determined project set-up by allowing the emergence of new ideas within the new performance specification, and nearly led to the closure of the whole project. The threat of closure of the project, a 'new versus old' tension, arose, forcing all stakeholders to contribute within their area of responsibility to overcome this tension, thus saving the project.

In this meeting we decided to award development contracts to our IT Solutions provider in advance. In four commercial papers we tied up a sum close to the 60% needed to save the project. In this way specialists could be kept on the payroll sensibly, by preparing everything necessary to start with development activities as soon as the software specification launched the development phase.

This caused two 'freedom versus responsibility' tensions. On the one hand we tied up the budget by pre-awarding the development contract to IT Solutions, enabling them to work on the future application and its architecture. On the other hand, especially in light of the forthcoming seasonal holidays in December, IT Solutions feared that advanced development contracts could lead to chaotic ad-hoc measures over Christmas.

11.7.14 Track 6: Choosing the best development environment

Following track 5 IT Solutions started to prepare the development environment. For the nature of the application to be designed, Oracle 9i was perceived to be the best choice. As a result IT solutions requested the use of Oracle 9i as an application development environment, which was not among the technical blanket agreements of Deutsche Post. With Deutsche Post not having the appropriate licenses, which were negotiated at that time, I decided not to take the risk of preparing for the use of Oracle 9i, which might be in vain. Current licenses may cause 'determined versus emergent' tensions. Within the evaluation of Oracle as a development tool we faced the problem of having to develop a workaround in a feature of Oracle 8i, which might be standard in Oracle 9i with additional and avoidable costs. Furthermore, we wanted to avoid a later migration from 8i to 9i for ESi DHL Express as soon as 9i became part of the technical blanket agreements of Deutsche Post and 8i is no longer supported by Oracle.

After dropping everything to implement Oracle 9i, IT Solutions was told to backtrack and install Oracle 8i instead. This caused an argument between IT Solutions and the corporate IT unit. From an IT Solutions point of view it was perceived as a weakness to have to develop with Oracle 8i, as several features are included in Oracle 9i which were judged as critical to the new application. The discussion escalated when it became clear that building back a development environment generated additional costs. The corporate IT unit declared that it would not be willing to pay as the development environment had not been finally confirmed.

After agreeing on Oracle 9i as the final development environment, all servers were reset from Oracle 8i to 9i. This decision was applauded by the development team as various features of Oracle 9i would be helpful during the development of an intranet application.

11.8   Development phase related tensions

11.8.1   Track 7: Kick-off meeting 'IT development'

After the completion of the software specification we tried to launch the development phase in a kick-off meeting, which included all the relevant stakeholders. Most of the stakeholders were rather problematic as certain people wanted to attend personally, making it very difficult to settle a date for the meeting. The inclusion of stakeholders in similar events may cause 'freedom versus responsibility' tensions at a level that they are explicitly stated by the people engaged in scheduling activities.

We finally managed to get all the stakeholders together, and the actual meeting with sixteen participants was held on January 31st, 2003. Mr. Seemann explicitly praised the

fact that all stakeholders were present, yet the meeting was perceived as being overstaffed as several business units sent more than one representative.

11.8.2 Track 7 A: System administration weaknesses

During and after the meeting Mr. Seemann pointed out that current procedures had certain weaknesses, which should be tackled in future. The missing cornerstone was the lack of application support planning. At that time there was no offensive planning of user help desks, service level agreements or dynamic coding of modules aiming at lower post roll-out administration costs. Mr. Seemann suggested that his department should be included in earlier stages of projects.

11.8.3 Track 8: Unexpected additional costs

In late January we were surprised by the announcement by T-Systems, our IT network operator, that the installation of software packages, which had been undertaken for free up till than, would no longer be free. With there not being any funds for installations in project budgets, additional funds were needed. In light of the tight overall budget situation in 2003 all projects with high additional funds ran the risk of cancellation. In our case, buffers were blocked to cover forthcoming installation costs.

11.8.4 Track 9: Intranet style guide

All applications at Deutsche Post have a layout guideline. In our case project ESi EE had to be designed in accordance with the corporate Intranet style guide. IT Solutions ran into trouble as the first few screenshots suggested that the style guide had major disadvantages in terms of human factors engineering, as the it was designed for intranet presentations and not for a working environment using intranet technology. This led to a long electronic mail war as the marketing department in charge of corporate identity insisted on compliance with given standards.

11.8.5 Track 10: Post kick-off meeting performance perceptions

After the kick-off meeting the project was perceived to be developing well, especially in terms of intra-network co-operation.

11.8.6 Track 11: Windows/Office XP

One of the requirements specified in the original development mandate was the use of Windows and Office XP. With the company not having reached a final decision on the implementation of Windows and Office XP the project reached a point at which a decision for the older Windows NT standard was inevitable. Mrs. Weissmann amended the mandate and turned down the requirement to develop the application for Windows XP for good. The application now had to be developed for Windows NT standards. A later release of ESi DHL Express now had to be developed for Windows XP and the current running release will have to be migrated to Windows XP in parallel.

11.8.7 Track 12: Definition of hardware requirements

Following the IT development kick-off meeting, the hardware requirements had to be finalised. The first proposal made by ITS was totally oversized, leading to a series of arguments. ITS' proposal was perceived as being too high.

11.8.8 Track 13: Finalising all necessary systems interfaces

When it finally came to the definition of the necessary links to other systems, we felt that there were noticeable gaps of knowledge about the system to be developed. We did not know which interfaces to current available systems were needed, or the configuration of the clients to fulfil future requirements. Several stakeholders felt uneasy about the missing 'helicopter view' of the system we developed. It was perceived that ITS lacked proactive collaboration with other relevant systems with which we needed to have interfaces, and hence the corporate IT unit enforced a higher degree of coordination and collaboration with other systems and projects. After the enforcement we noticed that ITS simply used all interfaces from the old loss prevention system without having tried to optimise, but because of narrow timelines it was accepted as the only option.

11.8.9 Track 14: Enhancing lead user friendliness

After some time we recognised available project reserves and started to use budget reserves to enhance performance and user friendliness. Mr. Wolf intervened. I was told to give back money to be used for other projects instead of delivering 'nice to haves' beyond what was specified by the specialised department.

11.8.10 Track 15: Changes in the ITS development team

One of the project members at ITS left the team for personal reasons. ITS tried to compensate for the 'brain drain' by recruiting a new staff member prior to the phasing out of the developer to ensure a smooth transition.

11.8.11 Track 16: Finalising the contract

The final contract following the development mandate was significantly delayed within the bureaucratic procedures involved in closing a major contract. The development team became uneasy. We tried to put pressure on the new contract and took the original around the organisation to gather all the necessary signatures.

11.8.12 Track 17: Reusability of old components

We had to check which components of the current ESi release were reusable. Only one was identified and migrated.

11.8.13 Track 18: First tests by lead users

A first test of all future core components of the new application was set up. The application was then successfully tested on a replica client used by loss prevention staff.

11.8.14 Track 19: Hardware procurement

In early April I was warned by Mr. Wolf and Mr. Laaser that our infrastructure service provider T-Systems International had long and complicated procurement processes, which have led to problems in several projects. I was asked to ensure that in case T-Systems did not deliver our hardware in time, it would be compensated for somehow, in order to avoid delays in the overall project. This track reappeared every time Mr. Wolf heard bad news from neighbour projects in his area and he checked on our status regarding server procurement. This track included various forms of escalation over

time, as due to a breakdown of the procurement system of T-Systems our hardware request was no longer able to be tracked.

11.8.15 Track 19 A: Hardware procurement

One of the precautions we took was to investigate whether we could use a server with similar dimensions which was not being used and was available at that time. Once this machine had been identified, we negotiated to be able to use it during our field test phase.

11.8.16 Track 19 B: A manual second hardware order

Due to a breakdown of the procurement system of T-Systems, our hardware request was no longer able to be tracked in the procurement software SAP. With the status of the original unknown, the hardware request had to be done manually. This delay resulted in 'negative feedback' from all stakeholders involved in hardware dependant development activities at that time. The delays at the end of this track had added up to eighteen weeks.

11.8.17 Track 19 C: Borrowing a spare server

With the hardware order having to be redone from the start, we borrowed a server from somewhere else in the organisation, which we were able to use for the field test.

11.8.18 Track 19 D: 'Just in time delivery'

On the very last day the original servers were delivered. This achievement was only possible after including various forms of escalation, including our and their boards of management.

11.8.19 Track 19 E: Six missing hard disks

The only problem was that the servers had missing components. This incident was immediately escalated as forcefully as possible.

11.8.20 Track 19 F: Declining morale

The delays caused during the procurement of six missing hard discs lead to a delay of thirteen days in the field test, the inspections, and ultimately in the roll-out. Even with the highest commitment a project manager could expect, my team was not able to compensate for the delays below thirteen days. This led to declining morale.

11.8.21 Track 19 G: Enforced hardware delivery

The missing six hard disks were acquired at short notice.

11.8.22 Track 20: Status reports as only source of development process

Some stakeholders felt uneasy about the uncertainty caused by the fact that status reports were only available as listings of work in progress and percentage of completion. Mr. Seemann and Mr. Schmidt were explicit about the tension. They perceived it as being close to impossible to execute their area of responsibility with only status reports. In that case development activities were more or less seen as a 'black box', with percentages of progress and percentages of used budgets. This was in the

context of narrow timelines in which developers concentrated more on development activities than on documentation and communication.

This tension was apparent until the application had been finished to a stage where it could be deemed to be ready for field testing as a running system. With the presentation of the system in one of the field test locations (Dorsten), this tension was resolved.

11.8.23 Track 21: Innovation as an on top workload

The concept of a field test made it inevitable that loss prevention officers had to use parallel systems, and so had an additional workload. The amount of additional work was criticised, and was carefully monitored by local works councils.

11.8.24 Track 22: New common label

The executive committee of Deutsche Post decided to introduce a new label and coding system. This decision triggered a temporary tension about whether the current coding logic in the application had to be redone at short notice.

11.8.25 Track 23: First demonstration of the application to shop floor staff

As part of the preparation for the field test, loss prevention staff had to be trained in the use of the application. Even though the innovation was seen as being on top of their normal work load, the results of the development were seen as a satisfactory compensation for the effort.

11.8.26 Track 24: Field test agreement

As a reaction to track 21 we negotiated a 'field test agreement' with the general work council, delegating the overall co-determination rights to the local works council in Dorsten. This unusual but trust-building measure enhanced the rights of the works council beyond current regulations by making it part of the core team. All decision making had to be done in collaboration with the works council. This opened up works council expertise to the field test and allowed us to change details in the application without having to undergo the legal twelve week decision cycle of works council co-determination in this project type[32]. This was possible as all changes leading to change requests were reached together with front line staff, our social partner, and management. All field test related improvements were developed at short notice in individual oral agreements with the local works council and formally finalised in a single change request at the end of the field test. These changes included the correction of mistakes and improvement suggestions by local loss prevention staff.

This agreement thus avoided the usual tension that details cannot be changed at short notice and need to be postponed to later releases. Postponements may lead to an inferior application being rolled out until a later release is available.

11.8.27 Track 25: Change request 'Automated accounting interface'

Within the course of developments it was suggested that we should implement an automated accounting interface, making it possible to directly withdraw money from customers' accounts instead of making a pile of printouts and handing them to the

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[32] Cf. Gesamtbetriebsvereibarung IT

accounting department for further manual processing. Even though this was supported by all stakeholders, the module was too expensive and time consuming to develop within time and budget. The automated accounting module was postponed as an immediate follow-up release in 2003 after the roll-out of this version of the application.

11.8.28 Track 26: First corrections

During the first training of local loss prevention staff, ITS was bombarded with suggestions for improvements which had to be fixed prior to the field test. As all of them included minor corrections they were finalised prior to the field test.
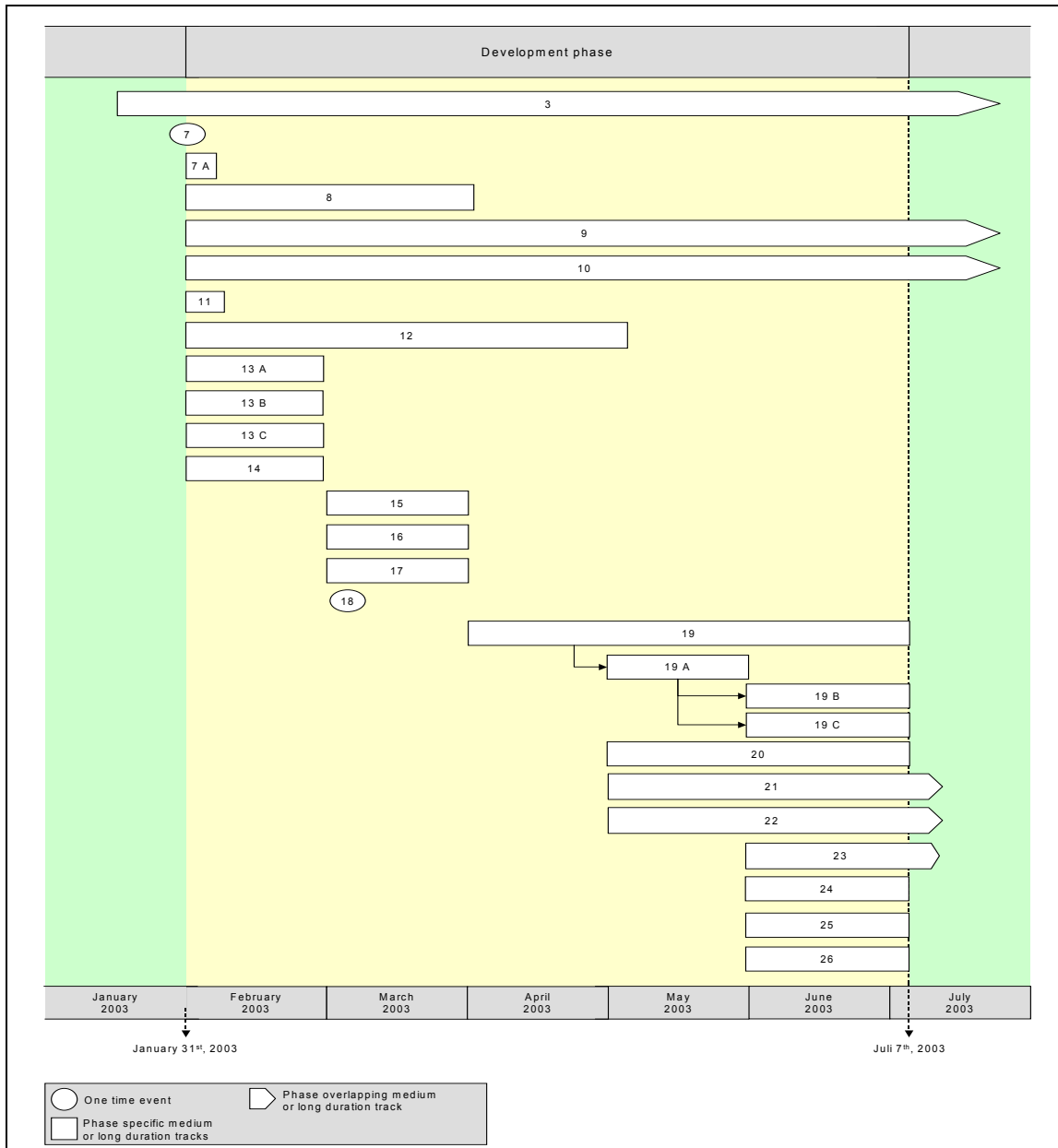
Figure 29: Tensions summary III

11.9 Tensions from field test to roll-out

11.9.1 Track 27: Performance tests

Within the field test the tension of whether or not we should have done performance tests emerged. This discussion continued throughout the field test. In the end it vanished as the few people involved in the field test would not have been enough to put the large system under sufficient pressure, and assumptions were made with the final sixty end-users.
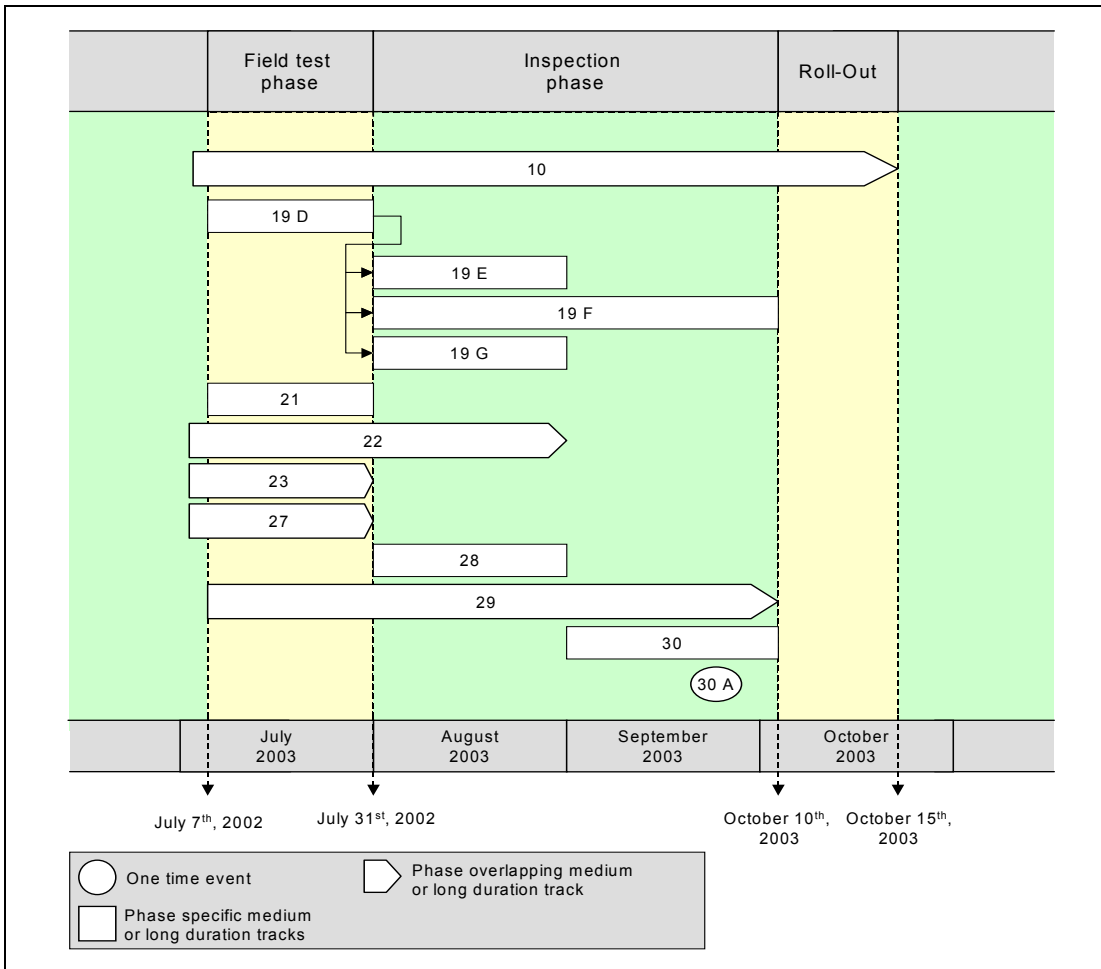
Figure 30: Tensions summary IV

11.9.2 Track 28: Awaiting the judgments

In August a strange uncertainty began to arise as to whether the inspections would highlight mistakes which we would have to handle at short notice. This tension faded away the longer the inspectors remained quiet.

11.9.3 Track 29: The ability to think in releases

The closer the project got to its end the more the specialised department started to think in releases. From a certain point onwards it became routine to discuss whether a certain feature was something we could do within budget and time reserves and which features had a priority allowing to be postponed to a later release.

11.9.4   Track 30: Aftermath

With a very high degree of consensus, all interviews suggest that project ESi was well managed in terms of carrying out a solid overall game plan, with the exception of two minor flaws. One was the start-up disruptions caused by the specialised department's decision to re-do the project content, and the second was the external hindrance by TSI. All first tier stakeholders expressed their willingness to re-do the process with minor corrections only.

11.9.5   Track 30 A: Aftermath perceptions reassured

Close to the end of the inspections Mr. Jung became the 'victim' of an internal quality audit at IT Solutions. The findings of the audit committee support the views outlined in track 30.

11.10   Conclusions

Evidence in response to the original research question, about what tensions are experienced in the defined stages of the current innovation process at DHL Express, has three aspects. Firstly, tensions were inherent in activities and hence were related to the stakeholders involved in that specific activity.

Secondly, tensions develop over time within a phase, and as a worst case may even trigger new tensions, as seen in tracks 2 and 19. Finally, tensions need to be managed with the same level of commitment as their parent activity.

11.10.1   Type of tensions

It seems advisable to add a second dimension to the four generic tensions proposed by Dougherty (1996). This second dimension covers the constellation of stakeholders involved.

Three distinct constellations were recognised in this study. These three were:
> - bi-polar
> - multi-polar and
> - proxy tensions.

11.10.2   Bi-polar tensions

Only in rare cases are bi-polar tensions between two stakeholders. Most of them are commitment problems in which one stakeholder enforces a prerequisite activity within a given context. One example is track 2 D. In a simplified stakeholder diagram depicted below, the 'problem owner' and champion of a project and the project manager are subject to a bi-polar tension. In real life the emerging new project content made it unpredictable for me to manage the effects on budgets, timelines, relationships to interface systems, expectations and requirements.

General
works
council

‚Problem
owner'

Programme
manager
Production

Interface
manager

Programme
manager

Inspectors

Project
manager IT

Specialised
department

Operations
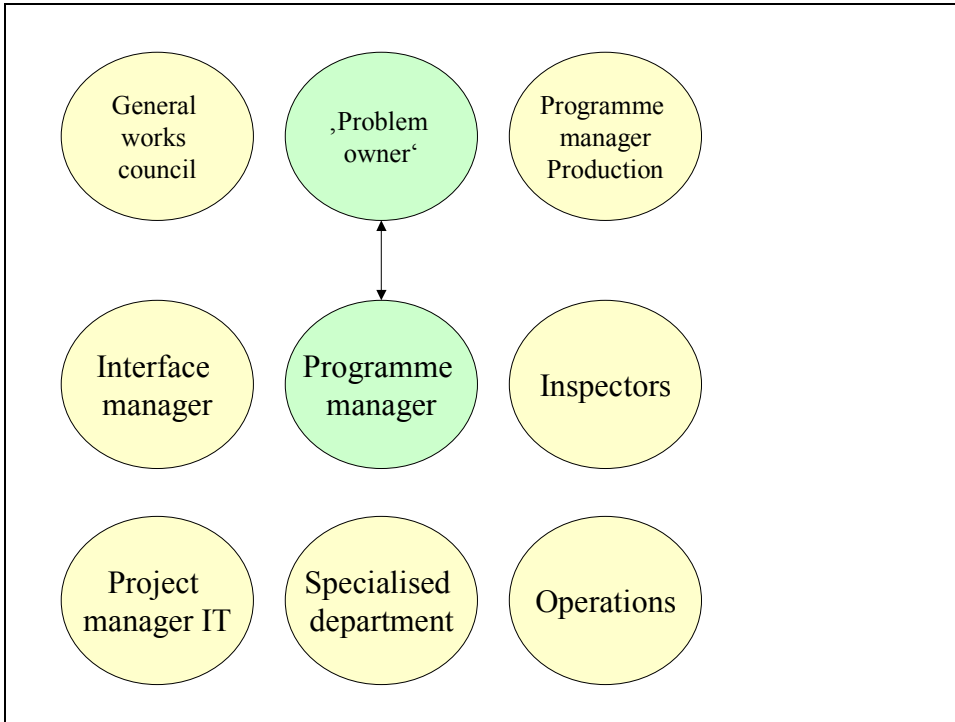
Figure 31: Bi-polar tensions

11.10.3 Multi-polar tensions

Multi-polar tensions were between three or more stakeholders. One example is track Number 19, in which the hardware dimensions were defined. On the one hand IT Solutions gave a recommendation where they thought the required one second answering time per investigation was definite. On the other hand Mr. Seemann's department required this project to be cheaper in terms of leasing costs and maintenance. Mr. Seemann's department has the last say in our organisation. His proposal of hardware dimensions did not meet the requirements of the specialised department, and hence created a problem for me. As project manager, I would not have got away with an unsatisfied specialised department and rebelling end users because a slow application would not deliver the speed needed in day to day operations.
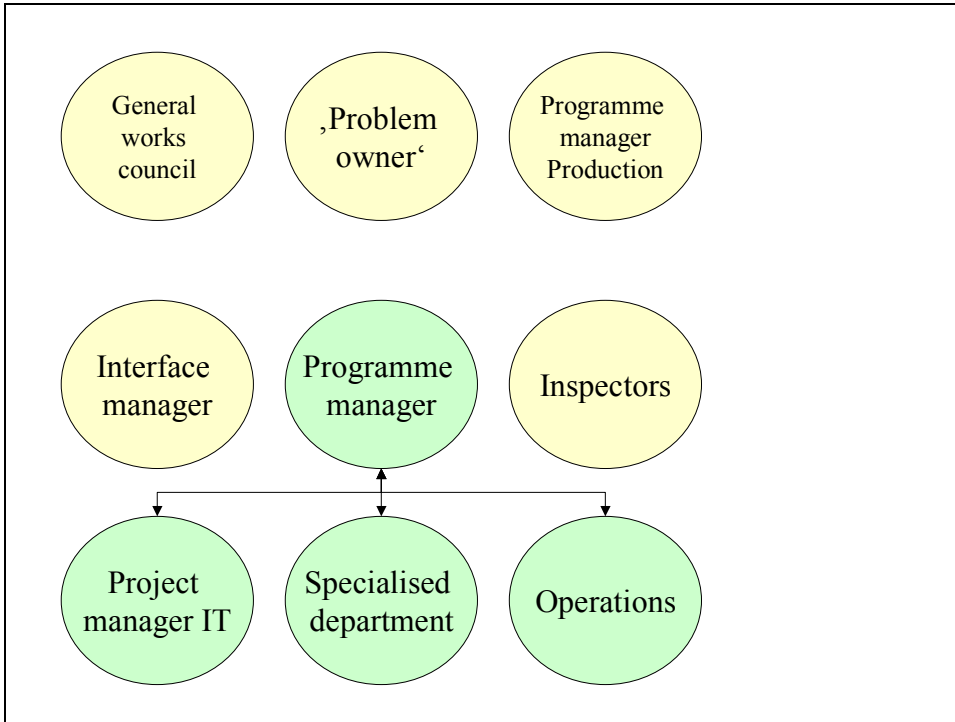
Figure 32: Multi-polar tensions

11.10.4 Proxy tensions

In a proxy tension a core first tier stakeholder had to manage an activity involving a third party. In our case Mr. Laaser had to acquire all hardware via T-Systems International. This is very problematic, as experienced in track 19. Commitment to innovation in a proxy tension is high as it is determined by the contracts involved. Whenever a first tier stakeholder as part of a team has a commitment to end an activity on a given date, he or she will do his or her best to do so. This may be different with resources not directly involved in an innovation. Our contract included a delivery horizon for a server within eight weeks. T-Systems[33], as reported in one of Mr. Laaser's interviews, was 'not impressed' by our escalation to try to enforce the delivery on a given date.

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[33] I would like to stress that T-Systems here stands for certain underperforming individuals and not for the organisation as such. Those members of T-Systems involved in the inspections tried their best to compensate for time losses. We would not have been able to compensate for the hardware delays without them.
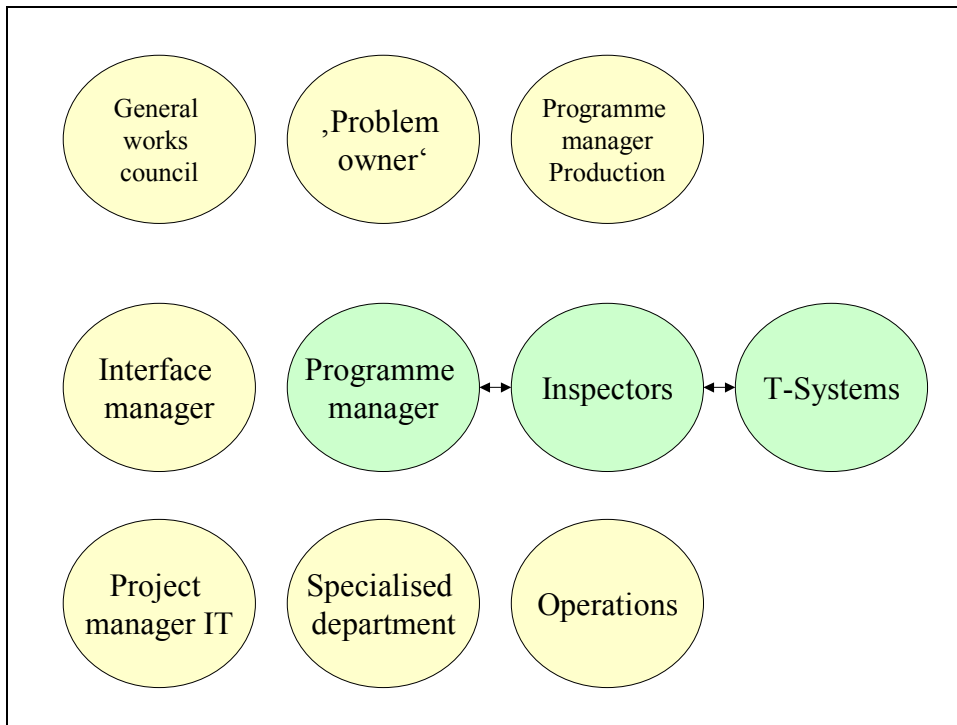
Figure 33: Proxy tensions

11.10.5 Tension management

Tension management relates to managing an activity and the inherent tension in an emancipated manner. Tension management may be clustered in terms of tension 'reconnaissance', tracking and restoring unbalanced tensions. In a non-research setting these three are crucial as managers do not usually have interviews to draw on.

11.10.6 Tension 'reconnaissance'

Tension reconnaissance includes all activities undergone to gain knowledge about tensions with the potential to become unbalanced, those which are becoming unbalanced, or those which are already unbalanced.

11.10.7 Tension tracking

Tension tracking relates to developments over time, the spin-off of derivatives or stakeholder inclusion. Certain tensions, like track 10, may continue throughout a project, while others are one-off situations.

11.10.8 Restoring Balance

The ability to restore balance has two aspects, one being the ability to actively manage participants executing an innovation towards a common goal. In this case study, the latter was achieved in all cases. On the other hand, managing external resources, especially in bureaucratic settings via proxy tensions is a problem which needs further investigation as this may have a disastrous impact on innovation activities.

11.11 Limitations

11.11.1 Research strategy limitations

I am aware that the conclusions drawn in this paper are specific to the case being examined, and one may hence question how effective a single case study may be in fully investigating tensions. Yin (2003), however, concludes that 'even a single case study can often be used to pursue an explanatory, and not merely exploratory, purpose'. Given that suggestion project ESi DHL Express can be used as a basis for later model building activities, if as Yin (2003) recommends 'the analyst's objective should be to pose competing explanations for the same events and to indicate how such explanations may apply to other situations'. The explanations I posed in this paper in the conclusions sections are meant to be understood as a first attempt to break new ground and address innovation management in logistics as a topic and as an invitation for scholars to elaborate on this by both verification and falsification activities.

11.11.2 Research method limitations

Within the 'doctrine of phenomenalism' only those events which are observable are researched. Those events or issues which were evaded or otherwise circumnavigated because of the nature of the project, or which were not stated in interviews may lead to limited generalisability.

11.11.3 Linguisticl limitations

Despite the validity enhancements used in this study the language barrier rooted in my German origin and the German context may also lead to a limitation to generalisability. With English not being my native tongue I may not have been able to convey the essence of original texts during writing up or translation activities.

11.11.4 Commitment related limitation

Other limitations can be assumed, because of management and stakeholders being aware of the fact that project ESi DHL was a research project. Certain tensions may have been balanced because of above average commitment at stakeholder level or above average protection by management. On the other hand this project may have been subject to vindictive measures by colleagues not wanting this research to be successful.

11.11.5 Interview delays

Additionally, interviews were sometimes delayed because of workload problems or staff absence. Those interviews might overlap with events covered across interviews, or be affected by the current status of a track at the time of writing.

11.11.6 Tension tracking

The assignment of tracks may be questioned. As the interviews were on a monthly basis the allocation of tracks had to be assigned to a month. If triangulation with archival data was not possible, tracks had to be used as an event unfolding in a one month block.

11.11.7 Organisational limitations

DHL Express is a very mature organisation and is good at innovating logistics processes. In addition, this project was managed by an experienced team. This could imply that the project did not face the tensions that one might encounter in an innovation project with a different team, let alone in a different organisation.

11.12 Research proposal for Project Two

All stakeholders have a perception about the success and failure criteria of an innovation within the development process. Thus, I should try to make those criteria part of the model, to ensure that all stakeholders are included in the process in terms of managing expectations and problem ownership. By expectations I mean that an innovation has to meet all stakeholders' perceived levels of benefit. By problem ownership I relate to the differences of sets of stakeholders affected in an innovation process. Stakeholders should be appropriately included in generating creative inputs depending on role and capability, as the ability to give input may vary in the various stages of an innovation process.

The project as such was unproblematic, with the exception of tracks 2 and 19. The evidence of this suggests that the overall process may only need minor amendments.

This view is also supported by my superior, Mr. Wolf, and the head of the specialised department, Mrs. Weissmann. Both were explicit about the high quality of the project in the final interview:

German original of PI14PWeQ2:
> *Nach anfänglichen Startschwierigkeiten hat sich bei den Beteiligten ein Teamgeist entwickelt, der für die Erreichung des gemeinsamen Zieles sehr förderlich war. Auftauchende Probleme wurden aufgegriffen und zielgerichtet bearbeitet.(...) Nicht unmittelbar an dem Projekt Beteiligte haben unnötigerweise den Projektfortschritt behindert.*

Translation:
> *After start up difficulties all participants developed a team spirit, which was helpful for achieving common goals. Emerging difficulties were addressed and corrected in a goal directed manner. (...) Not directly involved externals hindered the progress of the project unnecessarily.*

German original of PI14PWeQ9:
> *Mit den Ergebnissen bin ich zufrieden. Selbst wenn Fehler und Versäumnisse auftraten, war die Reaktionszeit zur Fehlerbeseitigung schnell.*

Translation:
> *I am happy with the results. Even when mistakes or weaknesses emerged the reaction time for corrections was short.*

German original of PI14PWoQ1:
> *Die Zusammenarbeit zwischen der Fachseite und unserer Projektleitung war sehr professionell. Das gute Arbeitsklima trug maßgeblich zum Erfolg bei.*

Translation:

The collaboration between the specialised department and our project management was very professional. Good working climate significantly contributed in achieving success.

German original of PI14PWoQ2:

Das Projekt lief, nach anfänglichen Schwierigkeiten, ruhig und unauffällig durch.

Translation:

The project went through smoothly all the way after start up problems.

German original of PI14PWoQ3:

Probleme gab es aus meiner Sicht nur mit der Bereitstellung der Hardware. Hier müssen die Vorgaben von der Entwicklung rechtzeitig vorliegen um dieBestellung zu veranlassen. Auch muß der Betreiber den Bestellvorgang monitoren. Eine gewisse Ohnmacht, wann den nun die Lieferung kommt, ist nicht akzeptabel.

Translation:

From my point of view only the procurement of the hardware was a problem. The developers' recommendations have to be available as soon as possible to trigger the procurement. Additionally the provider has to monitor the procurement process. A certain helplessness about the final delivery date is unacceptable.

German original of PI14PWoQ9:

ESi ist/war ein großes Projekt. Bei einer Laufzeit von ca. 14 Monaten und einem Budget von ca. 1 Mio € ist die Zufriedenheit groß, wenn Termine und Kosten eingehalten wurden. Ich kann mich beim Projektteam nur bedanken für die gute Arbeit und den Anwendern wünsche ich, dass ihre Erwartungen erfüllt werden.

Translation:

ESi is/was a large project. With a length of fourteen months and a budget of roughly one million Euros there is a high degree of satisfaction when time and budgets are kept to. I can only thank the project team for their good work and wish end users the fulfilment of their expectations.

It is my intention to integrate creative problem solving (Isaksen and Treffinger, 1985; Isaksen, Dorval and Treffinger, 1994 and 1998; VanGundy, 1988) into the proposed roadmap of how to theorise from case studies by Eisenhardt (1989). Having finalised steps one (getting started) to step five (analysing data), shaping hypotheses, generalising from the literature and reaching closure should be modified without endangering the underlying academic rigour needed.

As suggested above, the case study approach was chosen due to the assumed lack of available literature in this field, especially on problems like tracks 2 and 19. Conflicting and similar views about my research should hence be enhanced by stakeholder

contributions. For each process step and the related activities and tasks, a separate creative problem solving workshop will be used to build internal validity and link all variables into a holistic process model for the given context.

11.12.1 Model building

Based on the lessons learned, to be reused by the steering committee after finalising project ESi DHL Express, the process used in the latter project will be the 'game plan' for the second release, as explicitly requested by the specialised department.

My process model building activities afterwards comprise the phases 'shaping hypothesis' and 'enfolding literature' of the process of building theory from case study research (Eisenhardt, 1989). Those activities are likely to be overlapping, rather than sequential, before they are reviewed by project ESi DHL Express' stakeholders.

The process building and the proposal for activity related 'tension management' is based on the findings of Project One, challenged or supported by the available literature on new service development and tensions in innovation processes.

11.12.2 Enfolding literature

A first part of the required literature review, as put forward in the Eisenhardt roadmap (Eisenhardt, 1989) is used to find similar and conflicting views about the current process. This leads to a new process model for new service development in my organisation.

A second literature review will indicate ways of 'tension management' as suggested by scholars.

11.12.3 Process step workshops

Each step of this new process model will be exposed to peer and stakeholder review within the logic of a six step creative problem solving process (Isaksen and Treffinger, 1985; Isaksen, Dorval, and Treffinger, 1994; Isaksen, Dorval, and Treffinger, 1998; VanGundy, 1988) of how to manage tensions within our given set of stakeholders.

11.12.4 Mess finding

Within the mess finding phase I would like to use the technique of stakeholder specific one-on-one or group brain storming. By listing so-called WIBNI (Wouldn't it be nice if...) and WIBAI (Wouldn't it be awful if...) comments, I could collect each stakeholder's perceptions of potential improvements and concerns, before integrating them into the new process model.

11.12.5 Data finding

In this data finding phase I attempted to mind map each step of the innovation process model and triangulate cause and effect patterns and tensions found in the interviews of Project One.

12 Part III: Project 2

12.1 Introduction to research Project Two

This paper proposes a logistics innovation process including the management of activities in the conception, development, operation of activities, and launch of a new logistics service. All proposed activities have specific inherent tensions.

The proposed process model and all proposed tension management efforts were based on the findings of the exploratory case study of ESi DHL Express V 1.0, an innovation project in the loss prevention department at DHL Express, which was undertaken between August 1st 2002 and October 10th 2003. This exploratory case study aimed at gaining a deeper understanding of innovation management in logistics settings and building a better model of the current imperfect process based on the proposed roadmap of theorising through case studies, as proposed by Eisenhardt (1989).

Project Two linked Projects One and Three. Project Two was about using the findings from the exploratory case study in Project One to theorise on how to manage innovation activities in a logistics setting and the inherent tensions that managers will inevitably face. Project Two furthermore re-energised the strengths and weaknesses found in Project One through a flanking activity in which first tier stakeholders[34] of Project One went through a creative problem solving process.

12.2 Methodology of research Project Two

12.2.1 Theorising from case studies

The methodology applied in this research follows the overarching attempt to find a process model for logistics innovation. I proposed in Project One to use the roadmap suggested by Eisenhardt (1989).

The process had to be split into two separate clusters. The first cluster had to build a process model for innovation management in logistics based on the results of the exploratory case study ESi DHL Express. The second cluster had to develop new and appropriate tension management techniques to handle all the inherent tensions of the new process model.

12.2.2 Process model development

Based on Johne and Storey (1997) as well as Küpper (2001), I suggest that the literature on service innovation in the area on implementing innovations is very limited. This finding triggered the idea of modifying the Eisenhardt roadmap by collaboratively inquired hypotheses shaping activities, including the stakeholders of Project One.

Each step of this new process model was exposed to peer and stakeholder review within the logic of a six step creative problem solving (CPS) process (Isaksen and Treffinger,

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[34] The only stakeholder not involved was the works council, as German labour relations are covered on a legal bases, which we are unable to change in this research.

1985; Van Gundy, 1988; Isaksen, Dorval and Treffinger, 1994; Isaksen, Dorval and Treffinger, 1998) of how to manage tensions within our given set of stakeholders. These CPS sessions were held on 6th November 2003, 8th December 2003 and 18th December Dougherty, 2003. As Dougherty (1996) suggests that activities have inherent tensions, we first tried to optimise the activities within a new process model.

12.2.3   Mess finding

Within the mess finding phase we used the technique of stakeholder specific one-on-one or group brain storming. By listing so called WIBNI (Wouldn't it be nice if...) and WIBAI (Wouldn't it be awful if...) I collected each stakeholders' perceived potential improvements and concerns, before integrating them into the new process model.

12.2.4   Data finding

In this data finding phase I attempt to mind map each step of the innovation process model and triangulate cause and effect patterns and tensions found in the interviews of Project One.

12.2.5   Problem finding

During the problem finding block we discussed the findings from the data finding phase by using the divergent technique of the 5W and H of the so-called 'Kipling List', and arranged the activities within tasks and assigned the tasks to stakeholders.

12.2.6   Idea finding

As Project One was seen as a successful project by all first tier stakeholders, the idea finding phase had to concentrate on the collection of business requirements and the procurement of hardware, which were seen as the only potential 'show stoppers' of the exploratory case study.

To cover the overall process, relevant literature covering new service development processes, new product development processes and process innovation sources was identified and reviewed. This was a necessary prephase to the enfolding of literature, as I wanted to be able to challenge or strengthen rival literature from a stance empowered by holistically including all stakeholders.

12.2.7   Solution finding

The solution finding phase included a critical review of the most promising ideas generated or reviewed in the idea finding phase, before the ideas which were finally were incorporated into the logistics innovation model.

12.2.8   Acceptance finding

The acceptance finding phase included the negotiation of the implementation of the ideas into the follow-up release of project ESi DHL X V 1.0 in January 2004.

12.2.9   Implementation

Finally, the newly developed model was turned into a company confidential action plan. The resolution to do so was passed during a steering committee meeting on January 15th 2004.

Step	Content	Source
1	Getting started	Eisenhardt, 1989
2	Selecting cases	Eisenhardt, 1989
3	Crafting instruments and protocols	Eisenhardt, 1989
4	Entering the field	Eisenhardt, 1989
5	Analysing data	Eisenhardt, 1989
5a	Mess finding	Isaksen and Treffinger, 1985; Van Gundy, 1988; Isaksen, Dorval and Treffinger, 1994; Isaksen, Dorval and Treffinger, 1998
5b	Data finding	Isaksen and Treffinger, 1985; Van Gundy, 1988; Isaksen, Dorval and Treffinger, 1994; Isaksen, Dorval and Treffinger, 1999
5c	Problem finding	Isaksen and Treffinger, 1985; Van Gundy, 1988; Isaksen, Dorval and Treffinger, 1994; Isaksen, Dorval and Treffinger, 2000
5d	Idea finding	Isaksen and Treffinger, 1985; Van Gundy, 1988; Isaksen, Dorval and Treffinger, 1994; Isaksen, Dorval and Treffinger, 2001
5e	Solution finding	Isaksen and Treffinger, 1985; Van Gundy, 1988; Isaksen, Dorval and Treffinger, 1994; Isaksen, Dorval and Treffinger, 2002
5f	Acceptance finding	Isaksen and Treffinger, 1985; Van Gundy, 1988; Isaksen, Dorval and Treffinger, 1994; Isaksen, Dorval and Treffinger, 2003
5g	Implementation	Isaksen and Treffinger, 1985; Van Gundy, 1988; Isaksen, Dorval and Treffinger, 1994; Isaksen, Dorval and Treffinger, 2004
6	Shaping hypothesis	Eisenhardt, 1989
7	Enfolding literature	Eisenhardt, 1989
8	Reaching closure	Eisenhardt, 1989

Table 6: Customised Eisenhardt roadmap

12.3   A proposed logistics innovation process model

Based on the findings in Project One and the discussions surrounding the creative problem solving sessions, the inquiry team proposed a process which is composed of the following phases and includes soft- and hardware development as an integrated component:

1. Pre-phase
2. Business requirement statement phase
3. System requirement statement phase
4. 'Bargaining'
5. Development and field testing
6. Inspections and
7. Roll-out.

Pre-Phase	Business requirement statement phase	System requirement statement phase	'Bargaining'	Development and field test	User acceptance test and technical acceptance test	Roll-out
A1: Process vision A2: Project agreement A3: Project plan A4: Risk/ dependencies analysis A5: Requirement list A6: First information of IT committee of the general works council	A1: Business requirement specification A2: Project launch A3: Submission of final information document to IT committee of the general works council	A1: Analysis of business requirements A2: Description of a required system architecture A3: Description of required functionalities A4: Definition of needed physical components A5: Description of required data flows A6: Description of required software components A7: Description of required interfaces to other systems A8: Description of required data migrations	A1: Negotiating resources A2: Adapting specified modules to current available budgets A3: Optional request to delete or postpone requirements A4: Launch of application development A5: Award of development mandate A6: Project plan A7: Triggering decision phase of the general works council	A1: Application development A2: Hardware procurement A3: Requirement management through change requests A4: Definition of service level A5: First planning activities for follow up release A6: Hardware development A7: Field test preparations A8: Field test A9: Inspections preparations A10: System fusion	A1: User acceptance test A2: Technical acceptance test A3: Roll-out preperations	A1: Installation of application A2: Preperation of operational readyness A3: Operation of new system

Table 7: Depiction of proposed process

12.3.1 Step 1: Pre-phase

The proposed pre-phase can be divided into six activities. The six activities themselves are split up into two clusters. The first cluster surrounds all tasks needed to identify the influence of a project.

12.3.2 Process vision development

The first cluster surrounds all tasks needed within the design of a new process. This process is the foundation of all following activities, as all further activities aim at supporting the future envisioned process, as well as bringing it to life.

In project ESi all activities ground to a halt prior to the specialised department's decision on what the future loss prevention processes would have to look like[35]. In Project One the original development mandate was rewritten. This caused major disturbances in the sequence of activities needed for a certain milestone necessary to pass a stage-gate.

12.3.3 Organisation specific stage-gates

Activities two to five are activities related to first stage-gate milestones, namely the project agreement, the project plan, a risk analysis and the requirement list. The latter documents are milestones introduced at DHL Express to avoid so-called 'herding cats' activities in Project One, before all stakeholders were given the necessary structure to carry out the project.

The project agreement finalises the actual content of the development project. It defines what is to be expected from each stakeholder, and thus introduces the first stage in

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[35] Track 2: Revision of the development mandate in Project One

achieving a common understanding among the involved stakeholders as to what has to be done.

The overall process innovation, as well as related product developments, are broken down into work packages. Those work packages are finalised into a requirement list. This list will be used for budgeting the project and to define what must be done, can be done and may be done.

A first project plan is generated to determine any cut-off dates of milestones. Those cut-off dates may be achieved through reverse engineering in order to reach a certain roll-out date.

The risk and dependency analysis addresses and summarises all risks and dependencies that any stakeholder perceives to have an impact on his or her contribution to the development process.

12.3.4   Co-determination activities

In order to carry out a trusting co-operation with the works councils, in line with German labour-management relation regulations, works councils are included from the very beginning, from the pure intent to implement an innovation onwards to its final roll-out, thus ensuring organisational co-determination of the workforce[36]. The process described relates to the general works council, but is totally compatible with local works councils, corporate works councils or group works councils.

12.3.5   Step 2: Business requirement statement phase

In project ESi the core project started with a performance specification phase, in which all requirements defined in those eight sub-projects were aggregated into a performance specification outlining all future processes and related parameters. The business requirement statement phase mirrors the set of activities of the performance requirement specification phase.

However, the activities in Project One of organising eight sub-projects, gathering all requirements regarding products and codes, graphic user interfaces, databases, international loss prevention work flows, national loss prevention work flows, cross boundary work flows[37], after sales work flows[38] as well as loss prevention information system requirements[39] differs as they are meant to elaborate on the requirements list of the new pre-phase. The elaboration has to be at a level enabling the synchronisation of the process vision and necessary products within this process.

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[36] §§ 80, 87, 90, 91 BetrVerfG

[37] All transfer of information and fiscal claims towards a sender who has been caught red handed by a loss prevention officer.

[38] Monitoring senders are senders newly acquired by the organisation and get loss prevention support aimed at trouble-shooting related to handling parcels, packets and so on, and the way in which they are paid for.

[39] The loss prevention information system is a message board for loss prevention officers, on which they can post and discuss loss prevention related issues.

Once it has be defined what needs to be developed, the product development starts, triggered by a project launch. The project launch is a workshop in which the final business requirements are presented to all first tier stakeholders to provide a holistic picture of how each stakeholder contributes to the innovation process.

12.3.6   Step 3: System requirement statement phase

Following the project launch workshop, all first tier stakeholders have to analyse the business requirements and to ensure that they have a common understanding of the ultimate goal. Any unclear business requirements have to be sorted out.

Once the business requirements are clear they have to be specified in a system requirement specification.

A system requirement statement is a document covering all necessary system components and how they are intended to interact in order to deliver specified business requirements.

This specification may include:
- A description of the required system architecture,
- A description of the required functionalities,
- A definition of the necessary physical components,
- A description of the required data flows,
- A description of the required software components,
- A description of the required interfaces to other systems, and finally
- A description of the required data migrations from older systems.

The analysis of the business requirements is a collaborative process in which all involved stakeholders have to develop a common understanding of the business requirements. Based on the experiences in Project One and the CPS session on this phase, three tasks were identified.

The first task is for the specialised department to inform all stakeholders about their intent, process vision and related requirements.

The second task is the analysis of the requirements by each stakeholder. Stakeholders are expected to analyse how they can contribute.

The final task is the coordination of the sequence of the contribution.

12.3.7   Step 4: 'Bargaining'

The bargaining phase consists of seven activities forming the last hurdles prior to the start of development activities.

12.3.8   Negotiating resources

After having specified the overall system to be developed one might expect that it could be estimated how resource intensive all the necessary development activities are going to be. In Project One this was handled by calling IT Solutions for a tender. It might be that the development of the specified system is more expensive and time consuming

than an organisation can afford. In Project One we then had to enter negotiations to try to reduce the price. In rare cases this may be sufficient to reach available budgets from the initial and very rough project appraisal.

Whenever price negotiations are not enough, specified modules may have to be amended to current available budgets, or may have to be postponed for a later release of the system in question. All financial resources not needed are handed back for the benefit of other projects in the innovation portfolio.

12.3.9 Adapting specified modules to current available budgets

In cases in which price reductions are not sufficient to meet available budgets the requirement list can be used to identify requirements which can be modified. Examples from Project One were hardware performances from system components, which were decreased and led to cost reductions.

12.3.10 Optional request to delete and postpone requirements

As a final consideration, single requirements can be deleted, in case stakeholders perceive then as being only 'nice to have'. A softer way of handling requirements is to consider postponing them to a later release.

12.3.11 Launch of application development

Once all necessary resources are negotiated development activities have to be prepared. The launch of the application development is considered to be the point at which all stakeholders involved in carrying out development activities have to be briefed on the goal to be achieved. This activity may trigger any preparations that first tier stakeholders have to carry out in anticipation of the development mandate.

This activity includes feedback from stakeholders if certain aspects of the development process are perceived to have bottlenecks, have to be coordinated, or have to be specially managed. As a lesson learned from Project One, certain bureaucratic processes, as in our case the procurement of hardware, are an example.

12.3.12 Award of development mandate

As part of tender activities chunks of the development mandate may have to be awarded to external sources.

12.3.13 Project plan

Having received various pieces of feedback from first tier stakeholders during the launch of the application development, the project plan is amended and depicts a common understanding of all involved contributions of first tier stakeholders and the sequence and deadlines of those contributions.

12.3.14 Triggering the decision phase of the general works council

It is part of the execution of co-determination that the works council is informed about the final layout of the new service platform and all related development activities. Once informed, the works council will enter a decision phase in which all aspects of the new system are evaluated from a workforce point of view. As a result projects may be

stopped, amended or allowed to proceed. This phase is parallel to development activities. It may still be the case that the roll-out has to wait until the works council gives its final consent, if the development has been finalised within the legal decision phase limit.

12.3.15 Step 5: development and field testing

Development and field test are by nature two separate phases, but as development activities continue until the system is presented to inspectors, evidence from Project One suggests that the field test should be treated as a subset of the development phase. This subset view comes from the fact that in the beginning of the field test a raw version of the system is exposed to end users.

12.3.16 Application development

The application development component relates to the transfer of the specified system and system components into code. This includes the development of software.

12.3.17 Hardware procurement

Within the development phase all specified pieces of hardware have to be procured. This may include the simple acquisition of servers, computers and standard peripheral items. In project ESi the procurement of hardware also included the procurement of handset scanners, a weighing system, volume measurement devices and digital cameras.

12.3.18 Requirement management through change requests

The dynamic management of requirements partially challenges the idea of a funnel process, as certain change requests with a business case perceived as promising may include the introduction of additional requirements, which may cause budget enhancements, cut-off date postponements, or both.

12.3.19 Definition of service level agreements

Within the definition of service level agreements it has to be negotiated and finalised how the future system has to be externally supported to ensure a minimum level of acceptable disturbances when the system has been rolled out.

12.3.20 Planning activities for follow-up release

By starting planning activities for the follow-up release I refer to the frozen zone in which change requests are no longer accepted and the current set of requirements is prepared for roll-out. Hence all requirements identified after that date are perceived as planning activities for a later release within the system's life cycle.

12.3.21 Hardware development

In some cases specified hardware components may not be available to procure. In those cases coordinated product development activities related to the relevant piece of hardware have to be initiated.

12.3.22 Field test preparations

At some point during the development phase the chosen field test site has to be prepared for the field test. Within this activity all local stakeholders need to be informed and updated.

12.3.23 Field test

The field test is the first exposure of the new process, hardware and software being used together. From that point onward they are modified until they are perceived as being fit for use.

12.3.24 Inspection preparations

In Project One we invited the future inspectors to the test side, briefed them about the current status of the system and handed over a draft copy of the final system documentation. This set of tasks was labelled inspection preparations.

12.3.25 System fusion

System fusion is the label given to the set of tasks needed to forge a single system platform from the innovated process and aligned hard- and software, including experiences and amendments during the field test. The fusion of the system ensure readiness for inspection and roll-out.

12.3.26 Step 6: Inspections

The inspections phase has two major cornerstones. One is the user acceptance test, being the test of both fitness for use and the test of whether all specified requirements are met. The second cornerstone is the technical acceptance test, which examines whether all components interact and work faultlessly.

12.3.27 Step 7: Roll-out

Roll-out refers to all tasks concerning the distribution of the new service platform in the network and its operations.

12.4 Generalising to new service development theory

The proposed seven step logistics service innovation process can be used to discover the extent to which findings in the financial sector are applicable to other service sectors, like in my case logistics, as proposed by Johne and Storey (1997). This comparison has to be used with great caution as the models are compared on the basis of what should be a phase, activity or task, which may not reflect the label used by the original author.

12.4.1 Service innovation process models

The models reviewed were:
- Wilhelmsson and Edvardsson, 1994, based on Edvardsson and Mattsson, 1992 and Norling et al., 1992
- Donnelly et al., 1985
- Johnson et al., 1986
- Bowers, 1986

Summaries of the differences are depicted below. Shaded phases were either not covered or were out of focus in the relevant benchmark paper. All single arrows allow a one-on-one comparison of a phase label. Joint arrows unite activities which were proposed at phase level or which could be assigned under a unified label.
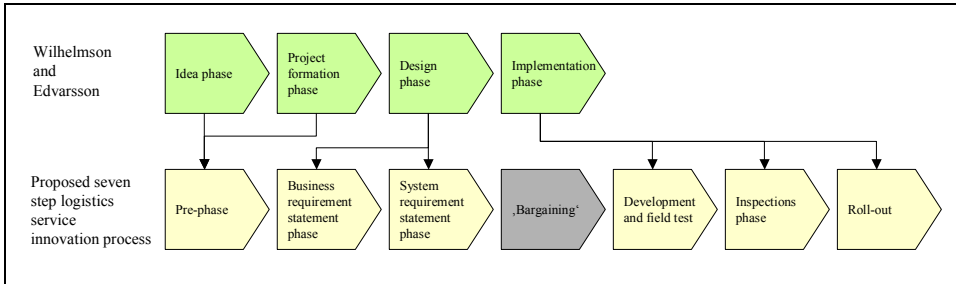
Figure 34: Wilhelmsson and Edvardsson, 1994
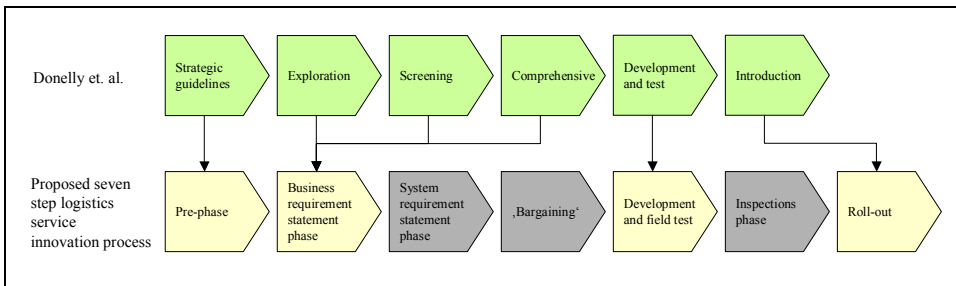
Figure 35: Donnelly, Berry, and Thompson, 1985
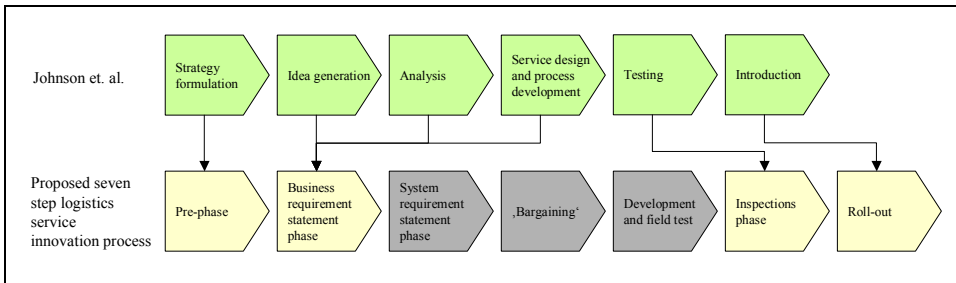
Figure 36: Johnson, Scheuing and Gaida, 1986
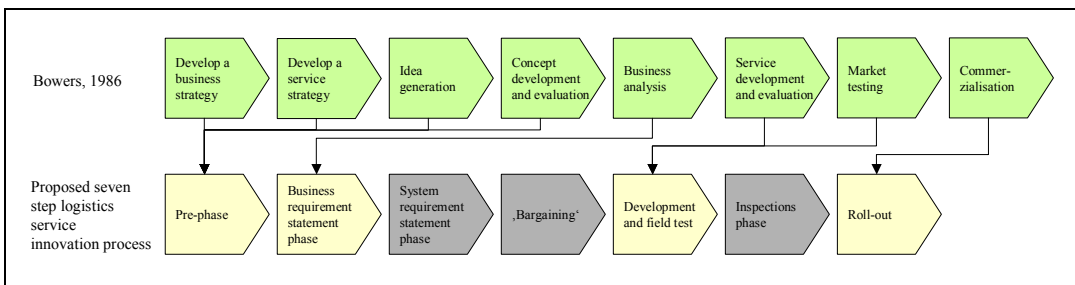
Figure 37: Bowers, 1986

All models but one (Wilhelmsson and Edvardsson, 1994) are rooted in corporate strategy. The way in which they are described in the models, all from the 1980s, shows early attempts to organise implementing strategy through projects, as in today's

programme management. Hence a strategic relevance of innovation management can be assumed.

Setting the proposed seven step logistics service innovation process against existing models suggests four major discoveries found in the exemplar case study which could not be easily integrated into existing service innovation process models.

> None of the four analysed models explicitly differentiates between process innovation and system innovation as a combined component of service innovation processes.
> None of the four analysed models discusses monetary issues, like the 'bargaining' phase.
> None of the four analysed models explicitly inspects aspects' 'conformance to requirements' or 'fitness for use'
> None of the four analysed models has explicit stage-gates to be managed.

12.4.2 Normative model of new service development

An exception to the above models is the so-called normative model of new service developments (Scheuing and Johnson, 1989), whicih proposes 15 steps mixing activity level (e.g. step 3) and phase level (e.g. step 9).

Apart from the difficulty of assigning activities to phases, the author proposes that innovation should be marketing-led (proposition 1), which is reflected in two activities, namely marketing programme design and testing and test marketing, which was not part of this research.
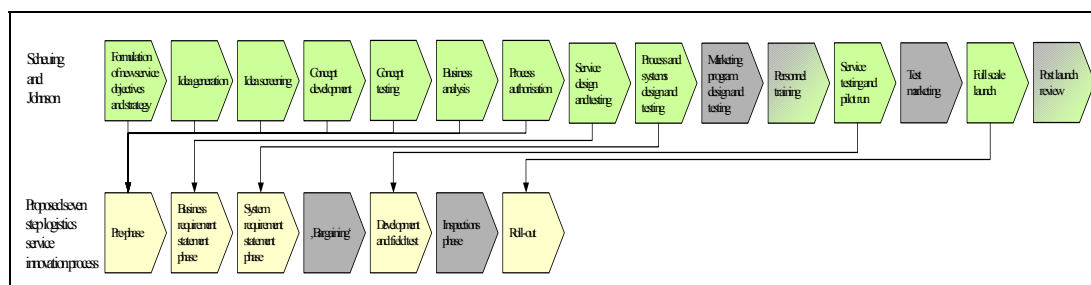
Figure 38: Scheuing and Johnson, 1989

The marketing focus of the normative model of new service development was developed using a proposition which set further limits to the ability to compare one model with the other. Project One was conducted by the production programme management at DHL Express. There is also a programme management for marketing and sales. It may be that projects have a different structure in that domain, which has not yet been researched.

Furthermore there is a different approach to new service development, being not to use a specialised new-service function, which DHL Express Germany does.

Additionally, two other steps are not covered. Personnel training is a separate responsibility of the specialised department at DHL Express Germany, and hence is beyond the focus of this research.

Finally, post-launch reviews were not covered in this research. In the interests of completion it needs to be mentioned that following the roll-out at DHL Express a four week effectiveness inspection was conducted. After the signing off of this period a project is handed over to operations.

12.5   Tension management

In Project One I proposed three aspects of tension management:
- ➢ Tensions are inherent to activities and hence are related to the stakeholders involved in that specific activity.
- ➢ Tensions develop over time within a phase, and may spin off into new tensions.
- ➢ Tensions need to be managed with the same commitment as their parent activity.

Pearson (1991) defines two ways of dealing with uncertainty; uncertainty of ends and uncertainty of means. Tension management is a way of dealing with uncertainty, and especially uncertainty of means. Dougherty (1996) herself proposes several approaches which are likely to result in the restored balance of a tension. The following propositions elaborate on that view, based on Project One and the activities undertaken in Project Two.

12.5.1   Market-technology linking

In Project One we started to manage the innovation at requirement level. Requirement relates to features, properties or behaviours of a system[40]. Project One showed that using a requirement list derived from the process vision is a powerful change control, version and release management tool. Within the consensus, participation approach changes were managed, including a control board staffed by first tier stakeholders. Sommerville (2000) supports this approach as change requests 'should be submitted to a control board which decides whether or not the change is to be accepted. The change control board considers the impact of the change from a strategic and organizational rather than a technical point of view and decides whether or not the change is economically justified.'

In practice the requirement was managed via change requests. A change request is an official request to implement changes to requirements which have already been agreed upon[41]. At DHL Express two types of change requests are defined. Change request type A is a change to requirements which does not change the itinerary of a project. Type A change requests may be finalised in a steering committee meeting. Type B change requests are changes either changing the itinerary of a project or its budgets. In Project One all change requests but one where Type A change requests. The only Type B change request was the rebranding from Deutsche Post to DHL Express, which triggered an enhancement of the project's budgets.

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[40] Cf. http://www.galileocomputing.de/glossar/gp/anzeige-8398
[41] Cf. http://www.galileodesign.de/glossar/gp/anzeige-7988
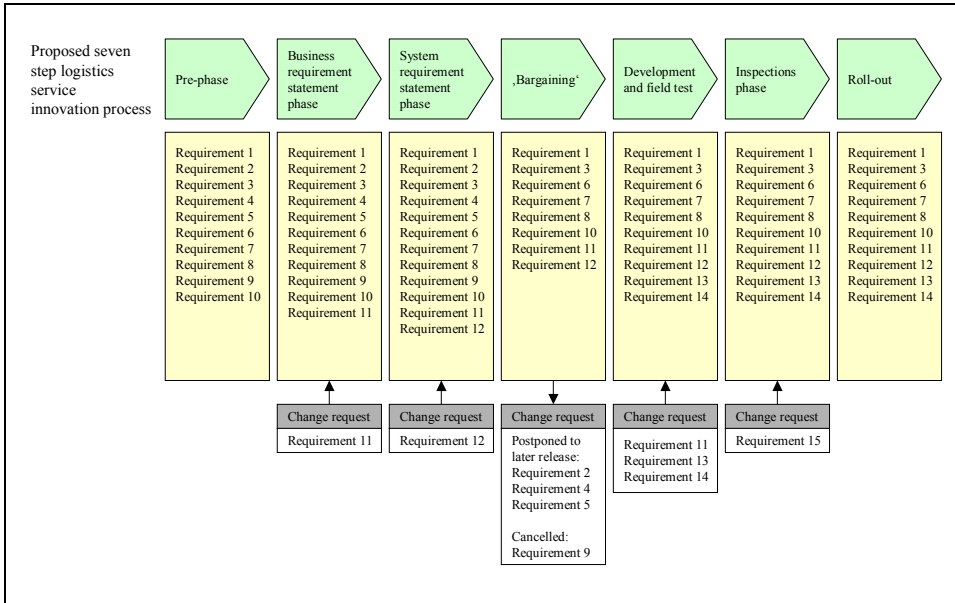
Figure 39: Dynamic requirement management

The ability to postpone requirements enforces participants to think in both the version and the release of not only a piece of software, but of a whole system. Sommerville (2000) defines a version as an instance of a system which differs, in some way, from other instances. It may include new functionality or may operate on a different hardware configuration.

A release may be defined as a version distributed to customers (Sommerville, 2000). This should be conveyed to innovation processes by introducing release thinking. Hence a release could be a version of a system or innovation rolled out, which may be increasingly linked to market needs over time.

12.5.2 Organising for creative problem solving

The evidence of Project One support three generic approaches for organising for creative problem solving:

➢ A need for a variety of boundary spanning roles to handle interfunctional communication (Acona and Caldwell, 1990)
➢ A 'heavy-weight' project manager for times when it is necessary to work through conflicts with higher functional managers (Clark and Fujimoto, 1991)
➢ Multi-team structures, which leverage technologies across multiple products (Jelinek and Schoonhoven, 1990).

A track record of how not to organise for creative problem solving was track 2 and its sub-tracks. As stated above, activities have inherent tensions. Thus an inappropriate sequence of activities may as in this case lead to one or more tensions.

Once the decision was taken to revise the development mandate and all loss prevention processes, several 'new versus old' tensions were unbalanced:

➢ Loss prevention staff were reorganised for project matters
➢ Roles and relationships were defined by focusing on the ability to contribute to the new process

➢ Loss prevention staff had to be consulted with IT and systems development know-how.

Analogous to the proposal of heavy-weight project managers being able to cope with higher functional managers (Clark and Fujimoto, 1991), one might expect that project champions protecting a project, like Mrs. Weissmann as problem owner and Mr. Wolf as head of the operations programme management, would need shield their projects very much like 'heavy-weight' project managers.

As the project was very close to being closed for good and was turned around, I propose the above action package as having the potential to balance 'new versus old' tensions. They may 'have verified that to manage complexity by organising resources in terms of process, focussing on relationships among parts, and changes' (Dougherty, 1996) balance managing complexity tensions.

12.5.3 Evaluating and monitoring innovation

Emergent activities are proposed to be rebalanced by situated judgment and the ability to be engaged in details of work, but also to appreciate unstructured problems (Dougherty, 1996).

An example of how this is done in practice was the revision of the development mandate and all loss prevention processes. Due to a change of management at the specialised department prior to the project start, the new head, Mrs. Weissmann, had new ideas and visions about the future of loss prevention. Revising the development mandate forced us to revisit all planned milestones. The resulting development mandate has to be seen in light of the stage-gate system. We feared that the expectations of various stakeholders may not be met, especially as the new management was not familiar with loss prevention processes.

Evaluating and monitoring emergent issues included the fact that requirements became unpredictable. Unpredictable requirements trigger unpredictable application interfaces, and budgets and timelines also became unpredictable. As a former project manager I question Dougherty's proposal to appreciate a situation like this. However, the turnaround was achieved through a combination of the collective ability to engage in a situation like this, and a structured approach with which to do so. This holds especially true for the front-end definition of a development mandate with specific parameters, which is reflected in the new proposed seven step process, which may prevent unforeseen developments at very short notice.

Overall, Dougherty's proposed tension management practice helped us to regain balance in this type of tension and its spin-offs. The feedback on the ability to balance this tension is straight forward in stage-gate processes, as the next hurdle will be the last if a project teams fails to cope (Cooper, 1990).

The only tension which cannot be managed lies within the heart of strategic management, and that is strategic change. As defined above, programme management provides a framework for implementing business strategies and initiatives through the coordinated management of a portfolio of projects that change organisations to achieve

benefits that are of strategic importance. Hence, emergent strategic change may make a project partially or totally obsolete.

Project ESi DHL Express was designed as ESi Euro Express. Deutsche Post Euro Express was merged with DHL and DANZAS, at which point the impact of the future corporate strategy regarding the integration into DHL was uncertain. It became unpredictable whether or not the ESi application would fit future needs. This tension could not be balanced at project level. Even state of the art project management may be in vain if a project is judged not to be delivering within new strategic settings.

12.5.4   Commitment to innovation

Innovation requires a deeper commitment than regular work (Burns and Stalker, 1966). The effect of individuals not investing in innovation may fatally hinder an overall project. Whenever innovation projects are meant to deliver to corporate strategy this behaviour sabotages the attempt to achieve strategic goals.

An example of the effects that lack of commitment may have was track 19, which started with the procurement of hardware and its punctual delivery by our IT infrastructure service provider being doubted, and ended with a project close to running out of time. The proposed capacity to restore balance to a similar situation is collective accountability problems (Dougherty, 1996). It is perceived by the inquiry team that collective accountability leading to a commitment which management could not have expected compensated an eight week delay into a five day delay, which was accepted as being on target by the specialised department. This track nicely supports Dougherty's proposal, yet also shows its limitations. The individuals who were not committed to the project were contractors outside the organisation, so commitment may founder where inclusion into an innovation is not perceived as part of a contract.

12.5.5   Type of tensions

In Project One I proposed three distinct constellations of stakeholder involvement in tensions, namely bi-polar, multi-polar and proxy tensions. The constellation of stakeholders involved in an activity and thus a tension suggest that stakeholders undertaking an innovation activity have to be included in restoring balance in cases where a tension becomes unbalanced and dysfunctional. Within the proposed setting of joint innovation development and the longitudinal involvement of relevant stakeholders managing activities and tensions, the stakeholders involved in an activity have to restore balance to tensions collaboratively. This proposed collaborative approach may ensure that a goal-directed compromise is obtained. Furthermore, uncertainty about ends is decreased as a collaboratively obtained restored balance is proposed to achieve an optimal output. Even if an innovation is not successful it may be perceived as the best result achievable at the time an activity was undertaken. This view is supported by Sommerville (2000), as 'large systems usually have a diverse user community who have different, and sometimes conflicting, requirements and priorities. The final system requirements are inevitably a compromise'.

So even if an innovation is not successful, it may be perceived as the best result achievable at the time at which the innovation activity in question was undertaken.

12.5.6 Set of propositions

Next to the innovation process model for logistics settings, including dynamic requirement management, six additional propositions are derived from the theorising activities.

Proposition 1:
Tensions exist and can be tracked.

Proposition 2:
Tensions are inherent to innovation management activities, tasks and functions or steps.

Proposition 3:
Tensions may be clustered within four generic activities, namely market-technology linking, organising for creative problem solving, evaluating and monitoring, and finally commitment to innovation.

Proposition 4:
Tensions can be managed.

Proposition 5:
Tensions can be described as 'bi-polar', 'multi-polar' or 'proxy' in nature.

Proposition 6:
Core tension management can be tension 'reconnaissance', tracking and restoring unbalanced tensions.

12.6 Limitations

12.6.1 Type of tensions

As tensions are specific to activities it may be difficult to generalise the findings of tension management to settings in which process innovation and system innovation is not a combined component of service innovation processes, as 'conformance to requirements' or 'fitness for use' are not externally inspected and explicit stage-gates are not comparable. German labour relations in particular may require the endurance of both activities and tensions which Anglo Saxon innovation projects may never encounter.

12.6.2 Research strategy limitations

I am aware that the conclusions drawn in this paper are based on just one exemplar case study, yet Yin (2003) concludes that 'even a single case study can often be used to pursue an explanatory, and not merely exploratory, purpose'. Taking that suggestion, project ESi DHL Express can be used as a basis for later model building activities, if as Yin (2003) recommends 'the analyst's objective should be to pose competing explanations for the same events and to indicate how such explanations may apply to other situations'. The explanations I posed in this paper in the conclusions sections are meant to be understood as a first attempt to break new ground and address innovations management in logistics as a topic, and as an invitation for scholars to elaborate on this, by both verification and falsification activities.

One might question whether the use of creative problem solving (Isaksen and Treffinger, 1985; Isaksen, Dorval and Treffinger, 1994 and 1998; VanGundy, 1988) as a part of the proposed roadmap of how to theorise from case studies by Eisenhardt (1989) was appropriate.

12.6.3 Other limitations

Despite the validity enhancements used in this study the language barrier rooted in my German origin and the German context may also lead to a limitation to generalisability. With English not being my native tongue I may have not been able to convey the essence of original texts during write up or translation activities.

Other limitations can be assumed, because of management and stakeholders being aware of project ESi DHL being a research project. Certain tensions may have been balanced because of above average commitment at stakeholder level or above average protection by management. On the other hand, this project may have been subject to vindictive measures by colleagues not wanting this research to be successful.

Additionally, interviews were sometimes delayed because of workload problems or absence. Those interviews may overlap with events covered across interviews or be affected by the current status of a track at the time of writing.

Finally, the assignment of tracks may be questioned. As the interviews were on a monthly basis the allocation of tracks had to be assigned to a month. If triangulation with archival data was not possible tracks had to be used as an event unfolding in a one month block.

13 Part IV: Project Three

13.1 Introduction to research Project Three

A number of models propose processes for the sequence of activities within a service innovation project (Donnelly et al., 1985 ; Johnson et al., 1986 ; Bowers, 1986 ; Norling et al., 1992; Wilhelmsson and Edvardsson, 1994 based on Edvardsson and Mattsson, 1992). The lack of consistent success records of service innovations in practice suggests that further aspects have yet to be defined (Köhler and Harrison, 2004).

Two possible aspects were tested in Project Three. One was a new seven step innovation process model (Project Two), and the second was 'tension management', as described in Project Two, and Köhler and Harrison (2004).

In order to critically question the proposed optimised seven step innovation process model and the concept of tension management, project ESi DHL Express V 2.0 was used to test potential improvements in the achievement of project cost, schedule and technical objectives. This test was made as the Cranfield DBA requires the generation of both knowledge about practice as well as a contribution to the success of the organisation under research. ESi DHL Express V 2.0 was a service innovation project led by the programme management operations group of the DHL IS Germany between May 3rd 2004 and November 4th 2004.

13.2 Amended theoretical background of research project 3

As Project Three was a sequential case study in which the research team had higher research capabilities than in Project One we tried to capture a higher granularity in the evidence collected. Thus, we were able to amend to the management of tensions in innovation processes as well as the use of events, changes and tracks.

This chapter summarises the shift from researching Dougherty's generic tensions as developed in Project Two. Section 3.1.1 summarises the tensions themselves, while 3.1.2 provides an example. Section 3.2 summarises the use of events, changes and tracks as used to follow the initiation and life cycle of tensions as in Project One.

Dougherty (1996) proposes that innovation activities have inherent 'tensions', which relate to challenges that have to be dealt with during an innovation project. Hence innovators may need to manage tensions in order to overcome their negative effects, to enhance their positive effects, or to restore balance between tensions at each stage of an innovation project in order to improve the achievement of project cost, schedule and technical objectives (Köhler and Harrison, 2004).

Generic tensions inherent to the clusters of generic innovation activities, being 'market-technology linking', 'organising for creative problem solving', 'evaluating and monitoring innovation and commitment to innovation' were used unchanged as in Projects One and Two.

Dougherty directly links four generic tensions to a distinct set of four activities. The findings of Project One supported that view. Additional elaboration of that model was

necessary as each activity is executed by a distinct constellation of stakeholders. The term stakeholder here is used as defined by Donaldson and Preston (1995), who propose that 'stakeholders are persons or groups with legitimate interests in procedural and/or substantive aspects of corporate activity'. Introna and Pouloudi (1999) support that view and argue that stakeholders' legitimate interests in the procedural and/or substantive aspects of corporate activity includes being able to claim transparency and subsequent judgements on that basis.

In Project One, three distinct constellations were identified as being 'bi-polar', 'multi-polar' or 'proxy' in nature:
'Bi-polar' relates to tensions experienced between two stakeholders. 'Multi-polar' describes activities with more than two stakeholders. A derivate of multi-polar tensions are stakeholders immediately involved in an activity at first or second tier level acting as a 'proxy'. This stakeholder has to include a third party in order to complete an activity or task.

Activity	Definition	Tension	Constellation
Market-technology linking	Conceptualising the product to integrate market needs and technological potential	Outside versus inside	Bipolar
			Multipolar
			Proxy
Organising for creative problem solving	Organising the process in order to accommodate creative problem solving	New versus old	Bipolar
			Multipolar
			Proxy
Evaluating and monitoring innovation	Evaluating and monitoring the innovation process	Determend versus emergent	Bipolar
			Multipolar
			Proxy
Developing commitment to innovation	Developing commitment to the effort	Freedom Versus responsibility	Bipolar
			Multipolar
			Proxy

Figure 40: Activities, tensions and constellations

One example in project ESi DHL X V 2.0 demonstrating this set of activities, tensions and constellations was the migration of the loss prevention application to Microsoft Windows and Office XP. On May 21st 2004 Mr. Hebner, Mr. Krane, Mr. Kuhn, Mr. Maasen and I gathered in Dorsten (Germany) to define how ESi could be migrated, taking into account limitations like deadlines, resources and costs. The activity was labelled 'organising for creative problem solving', for as Dougherty (1996) suggests, 'innovators solve complex problems to overcome surprises, work around barriers, merge processes from different functions, and weave together resources from different locations'.

Constellation-wise this is a multi-polar tension as all participants have 'legitimate interests in procedural and/or substantive aspects of corporate activity'. Mr. Hebner, as project manager of the XP project, had to ensure that all applications of our organisation were migrated by not later than the end of 2004. Mr. Krane, as loss prevention officer, was lead user and first 'victim' of whatever plan we agreed on. Mr. Kuhn, as deputy project manager IT, at IT Solutions and I, as project manager of this release, had to ensure that this migration plan did not disrupt current developments. For him it was also an issue that the migration could be used to optimise the utilisation of resources at IT Solution in terms of using this project to ensure continuous incomes between this and the following release in 2005. Mr. Maasen, as representative of the specialised department, wanted a soft transition without the disruption of local loss prevention activities.

In a creative problem solving session we listed all available options and made a plan for each, discussing the potential opportunities and threats of each option. Each plan was planned in a granularity such that it could be implemented if chosen.
The options were:
   a. Doing ESi DHLX V 2.0 and the migration in one project
   b. Do the migration prior to the roll-out of ESi DHLX V 2.0
   c. Install two PCs in the office of each loss prevention officer, one with XP and one with NT
   d. Do the migration after ESi DHLX V 2.0 in a standalone project
   e. Do the migration after ESi DHLX V 2.0 as part of the follow-up release

After various heated discusses it was perceived that option A was not feasible. Option B had too many interdependencies. Option C was declined, especially by Mr. Maasen and Mr. Krane. Finally, alternative E was not admissible for Mr. Hebner, so we proposed option D, which was then executed. This case shows how tensions have to be treated. If properly handled, tensions enable better results as they allow the incorporation of stakeholders' agendas into an innovation, thus achieving better results.

Activity	Definition	Tension	Constellation
Organising for creative problem solving	Organising the process in order to accommodate creative problem solving	New versus old	Bipolar
			Multipolar
			Proxy

Figure 41: Applied activities, tensions and constellations

13.3   Methodology of research Project Three

13.3.1   Positioning within the action research methodology

The label 'action research' in this research relates to the proposition that 'action research involves the researcher in working with members of an organization over a matter which is of genuine concern to them and in which there is an intent by the organization members to take action based on the intervention' (Eden and Huxham, 2002).

Having theorised from the exploratory case study in Projects One and Two, a process model for logistics service innovation was developed, which includes the management of inherent tension. Projects One and Two were connected by an overarching roadmap enabling theorising activities from case study research, as discussed above.

By using a newly developed framework in Project Three, one could argue that we take action and we create knowledge about that action. Furthermore, team members of the system participate actively, which is action research as defined by Coughlan and Brannick (2001). The active involvement assumed by Coughlan and Brannick relates to one member of the organisation undertaking an explicit role in addition to the normal functional role. In this case all first tier stakeholders execute this dual role. This inquiry strategy of including all stakeholders is proposed to be a central feature of the research process by Brooks and Watkins (1994), as this ensures that data is systematically collected and comes from the experience of participants.

The inclusion of people from the client system to participate in the research process as 'full partners or co-researchers' is labelled 'participatory action research' (Whyte, 1991). This label is used to demarcate this research from the 'pure' action research and collaborative inquiry as described in Bray et al. (2000).

13.3.2 Methodology within action research strategy

In order to be called 'research' have formulated fifteen characteristics (Eden and Huxham, 1996 and Eden and Huxham, 2002) to which the researcher has to give holistic attention. Each will be now discussed in turn.

13.3.3 Integral involvement

Action research demands integral involvement by the researcher with an intent to change the organization. This intent may not succeed – no change may take place as a result of the intervention This criterion is met as the process model and the proactive management of tensions in an innovation project was implemented by the project team. This actually meant that role duality was present for any stakeholder at first tier level. As co-researchers, each stakeholder was exposed to his or her own proposed improvements. This was a painful experience for nearly all of us.

13.3.4 Generation of knowledge in the domain

Action research must have implications beyond those required for action or generation of knowledge in the domain of the project. It must be possible to envisage talking about theories developed in relation to other situations. Thus it must be clear that the results could inform other contexts, at least in the sense of suggesting areas for consideration.

The domains proposed in Project One were corporate logistics (Pfohl, 1996), postal logistics (Niegel, 1987), health care (Ehrmann, 1997) and military logistics (North Atlantic Treaty Organisation, 1995). Our department has activities in all of those domains. The generic approach applied in Project One to postal logistics loss prevention is used as a generic approach applied to innovation projects as a whole, as it passed external validity tests discussed in the research strategy section below.

13.3.5   Valuing theory

As well as being usable in everyday life, action research demands valuing theory, with theory elaboration and development as an explicit concern of the research process.

This criterion was met as the theory building process of Projects One and Two were sequentially continued and thus elaborated and developed on the basis of exposure of all propositions to a longitudinal case.

13.3.6   Theory support or development

If the generality drawn out of the action research is to be expressed through the design of tools, techniques, models and methods then this, alone, is not enough – the basis for their design must be explicit and must shown to be related to the theories which inform the design and which, in turn, are supported or developed through action research.

Theory support or development was the underlying research intent. Hence, the case for exposure of the propositions was chosen deliberately as having as many constants as possible towards Project One. The amount of overlap ensures the ability to test as many propositions formulated as possible.

13.3.7   Emergent theory

Action research will be concerned with a system of emergent theory, in which the theory develops from a synthesis of that which emerges from the data and that which emerges from the use in practice of the body of theory which informed the intervention and research intent. The overarching research design forms the first block of Projects One and Two, which theorized from data. The final block, Project Three, now exposes the propositions to a real life project. This usage of practice led to emergent fine tuning of the findings of block one.

13.3.8   Theory-building

Theory-building, as a result of action research, will be incremental, moving through a cycle of developing theory-to-action to reflection-to-developing theory, from the particular to the general, in small steps. This criterion was achieved by deliberately using Project Three as a standalone case study without cross-case pattern matching.

By recording activities and tensions it was possible to match hypothesised unfolding of actual tensions with perceived tensions. This reflection, especially the discussion of mismatches, led to a more informed view of how tensions unfold over time, which enabled reshaping of hypotheses emerging from data.

13.3.9   Prescription and description

What is important for action research is not a (false) dichotomy between prescription and description, but a recognition that description will be prescription, even if implicitly so. Thus presenters of action research should be clear about what they expect the consumer to take from it and present it in a form and style appropriate to this aim.
In this research activities were described, as well as inherent tensions explicitly perceived by stakeholders. Of those explicitly perceived, the lifecycle was recorded as

well as the countermeasures taken. This is indeed a prescription of how to handle a certain unbalanced tension, or the fostering of a balanced tension over time.

Furthermore, it was seen as appropriate to present activities as separate from tensions in sections 11.4 and 11.5. This separation allows freedom to the view that tensions, even though inherent, need to be managed in isolation as the underlying process moves on and should not be halted, if at all possible.

13.3.10 Systematic method and orderliness

For good quality action research a high degree of systematic method and orderliness is required in reflecting about, and holding on to, the research data and the emergent theoretical outcomes of each episode or cycle of involvement in the organisation.

This criterion has two aspects. One is the fact that this case study is a standalone case study. Within this case study episodes of involvement had to relate to each of the steps of the innovation process. Reflection about data is based on this case. Additional evidence of systematic method and orderliness will be discussed later within the validity of case study research below.

The second aspect is reflection about emergent theoretical outcomes, which have to be part of the linking document of a Cranfield DBA.

13.3.11 Replicability

For action research, the process of exploration of data – rather than the collection of data – in the detecting of emergent theories and development of existing theories, must either be replicable or, at least, capable of being explained to others.

The research methodology chosen in Project One had to aim at reliability. The robustness of the methodology was demonstrated as the same methodology was replicable with the second standalone case study, so this is a replication of the process of data exploration. Certain amendments had to be made, as presented in this chapter (cf. coding), however, any amendment made was at the level of refinement, and was not needed due to failure or lack of suitability.

13.3.12 Theory exploration and development

The full process of action research involves a series of interconnected cycles, where writing about research outcomes at the later stages of an action research project is an important aspect of theory exploration and development, combining the process of explicating pre-understanding and methical reflection to explore and develop theory formally.

Theory exploration was, in order to ensure this criterion, separated towards the linking document. This design decision ensured that the evidence from this case was fully analysed before being used for further shaping of hypotheses.

With the inclusion of all first tier stakeholders the problem of pre-understanding was further minimised. As all interviewees were open and sometimes very direct in

providing feedback, pre-understanding was constantly challenged both ways, which formed a very painful experience in terms of personal development.

13.3.13 Internal validity

Adhering to the ten characteristics above is a necessary but not sufficient condition for the validity of action research. Eden and Huxham (2002) demand adherence to the ten characteristics above as a precondition to be considered action research. With the inclusion of all ten this research adheres to action research as a coherent research paradigm.

13.3.14 Theory in use

It is difficult to justify the use of action research when the same aims can be satisfied using approaches that can demonstrate the link between data and outcomes more transparently. Thus in action research, the reflection and data collection process - and hence the emergent theories - are most valuably focused on the aspects that cannot be captured by other approaches.

Action research was the preferred paradigm used as it enabled the testing patterns of action over time based on an intervention. It enabled recording differences in action and reaction to the differences of the implemented process and behaviour towards tensions. Hence it was possible to capture theory in use, as opposed to espoused theory (Argyris and Schon, 1974).

The most obvious limitation to this approach is the fact that interventions are assumed not to gain full thrust from all parties (Argyris and Schon, 1991). In this case a win-win situation was generated as all first tier stakeholders befitted from the research, by improving the ability to innovate. The specialised department as a problem owner benefits from improved outputs. The general works council was enabled to contribute towards lead user requirement incorporation. In return, all other stakeholders, being professional bodies meant to deliver innovations, are measured from the capability to do so. Given that the proposed key hindrance was minimised, action research as it was conducted was perceived 'as the method … likely to produce insights that cannot be gleaned in any other way' (Eden and Huxham, 2002).

13.3.15 Triangulation

In action research, the opportunities for triangulation that do not offer themselves with other methods should be exploited fully and reported. They should be used as dialectical device which powerfully facilitates the incremental development of theory.

Because of the striking similarities between them, it was possible to consider triangulating the evidence in order to identify similarities and differences to help in the process of hypothesis testing. This approach is supported by Denzin (1978a and 1978b). This methodology even matches the label 'exceptional' (Haré and Secord, 1976) as the overlap enables triangulation between the observation of events and social processes, the accounts each participant offers, and changes in these accounts over time, especially if they rival pre-intervention observations.

13.3.16 History and context

The history and context for the intervention must be taken as critical to the interpretation of the likely range of validity and applicability of the results of action research.
As the two case studies are two sequential major releases with most contextual variables stable and participants committed to the analysis, this criterion is covered in a way that most traditional PhDs are unable to achieve.

13.3.17 Wider audience

Action research requires that the theory development which is of general value is disseminated in such a way as to be of interest to an audience wider than that integrally involved with the action and/or with the research.

The two audiences of this research are practitioners observing a team of innovators outperforming the majority of the over four hundred innovation projects at Deutsche Post at the time of writing. The interest in the ability to increase the quality of innovation outputs is essential to the organisation as a whole.

On the other hand there is an academic audience to which this research has been and will be exposed. In the first publication of research findings innovation scholars were exposed to tensions being defined as an essential part of innovation activities; something which has not been done that explicitly on innovation project level before.

13.3.18 Methodology within the case study research strategy

With Project One being research on an innovation at project level from a management perspective and in a longitudinal real-time manner, Project Three had to use the same to ensure consistency. A management perspective and longitudinal real-time research are preferred in research in the management of innovations (Argyris, 1968; Argyris, 1985; Van de Ven et al., 2000), especially if operational links have to be 'traced over time, rather than mere frequencies or incidence' (Yin, 2003).

13.3.19 Case study selection

Project ESi DHL X V 2.0 was the first major release after ESi DHL X V 1.0 (Project One) and release ESi DHL X V 1.1, in which the postponed change request of Project One regarding the automated SAP interface was developed. ESi DHL X V 1.1 was a four month project which was installed by my superiors to ensure continuous developments and synchronization with my DBA studies. At the time that ESi DHL X V 1.1 was being developed, Project Two was undertaken, hence ESi DHL X V 2.0 could be launched to coincide with the beginning of Project Three of the Cranfield DBA.

13.3.20 Unit of analysis

The unit of analysis covered all activities and all inherent tensions of project ESi DHLX V 2.0. All refers to a broader time window than Project One, which started at the end of what is now the preface. During Project One the research project still had to be implemented. In Project Three all research project data gathering was deployed as early

as possible, allowing a more detailed picture of the preface, which was more vague in Project One.

13.3.21 Collection of evidence

As in Project One, archival data from documents having to be produced in conformity with the DHL IS Program Management Handbook V 1.1, specifications, project minutes, status reports were considered as relevant evidence for triangulation. This triangulation was performed to match activities and tensions documented in opportunistic and planned interviews.

13.3.22 Absence of artificial conditions

As opposed to Project One, ESi DHL X V 2.0 was started as close as possible to the beginning of the Cranfield DBA calendar. However, the end of the project was not foreseeable, and had the project had any delays, the research project would have been delayed for as long as necessary. Only in this fashion would a consistent match of collecting data longitudinally and for as long as necessary be achievable.

13.3.23 Alternative perspectives

In continuation of the practice of including all stakeholders, old ones were either included in planned interviews, or if new, in special situations in opportunistic interviews. One example of an additional opportunistic interview was the chief production officer at Deutsche Post, who had to give his consent, with ESi DHL X V 2.0 being a project above 250.000 €. At the time of Project One this regulation did not exist, so Mr. Reinboth was asked to give his comments in the interview template, which he did.

13.3.24 Evidence sufficiency

Presenting this research neutrally was one of the most important and painful experiences, especially seeing propositions being challenged. As this research was self funded and was supported by DHL, who gave me the freedom to undertake it regardless of matter the outcome, I had to force myself to present supporting and challenging data across all phases. This neutral stance alone enabled emerging improvements in the practices of innovations management.

13.3.25 Composition in an engaging manner

Taking a longitudinal approach with an unknown outcome ahead enforced an immediate reaction if proposed practices were to fail. This had to be flanked with an immediate analysis of failure. Bias due to potential manipulations was minimised as each stockholder's interview would cover potential misbehaviours from any other first tier stakeholder. As a more informed view on the quality of the propositions was a desired outcome, we acted with the utmost caution to record enabling and disabling ways of handling tensions.

13.3.26 Data analysis and role of the researcher

The approach to the analysis of data and the role of the researcher, as stated in Project One, was applied unchanged.

13.3.27 Validity

Research validity was tested in the four domains of construct validity, internal validity, external validity and reliability based on Yin (2003). The tests were based on the descriptions given in Project One.

13.3.28 Amendments of the Project One coding methodology

As the interviews were used concordant with Project One, the coding scheme had to be revisited and enhanced. The original coding scheme in Project One did not include coding towards distinct constellations of tensions, so a forth coding step had to be introduced. In this additional coding step the distinct constellation of the tension involved was included, being either bi-polar, multi-polar or proxy tensions.
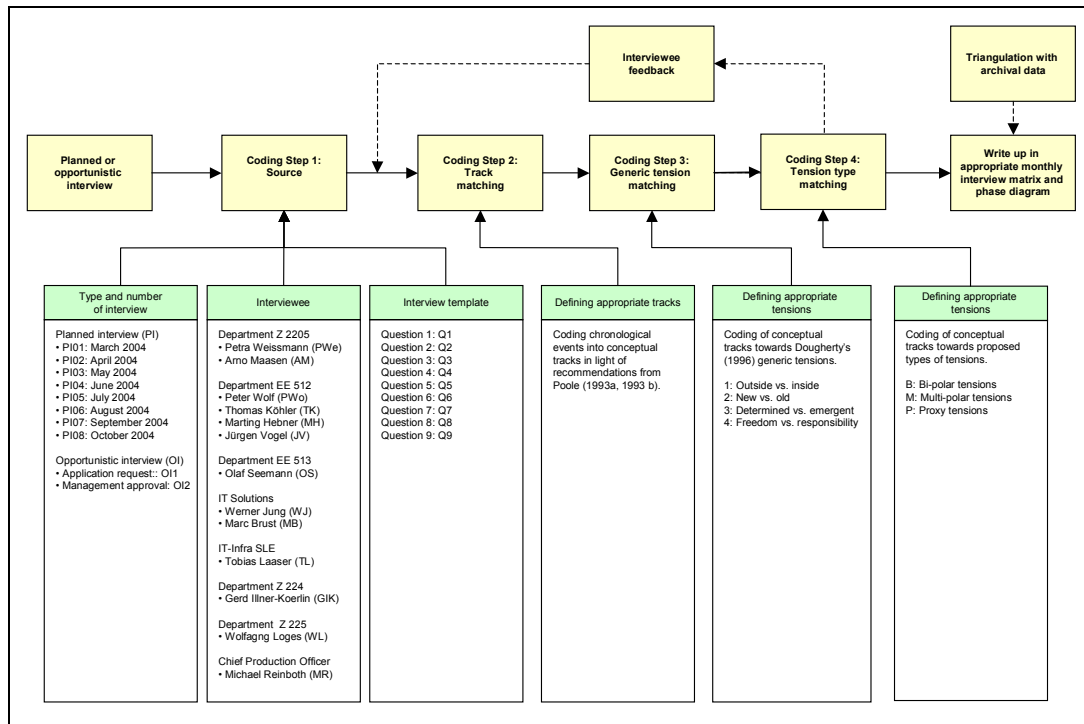
Figure 42: Amended coding work flow

As in Project One, the final findings of the coding process were exposed to the feedback of the relevant stakeholders involved. Only in rare cases did amendments have to be made before the final coordinated version was included in the data. Despite the enhancement the coding was robust enough to be able to identify tensions and process patterns, which can be used for further pattern matching activities of life-cycles of tensions in Project One and Project Three. Each planned or opportunistic interview was coded as shown in the diagram above.

13.4   Project ESi DHL Express V 2.0

13.4.1   Project objectives

Project ESi DHL X V 2.0 was based on business requirements from a project called 'Licence Plate'. Project 'Licence Plate' aimed at the introduction of a common transport

label in accordance with ISO 15394[42]. This label uses an item identifier which is globally unique, in accordance with ISO 15459 (Licence Plate)[43] for any item related transport process[44]. At Deutsche Post World Net this common label will be usable for any parcel and shipment above postal letters and below full truck loads. This effort includes the implementation of various licence plate related business requirements derived from each product, service and region on a common basis.

Based on an executive committee decision in May 2001 all applications at Deutsche Post Euro Express and its partners had to be adapted. From January 1st 2004 onwards, any partner hat to be able to handle licence plates, which are either EAN 128 or ANSI/FACT.
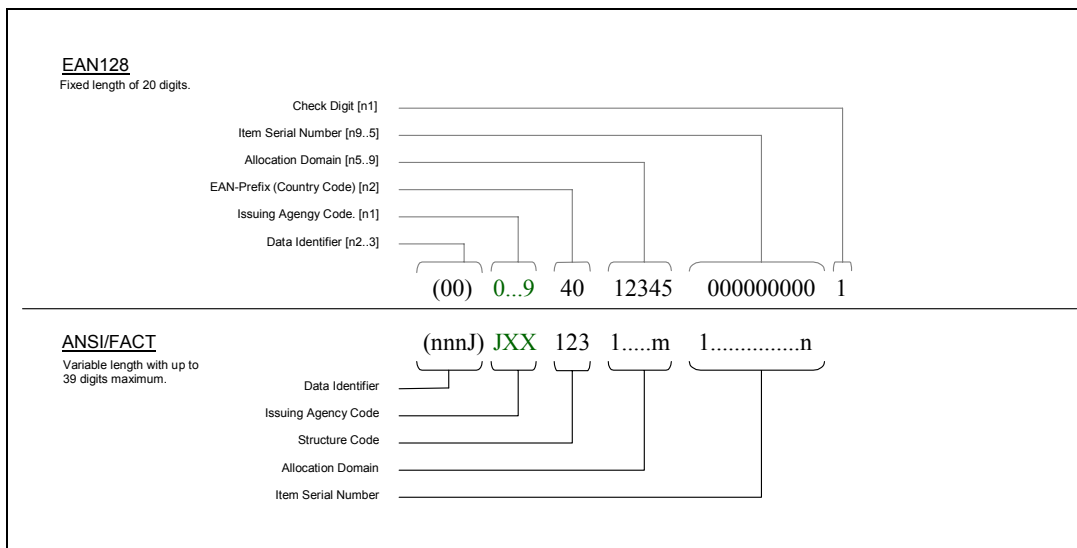
Figure 43: Possible licence plates at Deutsche Post

The introduction of the licence plate made it possible to adapt any application or peripheral system at Deutsche Post Euro Express, including ESi. From a loss prevention point of view licence plates are a problem as they are 'non-speaking'. A customer cannot be directly identified, which was possible with the old 2/5-interleaved system, which had an obligatory sender code. Having built a new loss prevention application recently in project ESi DHL X V 1.0, project ESi DHL X V 2.0 was launched to overhaul version 1.0 to enable loss prevention activities with licence plates and 2/5-interleaved codes.

Amending licence plates by introducing a customer identification facility was not an option as the international norm ISO / EN 1572 requires it to be non-speaking. The code

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[42] Cf. ISO/IEC 15394 (Packaging - Bar codes and two-dimensional symbols for shipping, transport and receiving labels)

[43] Cf. ISO/IEC 15459-1(Unique Identification of Transport Unit – Part 1: General and ISO/IEC 15459-2 (Unique Identification of Transport Unit – Part 2: Registration procedures)

[44] DP Euro Express decided to use the Multi Industry Transport Label standard; this label uses the ISO standard (ISO 15394); ISO 15394 = EN 157

itself can be an alphanumerical ANSI/FACT-code or a numerical EAN-code. Two derivates introduced are code 39 as an ANSI/FACT and code 128 as an EAN and ANSI/FACT.

Senders are free to choose between any of the two types so any application has to be able to handle both codes. Deutsche Post treats the EAN 128 as the preferred code. Complexity was further enhanced by a long transition phase in which all types of codes, EAN 128, ANSI/FACT and 2/5-interleaved, were allowed.

One of the main concerns at the specialised department was the potential confusion of sender information, and then ultimately in invoicing the wrong senders. This led to the perception that the current application was not able to support loss prevention officers if references to customers or products was no longer possible.

This concern was amplified by envisioning that roughly 500,000 manually reviewed parcels out of the 700 million parcels nationwide could no longer be referenced to their senders.

13.4.2 Function point analysis of projects 1 and 2

The argument that Project ESi DHLX V 2.0 was a re-run of project ESi DHLX V 1.0, for all loss prevention processes had to be reengineered in a way that cross application referencing made it possible to identify customers as in Project One, is enhanced by comparing both applications developed.

The measurement of complexity was achieved through a function point analysis, which is proposed to be effective and one of the best available metrics to measure the complexity of a piece of software (Garmus and Herron, 2001). They argue that the function point method evaluates the software deliverable and measures its size on the basis of well-defined functional characteristics of a software system.

As Mr. Kuhn is trained in applying function point analyses, he was asked to use the seven step procedure proposed, including all definitions and counting practice recommendations by Garmus and Herron (Garmus and Herron, 2001), which are:

1. Determine the type of function point count
2. Identify the counting scope and the application boundary
3. Identify all data functions (internal logic files and external logic files) and their complexity
4. Identify all transactional functions (external inputs, external outputs, and external inquiries) and their complexity
5. Determine the unadjusted function point count
6. Determine the value adjustment factor, which is based on the fourteen general system characteristics
7. Calculate the function point count

13.4.3 Type of function point count

The count was made on the final version in the development system of IT Solutions, which was provided to end users. This so-called 'development project function point count' counted the final application which went into roll-out.

13.4.4 Phase of count, counting scope and application boundary

The application boundary in project ESi DHLX is well established and was not influenced by the counting scope. Even in release 2.0 the application enhanced stayed as it was, except for the added functionality. The boundaries were consistent in both projects. Both counts were conducted at the time of delivery, being the final version installed.

13.4.5 Identification of data functions

Data functions are all internal logic files and all external interface files.

Definition of an internal logic file:
An internal logic file (ILF) is a user-identifiable group of logically related data or control information maintained within the boundary of the application. The primary intent of an ILF is to hold data maintained through one or more elementary processes of the application being counted.

The count for V 1.0 was 119 logic files, as opposed to V 2.0, with 134 logic files.

Definition of an external interface file:
An external interface file (EIF) is a user-identifiable group of logically related data or control information referenced by the application but maintained within the boundary of a different application. The primary intent of an EIF is to hold data referenced through one or more elementary processes within the boundary of the application counted. An EIF counted for an application must be in an ILF in another application.

V 1.0 has 18 EIF and V 2.0 23 EIF.

13.4.6 Identification of all transactional functions

Transactional functions are external inputs, external outputs and external inquiries.

Definition of internal inputs:
An internal input (EI) is an elementary process of the application that processes data or control application that enters from outside the boundary of the application. Processed data maintains one or more ILFs; processed control information may or may not maintain an ILF. The primary intent of an EI is to maintain one or more ILFs and/or to alter the behaviour of the application through its processing logic.

V 1.0 uses 52 EI, as opposed to 56 EI in V 2.0.

Definition of external outputs:
An external output (EO) is an elementary process of the application that generates data or control information that exits the boundary of the application.
The primary intent of an external output is to present information to a user through processing logic other than, or in addition to, the retrieval of data or control information. The processing logic must contain at least one mathematical formula or calculation, create derived data, maintain one or more ILFs, and/or alter the behaviour of the system.

ESi DHLX V 1.0 used to send 37 EOs to consumer systems and V 2.0 uses 39 EOs.

Definition of external inquires:

An external inquiry (EQ) is an elementary process of the application that results in retrieval of data or control information that is sent outside the application boundary. The primary intent is to present information to a user through the retrieval of data or control information from an ILF or EIF. The processing logic contains no mathematical formulas or calculations and creates no derived data. No ILF is maintained during processing, and the behaviour of the application is not altered.

Both V 1.0 and V 2.0 operate with 8 EQs.

13.4.7   General systems characteristics

Each system is then assigned a degree of influence. Each of fourteen general system characteristics are evaluated independently. These are:

1. Data communications
2. Distributed data processing
3. Performance
4. Heavily used configuration
5. Transaction rate
6. Online data entry
7. End user efficiency
8. Online update
9. Complex processing
10. Reusability
11. Installation ease
12. Operational ease
13. Multiple sites
14. Facilitate change

Each general system characteristic was evaluated in terms of its degree of influence on a scale from 0 to 5.

The degrees of influence are:

0	Not present, or no influence
1	Incidental influence
2	Moderate influence
3	Average influence
4	Significant influence
5	Strong influence throughout

Example:
Each characteristic is evaluated on distinct criteria. The first characteristic, being data communication, scored 4 based on the descriptions below.

1. The application is pure batch processing or standalone PC.
2. The application is pure batch but has remote data entry or remote printing.
3. The application is pure batch but has remote data entry and remote printing.
4. The application includes online data collection or a teleprocessing (TP) front end to batch process or query system.
5. The application includes online data collection or a teleprocessing front end, but the application supports only one type of TP communications protocol.
6. The application is more front end, but the application supports more than one type of TP communications protocol.

Next to defining each value for each characteristic, additional authors explain how to use them for each kind of application.

The evaluation and calculation of the general systems characteristics is identical in both versions of the application. These are:

1. Data communications — 4
2. Distributed data processing — 2
3. Performance — 1
4. Heavily used configuration — 2
5. Transaction rate — 0
6. Online data entry — 5
7. End user efficiency — 5
8. Online update — 3
9. Complex processing — 4
10. Reusability — 1
11. Installation ease — 4
12. Operational ease — 5
13. Multiple sites — 0
14. Facilitate change — 3

13.4.8 Results

The results of the final development function point calculation are outlined in the table below:

	ESi DHLX V 1.0	ESi DHLX V 2.0
Internal logical files:	119	134
External interface files:	18	23
External inputs:	52	56
External outputs:	37	39
External inquiries:	8	8
Unadjustified function point count:	1270	1445
Value adjustment factor:	1,05	1,05
Adjusted function point count:	1333	1517

Table 8: Function point count

This table demonstrates that the rerun of project ESi included a constant value adjustment factor. Hence the unadjusted function point count suggests a higher complexity than in Project One. Whereas V 1.0 was built from scratch, V 2.0 was an evolution project in which the old application was brought up to date and additional functions had to be added. Thus all differences were the delta of functions deleted in version one as they were no longer needed in version two, and functions added on top of the application.

This result is explicitly not used to argue the ability of having developed a more complex application in a shorter time or at lower costs. This function point analysis is meant to demonstrate a further similarity of cases, apart from objectives and stakeholders, as demonstrated in the following chapter.

13.4.9   Project stakeholders

One of the unique opportunities of using project ESi DHLX V 2.0, apart from being able to rerun the same objective of Project One, was the unique opportunity to do it with nearly all of the people involved in Project One.

At first tier stakeholder level only Mr. Schmidt, who was interface manager in Project One, was not immediately included. As Project One had ten interface projects, the role of an interface manager was implemented. Project Two had only two interface projects. This made the synchronisation towards other projects far less complex. Interface management was part of the project manager's duties in this project.

At second tier stakeholder level several roles were not filled. As the project did not have a field test and implemented amendments to an existing application, the works council was less involved. Only the head of the general works council was directly involved.
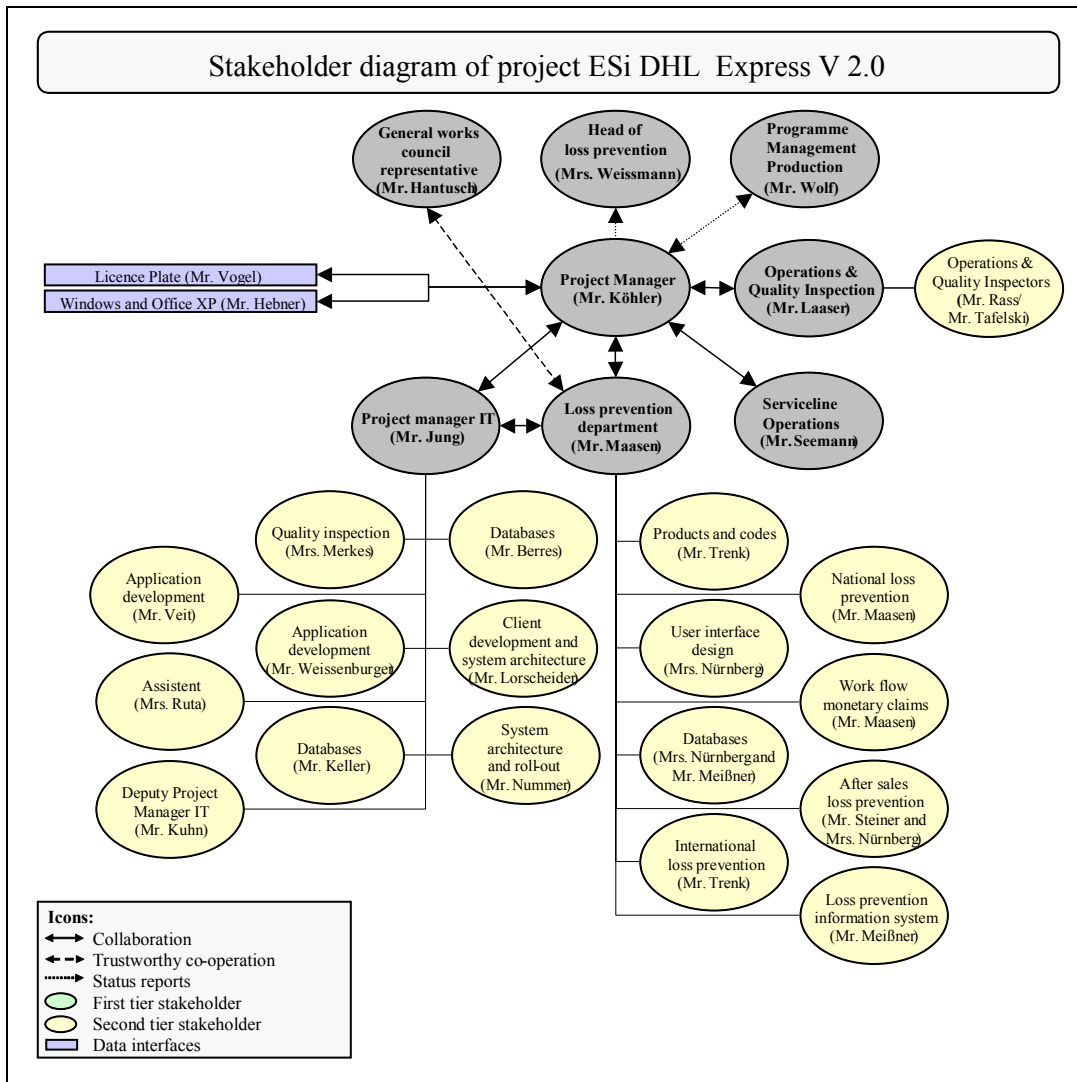
Figure 44: Stakeholders of project ESi DHLX V 2.0

The exclusion of the field test made the involvement of a local sorting centre as a pilot facility obsolete. Hence. Mr Krane was not directly included.

All staff involved in Project One were now either internal reviewers, like Mr. Schmidt, or part of review discussions following the roll-out of Project Two.

Two new roles were those of the managers of interface projects with active requirements towards project ESi DHLX V 2.0. The first was that of the manager of the licence plate project, Mr. Vogel. The second was the role of the manager of the Microsoft Windows/Office XP implementation project, Mr. Hebner. Both agreed to participate in the research and submitted a monthly interview.

Finally, several second tier stakeholders left the team for career move reasons, like Dr. Siegert, Mrs. Sader-Philips, Mr. Karsten and Mr. Hartmann at IT Solutions. Thus their roles were filled by Mr. Veit, Mrs. Ruta, Mr. Weissenburger, Mr. Keller and Mr. Berres.

As in Project One all stakeholders (shaded in grey above) submitted monthly interviews as first tier stakeholders. Additional monthly interviews were submitted by Mr. Vogel and Mr. Hebner.

Additionally, second tier stakeholders were included in opportunistic interviews if acting as a deputy or the like.

13.5 Project phases of project ESi DHLX V 2.0

13.5.1 General remarks

The original pre-phase mandate starting on April 19th 2004 was initiated to prepare a project agreement, the project requirement statement[45], a decision paper regarding the developments for 2004 and 2005, and a project plan on the basis of the recommendation.

The implementation of licence plates in an organisation such as Deutsche Post is not trivial. The loss prevention department alone was facing enormous challenges as the introduction of the licence plate all loss prevention activities had to be extended towards parcels, which

- use a common label with a two dimensional barcode[46]
- require customer identification through tracking and tracing data via optical character recognition
- require customer identification through tracking and tracing data via electronic data interchange
- require customer identification via DHL's central data storage system or
- the ability to report any parcel or item which cannot be assigned to a customer.

This would have meant

- a significant procurement effort of non-linear scanners with the ability to read two dimensional barcodes
- a further procurement of docking stations
- the development of a customised version of that scanner, including the development of software
- the implementation of the underlying logic of two dimensional barcodes in all databases involved in loss prevention activities
- a redesign of all user interfaces
- the development of a communication interface between the new scanner and the loss prevention system and
- a redesign of all interfaces of the loss prevention application.

All business requirements included in the original request for a development project were evaluated. In light of a project called 'Sorting Centre Bremen', 74% of the originally planned budgets were postponed to 2005. Those postponed were related to the usage of a two dimensional barcode including the licence plate and a customer

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[45] The official term for a development mandate in the DHL IS project management handbook V 1.1
[46] A future feature of the common label not fully defined at the time of writing, as two dimensional barcodes are not used in Germany, but in other countries of the network like the Netherlands.

identification code, making cross system references obsolete. As the two dimensional barcode was in the state of testing at that time and only five selected customers were planning to introduce them in the first quarter of 2005, the project team felt that those requirements should be postponed and made related planned budgets available for other activities.

The project team perceived that we would have used the full scale process model, if all requirements had been developed, especially the field test, as a new scanner would have been introduced, which would have included further product innovation activities towards a custom built scanner. The remaining 27 requirements were developed using a downsized seven step process model. The downsizings led to overlaps of 'bargaining', process vision amendments and business requirements specification activities.

For time boxing reasons the systems requirements specification was outsourced to the organisation doing the final developments. Usually I prefer to use a 'neutral' organisation not bidding in the tender prior to development activities. Hence overlaps occurred as postponing 17 requirements to 2005 made smaller 'bargaining' cycles inevitable as we had to pre-access the costs of each of the 27 requirements for 2004 and the 17 requirements for 2004. Additional pre-bargaining was related to the negotiation of the costs of a system requirements specification done by Mr. Jung's team.
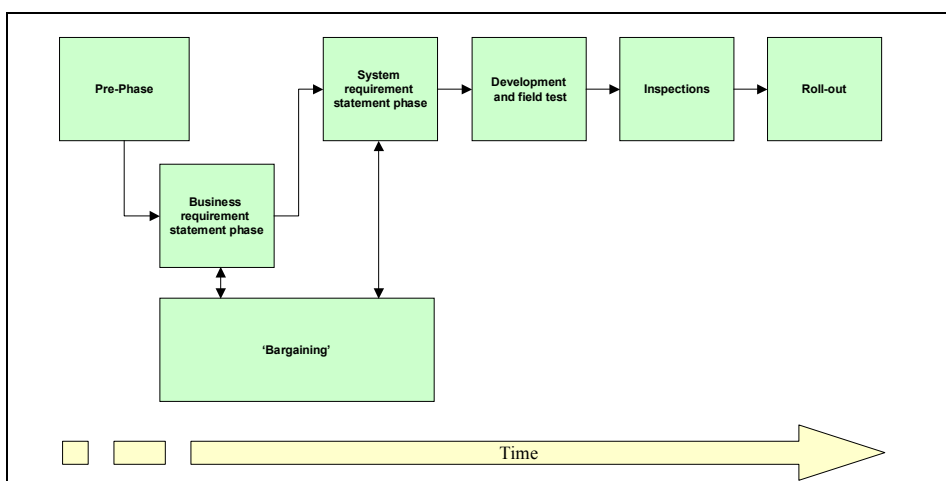
Figure 45: Overview of phases in project ESi DHL Express V 2.0

13.5.2   Step 1: Pre-phase

The pre-phase, as stated above, was started on April 19th 2004. Several activities led to the clearance for a pre-phase mandate. Those activities were launched in March 2004, hence the line of interviews started that month (March 2004). The pre-phase mandate covered the activities proposed in Project Two. The pre-phase was used to build a process vision of how each of the existing processes conducted by a loss prevention officer would appear in a licence plate scenario, especially which old ones needed amendments and which new processes needed to be introduced. The phase ended with the final project agreement, including all associated documents proposed in Project Two.

Figure 46: Observed activities in the pre-phase

Activity 6 was the only one not undertaken. To execute the trustworthy collaboration with the general works council was an activity which had to be undertaken by the specialised department, especially Mr. Maasen. He assumed that the sign-off from ESi as such did not require a further inclusion, and argued that the application was not changed as a whole. This is internally called an 'update', in which the general works council gives consent to a list of the new features of an application. This list is then filed with the original documentation of consent. So the execution of the general works council's co-determination rights was not carried forward until later in the project.

13.5.3 Step 2: Business requirement statement phase

The following Monday (April 26th 2004) the specialised department started to formulate the business requirement specification, which was finalised on May 5th 2004. From the business requirement specification we extracted a business requirement agreement and staffed all necessary roles to do make the project happen.

Figure 47: Observed activities in the BRS phase

As described above, Mr. Maasen continued to exclude the general works council at this point. Any other project would have submitted the final information document in order to meet the requirements of the German industrial relations regulations.

On additional activity was the inclusion of the domain steering group as the project needed clearance due to its budget. This activity was not part of Project One and is a new stage-gate introduced at DHL. This activity will apply for any organisation using distinct limits for certain bodies to be allowed to release certain funding. In my case the domain steering group's approval was needed to start a project above 250,000 €.

13.5.4 Step 3: System requirement statement phase

On May the 5th 2004 Mr. Jung's team at IT Solutions started to work on the system requirement specification. On July 6th 2004 a draft was submitted to the specialised department and to programme management. It was reviewed to ensure that all business requirements from the requirement list were covered in the development activities to come and were to be realised as intended by the specialised department.

Proposed system requirement statement phase	System requirement statement phase in ESi DHLX V 2.0
A1: Analysis of business requirements	A1: Analysis of business requirements
A2: Description of a required system architecture	
A3: Description of required functionalities	A3: Description of required functionalities
A4: Definition of needed physical components	
A5: Description of required data flows	A5: Description of required data flows
A6: Description of required software components	A6: Description of required software components
A7: Description of required interfaces to other systems	A7: Description of required interfaces to other systems
A8: Description of required data migrations	A8: Description of required data migrations

Figure 48: Observed activities in the SRS phase

As the ESi application existed and was not built from scratch, several activities described in the proposed seven step innovation process model were discarded as current components had to be re-used. So activity 2, being the description of a required system architecture, and activity 4, being the definition of the necessary physical components, did not have to be undertaken. If, as originally planned, the two

dimensional barcode had had to be implemented, those two activities and a field test would have been a compulsory exercise.

13.5.5   Step 4: 'Bargaining'

For several reasons bargaining was a cross-phase, activity as described above. As the project had to be designed to budget, each business requirement had to be individually priced and therefore had to be combined to meet available budgets. Once the release was tailored we had to pre-negotiate the costs of a software specification. The sum of all requirements costs and the price negotiated for the requirement specification was submitted in the project requirements statement.

Finally, there was no tender in order to ensure that the team for Project Three was as close to that of Project One as possible. Based on the draft a project plan was developed on June 8th 2004. On June 18th 2004 the draft was given clearance.

Proposed 'bargaining' phase	'Bargaining' in ESi DHLX V 2.0
A1: Negotiating resources A2: Adapting specified modules to current available budgets A3: Optional request to delete or postpone requirements A4: Launch of application development A5: Award of development mandate A6: Project plan A7: Triggering decision phase of the general works council	A1: Negotiating resources A2: Adapting specified modules to current available budgets A3: Optional request to delete or postpone requirements A4: Launch of application development A5: Award of development mandate A6: Project plan

Figure 49: Observed activities in the 'bargaining' phase

Even though conducted in parallel rather than in a sequential manner, all but one activity was conducted. Activity 7 was not carried into execution, hence the decision phase of the general works council was not triggered.

13.5.6   Step 5: Development and field testing

On June 21st 2004, the development activities were launched. The activities proposed in Project Two were all observable but three, as the field test was discarded and the 'old' hardware could still be used. Hence all hardware procurement and field test related activities were redundant.

Figure 50: Observed activities C&FT phase

On October 1st 2004 the application was ready for inspection. In order to help the inspectors the systems requirement specification was finalised by including all change request amendments to the draft.

13.5.7 Step 6: Inspections

The inspections had two parts, one being the user acceptance test by Mr. Rass as inspector, supported by Mr. Meißner from the specialised department. The second series of tests was the technical fitness for use, which was done by testing its installing ability, running all user acceptance tests and then testing the deinstalling ability of the application again. The inspection phase covered the time between October 4th 2004 and October 29th 2004.

Figure 51: Observed activities in the inspection phase

As the general works council was not pleased to receive the list of new features within the regular co-determination process, an additional activity was introduced by Mr.

Maasen. Activity 4 was to eat humble pie with the general works council to get roll-out approval even though we forgot to allow the full execution of their co-determination rights. Mr. Hantusch turned a blind eye and allowed us to carry on.

13.5.8 Step 7: Roll-out

Once the application was installed, loss prevention officers started to work with the new application.

Proposed roll-out phase	Roll-out phase in ESi DHLX V 2.0
A1: Installation of application A2: Preperation of operational readyness A3: Operation of new system	A1: Installation of application A2: Preperation of operational readyness A3: Operation of new system

Figure 52: Observed activities in the roll-out phase

In parallel IT solutions started to operate the application after being installed. All three roll-out activities were conducted on November 4th 2004.

13.6 *Chronological overview of events and related tensions*

In line with the longitudinal research of tensions used in Project One, based on a combination of Van de Ven and Poole's chronological listing of qualitative events and the coding scheme for chronological events (Van de Ven et. al., 2000; Poole, 1983a and 1983b) the content of each interview between March 2004 and November 2004 was analysed as it unfolded over time.

In order to ensure comparability each event was depicted in a track, outcome, and the appropriate generic tension. As additional pieces of information the type of tension (bi-polar, multi-polar or proxy tension) was also noted. Tracks again varied from one time event to medium or long duration tracks, as well as interrelating in terms of cause and effect patterns.

Unlike ESi DHL X V 1.0 it was possible to investigate the complete pre-phase of ESi DHL X V 2.0, which we were unable to capture at an acceptable level of rigor in Project One.

13.6.1 *Pre-phase to systems requirement statement phase tensions*
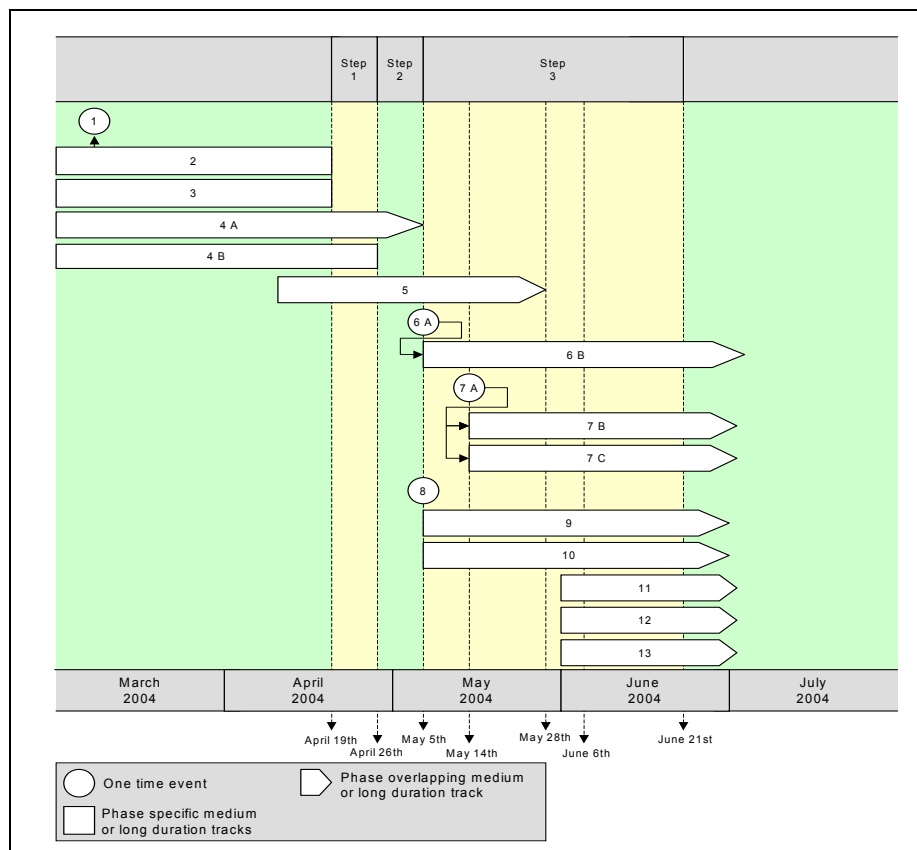
Figure 53: Tension summary I

13.6.2 Track 1: Rejected development request

Generic tension: Outside versus inside
Type of tension: Bi-polar

On March 16th 2004 the specialised department submitted the so called development request to Z 224, being the project and budget co-ordination department of the specialised department. The underlying activity was market-technology linking, as this request states the intended developments aiming at market needs and technological potential. This request was then appraised by the relevant stage-gate keeper at Deutsche Post. As this stage-gate decision is an upfront go or no-go decision, Mr. Illner-Koerlin as stage-gate keeper, was only included in one opportunistic interview.

The department in charge of appraising all projects handed over to the corporate IT unit for further developments was not convinced that the underlying process amendments towards the new coding system were ready for development, and felt that they needed several overhauls.

13.6.3 Track 2: Perceived low quality of the development request

Generic tension: Freedom versus responsibility
Type of tension: Bi-polar

This request was perceived as a rush work with superficial content and an unconvincing business case and was handed back to the loss prevention department for further improvements.

13.6.4 Track 3: Delay of project budgets

Generic tension: Freedom versus responsibility
Type of tension: Multi-polar

Without there being an official project and project budgets, the corporate IT unit and Deutsche Post IT Solutions could not start work. For all first tier stakeholders except the specialised department, the project had not started at that time. This event shows that tensions may arise if an activity is not undertaken.

13.6.5 Track 4 A: The advised roll-out date was internally questioned

Generic tension: Determinent versus emergent
Type of tension: Multi-polar

With the ultimate roll-out date being November 1st 2004, first tier stakeholders anticipated constraints during the development process because of dwindling time reserves.

13.6.6   Track 4 B: The advised roll-out date was externally questioned

Generic tension: Determined versus emergent
Type of tension: Multi-polar

With there being dependant interface projects, the lack of the release of V 2.0 was a major problem. The new coding project needed certain applications to be finalised in 2004, of which one was ESi. On the other hand the Windows XP project, which also had to be completed in 2004, was hoping to include the migration to Windows XP in this release without having to finance a Windows XP migration project on its own. Hence interface projects saw additional problems in not being able to synchronise with project ESi as necessary.

13.6.7   Track 5: Requirements review

Generic tension: Outside versus inside
Type of tension: Multi-polar

Within the pre-phase mandate dating from April 20th 2004, all requirements handed over from Mr. Illner-Koerlin were reviewed. One major block was the introduction of the two dimensional label, which only a few pilot customers were planning to use in 2005. Furthermore the final decision to implement the two dimensional barcode was planned for the time of the follow-up release of ESi DHLX 2.0.

This triggered a tension between Mr. Jung, Mr. Maasen and myself. Mr. Maasen and Mr. Jung would have preferred to have implemented as many features as possible. Their position was based on the potential threat of not getting budgets next year. My position was based on the potential interference of project 'Sorting Centre Bremen'. With a large project such as 'Bremen' we ran into conflicts of getting budget cuts during its development. I argued for a smaller project with unrivalled requirements.

After long hours of discussions a final list of requirements was settled. This list was shorter than the original list of business requirements as it did not include features regarding the two dimensional barcode. The delta of discarded requirements was settled in the first change request.

13.6.8   Track 6A: Official project launch

Generic tension: Outside versus inside
Type of tension: Multi-polar

The development mandate was finalised on May 28th 2004.

13.6.9   Track 6B: Project clearance from the domain steering group

Generic tension: Freedom versus responsibility
Type of tension: Proxy

Based on the cost appraisal of all requirements we passed the 200,000 € limit at which a head of a department can sign off a project himself. Hence the project had to be presented to the domain steering group, which is the body of the group's executive

management. A presentation was prepared, and in addition, Mr. Maasen and I briefed the chief production officer, Mr. Reinboth, about the project and our thoughts of postponing his personal hobbyhorse, the two dimensional barcode, in favour of other running projects. Mr. Reinboth gave us immediate clearance with his secretary writing to Mr. Wolf to start the project. Mr. Reinboth wanted to take care of getting the project retroactively cleared in the domain steering group.

13.6.10 Track 7A: Identifying interdependencies with other projects

Generic tension: Inside versus outside
Type of tension: Proxy[47]

The only immediately affected project was project 'Windows/Office XP'. This project was about the migration of all clients at DHL Express Germany from Windows/Office NT to Windows/Office XP. One this interdependency was identified, synchronisation activities had to be triggered.

Project 'Licence plate' was only affected as far as noting the roll-out date we had decided on, as we planned to be 'licence plate compliant' prior to December 31st, 2004.

13.6.11 Track 7B: Synchronising activities with other projects

Generic tension: New versus old
Type of tension: Proxy

This is the track related to the Microsoft Windows/Office XP migration, discussed above.

13.6.12 Track 7C: Monitoring synchronised activities with other projects

Generic tension: Determined versus emergent
Type of tension: Proxy

All activities on either side had to be controlled if they were perceived as having an impact on the project. All activities on the client were planned and reported to Mr. Hebner, who then checked back with his development team and visa versa.

13.6.13 Track 8: Abridging procurement

Generic tension: Freedom versus responsibility
Type of tension: Proxy[48]

The bureaucratic act needed to give the two contracts (specification and development) to ITS was perceived as being too lengthy, so I asked Mr. Wolf and Mr. Brust, the key account manager of IT Solutions, to compose a letter of intent so that Mr. Jung's team could start their work.

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[47] All activities and tasks related to track 7 and its spin-offs were classified as proxy tensions as the manager of a project having to be synchronised on acts as my proxy.
[48] Mr. Wolf procures IT Solutions' services through Mr. Brust, hence Mr. Brust acts as a proxy.

So after getting clearance, a letter of intent was given to Mr. Brust at ITS in order to enable the development team to start work immediately.

13.6.14 Track 9: Attuning business requirements

Generic tension: Outside versus inside
Type of tension: Proxy

An iterative process was started in which Mr. Jung's team developed a common understanding with the specialised department of the meaning assigned to each requirement by that department. Development proposals were discussed based on a finalised common understanding.

13.6.15 Track 10: Two dimensional barcodes 'reloaded'

Generic tension: Outside versus inside
Type of tension: Multi-polar

A discussion at the head office reawakened interest in the sense or nonsense of the introduction of a licence plate and the two dimensional barcode. The chief production officer Mr. Reinboth and his marketing counterpart Mr. Demuth reconsidered making the two dimensional barcode a 'must' with the licence plate. Mr. Reinboth, as Mrs. Weismann's boss, was a champion of making the two dimensional barcode binding, which was tried to be evaded by the marketing department. The specialised department therefore became uneasy about having postponed the implementation of the two dimensional barcode to 2005.

After several weeks of discussion the Universal Postal Union joined the debate. Mr. Weissmann started to perceive this track as a 'never-ending story', with developments reaching a point at which it was inevitable to accept any change requests, and stakeholders became indifferent about this discussion.

13.6.16 Track 11: First Thursday each month

Generic tension: Determined versus emergent
Type of tension: Multi-polar

Monthly project meetings for first tier stakeholders were implemented, in which the current status was monitored and presented to all first tier stakeholders. No hidden agendas were allowed. I tried to lead by example and reported mishaps as openly as I reported achievements.

In this open climate stakeholders felt well informed about their specific role and expected contribution towards project objectives.

13.6.17 Track 12: Raising maintainability

Generic tension: Determined versus emergent
Type of tension: Multi-polar

As part of the monthly project meetings, Mr. Seemann from the new solution support department was invited to submit requirements regarding the enhancement of the

maintainability of the future application. Solution support and IT Solutions started to evaluate maintainability enhancement possibilities.

As a flanking activity, maintainability enhancements were proposed, discussed and implemented. Even though this tension was managed in order to be enabling, Mr. Seeman doubted that maintenance expenditures could be lowered significantly.

Yet the final review, two days after Mr. Seemann's interview, showed that maintenance costs could be lowered by 30% because of the measures undertaken in this project.

13.6.18 Development phase to roll-out phase tensions
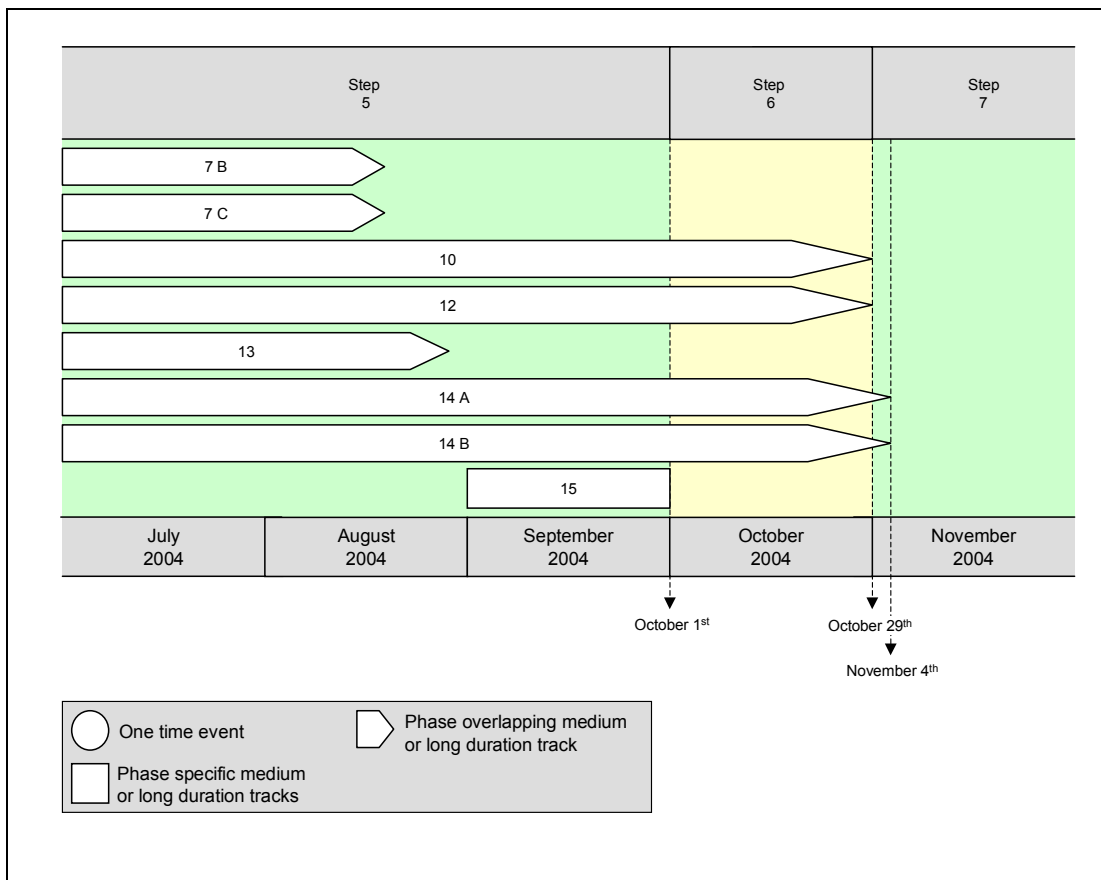
Figure 54: Tension summary II[49]

13.6.19 Track 13: NewCon

Generic tension: New versus old
Type of tension: Multi-polar

The introduction of a new contract, internally abbreviated NewCon, between Deutsche Post and our provider Deutsche Telekom was initiated by the board of management for Autumn 2004. The future general conditions for an inspection clearance became

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[49] Step 4 ' Bargaining' was disscussed as disscussed above.

unclear. This track ended as it became clear that this release would be settled under current regulations.

13.6.20 Track 14 A: Tension management

Generic tension: Freedom versus responsibility
Type of tension: Multi-polar

As we started to manage activities and tensions by engaging with them from the beginning, over time stakeholders started to perceive the way in which the project was managed as being very efficient.

13.6.21 Track 14 B: Perceived project performance

Generic tension: Determined versus emergent
Type of tension: Multi-polar

The performance of the project started to attract management attention as it became perceived as being well managed.

13.6.22 Track 15: Joint inspections

Generic tension: Freedom versus responsibility
Type of tension: Proxy

As a time boxing measure a joint inspection was attempted. Usually a user acceptance test and a technical acceptance test are sequential. This means that the final version of a piece of software is installed on a test server, which has to be totally identical to the server used as a final production server. Then all test scenarios and use cases are tested. In the following technical acceptance test the whole application is de-installed. Then all installation, operation and de-installation tests are made by T-Systems. Following Project Two the idea was to have the first installation as a first technical acceptance test, then we planned to have the operations test within the use case testing, followed by de-installation tests once the user acceptance test was finished.

Even with a common understanding of what would have to be done, Mr. Tafelski was not explicit about what would have to be done to pass a parallel technical acceptance test. Here Mr. Tafelski's commitment was developed by negotiating definite test criteria.

13.7 Limitations

13.7.1 Research related limitations

Most of the project team at first tier stakeholder level are very experienced, with between five and ten years in their roles. Having changed stakeholders at first tier level, they may have not been able to achieve the observed level of quality in managing activities and their inherent tensions.

A further limitation was the ability to extract subjective perceptions of all involved stakeholders in their interviews, which makes the attempt to copy the proposed ways of managing activities and their inherent tensions problematic. One might expect that not having a collaborative monthly interview snapshot over time would make the tracking of tensions difficult.

Finally, the overall intervention of a doctorate in the first tier stakeholder community may have resulted in a group dynamic which generated an awareness of tensions, and may have led to an to manage tensions that a non-research based project would not be capable of copying.

13.7.2 Research strategy limitations

In light of the preferred research strategy a single case study may only enable testing in terms of falsification. Even though proposed otherwise (Yin, 2003b), this case study was used to falsify propositions or reshape propositions based on a more informed base of evidence from two longitudinal research projects.

13.7.3 Other limitations

All limitations proposed in Project One regarding linguistic limitations, research project awareness of stakeholders, interview delays and track assignment also apply to Project Three.

13.8 Conclusions

13.8.1 Propositions about tensions

Based on their findings Köhler and Harrison (2004) propose how tensions could be exploited to improve achievement of project objectives. The evidence from the second longitudinal project enforces seven propositions on tension management.

13.8.2 Proposition 1

Tensions exist and can be tracked.

Tensions were perceived in fifteen tracks, as opposed to thirty-eight tracks in project ESi DHLX V 1.0. Having the perception of tensions in common and the ability to track tensions over time did not disprove the proposition that tensions exist and can be tracked.

13.8.3 Proposition 2

Tensions are inherent to innovation management activities, tasks and functions or steps.

As processes consist of activities, tasks and functions or steps (Harrison, 1998) tensions are not only inherent to activities, as proposed by Dougherty (1996), but also to each task which makes up a given activity.

This higher granularity can be derived from tracks 7A to 7C. Within the activity to migrate ESi V 2.0 to Windows/Office XP 7A, two spin-off tracks related to monitoring tasks and synchronisation tasks. Each had a different perceived inherent tension. As process steps are made of one or more activities, and activities are made up of one or more tasks, tensions should be observed at activity or task level.

The label step is used to cluster a set of activities. One cluster may be a pre-phase.

Functions may have inherent tensions. One example is the solution support department, represented by Mr. Seemann, as opposed to Deutsche Post IT Solutions, represented by Mr. Jung. Mr. Seemann is in charge of maintenance budgets, which are supposed to be kept at a minimum. Mr. Jung's team is part of an external organisation earning money from maintenance tasks. Thus, activities in which both parties are involved may have a function based set of tensions.

13.8.4 Proposition 3

Tensions may be clustered within four generic activities, namely market-technology linking, organising for creative problem solving, evaluating and monitoring, and finally commitment to innovation.

Within the coding process and each feedback cycle, none of the participants felt that perceived tensions had crunched into one of the four generic tensions. Even though Dougherty (Dougherty, 1996) explicitly states that the four generic tensions are not exclusive, no additional clusters of tensions were observed.

13.8.5 Proposition 4

Tensions can be managed.

As tensions are suggested to be enabling (Dougherty, 1996) they have to be nurtured, and if unbalanced, managed in order to avoid disruptive effects. Managing tensions is time consuming and demanding. Even though we were able to avoid disruptive instances, techniques which could be considered preferred practises were not researched as such. As there was no track which we were unable to manage, this proposition stays unchanged, as it was not disproved.

13.8.6 Proposition 5

Tensions can be described as 'bi-polar', 'multi-polar' or 'proxy' in nature.

None of the research participants felt any difficulty in coding the answers towards Dougherty's four generic tensions. This applies both to matching an issue to a tension,

as well as not having to 'crunch' an answer towards a tension in terms of missing additional tensions.

13.8.7 Proposition 6

Core tension management can be tension 'reconnaissance', tracking, and restoring unbalanced tensions.

Tension reconnaissance was one of the main activities for me as project manager. Not all activities or tasks have a perceived tension, as involved stakeholders may have common goals, for example. Thus activities have to be reviewed individually in search of unbalanced tensions. This activity adds further complexity to the job of an innovator, which turned out to be fruitful, taking stakeholders' perceptions of tracks 14A and 14B into account. Tracking tensions helped to manage each tension and to review the effects of interventions towards tensions until a track was perceived as being resolved. Restoring balance to tensions relates to the necessity to intervene in order to avoid tensions being unable to deliver their enabling benefits.

13.8.8 Proposition 7

Proactive tension management makes innovation processes easier to manage.

Having managed project ESi DHLX V 2.0 in the way we did, the project team proposes that managing activities and their inherent tensions may improve outputs and does make the process easier to manage. Improved outputs were perceived by monitoring stakeholders as described in Track 14B, but it should be stressed that no performance indicators were reviewed to prove that statement. Hence we propose that from a project team point of view, track 14A suggests that tension management makes innovation processes easier to manage.

13.8.9 Process model propositions

Based on the evidence of project ESi DHLX V 2.0, none of the proposed activities were disproved, although despite trying, we did not implement the process fully. All activities regarding the desired process of trustworthy collaboration with the works council were accidentally botched. Furthermore, 'bargaining' was avoided in favour of time boxing.

Depending on the organisation bargaining may be tackled in various forms. If the systems requirement specification is written by a neutral third party not included in a future tender, bargaining will be a distinct step after the system specification phase. Here, for time boxing reasons, the specification was written by an organisation included in the development of the future logistics system. This is an approach to be avoided if possible, as the development organisation has to be prevented from designing a system based on their needs or skills, consciously or unconsciously overruling business requirements.

Furthermore, time boxing measures may move activities to preceding phases, which will shift inherent tensions.

Having identified non-compliance with the process model proposed by Köhler and Harrison (Köhler and Harrison, 2004) as having negative effects, the process model and all underlying activities are still proposed as best practice.

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15 Appendix

15.1 *Overview of all qualitative events in project ESi DHL Express*

15.1.1 September 2002

The table below summarises all qualitative events explicitly stated in all September 2002 interviews of participating first tier stakeholders.

Track	Tension	Event	Outcome	Source
1	4	The project's budget was delayed from May 02 to August 02	Specialised department and the corporate IT department could not carry out necessary preparations	PI01PweQ1, PI01AMQ4 and PI01ISQ1
2 A	1	Development mandate and all loss prevention processes were revised	The specialised department focused on the new project while temporarily reducing line duties	PI01PweQ9
2 A	2	Development mandate and all loss prevention processes were revised	Loss prevention staff were reorganised for project matters	PI01PweQ5 and PI01PWeQ7
2 A	2	Development mandate and all loss prevention processes were revised	Roles and relationships had to be defined	PI01PwoQ9 and PI01TKQ9
2 B	2	Development mandate and all loss prevention processes were revised	Loss prevention staff had to be consulted with IT know-how	PI01PweQ2, PI01ISQ1and PI01ISQ2
2 B	2	Development mandate and all loss prevention processes were revised	Loss prevention staff specifies too deeply, causing time losses	PI01TKQ2 and PI01ISQ7
2 C	3	Development mandate and all loss prevention processes were revised	A new performance specification has to be re-evaluated after completion	PI01PweQ3, PI01TKQ3 and PI01TKQ4
2 D	3	Development mandate and all loss prevention processes were revised	Application interfaces became unpredictable	PI01ISQ6
2 D	3	Development mandate and all loss prevention processes were revised	Budgets became unpredictable	PI01PwoQ3 and PI01TKQ1
2 D	3	Development mandate and all loss prevention processes were revised	Requirements became unpredictable	PI01PwoQ3, PI01TKQ1 and PI01ISQ5
2 D	3	Development mandate and all loss prevention processes were revised	The expectations of various stakeholders may not be met	PI01PwoQ2 and PI01ISQ5
2 D	3	Development mandate and all loss prevention processes were revised	Timelines became unpredictable	PI01PwoQ3, PI01ISQ2, PI01ISQ3, PI01TKQ1 and PI01ISQ5
2 E	3	A change of management at the specialised department prior to the project start	New management is not familiar with loss prevention processes	PI01PwoQ3, PI01ISQ3 and PI01PweQ9

2 E	3	A change of management at the specialised department prior to the project start	The new head of loss prevention has new ideas and visions about the future of loss prevention	PI01PwoQ2
2 F	3	Up front definition of a development mandate with specific parameters	Preventing imminent developments on very short notice	PI01WJQ2
2 G	4	In case of the new application being postponed or turned down for good, significant maintenance and leasing costs are inevitable	The old application has to be migrated to a new server as well as to a new Oracle version	PI01WJQ4
2 H	4	The specialised department focused on the new project while temporarily reducing line duties	Perceived good quality of specialised department's outputs	PI01AMQ1, PI01AMQ2, PI01AMQ7, PI01AMQ9, PI01ISQ1, PI01ISQ2, PI01TKQ5, PI01PWeQ5 and PI01WJQ2
3	3	The impact of the future corporate strategy regarding the integration into DHL was uncertain	It became unpredictable whether the ESi application would fit future needs	PI01PweQ3
4	4	Third party IT solution provider has maintenance budgets only	Specialists have to be kept on stand-by unpaid	PI01WJQ1 and PI01WJQ3

Table 9: Qualitative events in September 2002

15.1.2 October 2002

The table below summarises all qualitative events explicitly stated in all October 2002 interviews of participating first tier stakeholders. This month included additional opportunistic interviews.

Track	Tension	Event	Outcome	Source
2 A	1	The specialised department focused on the new project while temporarily reducing line duties	Work is fulfilled goal-directed	PI02AMQ1
2 A	1	The specialised department focused on the new project while temporarily reducing line duties	Unique features of loss prevention work to be innovated were identified	PI02AMQ2
2 A	1	The specialised department focused on the new project while temporarily reducing line duties	Work is fulfilled with enhanced dedication	PI02AMQ7
2 A	1	The specialised department focused on the new project while temporarily reducing line duties	The very first subprojects started handing over completed specifications	PI02AMQ1
2 A	3	The specialised department delays the hand over of the performance specification aiming at reengineering current work flows	Although claiming to rework the development mandate the specialised department is perceived to only copy old specifications	PI02ISQ1 and PI02ISQ9
2 A	3	The specialised department delays the hand over of the performance specification aiming at reengineering current work flows	The specialised department is perceived still to be too involved in line duties to work on the performance specification properly	PI02ISQ2 and PI02ISQ7
2 A	3	The specialised department delays the hand over of the performance specification aiming at reengineering current work flows	The specialised department's effort about reengineering current work flows are feared to be too costly and time consuming	PI02ISQ3
2 A	3	The specialised department delays the hand over of the performance specification aiming at reengineering current work flows	The delay forces to change the deadline of the project from a July 31st, 2003 date to 'to be determined'	PI02TKQ2 and PI02TKQ2
4	4	In a steering committee meeting we decided to award development contracts to our IT solutions provider in advance to tie up as much money as we could	The IT solutions provider was able to secure specialist knowledge already on the organisation's payroll, which were on stand by	PI02WJQ9

5	2	All stakeholders contribute to overcome problems	Budget issues can be resolved on short notice	PI02TKQ2
5	3	In a steering committee meeting we decided to award development contracts to our IT solutions provider in advance to tie up as much money as we could	In four commercial papers we tied up a sum close to the 60% needed to save the project	PI02AMQ9, PI02WJQ1 and PI02TKQ2
5	3	The organisation's fixed budget system prevents budgets to be carried from one year to the next. Thus unused forecasts expire, which were forecasted into 60% use of budget in 2002 and 40% use of budget in 2003. With the specialised department reworking the development mandate for nearly five month, hardly any budgets were used 2002	60 % of the projects budgets were subject to expire on December 31st, 2002	PI02AMQ4, PI02WJQ2, PI02ISQ4, OI01IS, OI01PWo, OI01PWe, OI01AM, OI01WJ and OI01TK
5	4	In a steering committee meeting we decided to award development contracts to our IT solutions provider in advance to tie up as much money as we could	The IT solutions provider started working on the future application and its architecture.	PI02WJQ9
5	4	In a steering committee meeting we decided to award development contracts to our IT solutions provider in advance to tie up as much money as we could	The IT solutions provider feared that advance development contracts could lead to ad-hoc measures.	PI02WJQ6

Table 10: Qualitative events in October 2002

15.1.3 November 2002

The table below summarises all qualitative events explicitly stated in all November 2002 interviews of participating first tier stakeholders.

Track	Tension	Event	Outcome	Source
2 A	1	The specialised department focused on the new project while temporarily reducing line duties	Work is fulfilled goal-directed	PI03AMQ1
2 A	1	The specialised department focused on the new project while temporarily reducing line duties	Team building effects occur	PI03AMQ2
2 A	1	The specialised department focused on the new project while temporarily reducing line duties	Each sub projects effort is perceived as above average	PI03AMQ7
2 A	1	The specialised department focused on the new project while temporarily reducing line duties	Due to the reduction of line duties all sorting centres are perceived as not being given sufficient support	PI03PWeQ2
2 A	1	The specialised department focused on the new project while temporarily reducing line duties	Due to the reduction of line duties the line duty work load was concentrated on certain staff members now suffering from stress	PI03PWeQ9
2 A	1	The specialised department focused on the new project while temporarily reducing line duties	Consultants were recruited to support the specification work at the head office	PI03PWeQ5
2 A	3	The specialised department delays the hand over of the performance specification aiming at reengineering current work flows	All original project timelines are not achievable any more	PI03ISQ5
2 A	3	The specialised department delays the hand over of the performance specification aiming at reengineering current work flows	All specified requirements were feared to be without necessary quality securing efforts for time boxing reasons	PI03TKQ3, PI03TKQ6 and PI03TKQ9
2 A	3	The specialised department delays the hand over of the performance specification aiming at reengineering current work flows	The specialised department's effort about reengineering current work flows are feared to be of too poor standard to be used in the end	PI03ISQ3 and PI03ISQ9
2 A	3	The specialised department focused on the new project while temporarily reducing line duties	The project is perceived as progressing rather slowly	PI03PWoQ1 and PI03PWoQ2

2 A	3	The specialised department focused on the new project while temporarily reducing line duties	The project is perceived as progressing goal orientated, dedicated and fast.	PI03PWeQ1
3	4	The specialised department delays the hand over of the performance specification aiming at reengineering current work flows	The project is subject to new budget screening activities by the corporate IT strategy unit	PI03PWoQ3 and PI03TKQ1
3	3	All projects rolled out in summer 2003 or later are re-evaluated as they have to fit into the integration strategy at DHL	The delay of results from the specialised department became critical	PI03TKQ1 and PI03TKQ3
6	2	The IT solutions provider requests to use Oracle 9i as an application development environment, which was not among the technical blanket agreements of Deutsche Post	Some of the preparations towards using Oracle 9i might be in vain	PI03ISQ4, PI03ISQ9 and PI03TKQ3

Table 11: Qualitative events in November 2002

15.1.4   December 2002

The table below summarises all qualitative events explicitly stated in all December 2002 interviews of participating first tier stakeholders.

Track		Tension	Event	Outcome	Source
2	A	1	The specialised department focused on the new project while temporarily reducing line duties	Work is finished as soon as possible	PI03AMQ1
2	A	1	The specialised department focused on the new project while temporarily reducing line duties	The team has grown on the task to be completed	PI03AMQ2
2	A	1	The specialised department focused on the new project while temporarily reducing line duties	Dedication has risen under the very high time pressure	PI03AMQ7
2	A	1	The specialised department focused on the new project while temporarily reducing line duties	The project is perceived to be developing rather well	PI03AMQ9, PI03PWoQ1 and PI03PWeQ1
2	A	1	The specialised department focused on the new project while temporarily reducing line duties	Perceived enhanced team building in line with the dedicated work on the project	PI03PWeQ2 and PI03PWeQ7
2	A	1	The specialised department focused on the new project while temporarily reducing line duties	After the hand over of the performance specification the sub project teams could return to their day to day business	PI03PWeQ9
2	A	1	The impact of the future corporate strategy regarding the integration into DHL was uncertain	It became unpredictable whether the ESi application would fit future needs regarding the implementation of licence plates	PI03PWeQ3 and PI03PWeQ4
3		1	The impact of the future corporate strategy regarding the integration into DHL was uncertain	It became unpredictable whether the ESi application would fit future needs regarding the implementation of licence plates	PI03PWeQ3 and PI03PWeQ4
6		2	The IT solutions provider requests to use Oracle 9i as an application development environment, which was not among the technical blanket agreements of Deutsche Post	After implementing Oracle 9i in hurrying obedience IT Solutions now has to row back and install Oracle 8i	PI03TKQ2
6		2	The IT solutions provider requests to use Oracle 9i as an application development environment, which was not among the technical blanket agreements of Deutsche Post	It is perceived as a weakness having to develop with Oracle 8i as several features are included in Oracle 9i, which are critical to the new application	PI03WJQ3

6	2	The IT solutions provider requests to use Oracle 9i as an application development environment, which was not among the technical blanket agreements of Deutsche Post	IT Solutions started developments using Oracle 9i, even though it has not been finally confirmed. This causes additional costs, which could have been avoided.	PI03PWoQ2
7	4	Kick-Off IT development	IT is very difficult to get all needed stakeholders for the IT development process pinned down on a single agreeable date	PI03ISQ2 and PI03TKQ3

Table 12: Qualitative events in December 2002

15.1.5 January 2003

The table below summarises all qualitative events explicitly stated in all January 2003 interviews of participating first tier stakeholders. This month included additional opportunistic interviews.

Track	Tension	Event	Outcome	Source
2 A	1	The specialised department focused on the new project while temporarily reducing line duties	The team has grown on the task to be completed	PI05TKQ2, PI05WJQ6 and PI05PWeQ2
2 A	3	The specialised department delays the hand over of the performance specification aiming at reengineering current work flows	The overall time length from the internal kick-off of a project up till the final development mandate is awarded is perceived as far too long	OI02MBQ1, OI02MBQ3, OI02MBQ4 and PI05PWoQ2
2 E	3	A change of management at the specialised department prior to the project start	The head of the specialised department bases her positive perception on feedback from her staff	PI05PWeQ1, PI05PWeQ7 and PI05PWeQ9
3 A	3	The impact of the future corporate strategy regarding the integration into DHL was uncertain	Tight IT budgets endangered the project to be reprioritised and closed for good	PI05TKQ3, PI05TKQ9, PI05WJQ3, PI05WJQ9, PI05PWoQ3 and PI05PWoQ3
3	3	The impact of the future corporate strategy regarding the integration into DHL was uncertain	In light of the tight IT budgets it was perceived as essential that all budget matters were solved internally in order not to endanger the project, because of being judged as a project becoming potentially more expensive	PI05ISQ1, PI05ISQ3, OI02MBQ6 and PI05PWoQ9
3 B	3	The impact of the future corporate strategy regarding the integration into DHL was uncertain	With future priorities unknown to the specialised department support from that stakeholder is limited	PI05PWeQ2
6	2	The IT solutions provider requests to use Oracle 9i as an application development environment, which was not among the technical blanket agreements of Deutsche Post	All development servers were reset to Oracle 9i	PI05WJQ1
6	2	The IT solutions provider requests to use Oracle 9i as an application development environment, which was not among the technical blanket agreements of Deutsche Post	The final decision to use Oracle 9i enables the IT solutions provider to use additional features not included in Oracle 8i	PI05WJQ1
7 A	4	Kick-off IT development	The system administration department representative criticised that there was no appropriate planning of application support	PI05OSQ3

7 A	4	Kick-off IT development	The system administration department representative criticised not to be included in all previous project phases	PI05OSQ2
7	4	Kick-off IT development	At the kick-off meeting all relevant stakeholders were present	PI05OSQ2
7	4	Kick-off IT development	The kick-off meeting was felt to be overstaffed as some stakeholders send several people	PI05OSQ2
7	4	Kick-off IT development	Stakeholders felt well informed and included	PI05OSQ9, PI05TLQ9 and PI05PWoQ2
8	3	T-Systems started to charge the installation of software packages, which were for free up till than and not included in the project budget	Additional budgets needed or additional buffers in the current budget were unclear and endangering the overall project	PI05ISQ3, PI05ISQ6, PI05ISQ9 and PI05TLQ4
9	4	All Intranet applications have to be developed in accordance with the company's Intranet style guide	The Intranet style guide is not applicable to many of the masks of the application	PI05WJQ4
10	4	Intra-network co-operation post Kick-off IT development	The project is perceived to be developing rather well	PI05TKQ1, PI05WJQ6 and PI05TLQ2
11	4	The company was undecided whether to use Windows/Office XP in future	The projects task to develop the client application towards Windows/Office XP was a problem for the development team	PI05TLQ3
12	1	Hardware requirements were unclear	The team was unable to predict appropriate hardware parameters at that time	PI05TLQ6

Table 13: Qualitative events in January 2003

15.1.6 February 2003

The table below summarises all qualitative events explicitly stated in all February 2003 interviews of participating first tier stakeholders.

Track	Tension	Event	Outcome	Source
3	3	The impact of the future corporate strategy regarding the integration into DHL was uncertain	Tight IT budgets endangered the project to be reprioritised and closed for good	PI06AMQ3 and PI06AMQ9
9	1	The new designs needed to be in line with the future DHL intranet style guide were unclear	ITS pushed the project manager to get to a final decision to avoid time losses	PI06WJQ4
10	4	Kick-off IT development	The early involvement of all relevant stakeholders was perceived as very fruitful	PI06ISQ2
12	1	ITS was asked to recommend a suitable hardware configuration for the new ESi application	The recommended hardware dimensions by ITS were perceived as totally oversized	PI06ISQ2
13 A	4	It was perceived that we had noticeable gaps about the system to be developed: Stressed were gaps about number of interfaces to current available systems needed and the configuration of the clients.	Several stakeholders felt uneasy about the missing 'helicopter view' of the system to be developed	PI06PWoQ1 and PI06PWoQ2
13 B	4	It was perceived that ITS lacked proactive collaboration with other relevant systems to which we needed to have interfaces to.	The corporate IT unit enforced a higher degree of coordination and collaboration with other systems and projects.	PI06PWoQ1 and PI06PWoQ2
13 C	1	ITS were criticised to have used all interfaces from the old loss prevention system without having tried to optimise.	Because of narrow timelines it was accepted as the only option.	PI06WJQ2
14	4	We started to use budget reserves to enhance performance and user friendliness.	The project manager was cautioned to rather give back money to be used for other projects instead of delivering 'nice to haves' beyond what was specified by the specialised department.	PI06PWoQ5

| 15 | 4 | One of the project members at ITS left the team. | ITS tried to compensate the 'brain drain' by inprossessing a new staff member prior to the phasing out of the developer. | PI06WJQ5 |
| 16 | 4 | The development team got uneasy after a delay with the follow up contract. | We tried to put pressure on the new contract. | PI06WJQ3 and PI06WJQ9 |

Table 14: Qualitative events in January 2003

15.1.7   March 2003

The table below summarises all qualitative events explicitly stated in all March 2003 interviews of participating first tier stakeholders.

Track	Tension	Event	Outcome	Source
3	3	The impact of the future corporate strategy regarding the integration into DHL was uncertain	Finally the project was perceived as complementary with future DHL needs.	PI07AMQ3 and PI07AMQ9
3	3	The impact of the future corporate strategy regarding the integration into DHL was uncertain.	Project ESi was finally excluded from further IT budget cuts.	PI07AMQ3, PI07AMQ9, PI07TK2, PI07TK9 and PI07PWQ2
8	1	Prior to the inspections the application needed to be packaged for inspection and roll-out.	It was unclear whether we needed to outsource packaging or not as our service provider unexpectedly gave notice of the termination of their packaging services.	PI07TLQ2 and PI07TLQ3
12	1	ITS was asked to recommend a suitable hardware configuration for the new ESi application	The recommended hardware dimensions by EE 513 were perceived as too low by ITS	PI07WJQ3 and PI07TKQ3
15	4	One of the project members at ITS left the team.	It was perceived that the new developer was phased in without problems.	PI07WJQ5
16	4	The development team got uneasy after a delay with the follow up contract.	The new contract was finalised on time.	PI07WJQ2, PI07WJQ9 and PI07TKQ2
17	1	All components of the old application had to be checked for reusability	The only reusable component of the old loss prevention application had to be migrated	PI07WJQ6
18	1	A first test of all future core components of the new application was set up.	The application was successfully tested on a replica client used by loss prevention staff	PI07TKQ1

Table 15: Qualitative events in March 2003

15.1.8 April 2003

The table below summarises all qualitative events explicitly stated in all April 2003 interviews of participating first tier stakeholders.

Track	Tension	Event	Outcome	Source
3	3	The impact of the future corporate strategy regarding the integration into DHL was uncertain	The project was forced to continue and hope for the best	PI08PWeQ3, PI08PWeQ6, PI08AMQ3 and PI08PWoQ9
10	4	Kick-off IT development	Following the kick-off meeting all stakeholders were perceived to show a very high commitment to the project	PI08PWeQ1, PI08PWeQ2, PI08PWeQ5, PI08PWeQ7, PI08PWeQ9, PI08TLQ2, PI08TLQ7, PI08ISQ1, PI08ISQ2, PI08ISQ9, PI08TKQ7, PI08AMQ1 and PI08AMQ2
12	1	ITS was asked to recommend a suitable hardware configuration for the new ESi application	The discussion around the recommended hardware dimensions was perceived as too long	PI08TLQ2, PI08TLQ6, PI08TKQ2 and PI08ISQ6
19	4	The procurement of hardware and its punctual delivery by our IT infrastructure service provider was doubted	Stakeholders started to perceive a rising risk of project delays caused by T-Systems	PI08TLQ3, PI08TKQ3 and PI08PWoQ3

Table 16: Qualitative events in April 2005

15.1.9 May 2003

The table below summarises all qualitative events explicitly stated in all May 2003 interviews of participating first tier stakeholders.

Track	Tension	Event	Outcome	Source
10	4	Kick-off IT development	Following the kick-off meeting all stakeholders were perceived to show a very high commitment to the project	PI09TKQ1
12	1	ITS was asked to recommend a suitable hardware configuration for the new ESi application	The final hardware dimensions were settled after fierce negotiations	PI09ISQ8, PI09OSQ1 and PI09OSQ2
19	4	The procurement of hardware and its punctual delivery by our IT infrastructure service provider was doubted	Stakeholders started to get uneasy about potential delays caused by T-Systems	PI09ISQ8, PI09ISQ9, PI09WJQ2 and PI09TKQ8
19 A	4	The procurement of hardware and its punctual delivery by our IT infrastructure service provider was doubted	We arranged that a spare server from another project could be used	PI09WJQ2, PI09TKQ1 and PI09TKQ2
20	4	ITS hardly communicates any progresses about developments	Stakeholders became dissatisfied that one could draw on status reports only without any backup	PI09ISQ2, PI09ISQ3, PI09ISQ7, PI09ISQ7, PI09ISQ8, PI09ISQ9, PI09WJQ6 and PI09OSQ6
21	4	During the field test it was inevitable that loss prevention staff had to fill out two parallel systems	Lead users had enhanced work loads to handle	PI09WJQ4
22	4	It was criticised that projects do not necessarily have to lower maintenance costs	It was tried to develop the affordable maximum towards low maintenance costs	PI09OSQ5

Table 17: Qualitative events in May 2003

15.1.10 June 2003

The table below summarises all qualitative events explicitly stated in all June 2003 interviews of participating first tier stakeholders. This month included additional opportunistic interviews.

Track	Tension	Event	Outcome	Source
10	4	Kick-off IT development	Following the kick-off meeting all stakeholders were perceived to show a very high commitment to the project except TSI	PI10TKQ3, PI10TKQ9, PI10ISQ2, PI10ISQ3, PI10ISQ9, PI10PWeQ1, PI10PWeQ2, P10PWeQ7, PI10PWoQ9, OI01TKrQ2, PI10TLQ7, PI10WJQ2, PI10WJQ5, PI10WJQ6 and PI10WJQ7
19 B	4	The procurement of hardware and its punctual delivery by our IT infrastructure service provider was doubted	Stakeholders were annoyed about delays caused by T-Systems	PI10ISQ2, PI10ISQ3, PI10ISQ6, PI10ISQ8, PI10ISQ9, PI10TLQ2, PI10TLQ3, PI10TLQ7, PI10TLQ9 and PI10WJQ1
19 C	4	The procurement of hardware and its punctual delivery by our IT infrastructure service provider was doubted	We arranged that a spare server from another project could be used for the field test	PI10ISQ6
20	4	ITS hardly communicates any progresses about developments	The development team concentrated on development only with poor documentation and rare reporting	PI10OSQ6, PI10OSQ9, PI10TLQ3, PI10WJQ3 and PI10WJQ4
21	4	During the field test it was inevitable that loss prevention staff had to fill out two parallel systems	Lead users had enhanced work loads to handle	OI01WEQ2, OI01WEQ9, OI01TKrQ2 and OI01TKrQ3
22	3	The executive committee of DHL Express started a decision process about introducing a new coding system	It became unclear whether this would have immediate implications for the this or a later release	PI10PWeQ3, PI10PWeQ4 and PI10PWeQ6
23	1	Stakeholders were exposed to the new application and its use in practice	Loss prevention staff was pleased about the outcome of the project	PI10PWeQ9, PI10PWoQ10, OI01TKrQ9 and PI10WJQ3

24	4	Introduction of a field test agreement with the general works council	Enhanced flexibility	PI10TKQ2
25	3	A change request for an automated accounting interface had to be turned down for the current release	This change request had to be postponed for the following release	PI10TKQ3 and PI10WJQ4
26	3	During the field test improvement suggestions were reported from the lead users as well as errors in the software	ITS had to erase the errors and implement all possible features on short notice.	PI10WJQ3

Table 18: Qualitative events in June 2003

15.1.11 July 2003

The table below summarises all qualitative events explicitly stated in all July 2003 interviews of participating first tier stakeholders. This month included additional opportunistic interviews.

Track	Tension	Event	Outcome	Source
10	4	Kick-off IT development	Following the kick-off meeting all stakeholders were perceived to show a very high commitment to the project	PI11TKQ1, PI11TKQ3, PI11TKQ7, PI11OSQ9, PI11PWeQ2, PI11PWeQ5, PI11PWeQ7, PI11PWeQ9
19 D	4	T-Systems delivered wrong components	T-Systems was forced to immediately deliver the missing components	PI11TKQ3, 02OSQ2
21	4	During the field test it was inevitable that loss prevention staff had to fill out two parallel systems	Lead users had enhanced work loads to handle, which was accepted due the perceived superior quality of the application	OI01PHQ2
22	3	The executive committee of DHL Express started a decision process about introducing a new coding system	It became unclear whether this would have immediate implications for the this or a later release	PI11PWeQ3, PI11PWeQ4
23	1	Stakeholders were exposed to the new application and ist use in practice	Stakeholders were pleased about the outcome of the project	PI11TKQ9, PI11PWeQ7
27	1	The field test did not include performance tests	The future performance of the system was questioned	PI11OSQ2, PI11OSQ3, PI11OSQ5, PI11OSQ9

Table 19: Qualitative events in July 2003

15.1.12 August 2003

The table below summarises all qualitative events explicitly stated in all July 2003 interviews of participating first tier stakeholders.

Track	Tension	Event	Outcome	Source
10	4	Kick-off IT development	Following the kick-off meeting all stakeholders were perceived to show a very high commitment to the project	PI13PWeQ2, PI13PWeQ5, PI13PWeQ7, PI13PWeQ9, PI13WJQ1, PI13TLQ1, PI13TLQ2, PI13TLQ5, PI13TLQ6, PI13TLQ7 and PI13TLQ9
19 E	4	The delayed hardware delivery caused delays during inspections	The delays were expected to cause a postponement of the roll out of the application	PI13PWoQ2, PI13PWoQ3, PI13WJQ2, PI13WJQ3, PI13WJQ4, PI13TLQ3, PI13ISQ2 and PI13ISQ3,
19 F	4	The delayed hardware delivery caused delays during inspections	Stakeholders felt sad about not being able to compensate the delays	PI13WJQ4
19 G	3	Some of the components delivered were wrong	Additional hard discs had to be acquired on very short notice	PI12ISQ1, PI13ISQ6, PI13ISQ8 and PI13ISQ9
22	3	The executive committee of DHL Express started a decision process about introducing a new coding system	It became unclear whether this would have immediate implications for the this or a later release	PI13PWeQ3, PI13PWeQ4 and PI13PWeQ6
28	3	All necessary operations and technical inspections where triggered	Stakeholders felt uneasy about the uncertain judgement about the developments	PI13PWoQ9 and PI13TKQ9
29	3	Some requirements raised during the field test and the inspections were postponed to a later release	The specialised department requested to start with the new release right away in order to get the missing features as soon as possible	PI13PWeQ1

Table 20: Qualitative events in August 2003

15.1.13 September/October 2003

The table below summarises all qualitative events explicitly stated in all July 2003 interviews of participating first tier stakeholders.

Track	Tension	Event	Outcome	Source
10	4	Kick-off IT development	Following the kick-off meeting all stakeholders were perceived to show a very high commitment to the project	PI14PWoQ1 and PI14TKQ1
19 F	4	The delayed hardware delivery caused delays during inspections	Stakeholders felt sad about not being able to compensate the delays	PI14TKQ1, PI14ISQ1, PI14ISQ2, PI14ISQ3, PI14ISQ5, PI14ISQ7, PI14ISQ6, PI14AMQ1, PI14AMQ3 and PI14AMQ9
29	3	Some requirements raised during the field test and the inspections were postponed to a later release	The specialised department requested to start with the new release right away in order to get the missing features as soon as possible	PI13PWeQ1
30	3	Roll-out	With a high consensus stakeholders perceived the project to be successfully carried out apart from tracks 2 and 19	PI14TKQ1, PI14TKQ2, PI14TKQ3, PI14TKQ19, PI14PWo2, PI14PWo3, PI14PWo9, PI14WJQ1, PI14WJQ9, PI14ISQ1, PI14ISQ9, PI14PWeQ1, PI14PWeQ2, PI14PWeQ5, PI14PWeQ7, PI14PWeQ9 and PI14AMQ2
30 A		Project ESi was subject to a random quality audit at IT Solutions	The project was reviewed and to be perceived as an overall sucess story	PI14WJQ2

Table 21: Qualitative events in September and October 2003

15.2 Overview of all qualitative events in project ESi DHLX V 2.0

15.2.1 March 2004

The table below summarises all qualitative events explicitly stated in all March 2004 interviews of participating first tier stakeholders. This month included additional opportunistic interviews.

Track	Tension	Event	Outcome	Source
1	1	Z 224 perceived the description of requirements and necessary budgets as being too vague.	The original request was rejected and handed back for further improvements.	OI01GIKQ1B, OI01GIKQ2B and OI01GIKQ3B
2	4	Z 224 felt that the specialised department was not attending to the requirement definition as they were supposed to be.	Z 224 did not give clearance to a request of an IT project.	OI01GIKQ6B, OI01GIKQ7B and OI01GIKQ9B
3	4	Z 224 did not give clearance to a request of an IT project.	The corporate IT department could not start with necessary preparations.	PI01TKQ3M,PI01TKQ 7M, PI01WJQ2M
4 A	4	The advised roll-out date was internally questioned	First tier stakeholders anticipated constraints during the development process, because of melting time reserves.	PI01WJQ3M, PI01TKQ2M and PI01TKQ3M
4 B	4	The advised roll-out date was externally questioned	Depending interface projects saw potential additional problems in synchronising with the project as needed.	PI01TKQ3M, PI01HQ3M, PI01HQ6M, PI01HQ6M, PI01JVQ3M, and PI01JVQ6M

Table 22: Qualitative events in March 2004

15.2.2 April 2004

The table below summarises all qualitative events explicitly stated in all April 2004 interviews of participating first tier stakeholders.

Track	Tension	Event	Outcome	Source
2	4	Project management and ITS pressed the specialised department to speed up the formulisation of the business requirements and the calculation of the business case.	Z 224 gave clearance to the project.	PI2JVQ2B
3	4	Project management and ITS pressed the specialised department to speed up the formulisation of the business requirements and the calculation of the business case.	The corporate IT department could not start with necessary preparations until late April.	PI2JVQ2B PI01TKQ3M,PI01TKQ 7M and PI01WJQ2M
4 A	4	The advised roll-out date was internally questioned	First tier stakeholders anticipated constraints during the development process, because of melting time reserves.	PI01WJQ3M, PI01TKQ2M and PI01TKQ3M
4 B	4	The advised roll-out date was externally questioned	Depending interface projects saw potential additional problems in synchronising with the project as needed.	PI01TKQ3M, PI01HQ3M, PI01HQ6M, PI01HQ6M, PI01JVQ3M, and PI01JVQ6M
5	1	Some of the business requirements were perceived as unnecessary	The list of requirements was reviewed and each requirement questioned.	PI2TKQ3M and PI2WJQ3M

Table 23: Qualitative events in April 2004

15.2.3   May 2004

The table below summarises all qualitative events explicitly stated in all May 2004 interviews of participating first tier stakeholders.

Track	Tension	Event	Outcome	Source
4 A	4	The advised roll-out date was internally questioned	First tier stakeholders anticipated constraints during the development process, because of melting time reserves.	PI03PWQ1M, PI03PWQ3M, PI03PWQ9M and PI3WJQ9M
5	1	Some of the business requirements were perceived as unnecessary	A final list of requirements was settled. This list was shorter than the original list of business requirements. The delta was settled in a change request.	PI03PWQ2M
6 A	1	The development mandate was finalised on May 28th 2004.	The project was officially started.	PI03PWQ1M
6 B	4	Projects of a certain size need clearance from heads of departments, a steering group or from the board of management.	ESi DHLX V 2.0 had to be send to the next possible steering group Germany meeting.	PI03PWQ4P
7 A	1	Interdependences towards project roll-out XP was identified	A final decision to migrate the ESi application to Windows/Office XP	PI03MHQ1P
7 B	2	Interdependences towards project roll-out XP were identified	Activities had to be synchronised	PI3MHQ1P1, PI3MHQ1P2 and PI3WJQ1P
7 C	3	Interdependences towards project roll-out XP were identified	All activities were bilaterally controlled.	PI3MHQ2P, PI3MHQ4P and PI3WJQ4P
8	4	The bureaucratic act needed to give the two contracts (specification and development) to IT S was perceived as to lengthy	A letter of intent was given to the key account manager at IT S in order to enable the development team to start work immediately.	PI3WJQ1B, PI3WJQ2B, PI3WJQ3B, PI3WJQ5B, PI3WJQ6B, PI3WJQ8B and PI3WJQ9B
9	2	The impact of ITS' ability to contribute to the project was immediately noticeable	Iterative processes to define the application were started	PI03PWQ1M, PI03PWQ2M, PI03PWQ3M, PI03PWQ5M and PI03PWQ7M
10	1	A discussion at the head office reappeared on the sense or nonsense of the introduction of a license plate and the two dimensional barcode.	The specialised department became uneasy about the project.	PI03PWQ4P and PI03PWQ9P

Table 24: Qualitative events in May 2004

15.2.4   June 2004

The table below summarises all qualitative events explicitly stated in all June 2004 interviews of participating first tier stakeholders.

Track	Tension	Event	Outcome	Source
7 B	2	Interdependences towards project roll-out XP were identified	Activities had to be synchronised	PI04MHQ1P, PI04MHQ2P and PI04MHQ4P
8	4	A letter of intent was given to the key account manager at ITS in order to enable the development team to start work immediately.	The letter of intent was perceived as an effective time boxing measure.	PI04WJQ1M, PI04WJQ5M, PI04WJQ6M and PI04WJQ9M
11	3	Monthly project meetings for first tier stakeholders were implemented.	Stakeholders felt well informed about their specific role and expected contribution towards project objectives.	PI04TLQ1M, and PI04XHQ1M
12	4	As part of monthly project meetings, solution support was invited to submit requirements regarding the enhancement of the maintainability of the future application.	Solution support and IT Solutions started to evaluate maintainability enhancement possibilities.	PI04OSQ1B, PI04OSQ2B, PI04OSQ4B and PI04OSQ5B
13	1	The introduction of a new contract between Deutsche Post and Deutsche Telekom our provider was initiated by the board of management for Autumn 2004.	The future requirements for an inspection became unclear.	PI04TLQ3M, PI04TLQ4M, PI04TLQ6M and PI04TLQ9M

Table 25: Qualitative events in June 2004

15.2.5 July 2004

The table below summarises all qualitative events explicitly stated in all July 2004 interviews of participating first tier stakeholders.

Track	Tension	Event	Outcome	Source
6 B	4	Mr. Reinboth was not able to cover project ESi in the domain steering group meeting in July.	The confirmation had to be postponed to August.	PI05PWoQ4P, PI05TKQ4P
7 B	2	Due to budget changes in the XP migration project the migration of the ESi application was postponed to 2005	Activities regarding developments towards Windows/Office XP were stopped cold in favour of Windows/Office NT.	PI05MHQ1P
14 A	4	Activities and tensions were tried to be managed in an engaging manner	Project work was perceived as being dealt with efficiently	PI05AMQ1M, PI05AMQ2M, PI05AMQ7M, PI05WJQ1M, PI05WJQ5M and PI05JVQ2M
14 B	3	Activities and tensions were tried to be managed in an engaging manner	The performance of the project team got management attention because of being perceived as managing the project exemplary	PI05PWeQ1M, PI05PWeQ2M and PI05WJQ1M

Table 26: Qualitative events in July 2004

15.2.6   August 2004

The table below summarises all qualitative events explicitly stated in all August 2004 interviews of participating first tier stakeholders.

Track	Tension	Event	Outcome	Source
10	1	The Universal Postal Union joined the act in the still open discussion about the introduction of a two dimensional barcode.	The specialised department started to perceive the discussion as a 'never ending story'.	PI06PWeQ4P
12	4	The majority of the maintainability enhancements were negotiated	Mr. Seeman doubted that maintenance expenditures could be significantly lowered.	PI06OSQ1M
13	1	NewCon was finalised and prepared for final negotiations to enable to be valid retroactively as of July 1st, 2004	In order to avoid disruptions it was negotiated to inspect this project using the now outdated regulations	PI06TLQ2P
14 A	4	Activities and tensions were tried to be managed in an engaging manner	Project work was perceived as being dealt with efficiently	PI06WJQ1M, PI06WJQ2M, PI06WJQ3M, PI06JVQ1M and PI06JVQ7M
14 B	3	Activities and tensions were tried to be managed in an engaging manner	The performance of the project team got management attention because of being perceived as managing the project exemplary	PI06PWoQ1M, PI06PWeQ1 and PI06PWeQ2M

Table 27: Qualitative events in August 2004

15.2.7 September 2004

The table below summarises all qualitative events explicitly stated in all September 2004 interviews of participating first tier stakeholders.

Track	Tension	Event	Outcome	Source
10	1	The Universal Postal Union joined the act in the still open discussion about the introduction of a two dimensional barcode.	The specialised department started to perceive the discussion as a 'never ending story'.	PI06PWeQ4P
12	4	The majority of the maintainability enhancements were negotiated	Mr. Seeman doubted that maintenance expenditures could be significantly lowered.	PI07OSQ1M
14 A	4	Activities and tensions were tried to be managed in an engaging manner	Project work was perceived as being dealt with efficiently	PI07TLQ1M, PI07TLQ9M, PI07JVQ1M and PI07JVQ7M
14 B	3	Activities and tensions were tried to be managed in an engaging manner	The performance of the project team got management attention because of being perceived as managing the project exemplary	PI07PWoQ1M
15	4	T-Systems were not explicit about what various aspects having to be delivered within a technical acceptance test.	Necessary information had to be extracted and 'practical' solutions had to be negotiated.	PI07TLQ2P

Table 28: Qualitative events in September 2004

15.2.8 October 2004

The table below summarises all qualitative events explicitly stated in all October 2004 interviews of participating first tier stakeholders. This month included additional opportunistic interviews.

Track	Tension	Event	Outcome	Source
10	1	The Universal Postal Union joined the act in the still open discussion about the introduction of a two dimensional barcode.	The specialised department started to perceive the discussion as a 'never ending story'.	PI08PWeQ4P, PI08PWeQ6P, OIJMQ4P and OI8JMQ6P
12	4	The majority of the maintainability enhancements were negotiated	Mr. Seeman doubted that maintenance expenditures could be significantly lowered.	PI08SQ1M, PI08SQ2M, PI08SQ5M and PI08SQ9M
14 A	4	Activities and tensions were tried to be managed in an engaging manner	Project work was perceived as being dealt with efficiently	OI08TRQ2M, PI08WJQ1M, PI08WJQ6M, PI08WJQ9M, PI08TLQ1M, PI08TLQ2M, OI08JMQ1M, OI08JMQ2M, PI08TKQ1M and PI08TKQ9M
14 B	3	Activities and tensions were tried to be managed in an engaging manner	The performance of the project team got management attention because of being perceived as managing the project exemplary	PI08PWeQ1M, PI08PWeQ2M and PI08WoQ1M

Table 29: Qualitative events in October 2004