
# DIGITAL TRANSFORMATION IN LOGISTICS: OPPORTUNITY OR DOWNFALL FOR SMEs?

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## I) Abstract

The B2B logistics industry is the last of the brick-and-mortar industries to digitalise, and particularly the freight forwarding market stands on the brink to an extensive change of its competitive landscape. Start-ups and incumbents alike compete for supremacy of online forwarding. The majority of the trillion-dollar logistics market, however, is represented by small- and medium-sized freight forwarders (SMF). With little value in assets, a limited geographical scope, and a smaller range of value-added services the SMF is a specialised business with strong personal relationship to his clientele. When IT standards are fulfilled, the SMF can outcompete larger competitors through personal touch. In the future, however, the customer expects flexible and individualised supply chains, high visibility of shipments, and instant booking. Logistics is an industry in flux, and SMFs will have to find ways to reinvent themselves and deliver value to the customer in new ways.

This thesis offers an approach to process innovation in the freight forwarding context in which digital transformation of logistics is not a threat to the legacy of the 'people's business'. The SMF uses his proximity and regional presence and embarks on a journey together with the shipper to grow a digital customer relationship. The sales and booking process should be digitalised first to ensure future collaboration. By means of 'lean' start-up methodology and an 'agile' working approach, the SMF continuously tests hypotheses with the shipper to co-create new value-added services, and drives collaboration with tech-driven partners and educational institutions. Consequently, the SMF leverages his social capital to proactively engage his customer in the digital transformation process and establishes the mantra of a learning organisation.

## II) Abbreviations

| ABBREVIATION | EXPLANATION |
|---|---|
| API | Application Program Interface |
| BOP | Booking and Optimisation Platforms |
| BPR | Business Process Re-engineering |
| BT | Business Technology Expert |
| B2B | Business to Business |
| B2C | Business to Customer |
| CEP | Courier Express Parcel |
| DL | Digital Logistics Expert |
| DVZ | Deutsche Verkehrs-Zeitung |
| EDI | Electronic Data Interchange |
| ERP | Enterprise Resource Planning |
| HBR | Harvard Business Review |
| HRM | Human Resource Management |
| IAAS | Infrastructure-as-a-Service |
| IATA | International Air Transport Association |
| ICT | Information and Communications Technologies |
| IP | Industry Practitioners |
| IS | Information System |
| IT | Information Technology |
| LCL | Less-than-Container Load |
| LP | Logistics Provider |
| MNC | Multi National Corporation |
| NVOCC | Non Vessel Operating Common Carrier |
| OECD | Organisation of Economic Co-operation and Development |
| P.A. | Per Annum |
| PAAS | Payment-as-a-Service |
| PWC | Price Waterhouse Cooper |
| R&D | Research and Development |
| RFID | Radio Frequency Identification |
| SAAS | Software-as-a-Service |
| SCM | Supply Chain Management |
| SME | Small- Medium-sized Enterprise |
| SMF | Small- Medium-sized Freight Forwarder |
| SO | Supply Chain Operator |
| TMS | Transport Management System |
| TQM | Total Quality Management |

| | |
|---|---|
| VAS | Value-Added Services |
| 2PL | Second Party Logistics Provider |
| 3PL | Third Party Logistics Provider |
| 4PL | Fourth Party Logistics Provider |

## ii) Acknowledgements

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To other loved ones for the comfort and support.

From the heart, thank you.

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## Table Overview

# 1. Introduction

In the past decade most of the old-established brick-and-mortar industries have been ambushed by digital disruption. Transportation & Logistics however, the trillion-dollar market that enables world trade, has been left mostly unscathed - until now. As a result of multifaceted technological advancement, the impact on the industry slowly becomes apparent; the often-called “long fuse, big bang” (Deloitte Digital GmbH, 2015). Be it revolutionary transport modes with autonomous trucks and drones, rethought value chains with direct-to-consumer delivery and Internet of Things, or real-time visibility enabled by cloud services, the B2C transportation industry is chiefly in flux. The B2B segment, dealt as the market with the longest fuse is more slowly moving online.

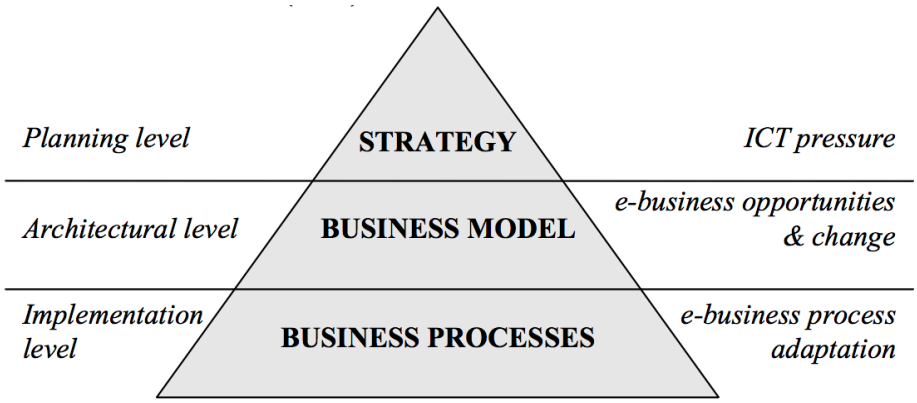
Logistics is an industry with a variety of stakeholders in the transport chain, multiple facets of market segmentation, and, as opposed to the travel industry, a strong intermediary in its centre. The freight forwarder has the network to the producing industry and logistics providers, and provides shippers end-to-end logistics solutions. Like in many B2B service industries before the internet, freight forwarding is a ‘people’s business’, in which trust and personal touch are still cornerstones of best practice. This is particularly true for logistics’ long tail of the market. A large market share constitutes small- and medium-sized freight forwarders, and the laws of this market are predicated on regional presence and personal relationships (DSLV Deutscher Speditions- und Logistikverband e. V., 2015). Paper-based operations, isolated IT solutions that have not been updated in years, let alone integrated seamlessly, and bad internet connectivity make the industry ripe for disruption – at least in the eyes of entrepreneurs.

Upstarts in the form of online platforms and cloud-based online forwarders enter the industry with the premise of dynamic rates, instant booking, and transparency. Large-scale logistics incumbents are adapting, launching online booking and investing heavily in holistic IT systems. In addition to that, e-Commerce tech giants, large-scale producers, and ocean carriers, are expanding their logistics capabilities to offer end-to-end solutions and stay relevant in their respective domains, claiming parts of the market previously in the hands of the forwarder. Cost pressures as well as customer expectations are ascending, forcing established businesses to look into IT capabilities and move into niche markets. The speed

of change is picking up in logistics, especially through key technology enablers of big data and predictive analytics, API and web services technology (Drewry Supply Chain Advisors, 2016).

Considering these developments, particularly in light of the success of platforms and tech giants entering other industries, there is high uncertainty around the role of the more regional, mostly specialised small- and medium-sized freight forwarder (SMF), and what value domain expertise and personal customer relationships will hold in the future. The cloud-based start-ups are able to enter without any such social capital. As the disruptor, they are not only entering with a radical strategy and novel business models for the logistics space. The market entrants utterly scrutinize processes, and model a value chain that makes optimal use of technology. It is in the implementation level (Figure 1) that the start-ups capitalize on their technology advantage, because this is the aspect of the business logic that continuously adjusts along the way, maximising data collected, leads generated, and services delivered. In the logistics context, this indicates that upstarts' from-scratch set-up has allowed for new efficiencies which the established SMF with processes and respective technology in place, cannot reach without more ado. Thus, depending on how he chooses to stay relevant, the SMF may need to reassess how his business activities can remain competitive in the future.

**Figure 1: Business Logic Triangle**




Source: Osterwalder, 2002

## Problem Formulation & Research Question

The circumstances surrounding the digital transformation of the vast logistics industry are multifaceted and currently unfolding, and have accordingly received much interest by

consultancies and researchers. More often than not, such papers are not tailored to the situation of the SMF and his limited means, and it is unclear which options he has, and whether he should seize them. The potential threat that digital poses for him, what the value of his social capital will develop into, and how important the SMF's regional presence is for his individualised services – there is high uncertainty around the small guy's reason to exist. Whether he must reinvent his business model, seek new partners, or redefine his positioning, the implementation of it manifests itself in the business processes he runs. For this reason, the research question of the thesis aims to investigate the practicalities of process innovation in the context of digital transformation:

**RQ: How can small- and medium-sized freight forwarders use technology to innovate business processes?**

Firstly, I take the reader through my methodology which explains how the thesis fulfils the scientific and academic requirements. Secondly, I review the theoretical background of process innovation, and how business process reengineering has been carried through with IT as backbone. An overview of the transport industry will be given to set the scene of the forwarding ecosystem, of which the most imminent forces are presented. The paper will then assess the relevance of insights of secondary sources and how its suggestions for the small- and medium-sized freight forwarder. This will serve as a foundation for my qualitative research with practitioners in the domains around logistics and new technologies. Lastly, I discuss these findings and establish my own thesis on how small- and medium-sized forwarders can use technology to innovate business processes.

## 2. Methodology & Research Design

### Epistemology

I have predominantly followed the epistemology of Bernard J.F. Lonergan, Insight Based Critical Realism, which states that experience, understanding, reflection and will are grounds for insight, deliberation and choice. It also sees collaborative work in society as providing the grounds for reflective affirmation of reliability and validity in what is known (Lonergan, 1992). In the same vein, I attempted to engage with a diverse set of experts with potentially different viewpoints while writing the thesis, as well as sourcing knowledge from academic papers, consulting studies, and domain newspapers alike, and participate in events organised by the logistics and tech industry. I acknowledge that the 'reality' of the case study and my findings are the result of insights and reflection based on concrete set of interlinked circumstances that I have experienced. As opposed to interpretivists, I specifically strive for generalisability. I have of course tried to reduce my subjectivism by questioning all findings and their possible meanings, as for example the interviewee's notion of a process. Nevertheless, the project does offer findings with general merit, especially on how the SMF can attempt to drive digital transformation to better position himself, so to develop the necessary capabilities to sustain in the changing ecosystem.

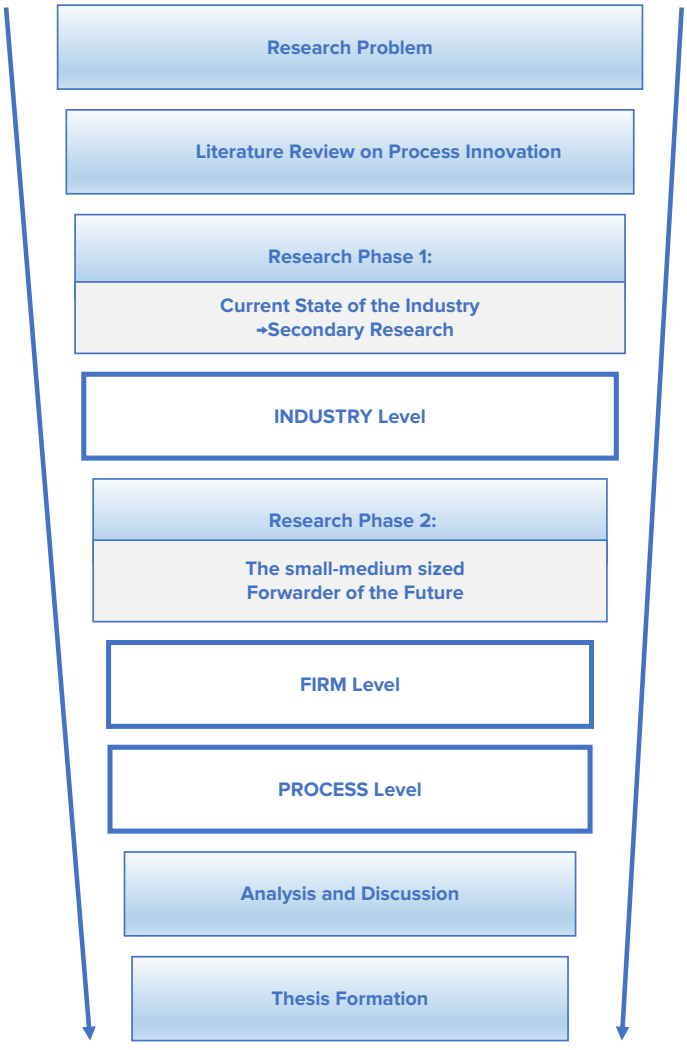
### Research Approach

Complementary to my research philosophy is the aim that although logistics is a complex field of business practice, one will be able to generalise and build some theory grounded in relevant cases, which the common freight forwarder can apply. Yet, my research is not trying to construct a rigid methodology that does not allow for alternative explanation of what is going on (Saunders, Lewis, & Thornhill, 2003). As I have already collected experience within the industry and have formed opinions, testing known theories all as part of deductive research seems sensible. Nevertheless, I want to bring new insight into the theoretical context of small-scale freight forwarding, hence I approach the research in an inductive manner, conducting mostly qualitative research, and attempting to grasp the perspectives involved that I deem relevant to form new theory. The qualitative research approach is applied to construct a more complete, holistic and contextual study of the research object

(Ghauri, 2004). For the research design this implies a focus on new causalities for events or new solution approaches to a problem.

This has led me to seek a research designed for qualitative diversity. In choosing the research strategy, I considered the fit of the strategy across two main dimensions – the fit with the *aim* of the research and fit with *the research philosophy*. The case study format was chosen after a thorough process of assessing strengths and weaknesses of a case study. The purpose of a case study is to examine a phenomenon in its natural setting through deployment of multiple methods of data collection to gather information from one or more entities i.e. people, groups, or organizations (Benbasat, Goldstein, & Mead, 1987). This case study, however, will not remain on the firm-level to derive at new theory about the case. It will, for

**Figure 2: Overview of Research Design**




Source: Own Creation

one, dissect macro-trends by inclusion of several perspectives in the hope of recognising the diversity of drivers for change. For another, it will zoom into processes of the value chain of the forwarder, and exposing the way the drivers for change can be leveraged on a business process level. The order of 'lenses' applied is depicted as part of my research design in figure 2. Case studies are flexible in design and selecting of cases, which supports the notion of maximizing what can be learned. As stated by Flyvbjerg (2007), the case study is very powerful, because it brings theory into the world. If the theory does not hold in one case, it does not hold at all. If it holds in one context though, it should hold in similar contexts as well. In short, context is everything, and one should not underestimate the power of the example. As I seek to emphasize detailed contextual analysis of a limited number of events or conditions and their relationships, the chosen research design should have considerable ability to generate answers to the research question.

The research design is mapped towards solving the research question: how can small- and medium-sized freight forwarders use technology to innovate business processes? My research strategy follows the funnel approach and is divided in two phases, i.e. starting with a general understanding of trends in the SMF context, and then narrowing down to process innovations that SMFs can undertake. After considering the concepts of business models generation, lean start-up methodology and other concepts in line with the current hype of digital transformation, I dive into the more established concepts of process innovation, or business process reengineering, the approach to management that implies a full focus on business processes, and redesigning them with IT-driven innovations. I build a theoretical foundation that takes the concept from the early 90s, and frames it to apply in the digital technology era. The data collection brings context before the last phase of the research emulates the process-centric approach.

## Data Collection & Analysis

### Secondary Research

In the first research phase, I conduct extensive secondary research on the topic of digital transformation in logistics – with the goal of identify key trends, understand underlying assumptions of the change, and isolate the SMF in this context. First I set the boundaries of the freight forwarding market for the reader to grasp the volume of the freight forwarding

market. Part of the foundation for the research is also a clear understanding of the processes in place in a common SMF operational set-up. This aids me in delimiting the implications on the small- and medium-sized freight forwarder over more global effects. Hereby, I hold a two-tiered focus: how the internal context of the forwarder is perceived, as opposed to the external context, all to understand what part of the reality in global logistics ecosystem doesn't apply to the same extend to small- and medium-sized freight forwarders (yet).

Due to my rather generalist background in business, language, and culture studies at Copenhagen Business School, a multi-faceted set of theories make up the relationships and patterns I would have assumed to influence industry dynamics, and obstacles in process-driven change. The case study design supports this focus, and enables me to challenge existing literature. Reviewed sources entailed quantitative research across the logistics and supply chain sector and found generally little to some awareness of innovative technological concepts. As a consequence I assumed that more quantitative research would not lead me to more insights on the ability of SMFs to digitally transform.

### Primary Research

My primary research seeks to shed light on explanations of the accumulated insight, but by means of diversity in perspective, which warrants source triangulation. These are the perspectives of technology experts, and logistics domain experts. The intersection of the two, implementing IT and applying it to processes within logistics companies, is highly practical, so the voice of practitioners, experts in process improvement/redesign is also requested. Table 1 lists the twelve experts, which I have grouped into four rough groups:

1) Group 1 has a more technical background, but has been heavily exposed to logistics, and actively contributes in research and business activities of the digital transformation
2) The second set, outlined in red are people working at the forefront of new technology and its application. They may contribute with more radical views on the future of SMFs.
3) The biggest group, outlined in blue, mark the logistics expert. With a mixed background in liner shipping, ocean- and air freight logistics, these managers have worked in sales, operations, and human resources.

4) Lastly, I have included two individuals with operational background that view innovation from the customer and supply chain perspective.

In regards to the interview structure, it is of importance that the interviews sought to investigate both an overall understanding of the future of logistics and process-centric practicalities in the context of the SMF. My interviews are semi-structured, as digital trends, strategic insight and internal obstacles are often interrelated. Each interview starts in a broader sense about where the expert sees the industry moving and what this implies for the SMF. The flexible design aids in navigating through the different themes, such as customer relationships and specific technological trends, and subsequently narrows down the conversation to specific obstacles, IT solutions, and implementation tactics a forwarder should consider. Moreover, I refine protocols further after each interview and develop a series of prompts which would help to obtain a thorough empirical study (Fylan, 2005).

Lastly, I transcribe the main statements pertaining to the RQ of each interviewee, to then scrutinize key statements. The transcription of these statements are attached in Appendix I. I unite core ideas and practical advice of the interviews to present and elaborate on in my findings section. I then discuss the ideas with the purpose of giving a normative suggestion as to how SMFs can best adopt digital technology to innovate business processes and which partners to choose for this.

### Limitations and Demarcations

As Yin (2009) presented, the single case study approach has in particular been criticized for its embedded limitation of “providing little basis for scientific generalization”. The ability to bring generalizable insight through a case-study on a strategy- and process-level is ambitious, and I am aware that the scope of my thesis contributes to this limitation further. While my diagrams will point to more fine-grained processes and value-added services in freight forwarding, I will generally keep my argumentation on a higher level, such as referring to documentation instead of listing bill of lading, letter of credit, etc.

Another potential drawback to my study is the nature of the primary data. It is primarily data collected through interviews, of people who have extensive experience with logistical operations and technology who may hold some biased views. This paper does not generate

**Table 1: List of Interviewees**

| Name/Profession / Organisation | Relation to Logistics and/or Process Innovation |
|---|---|
| **Prof. Dr. Dr. h. c. Wolfgang Kersten**<br>Managing Director at Institute of Business Logistics and G. Mgmt. | Professor and researcher of logistics and supply chains at Technical University Hamburg-Contributions to over 217 publications in the field, including a paper on the digital transformation in logistics |
| **Thomas Sørbø**<br>CBDO and Co-Founder<br>Xeneta | Co-founded Xeneta in 2012, a container rate visibility platform, the first big data index to benchmark freight rates for shippers and freight forwarders. Has a background in 4PL Solutions at Kühne+Nagel |
| **Jannik Henriks**<br>Senior Consultant<br>KPMG, New Nordic Tech Department | The New Nordic Tech Team is advising clients in how to rethink processes and implement cutting-edge technologies, such as AI, machine learning and VR. Primarily works with Financial service industry |
| **Ioanna Constantiou, Ph.D**<br>Professor with special responsibilities, CBS, Department of Digitalization | Professor and researcher of Big Data and Strategy Making in the Digital Environments, including a recent study on digitizing processes in the maritime sector. |
| **Sven Petzold**<br>Managing Partner<br>Change55 | Former CEO and co-owner of a medium-sized forwarding business specialised in transports to Scandinavia. Now change consultant and investor in innovative logistics & tech. |
| **Joanna & Florian Langosch**<br>Transformation Lead // Business Development Northern Europe<br>Maersk Liner // tantumshipping GmbH | Joanna is Manager in company-wide Transformation Program, leading IT process design at Maersk Liner.<br>Florian is a Liner shipping specialist with long years of experience on liner- as well as agency side. |
| **Jörn Schmersahl**<br>CEO Air&Ocean Europe<br>Rhenus Logistics | Senior Executive in global logistics group, Rhenus Logistics, overlooks processes of sales and operations team. Member of advisory board of Rhenus' growing innovation arm, Rhevolution. |
| **Jörg Röhl**<br>Chief Executive Officer<br>Natco | As CEO, he supervises all processes of the Swiss airfreight logistics company. Strong experience in sales and building customer relationships. |
| **Ulf Mindermann**<br>former Chief of HR<br>Hamburg Süd | Seasoned human resources executive, lastly at the 6th largest ocean carrier in the world. Has deep understanding of HR capabilities required to align internal processes. |
| **Ben Schramm**<br>Chief Operating Officer<br>HSE 24 | With an expertise in process management, Ben is currently running operations of HSE24 – the biggest teleshopping company in Europe. |
| **Fabiene Devoille**<br>Customer Process Manager - EMEA<br>Nike EHQ | Across different producing industries Fabienne has deep insights in supply chains, customer journeys, excellence and process improvement. Has coordinated operations primarily with large logistics providers. |

insight from first-hand data through own field research on the inner workings of a freight forwarding company was collected. Hence, due to my epistemological viewpoint, I would have liked more time and chances to gather data of participatory or observatory character to rely less on interviews.

This would have also enabled me to gather a bigger sample size, and find more candidates from smaller (possibly innovative) forwarders with even more local operations. Furthermore, the interviewees were based in Northern Germany, Denmark, Norway, Switzerland and the Netherlands. This, in combination with the fact that most of the market data retrieved was only available for Germany, may skew the results, and limit the theory's generalisability. The logistics industries are similar in nature, but Germany's infrastructure and market segmentation is more fragmented and employs a relatively large middle class.

As the global transportation sector is a trillion-dollar industry, even the market segment 'contract logistics' in Germany has a wide scale and scope, so regardless of the general nature, the proposed process innovations may not be relevant in the context of certain freight forwarders.

As demarcation, I would briefly like to point out to the reader that digitisation (e.g. electronic versions of paper-based work) and digitalisation (e.g. online interface of a customer relationship) are two subtle nuances of digital redesign of analogue artefacts.

### Quality of the Research

Reducing the possibility of drawing inaccurate conclusions scholars need to pay attention to two factors on research design – reliability and validity. Saunders et al (2003) suggest that reliability can be assessed by answering three questions: 1) will the measures yield the same results on other occasions?, 2) will similar observations be reached by other observers?, and 3) is there transparency in how sense was made from the raw data?

Threats to the reliability of a research project can be categorised and include participant error, subject or participant bias and observer bias. As the research input is based upon secondary and primary research, from somewhat diverse sources, I would argue that the threats addressed through the first two questions are limited, although observer bias cannot be completely denied.

By means of source triangulation, as mentioned before, this case study holds merit, and the proposed arguments should be considered valid. However, the main reason for the application of the case study strategy, the ability to “read between the lines”, indubitably leaves room for prejudice in the analysis of factors and the discussion to shape own process innovations. This threat to reliability has been reduced to a minimum by solid argumentation and continuous questioning of statements, and linkage to external sources. I am convinced that if one follows the previously described research design (Figure 1), considers the limitations, data collections and analysis guidelines, it will be possible to reach similar observations. The final discussion points and prescriptions for SMFs, however, are just one of many possible interpretations. Yet, transparency in how sense from the raw data was made is ensured by elaborating on data collection and analyses process, as well as by numerous visual displays with detailed explanation followed.

## 3. Literature review

This chapter represents a critical overview of process innovation literature and its value to practitioners. For over three decades there has been a considerable discussion about Business Process Re-engineering (BPR) as it is usually referred to. The wave of BPR research, which started in the late 1980s found wide resonance among researchers and management thinkers in the fields of operations, strategy and information technology, yet failed to be implemented successfully by over 70% of organisations (Habib, 2013). Nevertheless, operational innovation can be argued to be the only lasting basis for superior performance, and staying ahead of competition (Hammer, 2004). Thus, many organizations who may eventually face times of uncertainty could utilise the rather radical approach to rethinking processes, and become a process-centric organisation.

A process is a collection of tasks that create value for the customer, not individually, but as end-to-end work across the enterprise (Hammer, 1990). Business Process Re-engineering can then be defined as "the critical analysis and radical redesign of work flows and business processes to achieve dramatic improvements in important measures of performance" (Martinsons, 1995, S. 254). The reengineering process is often IT-driven and linked to automation, optimisation or simplification by technology. Its purpose lies in striving to achieve dramatic improvement in critical contemporary measures of performance, such as cost, quality, service and speed (Hammer, 1990).

### The Balancing Act of Improving and Innovating

There are a variety of terms of innovating one's operations: Process innovation (Davenport & Short, 1990), business process- transformation, redesign, or re-engineering (Burke & Peppard, 1993), all referring to process change large and small. What differs between them is the levels within the organisation in which they take effect (O'Neill & Sohal, 1999). The business scope, and the overhaul of process systems, is what quintessentially makes it a more episodically, yet radical practice of management. Precisely here, the core distinctions between BPR and quality management thinking becomes evident; namely, its nature, scope and frequency of change (Table 2).

**Table 2: Process Improvement versus Process Innovation**

| | Process improvement | Process innovation |
|---|---|---|
| Starting point | Existing processes | Clean slate |
| Nature of change | Fine-tuning of activities, culture and structure | Radical restructuring and cultural transformation |
| Time needed | Short | Long |
| Effort needed | Moderate | Extensive |
| Participation | Bottom-up | Top-down |
| Scope of change | Narrow, within a function | Broad, cross-functional |
| Risks and rewards | Moderate | Major |
| Primary enabler | Statistical control | Information technology |
| Frequency of change | One-time/continuous | One-time/periodic |

Source: Martinsons, 1995

As its main antecedent in prior research, Total Quality Management (TQM), or continuous improvement, is the improvement philosophy of all sorts of operational processes. Initially brought forward by Shewhart in the 1930s as statistical process control and carried to Japan in the 1950s, where its practicing, understanding and iterating for three decades laid the foundation of what TQM, or "Company Wide Quality Control", is today (Dahlgaard-Park, Chen, Jang, & Dahlgaard, 2013). At its core is the approach to improve the competitiveness, effectiveness and flexibility of an organisation, by planning, organising and understanding each activity depends on each individual at each level (Oakland, 1993). This is achieved by bottom-down communication and deployment of objectives, as well as bottom-up implementation of continuous improvement activities (O'Neill & Sohal, 1999).

Over the years, as it evolved into a holistic managerial framework, TQM integated Process/Operations Management and elements of HRM and Strategic Management. Often regarded as a management innovation, if not revolution, its tools and techniques have received much attention for research. Much studied is the Toyota Production System, and its Lean Manufacturing approach, but also Six Sigma, Enterprise Resource Planning and Balance Score Cards as methods and tools are commonly known. The five TQM core values are leadership, customer focus, management-by-fact, people-based management / everybody's participation, and continuous improvement (Dahlgaard-Park, Chen, Jang, & Dahlgaard, 2013).

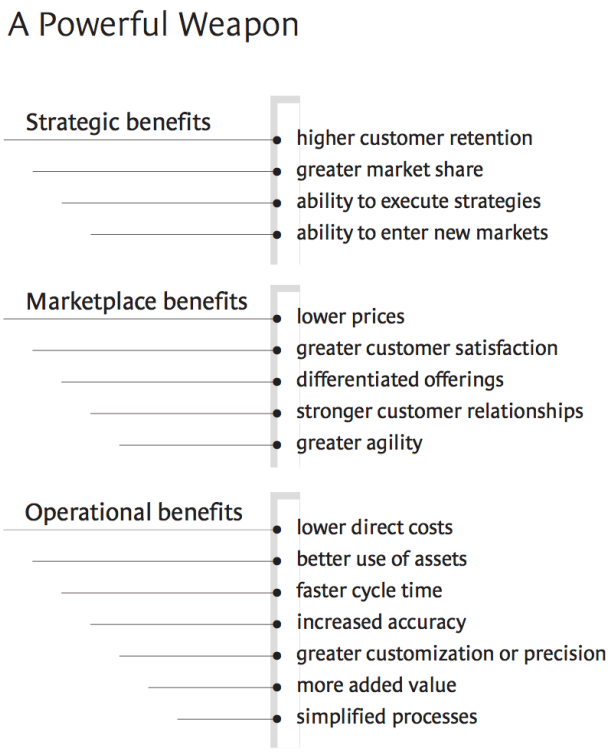
One often overlooked relationship that was published alongside quality management was the coordinated pattern of product and process change (Abernathy & Townsend, 1975), and the different phases of incremental and radical change in process change within and across

industry sectors (Abernathy & Utterback, 1978). Already Harvey (1968) studied that as a firm's production process become more highly integrated, such as of Ford, there are corresponding broad changes in product and the firm's organizational structure. Abernathy and Townsend characterised three modes of process change as continuous process cycle any organization to be: 1) process rationalization where standardization, stability and expenditure for automation and specialization so to scale production, 2) Systemic Technological Development, where full stability is reached and process design is fixed, and a specialized equipment supplier industry may have formed, and difficult tasks outsourced, and 3) Process/Product Realignment where productivity gains stagnate due to the full developed state of processes, where companies must make strategic long-range decisions. This is usually a trade-off decision between the capability for innovation and productivity improvement (Abernathy and Townsend, 1975), which essentially means depending on timing of the industry one switches between BPR and TQM. This decision can be forced by the environment.

Continuous improvement can be constructive for highly organised organisations, but it rarely has strategic significance as a whole. It will instead be likely to result in many small-scale projects, many of which will just have to perform consistently, but probably not reach the new demands of customers (Hammer, 2004). A ten-fold improvement in results can occur by BPR, while a 10% yearly increase in continuous improvement measures is achieved (O'Neill & Sohal, 1999).

Hammer as a thought leader of process management understood that processes, not functions, create value, and that the re-engineering was able to "attack the evils of

**Figure 3: Benefits of Operational Innovation**




Source: Hammer, 2004

fragmentation: the delays, nonvalue-adding overhead, errors, and complexity" head on. It connects the organisation over cross-functional activities that serve a holistic purpose, instead of several departments with different priorities, performance metrics, and information sources (Hammer & Champy, 1993).

Further, the idea of designing processes instead of its plain execution gave flexibility and empowered managers and staff, offering a more cooperative 'everybody's participation principle' than TQM. More importantly, it did not leave the tacit assumption that process designs were sound and performance difficulties would solely result from defects in execution (Hammer, 2004). But despite its high upside, and the wide ranging benefits, operational innovation is capable of achieving, many benefits lie only in reach after profound, well-executed redesign implementation.

The BPR approach has failed often for a reason: it is difficult to implement because of political, organizational and resource constraints. Hence, often an evolutionary (incremental) implementation is adopted. Some businesses also modify their existing TQM methods to accommodate more proactive business process change (Kettinger, Teng, & Guha, 1997). Sadly, as Martinsons unveals, for some of the successful BPR stories the buzz word 'reengineering' has been used to repackage 'business as usual', to dramatize minor organizational tune-ups and to make many spectacular but poorly substantiated claims (1995). Some cases show industrial engineering techniques, like time and motion studies, have been simply and mechanically applied to office environments.

Harrison and Pratt (1992) advocated for TQM and BPR working together as an integrated management system for the modern organisation, alongside a number of other academics. Hammer (1990), however, warned against using the two approaches concurrently, and saw them under the umbrella of process management. Mixing continuous and discontinuous improvement could be a legitimate way to marry the two approaches. In the same vein, as soon as the marginal value of incremental improvement begins to decline, a firm should consider radical change (Imai, 2005). Admittedly, the implementation of both is time-consuming, and significant results often only show after one or two years (Davenport, 1993). It remains to conclude that while TQM requires training and cultural change, BRP typically

requires time for setting up new information systems and organizational structures. Both, however, appear to hold unique value in carrying operational growth forward.

## The role of Information Technology in Business Process Re-engineering

From the very beginning of process redesign, the use of information technology and information systems (IS) was part of it. Although not a necessity it is a key enabler if BPR because of its capability to surmount both time and distance constraints (Martinsons, 1995). The technological possibilities translate into radical business improvements, and BPR strives to align organization and IS and optimize IT use.

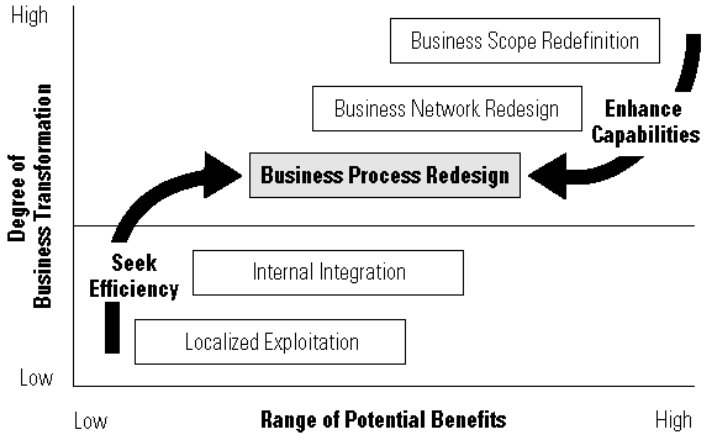
Over the years, research has indicated that there is not only a misalignment, but misconception between how IT and strategy are aligned, leading to a disparity between managerial perception and the measurement of IT alignment. Hence, the research of *InformationWeek* on this topic concludes that a better definition with more measurable goals is required, such business value or customer satisfaction rather on internal performance indicators that often lack practicality (Coltman, Tallon, Sharma, & Queiroz, 2015). New organisational designs must be predicated on business needs which are related to the marketplace realities as well as current and emerging IT capabilities (Martinsons, 1995).

*"IT is the primary factor in enabling process innovation (while) organisational change is the primary factor in implementing it."* **Thomas Davenport, 1993**.

IT is a central lever to BPR. The real power of IT for any firm lights not streamlining internal operations but in restructuring the relationships in extended business networks. (Venkatraman, 1993) IT facilitates the creation of flexible and fluid inter-organisational networks with customers, suppliers and other allies. Even if this may not be achieved in a single step, it is useful to create a vision based on technological possibilities. With electronic data interchange and the internet as primary sources for information-based affiliations and structures, organizations are capable of creating virtual business networks and expand their business scope (Martinsons, 1995).

The 'solution enabling' effect of intelligent systems applied within BPR is clearly more apparent in today's world. But already then, one scholar focused on knowledge reallocation of Venkatram's five different IT-induced business reconfiguration levels (Figure 4) (Venkatraman, 1994), by means of different intelligent systems and the relationships between them (Hart, 1996). For 't Hart, intelligent system on the upper three levels, the revolutionary levels of change, enable organizations to transcend to new peaks in performance. On the business process redesign level (#3) intelligent system reallocate knowledge to earlier stages in the process, and obliterating unnecessary repetitions. Level 4 sees the use of IT to redesign the collaboration between participants in a business network, usually through electronic data interchange, by sharing information to the network. This considerably makes decision making faster, more reliable, and thus cheaper (Hart, 1996), but also expects a much more profound effort. Lastly, level 5 sees the IT-induced redefinition of the business scope. Both business scope enlargement and business scope shifts are possible with IT, but in particular its enlargement is seen across industries through IT. Hart explains that IT gives for example financial services a client-oriented service, instantly granting it access to the desired financial products which are customised to their unique situations and needs (1996).

**Figure 4: Alternative Approaches to Business Process Redesign**




Source: Venkatraman, 1994

There are more challenges than just implementation of a new process tool alongside day-to-day operations. For IS professionals to provide applications consistent with the BPR effort, they must thoroughly understand the strategies and processes of the organization. Information systems are central to the identifying and analysing of problems, generating solutions and offering viable alternatives, but more importantly can facilitate the end-to-end coordination of technologies, processes and people across departments (Martinsons, 1995).

Information architectures, which are high-level database models, must be aligned to support value-added business processes. A common challenge is to make innovative use of existing IT investments as part of cost-effective BPR solutions (Martinsons, 1995). It is naïve to assume that legacy systems can simply be discarded, like Hammer has in first works on BPR. In fact, Ramirez et al., from their research on their firm-level studies about BPR initiatives, show evidence that the market places a slightly lower value on a high-level implementation of BPR, so a less aggressive or holistic adoption of a BPR program appears to be beneficial (Ramirez, Melville, & Lawler, 2010). The authors have differentiated between cost rationalization and work restructure, and see it being true for both, as the market deems it to challenging and complex, and thus predicting an adverse performance impact. It does overall see the interaction between an organizations IT and BPR portfolios as positive and significantly associated with an organization's production efficiency and market value (Ramirez, Melville, & Lawler, 2010).

Further, to master mammoth transformations in IT, specifically dynamic capabilities, a firm's ability to adapt internal and external competences to rapidly changing environments is needed (Kettinger, Teng, & Guha, 1997). Moreover, if done with little grace, it may be an open-heart operation as day-to-day business still needs to be tendered to. This has made BPR, but especially IT-driven process change projects hard to realise. Interestingly enough, however, companies that develop a flair for innovation, and have different innovation activities at the same time, can increase the chance of process innovation success, which positively impacts financial performance (Piening & Salge, 2015). Furthermore, on a more sociotechnical level, a major obstacle that can develop within an organisation is resistance to change through hidden groups of potential significance, which can lead to the entire failure of the project, due to complete disintegration during any time of the change process (Sarker, Sarker, & Sidorova, 2006). Overall, there can be a lot of challenges with legacy systems, and despite its wide-reaching impact possible, more basic projects have been more successful. In the future, IT scholars see the following three micro-foundations of IT alignment for future research: the rise of digital business strategy, and innovation ecosystems and value co-creation are (Coltman, Tallon, Sharma, & Queiroz, 2015). These are all aspects picked up in my thesis which are key components of a modern IT-driven company in logistics.

### Executing BPR in Context

Typically, there are six stages in the BPR process, with several activities in each. The stages are envision, initiate, diagnose, redesign, reconstruct, and evaluate. Many methodologies only implement without further evaluation and improvement and other methodologies do not address human and organizational requirements. Both primary activities related directly to external customers and secondary more administrative activities in the value chain can undergo, and it has especially been applied to secondary sector activities, such as manufacturing and SCM, but also service companies. In the context of SCM, Gorla, Chinta, Chu (2007) identified that the heterogeneity of user-IT systems becomes more challenging for the companies with legacy systems. It is suggested that the widespread use of web-based applications and Extensible Markup Language in computing may improve this incompatibility situation in the future. Nevertheless, employing a change agent for large SCM-BPR implementation projects to overcome hurdles is recommended (Gorla & Chu, 2014)

In the beginnings of Re-engineering thinking, major focus on manufacturing was studied, and it was found that while some companies can make radical, customer-oriented changes, others do not accomplish the same rapid improvement. The process-intensive fields of logistics and operations management also gained more interest through BPR. Schneider National, a transportation company and subject for a HBR case study, showed that really it is not about the industry but six decisive factors in the implementation process (Hammer, 2005). The process focus must be well-defined, with set boundaries, metrics and improvement targets. The implementation also necessitates process owners that have full responsibility, a full-time design team that shows full commitment, and managerial engagement to review progress and solve problems that need. Lastly, ensure to involve front line staff and give them a chance to buy-in to the initiative, and give space for further change and redesign. Adopt the principle *70% and go,* and have a bias for action (Hammer, 2005). He also understood that large-scale implementation into a series of limited releases creates momentum, dispels scepticism and anxiety, and “delivers a powerful rejoinder to carping critics” (Hammer, 2007). From there, one can develop a reputation with customers for relentlessly improving performance, a brand promise of extraordinary value.

For SME process innovators, who usually have little resources, but are investing in embodied technical knowledge do improve their production-oriented innovative performance due to technological process innovation, and it is complemented by access to other external sources of knowledge, mainly from within the industry. On top of this, synchronous co-adoption of technological and organizational process innovation is effective (Hervas-Oliver, Sempere-Ripoll, & Boronat-Moll, 2014). Most important is Hervas-Oliver et al.'s third hypotheses which states that, as opposed to product innovators who require R&D investments, process innovators rely on external sources of knowledge due to their limited in-house capabilities (Hervas-Oliver, Sempere-Ripoll, & Boronat-Moll, 2014). Especially absorptive capabilities are crucial for SMEs, as increased organizational knowledge positively relates to the capacity for BPR (Srivardhana & Pawlowski, 2007).

### Towards lean management

In an attempt to decode the DNA of the Toyota Production System, Steven Spear and H. Kent Bowen (1999) outlined the unique mind set and approach of the Japanese car manufacturer. In a nutshell, it is a community of scientists following the scientific method in a continuous improvement context (Spear & Bowen, 1999). Toyota has the company culture of a learning organization with four core rules every employee has fully internalised. BPR may become very strategic, it is by nature discontinuous. Re-engineering the organisation is not a phenomenon to witness much these days. Instead, one finds operating systems in which incumbent's path dependence is challenged on a micro- and macro-level every day.

With the rise of the internet and web software development, several tech-minded thinkers have looked for a template of Lean Manufacturing for the contemporary organisation. End of the 1990s, the agile methodology was built, a manifesto of "lean" method of improving productivity by eliminating waste through reductions in uneven work flows and destructive overburdening (Rigby, Sutherland, & Takeuchi, 2016).

Agile development, as opposed to waterfall and other out-of-date software methods, is becoming a popular and diversely adopted approach to project work. Its large advantage to waterfall models is the ability to have a minimal working software product soon, and build on it, preferably with feedback from your customer (Rigby, Sutherland, & Takeuchi, 2016). The methodology is rather simple: short daily meetings (stand-up), bi-weekly project prioritisation

plans with instant execution (sprints), with a project backlog for all work to come, and group reflection and feedback after every sprint. Essential to its philosophy is constant communication, small teams (3-9 people) that are accountable to themselves, honing the methodology on all levels, organization structures and roles to support it, and customising one's practices upon mastering the standard method (Rigby, Sutherland, & Takeuchi, 2016). There is no real hindrance in adopting this model for a project team and it offers a simple way to adopt the Toyota mantra. The focus on the team increases work satisfaction, team productivity, and promises various other benefits to the entire organisation while eliminating waste.

Eric Ries, a serial entrepreneur, went a step further and developed the manifesto for the modern enterprise. The lean start-up methodology is a toolbox for any type and size of organisation, any individual or group of people that are developing a new product or service under high uncertainty (Ries, 2011). At its core it is the reoccurring process of *Build-Measure-Learn* to quickly achieve success with very little time spent. Based on science, the process called *Validated Learning* offers a method to test hypotheses based on your purpose, excellence and vision that may appear hard to measure. Learning is a metric of success, and brings clarity into the organisation regularly, thus fuelling the innovation engine, adjusting strategy as one moves along.

Operational innovation, once by Hammer and Davenport announced as management revolutions, is still sought after today, just under different names and in different forms. Back when Western business thinkers realised the consistency of Toyota's advanced operations, the only way to make up the lost time was to take a leap and fully reinvent oneself (O'Neill & Sohal, 1999). Especially for large companies this appeared too difficult, and less radical approaches saw more approval (Davenport, 1993). Yet, scrutinizing existing business processes and challenging the status quo will always be essential to longevity.

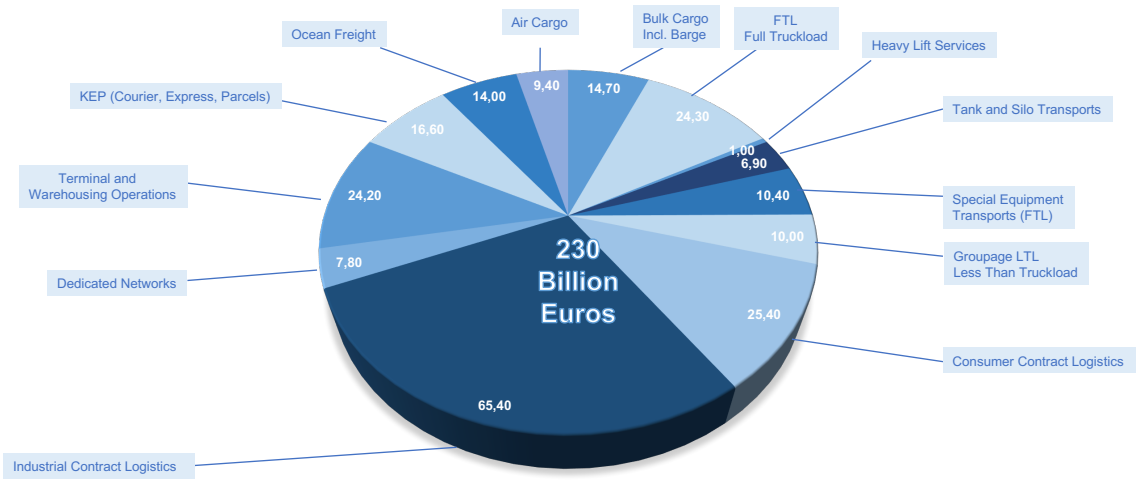
Broadly speaking, BPR sought to break patterns, and write new legacies powered by information systems (Davenport & Short, 1990). 'Disrupt yourself before somebody else will' is the underlying assumption of most of the radical innovation methods, but they vary in practicality. Continuous improvement, however, cannot lead to new heights by incremental change. To redesign operations, let alone innovate partner networks or the scope of one's

business, episodes of small step changes may improve chances of implementation success (Ramirez, Melville, & Lawler, 2010). The contemporary interpretation of process innovation is a learning organisation. Equipped with the lean start-up methodology and the agile working approach, learning becomes central to the business. With flexible work coordination around small-size projects and continuous challenging of assumptions, a business has a set-up that can foster innovating business processes and one's product or service. The learning organisation spearheads innovation and introduces BPR and TQM to today's organisational context.

## 4. Overview of the transport industry

In order to make sense of the digital transformation in the context of the common freight forwarder, this section has the purpose to provide a background of the matter. It takes departure in the rough segmentation of the transport industry and the different stakeholders, defines the freight forwarder and his functions, and paints a contemporary picture of trends in the forwarding market. Lastly, research of digital strategies and "endgame scenarios" is presented, laying the contextual foundation of this case study.

**Figure 5: Expenditure in German Logistics Market, p.a.**




Source: Deutscher Speditions- und Logistikverband (DSLV), 2015

The term logistics is widely used to define how resources are handled and moved around the supply chain. More specifically, it is the process of planning, actualising, and controlling efficient, cost-effective flow and storing of raw materials, semi-finished products and finished products and the related information from destination to origin, considering the demands of the client (Lorenz, Hoester, 2016). Due to the sheer size of the logistics industry, even a more fine-grained segmentation still only gives billion-euro "niches", at least for the German market which is by far the largest in Europe due to the country's size, infrastructure and geographical position. Figure 5 provides an overview of the €230b market which makes up 8,4% of the Germany's gross domestic product. Most countries will have similar divisions of national costs, and subsequently labour, such as South Africa with 11.2% (Havenga, 2016), and the US with 7,85% (Schulz, 2016).

### Ocean Carriers

Container shipping companies are the engine of the logistical chain that moves the masses. It is by far the cheapest, most environmental-friendly, but also the slowest way of transporting goods. With the containerisation in the 1970s, a globally established standard in cargo transportation gave path to the efficiency and scale to the exorbitant ocean carriers. The carrier lines have in the past decade had difficult times, with historic low levels of freight rates and weak earnings, triggered by weak demand and oversupply of new tonnage (United Nations Conference on Trade and Development, 2016). This caused the bankruptcy of Hanjin, a large Korean carrier, and induced mass consolidation in the asset-heavy maritime business. Due to a merger of three Japanese carriers, and Maersk Line, the largest shipping company, recently having acquired Hamburg Süd – #6 in capacity prior to acquisition – the market has been shaken, and a reformation of the carrier alliances has occurred. The increasing power of certain players, also considering their expansion and IT strategies, are factors to consider when looking into the freight forwarder market later on.

Carriers, also referred to as a second-party logistics provider (2PL), have direct contact to freight forwarders and let them handle the micro-management of shipments, but some maintain own customer relationships with large-scale producers ranging between 100-500 TEUs a week. Hence, they are an invaluable component to 80% of global logistics operations. Figure 6 gives an overview of the entire process chain. The freight forwarder may, depending of his service competencies, handle all elements apart of the ocean freight by himself.

**Figure 6: The Shipping Process**


Source: www.transporteca.co.uk

### Air Freight Providers and IATA

Air cargo, on the other hand, has usually been the mode for delivering high-quality products, postal cargo and by now, much parcel cargo. In the US alone, $6 trillion per year worth of goods are transported via air cargo, accounting for approximately 35% of world trade by value (IATA, 2017). A valuable asset of the air freight sector is the centralised body for policy and regulatory standards. Representing 83% of total air traffic, the International Air Transport Association (IATA) is the trade association for the world's airlines (IATA, 2017).

With the boom of e-commerce, this sector has also seen a variety of new market entrants that have claimed their niche quickly. Amazon Prime Air has 40 air crafts based in Cincinnati, but also in Europe and Asia the booming e-com has given path to several (at least 7) cargo airlines, most notably SF airlines with 37 aircrafts and other players along the Silk Way (Europe to China) (Mahrun, E-Commerce beflügelt Start-up-Airlines, 2017).

### Inland water ways

The grid of canals in central Europe has been dealt as the most efficient, and sustainable alternative mode of transport to trucking. It is clearly slower, but is seeing more innovation thanks to the digital transformation (DSLV Deutscher Speditions- und Logistikverband e. V., 2015).

### Rail logistics

In the field of land transport, rail freight is a cost-efficient, fast and sustainable option compared to trucking, but due to lack of innovation has not been able to grab a larger market share than potentially possible. It is considered up to 6 times more efficient, and increases of congestion, such as resulting through the Syrian refugee crisis, are causing a shift to rail (Allen, 2017). The $210bn market is expected to grow by nearly 4% annually between 2017-21, and is particularly efficient in intermodal operations, where another mode of transport is utilised to convey the transport.

### Terminal Operators

For rail, air, and ocean freight, container freight stations are specialised to load and unload the vehicle of transportation. The port terminal operators are an indispensable component of any value chain, to move cargo through a sea-, rail- or airport. They can be state-owned or

privately run. Coordination work to minimize the amount of time a ship spends in port, by optimizing the flow of goods through customs is the principal function. Maintaining the level of efficiency involves managing and upgrading infrastructure, storage facilities, communication equipment, computer systems, union contracts, while managing paperwork, leases, safety and port security (Wikipedia, 2015). Many larger ports usually have numerous adjacent container freight stations, in which consolidation of containers of all kinds, the handling of heavy goods, project loading and hazardous goods, the storage of goods, the trucking of containers and customs declarations can be performed before being loaded onto the vessel at the port terminal (Unilok GmbH, 2015).

With increased automation and comprehensive information systems, autonomous port operations, next to autonomous technology for ocean vessels, trains, and air planes, are among the closest to reality. Innovations for support services for container freight stations and port terminals are already being tested, such as the introduction of automated port operations in Hamburg (World Economic Forum, 2016).

### NVOCCs – the independent intermediary

A Non vessel operating common carrier (NVOCC) is a cargo consolidator who does not own any vessel, but acts as a carrier legally by accepting required responsibilities of a carrier who issues his own bill of lading (or airway bill), which is called House bill of lading under sea shipment and House airway bill under air shipment. NVOCC acts a 'carrier to shipper' and 'shipper to carrier' (Kollerath, 2017). The importance of this player in the value chain is the gap that he is filling – a consolidator of shipments, especially for Less-than-container load (LCL) shipments that otherwise would have to be done by the carrier, or by the freight forwarder himself. Especially for asset-light forwarders, the NVOCC is a precious partner.

### Shipping Agents – the brokers of liner agencies

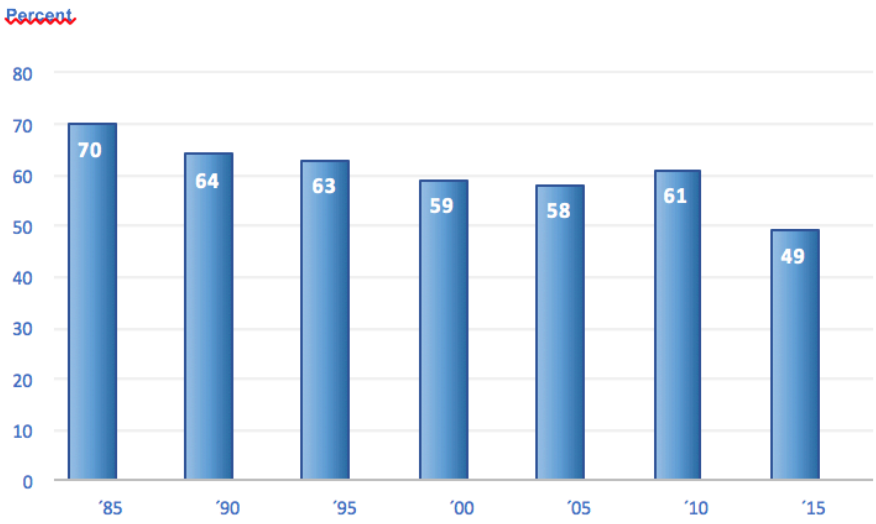
Shipping agents, another middle man with responsibilities difficult to distinguish from the ones of a freight forwarder, usually take care of all the regular routine tasks of a shipping company quickly and efficiently. They often act as a service vendor of a carrier, and call freight forwarders as well as direct shippers to their clientele. The routine tasks that carriers delegate to their agents can be crew transfers, customs documentation, and waste declarations, updates and reports on activities, and they are thus deemed responsible for the handling and

transportation of cargo with the general interest of its customers in mind (M&P International Freight, 2016).

### Freight Forwarders & Trucking Companies

The freight forwarder is the first and often the only touch point to the client, with the network and expertise to arrange for even the most complex logistics projects. Other than the shipping agent who is usually bound to the provision of a certain freight service and limited in scope, the freight forwarder will preferably see the cargo through the entire process, possibly as a door to door freight service, offering multi-modal transportation, cargo insurance, customs clearance at customs border controls, or other value-added services. As the person responsible for the organisation of transport, he is legally obliged to decide the mode and journey of transport, the selection of executing partners, the completion of the freight-, warehousing- and forwarding agreements required for the shipment, inform and order selected transport partners for coordination. Depending on the size, freight forwarders are in possession of assets – usually trucks (Figure 7). The ownership of warehouse facilities or shipping vessels, for example, allows them to dictate better rates for customers. Some freight forwarders are strictly operating truck fleets, and as asset-intensive operator referred to as haulage firm or trucking company. Hauliers, warehouse operators and other asset owners offer their standardized service with own resources. In Germany, (only) 48% of logistics costs, or €113b in revenue p.a. are actually managed by forwarders, the other 52% are internalised by producers (DSLV Deutscher Speditions- und Logistikverband e. V., 2015).

**Figure 7: Percentage of companies with trucks in Germany**




Source: Deutscher Speditions- und Logistikverband (DSLV), 2015

Reference: 2.500 companies

In the past decade, the expression of 3PL and 4PL is oftentimes utilised, to distinguish between the level of service integration with the client of the logistics company. The third-party logistics provider (3PL) if a freight forwarder that delivers management of complex service chains, while the Fourth-Party Logistics Provider (4PL) is said to manage the entire supply chain in an integrated approach, without owning assets himself. He combines services of 3PLs, software solutions and logistics consultancy to find logistics services tailor-made to supply chain needs of the client using best-in class resources (4PL Central Station, 2012). This type of provider has, across sectors honed schedule-efficient, customer and process oriented coordination of added value activities.

### Freight Forwarding Collectives

Apart from close customer relationships, the logistics industry is characterised by the need for a) domain expertise that some complex supply chain operations require, and b) a network of logistics partners necessary to cover global routes coupled with rural delivery. Consequently, collectives of hauliers, freight forwarders, NVOCCs and shipping agents have founded carrier alliances, cargo networks, consortiums and government associations between equal partners to leverage network effects and appear stronger to customers. This additional interconnectedness and long-term cooperation agreements enable simple communication, established standards for operations and payment, and can lead to expansion possibilities.

In freight forwarding, there exist more regional network like ELVIS, and international ones such as WACO and Cargoline, which all promote itself to be mostly owner-operated partners and long-standing local partners (CargoLine, 2017). The increasing connection and collaboration between companies, especially through cargo networks, has increased in the past years, and 73% see it as one of their most affluent trends in logistics today (Kersten, Seiter, von See, Hackius, & Maurer, 2017).

Technology-driven networks have also gained attention recently, as the aim to provide their mid-size forwarder member with technology, network capacity or rates to compete with market leaders (Drewry Supply Chain Advisors, 2016). Examples of such are BuyCo, Centrolene and WIN/WWCA.

Regional as well as national associations empower the individual enterprise further. In Germany the association for forwarders and logistics providers (DSLV) comprises 3.000 member companies, making up 90% of German logistics revenue. The associations do not provide the same level of integrated network and collaboration opportunities, but as a Logistics Provider's (LP) success is largely predicated on his relationships to clients and partners, it is through such alliances that small- and medium-sized freight forwarders (SMF) can maintain a strong profile in the competitive landscape that is logistics (Kersten, Herstatt, von See, Kalogerakis, & Wagenstetter, 2015).

## 5. Market Segmentation of Freight Forwarding

Within the freight forwarding market, differentiation and finding one's niche is important, especially hard if one avoids to compete purely on price. To differentiate oneself, forwarders introduce new services and trade lanes, or implement technology solutions to improve customer service, visibility and operational efficiencies (Barrios, 2016). Accordingly, segmenting the competitive landscape can be done in a number of ways. The three most relevant ones for this thesis are company size, geography, and service range.

Freight Forwarders' size tends to be reflected in their average customers' scale of operations. The multinational logistics groups prioritise providing to global importing and exporting companies. Yet, logistics is considered one of the most equally distributed markets. In fact, over 70% of German LPs have fewer than 100 employees, and 17% have fewer than 10. This is similar to the US, where 97% of importers employ under 500 staff while managing approximately one-third of the nation's global imports (McKevitt, 2017). Moving forward, this paper adopts the term of small- and medium-sized companies as defined by the European Union: non-subsidiary independent organisations of 250 employees or less. Small players are less than 50 staff (OECD, 2005).

Logistics is predicated on the activity of moving things from A to B. Hence, the geographical location of logistics companies strongly delineates competition markets, specifically their trade lanes served, and transport modes. Yet, the function of this link involves a variety of processes, and as the forwarder seeks new ways of rationalising the transport handling, a multitude of additional services, some deeply integrated into the shipper's production activities, have become focus areas in freight forwarding. These ancillary activities are often referred to as value-added services (VAS), and are booked by the customer on-demand for different stages of a transport. They ease the workload of the customer, or bring additional efficiency to his operations and product development, thus adding value. Table 3 lists the types of logistics services offered, and its respective prevalence. On average nine service areas are covered by German freight forwarders and logistics companies, and as the operating size increases, the performance spectrum increases significantly (DSLV Deutscher Speditions- und Logistikverband e. V., 2015).

**Table 3: Value-added services in Germany**

| Logistics Service | Share | Logistics Service | Share |
|---|---|---|---|
| Logistics Consulting | 75% | Pick and Pack | 28% |
| Call Control | 25% | Assembly Work | 17% |
| Security Air and Ocean Freight | 20% | Preparation of Shipments | 67% |
| Quality Control | 42% | Labelling | 54% |
| Vendor Management | 46% | Tracking and Tracing | 49% |
| Distribution Warehousing | 29% | Invoicing and Factoring | 11% |
| Order Management | 27% | Return Management | 22% |
| Shelf Delivery | 9% | Call Centre | 4% |
| eFulfilment | 7% | Others | 2% |

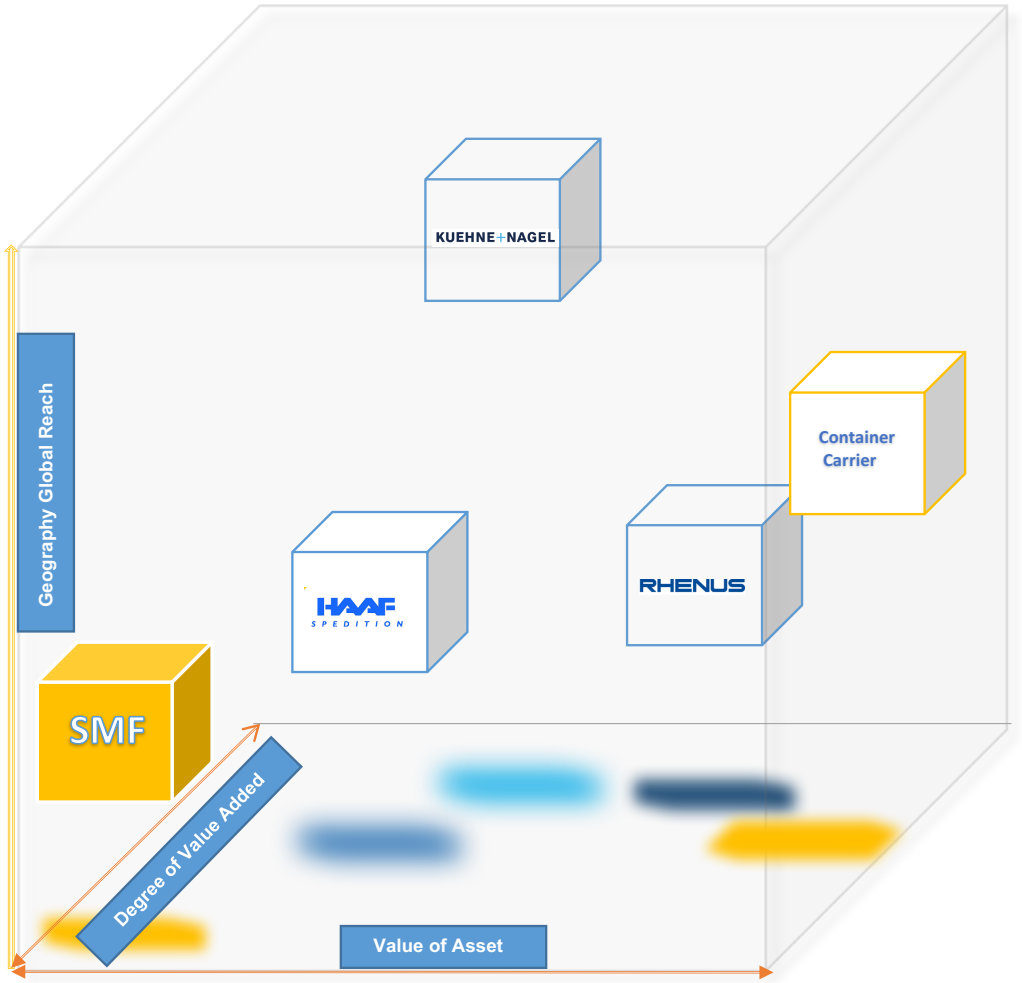
Source: Deutscher Speditions- und Logistikverband (DSLV), 2015

This prevalence is the result of close customer relationships between the logistics provider and his clientele. As the diagram on logistics costs (Figure 5 on p. 30) exposed the size of contract logistics (28,4% of German market), it is the foundation of the diverse set of ancillary activity scope. More than two thirds of expenses of the LP is attributed to transport, handling, warehousing, but contract logistics holds large value for the shipper (DSLV Deutscher Speditions- und Logistikverband e. V., 2015). Secured in formal agreements of at least one year, the forwarder provides multiple logistics activities integrated into a performance package of increased complexity; in a manner adapted to the needs of the shipper. It is in these types of commitments that the forwarder's value-added services serve as competitive advantage and aid him in manifesting his social capital (Tian, Wang, Li, Niu, & Si, 2016).

The segmentation into size, geography and service range allows for a three-dimensional measuring of logistics providers. Figure 5 portrays my own estimation of the different types of players on each of the three axes, namely x) value of assets, y) geographical reach of

logistics operations, and z) ability to create value for the customer, in the form of Value-Added services. As exemplary cases I chose three LPs that I came across during my research, as well as the common small-scale freight forwarder, and large-scale container carriers. Important to see is that as the SMF scores rather low on all of these variables, he is in the bottom left of the diagram. In spite of their limited assets in place, Kühne + Nagel, the market leader, comes the closest to full operational scope and scale. This is partially due to their strong IT set-up. Container carriers can sail the ocean, but lack operations in-land. The common SMF is not the 200 people establishment, such as Haaf Spedition, but is smaller in size, scope, and undertakes less ancillary activities.

**Figure 8: 3D segmentation**




Source: Own Creation

### The value chain of the freight forwarder

As freight forwarders create value in customised ways, there is no one correct process for handling a shipment in the first place. But on a higher level, the process is split into six stages, of which three stipulate the physical transport (blue elements in Figure 9 on p. 42). To deliver the different facets of services for warehousing, distribution and information flow, the forwarder may contract any of the value-added services to a third party, and must always perceive the interest of his consignor and follow his instructions. On the bottom line, however, the forwarder is responsible to execute any parts of the service that have been agreed upon for a single shipment. The freight forwarder can act as warehouse keeper, and possesses the right of self-entry, allowing him to operate trucks as well as ships and airplanes (Lorenz, S. 49. 2016).

An ever-increasing number of new communication facilities with electronic data exchange (EDI), mobile communication and automatic identification systems such as barcodes, 2D codes and radio frequency identification (RFID) has continuously augmented forwarders' capabilities (DSLV Deutscher Speditions- und Logistikverband e. V., 2015). The information technology used to enable each process is mentioned, and VAS offerings are arranged to the transport stages, some such as track&trace being mentioned multiple times as this service is delivered throughout the value chain.

The value chain for the operations of a freight forwarder, before any shipment is undertaken, is the sales process. The value of social capital is apparent in the forwarder's ability to build rapport and acquire new business. In contract logistics this is demonstrated in physical meetings where services are presented. For irregular customers, also referred to as spot shippers, contact can also be limited to an exchange of e-mails and phone calls, initiated through the booking order form on their website. Sophisticated freight forwarding companies will use freight rate management systems to coordinate their tariffs. Based on the complexity of the logistics services, and the customer relationship freight rates, and the services he offers, the shipper will choose his logistics providers. Once the necessary documents, such as product lists, are prepared by the shipper, and his shipment details are confirmed, the forwarder initiates the booking process.

An effective booking process is essential for the internal resource management, and critical back office processes occur. The freight forwarder can have a variety of IT systems and interfaces to manage freight rates, manage transports internally, organise and cooperate with logistics partners, such as container depots, rail, air or ocean freight operators, and foreign trucking companies at the point of destination, if requested.

The majority of information flow between operators with frequent interaction, and their respective customers have established Electronic Data Interchange (EDI) which lets systems seamlessly send and receive information for freight rates and shipment orders in a standardised format. In the new generation of IT, a more innovative interface is utilized, which is called an Application Program Interface (API). Large logistics groups use it for the majority of their customers (see Table 4), predominantly for transmitting Data forwarding orders, delivery notes, and status reports, and exchanging data with databases of sea ports, airports and governmental institutions. SMEs will often have established connections via EDI, but they only have it with few of their customers, also because their clients prefer other ways of receiving and transmitting information.

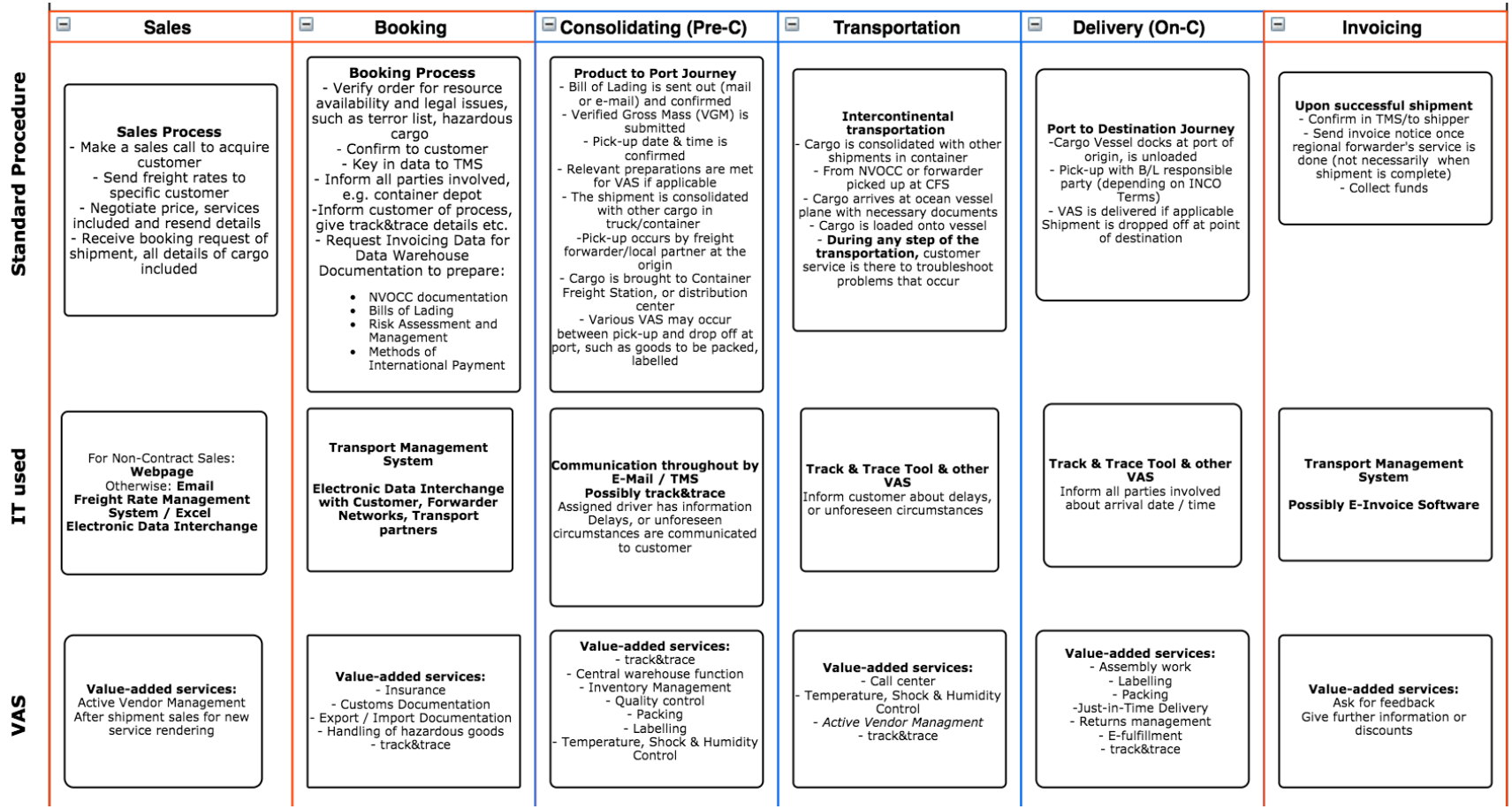
**Table 4: EDI Utilization in Companies**

| Employees per Company | EDI Usage in Percent |
|---|---|
| 1 to 10 | 52% |
| 11 to 50 | 75% |
| 51 to 100 | 76% |
| 101 to 200 | 85% |
| < 200 | 97% |
| **Total** | **76%** |

Source: DSLV Deutscher Speditions- und Logistikverband e. V., 2015

A number of back office processes take place to make information entries in the Transport Management System (TMS), which is software introduced to the industry in the late 1990s that aids in organising transport modes, warehousing and containers. It is perhaps the system closest to becoming a 'Holistic IT system' as it can support the forwarder for the end-to-end moving of cargo, from rate management and freight booking, over consolidation, transportation, and delivery process. The TMS may also assists in documentation, but there still is an unnecessarily high amount of typing, copying and re-verifying of data. Recently, TMS application have seen an estimated annual 7% growth across all market segments (Drewry Supply Chain Advisors, 2016).

## Figure 9: The Process Chain of the Common Forwarder




Source: Own Creation

Mid-size forwarders also look for end-to-end integrated solutions and connectivity and migrate to cloud-based TMS providers with pre-set connectors to marketplaces, port community systems, rate management tools and dashboards. In spite of such advanced systems, there are still several challenges in the coordination of resources and capacity and even for market leaders with advanced IT like Kühne+Nagel, the shipment handling process takes an individual 3-4 hours.

Once all preparations have been made from both the shipper's and the logistics provider, the physical shipping process should run exactly as planned. More often than not, there are bottlenecks in the transport chain, border control issues, or other causes for delay, all of which the freight forwarder troubleshoots. This as well as voluntary rerouting orders by the client are matters that are tackled by customer service departments, and little automation is available in this process.

49 percent also offer track & trace for their packages and shipments to the consignee, especially through barcode-based track&trace which supports eliminating errors. The technology requires a considerable investment, but it allows a complete tracking of packs and consignments at all stations of their journey from the consignor to the consignee, while shortening the time of arrival and improving customer service (DSLV Deutscher Speditions- und Logistikverband e. V., 2015). The technology is particularly useful in general cargo, where shipments have to be consolidated and sorted several times. Conversely, the application of RFID in forwarding has after initial euphoria lost traction, as the technology must be technically and organizationally stable, and operated economically. On a long-term perspective, there are also no plans for a fully uniform technology and processes with the same applications which results in only a good ten percent of freight forwarders choose RFID to identify packages as their identification systems (DSLV Deutscher Speditions- und Logistikverband e. V., 2015). This might change with growing volumes of e-Commerce, though.

In principal, the common freight forwarder makes use of technology when he sees a need for it. In the past, forwarders were quick to adopt universal customs software ATLAS, and other technologies like RFID and EDI that were accepted by shippers quickly and created short-term value as fast data interchange was enabled. Yet, Fleet telematics, as a counter-example

which help optimise times of loading, transport, track&trace services, and reports on successful shipment delivery, are only slowly gaining traction. Compared to other industries, logistics providers have invested little in optimising the shipping process of cargo, considering the maturity of most innovations (Kersten, Seiter, von See, Hackius, & Maurer, 2017). In fact, very small forwarders, especially hauliers, are primarily doing all their management on paper, and work with their phone and e-mail. It appears as if they have skipped the first generation of IT, and customer expectations from a digital age are far out of reach. Nevertheless, the value chain of the common freight forwarder is next to impossible without information systems. He has operated like this for decades. But he has already digitised parts of his operations. Whether this reveals itself as a stepping stone, or as an obstacle for the transition into the digital landscape remains to be discussed – because the market expectations are rising further.

## 6. Trends in the Forwarding Industry

The accelerating force of globalisation has driven the interconnectedness of organisations to a peak state in terms of flow of goods and information. In logistics today, the customer, even more than before, dictates the terms of transport, and it keeps ascending. Consequently, **cost pressures** have remained a large influence on operations of the common freight forwarder. Yet, as the market still considerably lacks transparency, and contract rates are negotiated on a personal basis, profit margins for forwarders remain substantial, unlike the ocean carrier market.

Next to cost pressures, there has been a higher tendency for **individualisation** of services around the supply chain. Forwarders have had to meet growing expectations, and with it, a higher overall level of complexity of solutions to deliver. **Complexity** arises through the increasing number of products, parts, suppliers, and services to coordinate, and their constant state of flux which tends to increase disproportionately with the number of entities. This trend is primarily observed on the global level, and is partly triggered through e-commerce, as the mass consumption of fast-moving consumer goods has risen the standard of what supply chains are able to deliver, in terms of speed, coordination, and flexibility.

The global and regional logistics industry is also increasingly **consolidating**. Nearly all large-scale forwarders do not solely rely on organic growth and acquire small-sized competitors to secure assets and customer access. On a macro-economic level, the freight forwarder as the middle man between two fronts is arguably becoming his biggest volatility. Some experts condemn the forwarder as we know it **obsolete in the future** (Lopez, 2017). The reason being that in the digital era transparency over offerings and supply chain costs, especially for standard dry goods, becomes the new standard, and freight forwarding services become incrementally commoditised (Burnson, Patrick – 2015).

Furthermore, **sustainability** has been a reoccurring trend, and various initiatives have surfaced to combat the environmental damage caused by mass consumption, such as EU's initiative for cleaner last mile logistics (CIVITAS WIKI consortium, 2015). Sustainable logistics operations can mean the use greener methods of transportation, reducing their overall CO2 emissions and cutting down on waste from packaging (World Economic Forum, 2016).

Unfortunately, it is likely that sustainability for freight will be achieved later than for personal transport. The reality is that there is no interest from LPs if investments do not monetize into a benefit right away. Moreover, initiatives connected to IT solutions are missing, and especially a practical adoption approach of sustainability initiatives in the context of 3PLs is missing in current research (Marchet, Melacini, & Perotti, 2014).

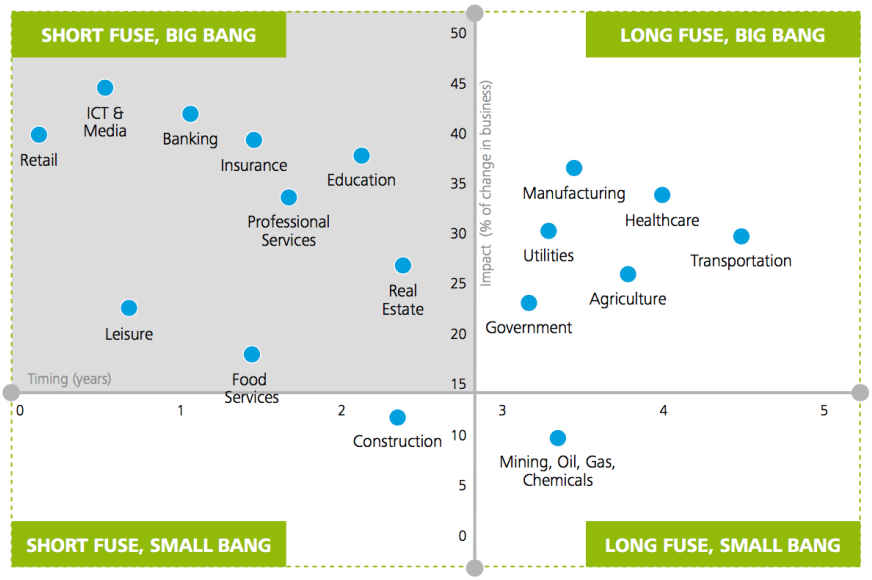
Within the transport and freight logistics market, the external drivers of cost pressure, individualisation and complexity are of high relevance. However, the most important trends for the freight forwarder are endogenous ones (Kersten, Seiter, von See, Hackius, & Maurer, 2017). These must be propelled from inside the organisation and are related to digital transformation and the innovative technology concepts it encompasses. Next to **real-time visibility on the supply chain**, the **digitalisation of business processes** is the most important trend that logistics is facing. **Automation and business analytics** are part of the looming shift, and 73% of the industry rate the opportunities that digital transformation holds for their companies as high to very high (Kersten, Seiter, von See, Hackius, & Maurer, 2017). However, more than half of the companies take a wait-and-see position, until tried and tested solutions become available.

The following section will shed light on the market dynamics of the digital forwarding ecosystem, by introduction of new market entrants and incumbents' adjustments made thus far. Afterwards, a sum up of endgame scenarios for the logistics industry from secondary research is provided. This should leave the reader with a good understanding of the current environment as we zoom into the circumstances of the small- and medium-sized freight forwarder.

## 7. The era of Digital Transformation

Ignorance to digital developments was prevalent in most industries before a disruptive power caused a shake-up, to different extents. In logistics, as described above, information technology has been a major component in the daily operations of the freight forwarder, also for SMFs. Threats emerge from different frontiers, and despite its physical nature, the transportation sector will not be spared of tech-induced disruption of some sort. Many of the asset-intensive B2B industries are characterised by a "long fuse, big bang" type of disruption, and transportation has the longest fuse of them all (Deloitte Digital GmbH, 2015).

**Figure 10: Disruption map by industry**

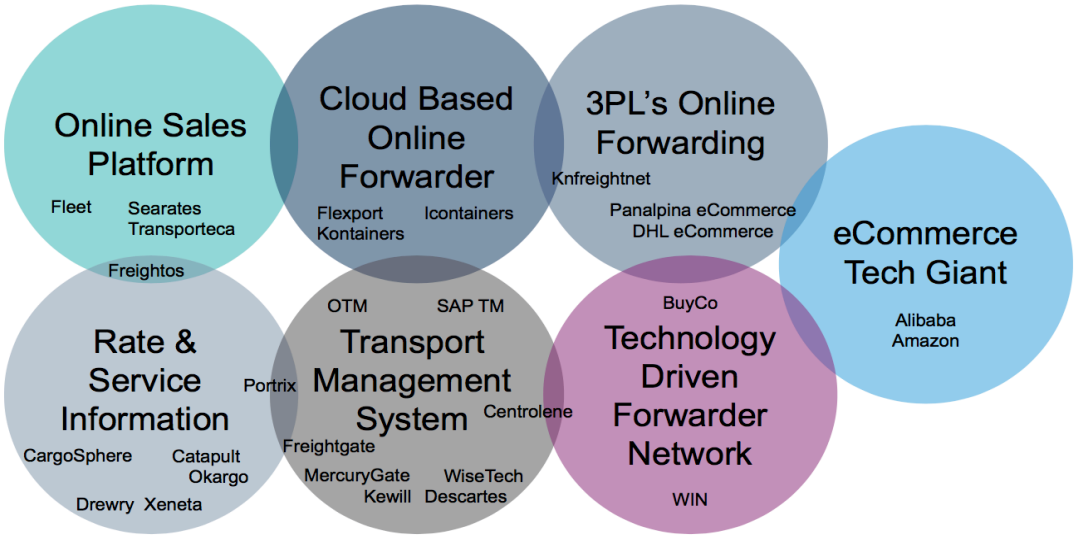



Source: Deloitte Digital GmbH, 2015

### A new ecosystem

Through digitalisation, the competition is elevated from a physically-bound to a digital level, diminishing the value of geographical proximity in retail, insurance, banking, media, and arguably professional services and education. Commerce is still the same, its transactions are just happening in a different sphere. In the context of forwarding this has resulted in cloud-based market entrants with little operational expertise, non-existent social capital, but highly efficient IT infrastructure and scaling capabilities that either present itself as competitor or technology-driven partner (Figure 11).

**Figure 11: The Online Forwarding Ecosystem**




Source: Drewry e-forwarding research (2016)

These seven groupings provide the forwarder an overview of his novel sources of opportunity and potential culprits of his downfall. I have already presented forwarder networks, and the scope of TMS providers in the market overview. Another definite partner are rate & service information providers that enable online sales by rate automation solutions with carriers and shippers. Drewry and Xeneta offer freight business intelligence for shippers and forwarders to index their freight rates versus the market. Most of these services are usually linked to large costs, and do not target the long tail of the market yet. The following section will focus on competitors, or potential collaboration partners in the case of some.

### e-Commerce Tech Giants

There has been an annual 7% increase in shipments through online business, and this booming business drives prices for shipment delivery services down, by approximately by more than 6% a year (Mahrun, 2017). Amazon & Alibaba's contributions in this development are immense. The Chinese conglomerate Alibaba envisions a global online marketplace for B2B transactions, and announced a global cooperation with Maersk (Reuters, 2017) and Kühne+Nagel as its logistics arm (McKevitt, 2017). Amazon has continuously made major investments into its European logistics capabilities and automated warehousing, while entering grocery delivery (Kümmerlen, 2017). Although e-commerce currently barely affects

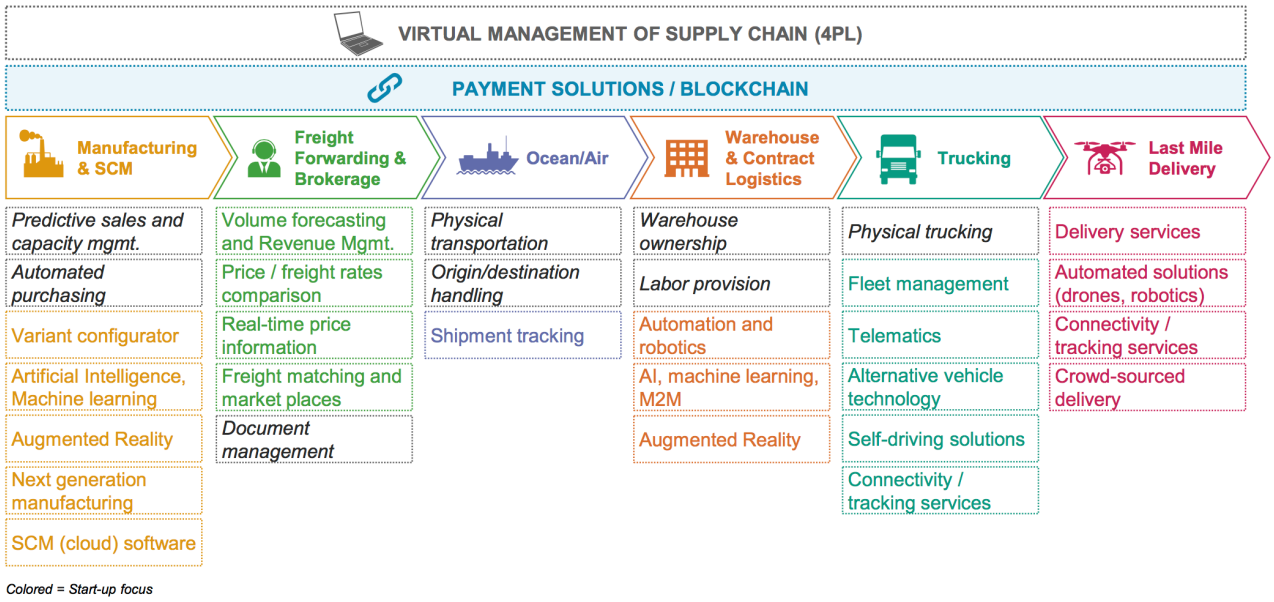
contract logistics, the expansion plans of both tech giants can pose a threat to the forwarding market in the next decade (Schreiber, 2016).

### A new wave of market entrants

Digitally native and asset-light start-ups have entered the forwarding industry, and now compete with the logistics provider along its entire value chain, as figure 12 depicts (Schambach, Borreck, & d'Incà, 2017). The business models of market entrants are diverse, and online platforms and data-driven services (Schambach, Borreck, & d'Incà, 2017). The largest threat to the SMF are 'cloud-based freight forwarder' who offers dynamic pricing, shipment visibility and instant booking, and alleviates shippers of menial tasks in the booking process (Drewry Supply Chain Advisors, 2016).

Since investments into logistics innovation are just starting in Europe, the market has not yet seen a large effect of it, but a large percentage of new logistics start-ups are focused on. In Germany, Austria and Switzerland, there were less than 40 start-ups in the logistics sector last year, and less than €300 million have been invested by the logistics industry in the sector (Schambach, Borreck, & d'Incà, 2017). However, AngelList, a platform for start-ups and venture capitalists currently reports over 1.700 logistics start-ups worldwide, indicating that until now innovation is seen elsewhere in the world (AngelList, 2017).

**Figure 12: Disruption along the Value Chain**




Source: Schambach, Borreck, & d'Incà, 2017

Most consultancy reports do not necessarily warn from such innovation, but urge them to see it as a means to an end of evolving core business. Large logistics groups therefore find ways to collaborate, such as DB Schenker who invested $25 million into the freight platform uShip (Baskin, 2017) . Rhenus Logistics went a similar path and invested in conducting an innovation hub contest, an idea platform for which they chose ideas not necessarily focused on digitalisation but on “general improvements of processes and products (Reimann, 2017).

### Reaction of the Logistics Incumbents

The multinational 3PL’s have not hesitated to react to the influx of digital competition, and want to enhance their physical assets with technology. The market leaders invest both in internal capabilities in form of holistic IT systems, and outward-facing online forwarding projects. Some find inspiration in cloud-based solutions and build digital forwarding web application, essentially extending their services to the internet. They present 3PL’s services in a modern user interface more and save the shipper during shipments with direct rates and instant booking. Their purpose is to compete with the new generation of digital freight forwarders and expand its customer base to smaller and more transactional shippers who were previously overlooked (Johnson & Desormeaux, 2017). Examples of such are Cillox, powered by DHL, Twill Logistics, powered by Damco.

The forwarder that has been the advanced in customer interaction through the web has been Kühne + Nagel (K+N). Already in 2015, they initiated the *KN Freightnet*. The powerful aspect of their booking portal is that internally they have already built out a sophisticated IT infrastructure. Thus, the same efficiencies as with large-scale customers are provided, although the KN Freightnet provides access to the long tail of the market. Shippers can find binding prices for LCL and air freight services, directly book them, and track them (Kühne + Nagel INC., 2014). This segments are small importers and exporters which predominantly SMFs serve. The industry fears that their freight booking platform, which is only open to their current customers, would be a threat to the market once made publicly accessible to all shippers.

Yet, up until then, the industry remains conservative towards innovation, and few of the Top 20 forwarders provide instant pricing. As part of a survey in logistics and SCM, seventy-three

percent of companies rate the opportunities that digital transformation holds for their companies as high to very high. However, more than half of the companies take a wait-and-see position until tried and tested solutions become available, and 32% rate digital transformation as carrying high to very high risk (Kersten, Seiter, von See, Hackius, & Maurer, 2017). This result is apparently not a technology denial or a lack of effort, but rather competing priorities, according to a Freightos report (Lopez & McKevitt, 2017). The segment of small- and medium-sized shippers are not demanding such applications yet. Perhaps there is also little understanding of the magnitude of the trend. Nevertheless, industry experts agree that forwarders which create value for shippers and invest in IT will be the ones that survive (Lennane, 2017).

### Endgame Scenarios

Logistics has enjoyed growing attention by management consultants and research in the last year, thanks to the changeful competitive landscape and the question: what will the role of the forwarder in logistics be? Table 5 (on p. 56-57) gives an overview of the conducted research, and outlines the frameworks and strategy approaches. Most of the suggestions apply to the SMF.

As of now, it is generally uncertain (Marwyk & Treppte, 2016), and the fact that one advisory company maps four scenarios that could potentially constitute the future of logistics, supports that uncertainty (Kauschke & Tipping, 2016). Despite the many possible realities, the underlying assumption made by most is that platform technology, like in all other “big bang” industries, is going to play an important role in logistics. Booking and optimisation platforms (BOP) as Roland Berger call it, will take a significant amount of today's standard forwarding business (Marwyk & Treppte, 2016). As independent intermediaries, they will be the centrepiece of the new market, and regardless of position, market players need to connect to or control them. Controlling them can only possibly happen as joint efforts, as they must be independent, according to Roland Berger (Marwyk & Treppte, 2016).

Freight forwarders are more likely to become one of the other three surviving players in the market next to BOPs: there will be asset-intensive carriers and terminal operators, supply chain specialists, and service providers, which may act in other industries as well. The SMF is

most likely to follow the path of the supply chain specialist, who are expected to manage and handle complex logistics task that require specific industry knowledge or that cannot be standardized (Marwyk & Treppte, 2016). Moving into more IT-heavy or asset-heavy roles are certainly possible, but require capital and expertise. The service providers will act as enablers of digital business models, as they are going to provide data, transactional, clearing, software and other services.

There is a rethinking happening in the shipper industry, as they focus resources to shape a more compelling value proposition for their respective customers (Eke, 2017). PwC describes this scenario as complex competition: producing shippers start competing with LPs on transport, as they shift towards internalising logistics more, and develop full overview of the supply chain as a core competency (Kauschke & Tipping, 2016). As service-oriented organisations look towards establishing control consoles as significant help to avoid coordination errors (Eke, 2017), one possible driver towards continued increase of collaboration could be based on standardised processes. PwC pictures the scenario of the 'Physical Internet' in which its standards lead to new solutions for loading and packing as well as to consistent shared communications standards and data exchange (Kauschke & Tipping, 2016). The World Economic Forum hopes for governments to also encourage greater vertical collaboration across the industry and fund initiatives such as EU-driven programs to increase 'synchromodality' (connectivity between shipping modes and across shippers) (World Economic Forum, 2016). The reality, however, is that in many sub segments of transportation and logistics it's about disrupting or being disrupted with data and information at the core. (De Clerck, 2017).

Largely, the secondary research brings forth three main ideas. Freight forwarders must:

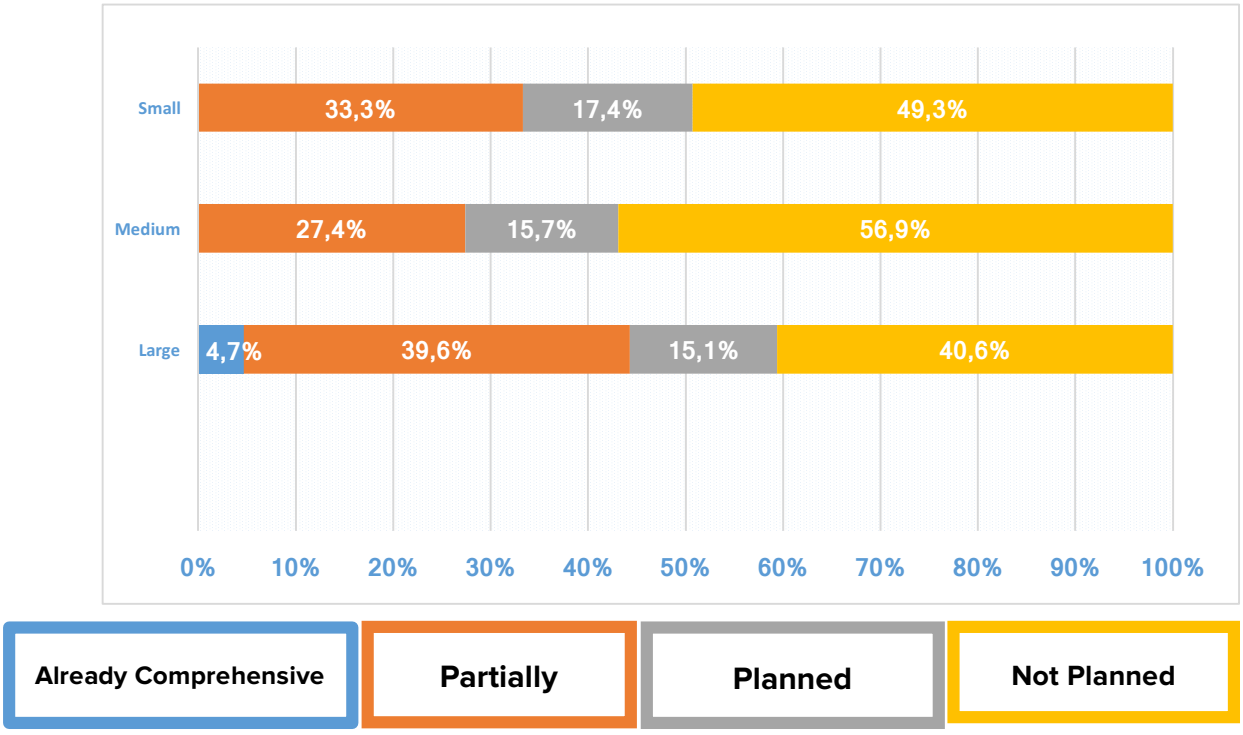
1) **specialise further into a niche where they have the 'right to win'**
2) **invest in (a) technology to acquire competencies, possibly through as-a-service solutions and (b) organisational capabilities**
3) **seek collaborations with clients, start-ups and others.**

The following section dissects these strategy suggestions and identifies those aspects that are applicable to small- and medium sized forwarding companies.

## 8. SMFs and the Digital Transformation

The pattern of the past has been that if the initial investment in the technology exceeds its use, logistics companies, and particularly SMFs are careful to adopt new technology and adjust process chains. This inclination extends from past ICT tools to digital technology and digital transformation of business models, as can be seen in Figure 13. Companies that acknowledge digitalization as important and press ahead with implementation, also tend to deal better than others with the customer-driven requirement. Nevertheless, 49% of small, and a staggering 57% of medium-sized enterprises in the survey have no digital transformation planned (Kersten, Seiter, von See, Hackius, & Maurer, 2017).

**Figure 13: Digital Transformation of Business Model by Company Size, in %**




Source: Kersten, Seiter, von See, Hackius, & Maurer, 2017

### Obstacles of the SMF

While larger logistics group may have lack of knowledges for successful transformation, the smaller-sized operators often lack resources to kick-start IT projects altogether (Burnson,

2015). Consultancy reports and academic studies rarely considered a distinction between different sizes of forwarders, and their respective challenges (Kersten, Seiter, von See, Hackius, & Maurer, 2017).

On one hand, SMFs are confronted with technical problems, such as incompatibility of existing systems, immaturity of technology, security problems, and problems with internet connectivity. In this regard, one professor of Hochschule Ludwigshafen deems privately-owned medium-sized forwarders in competitive advantage (Iskan, 2017). He argues that they have been more profitable than logistics groups, as the latter are often consolidated medium-sized competitors that do not have harmonised but consolidated IT systems. The importance of own IT solutions, as the professor promotes, is the key to securing one's own sustainability.

On the other hand, the human factor can represent critical bottleneck in the digital transformation process. The logistics conglomerate usually faces internal resistance to change, but also coordination and communication issues between departments. This is fewer the case with smaller teams once they decide to transition (Iskan, 2017). The smaller the company the better usually the attitude to change. This can be seen in the case of Haaf Spedition, a forward-oriented freight forwarder whose CEO believes in the full digitization of all logistics processes, workflow and documentation. They are continuously investing in IT in order to build a holistic system that must be harmonised between the different IT systems of customers (Müller, 2017). For this reason, Haaf is pushing its employees to become more IT-savvy. They are training staff, which can by itself already pose unanticipated hurdles, and face challenges with recruitment. Young people are hard to motivate and require more work-life balance. They are also facing truck driver capacity shortage, and while customers are interested in the innovation initiatives, the CEO is trying hard to build up the competency and productivity level of his 200-person team (Müller, 2017).

Apart from potential technical, and motivational factors, the resource-based requirements score high as obstacles for the freight forwarder. Costs are, for over one third of new logistics technology, higher than expected, and for 28%, there are unclear use cases and benefit assessments which pose restrictions to its success (Kersten, Seiter, von See, Hackius, & Maurer, 2017). If the utility compared to its upfront investment is not feasible, this can mean bankruptcy. This can also arise through poor change management, or inadequate

qualifications of employees, which is reported to affect 19% of surveyed logisticians. The following section will summarise digital transformation strategies for the freight forwarder.

### Business Model Innovation

The digital transformation infers a redesign, not of a service or department, but of one's entire business model. The clear message is: commit to an identity, and focus on the key areas where you have 'the right to win' (Kauschke & Tipping, 2016). Yet, many forwarders have often already sought to optimise services to their clientele. Some deem a small forwarder operating in the crowded European road freight space an accomplished business, often oblivious to the opportunities that could be exploited from clearly differentiating its services and targeting distinct customer groups (De Clerck, 2017). Moreover, SMFs find that IT-driven change may not even be requested by the customer as of now, and prefer personal relationships (McKevitt, 2017).

The higher degree of automation and standardisation must be balanced with preferences of small-and medium-sized enterprises. Haaf Spedition, as an example of a medium-sized forwarder seeks a holistic IT system to digitally illustrate process chains (Müller, 2017). Yet, for all investments Haaf makes, the leadership takes their operational maxims into account. For the CEO of Haaf Spedition, that is short decision paths, less bureaucracy, and designated contact persons for customers. So as opposed to simply looking at external value, internal efficiency of processes appears to be prioritized. Haaf Spedition's goal, data transparency along the supply chain, also aims to anticipate the growing customer demands. The jumbo freight specialist already offers "Dedicated Solutions" with which they are integrated into the factory structures of their customers. Their investments in IT and employee training are characterized by customer centricity. In line with the research conducted by Kersten et al., it is the most obvious of three main approaches to innovate one's business model. The others are analytics-, and payment-driven approaches which both focus on data ( (Kersten, Seiter, von See, Hackius, & Maurer, 2017).

Customer-driven business model innovation may be more intuitive to a small- and medium-sized forwarder, as the personal relationship is already strong.  In the context of Haaf, their

## Table 5: Logistics Studies on Digital Transformation

| Author | Final framework or thesis | How it is relevant to SMFs |
|---|---|---|
| Oliver Wyman<br><br>**How Start-ups are digitalizing logistics**<br><br>(Schambach, Borreck, & d'Incà, 2017) | Five main **clusters of logistics start-ups**:<br>**Online platforms**<br>**Shipping execution and tracking**<br>**Robotics and self-driving trucks,**<br>**Data and analytics solutions**<br>**Asset management.**<br>Four partnership models between LP and start-ups. All help LP with development of competencies and technology. It ranges from: mere learning, to partner, invest in or collaborate deeply with start-ups. | There is little reason why the partnership model wouldn't apply to SMFs. Logistics incumbents should not be afraid of disruption through startups, but instead need to **see them as a means to an end.**<br>Established logistics providers have a **window** right now to capitalize on the energy and agility of digital startups.<br>LPs **face competition for start-up collaboration** through Tech Giants, Mobility Providers and Venture Capitalists with increasing emphasis |
| LogU<br><br>Trends and Strategies in Supply Chains and Logistics<br><br>(Kersten, et al., 2017) | A **Strategy map for digitally-transformed logistics** and supply chain:<br>Comprehensive list of strategic priorities:<br>1) company transformation: digital transformation is one of the core pillars of strategy,<br>2) IT&Data: transparency along value chain is provided, and<br>3) innovations: Competitiveness is ensured. Each has four focal areas 1) new business models, 2) changed competency requirements, 3) Changes in the value chain, and 4) innovative technology concepts. | These trends have been brought together by logistics, trade, and the producing industry, from small-sized to large companies in the survey.<br>Whereas acquisition of competencies may be restrained by limited resources, the authors point to **cloud solutions and "as-a-Service" providers.**<br>Especially SMEs should **focus on strengths and preferences of own employees**, and realign responsibilities accordingly.<br>What is clear to the authors: the best time to start with digitalization is now. |
| PwC<br><br>Shifting Patterns: The future of the logistics industry<br><br>(Kauschke & Tipping, 2016) | **Four logistics scenarios** how key disruptions facing the market may interact:<br>1. **Sharing the Physical Internet**: Incumbents collaborate more, develop new BMs, such as sharing networks with new standards in modal connectivity and IT.<br>2. **Start-up, shake-up**: Service providers and platforms establish in niches, based on data analytics, blockchain and other technologies.<br>3. **Complex competition**: Big retail players and technology firms enter logistics arena through acquisitions, and turn into competition.<br>4. **Scale matters**: Streamlined, IT-driven, efficient operations, venture investments and increased talent sourcing, and possibly mergers put big players in dominant position. | The SMFs plays bigger roles on scenarios 1 & 2, where they either collaborate more with other LPs or start-ups/platforms respectively, complimenting their own unique value propositions. For either of these to occur, logistics companies require five strategy steps:<br>1) Commit to an identity: Develop clear strategy for key areas **where you have the "right to win".**<br>2) Translate the strategic into the everyday, and<br>3) put your culture to work. 4) Cut costs to grow stronger by freed up resources, and lastly 5) Shape the future by developing services and solutions that will **create demand** instead of just following it – through close customer relationships. |
| Roland Berger<br><br>2016 logistics study on digital business models<br><br>(Marwyk & Treppte, 2016) | There will be **four types of surviving players** in the logistics industry of the future:<br>1) **Booking & Optimisation Platforms** (BOP) - attractive for standardized and small to medium-sized orders – Many BOP will compete for clients.<br>2) **Carrier & terminal operators** (CTO) must react to BOP by selling recurring business and large corporate packages – Customers will benefit from better prices<br>3) **Supply Chain Specialists** (SCS) handle complex logistics tasks that require industry-specific supply chain expertise – Contract model is one option.<br>4) **Service Providers** (SP) are involved in all clients interactions and service provisions – They enable the change in the logistics industry, for BOP, CTO, and SCS. | Current LPs will have to decide how to develop – Becoming a BOP is not an option.<br>Cooperation in a flexible structure, but BOP must be neutral as they are being used by various parties. Forwarders can move into two directions: Focus on asset ownership and operation(CTO) or focus on services (SCS, SP). It is **largely determined by current BM and market position** (partnerships, customer base, capabilities).<br>In order to be prepared for the interaction with a BOP, forwarders need to undergo a digital transformation – a holistic programme, **an early start is essential**. |

| | | |
|---|---|---|
| World Economic Forum<br><br>**Digital Transformation of Industries:** In collaboration with Accenture **Logistics Industry**<br><br>(WEF, 2016) | **Five key digital themes** in Logistics will be: Data-driven information services, digitally enabled logistics services, new delivery capabilities (drones, autonomous trucks), circular economy for a more sustainable product life cycle, and shared logistics capabilities to increase asset utilization.<br>**Underlying requirements for LPs:**<br>**1) Better data collection from entire value chain**<br>**2) Big data analytics competencies for improved efficiency and innovation**<br>**3) Embrace shared transport** | WEF see Digitally enhanced cross-border platforms as key to empower SMFs, and provide access to a global marketplace with an estimated increase in profits of more than $600 billion. This means independent, specialized SMEs can oversee the different steps and, together, offer an end-to-end service to compete with the big players. The platform coordinates the commissioned companies, takes care of documentation and offers monitoring and analytical services to the recipient. Key theme **shared logistics capabilities for warehousing and transport** may be very relevant for SMFs. Ideas are vehicle-sharing platforms, shared warehouse agreements, which can reduce logistics costs 12-15% |

expansion in integrated services and the support of such is interesting to the customer and creates a closer relationship. But for this to happen there has to be continuously growing know-how (Müller, 2017). Kersten et al. identified such a value-added service for the customer, called Object-Self-Service, technology. It enables physical objects to autonomously place orders (Kersten, Seiter, von See, Hackius, & Maurer, 2017). In practice, this can be weighing devices installed by the LP at his clients' facilities, triggering an automatic replenishment order at a certain weight threshold of a material used. The customer in future doesn't have to care to control inventory and its reorder himself. Through this, next to the core service (delivery of good) an additional value for the customer is created. The additional value ties the customer to the LP, and creates switching costs/change barriers (Kersten, Seiter, von See, Hackius, & Maurer, 2017).

The approach that has been increasingly promoted by experts is analytics-driven business model innovation. Here, starting point is the insight generated through data to seek new activity areas. The critical elements is the data's validity, actuality, and feasibility of mining it. Depending on the quantitative measures for criteria, the company can then conduct business analytics, ranging from more basic Descriptive, to advanced Predictive as well as Prescriptive Analytics. The insights one stand to gain are then translated into value-added services and internal improvements that would innovate business model components. Particularly to paper-based forwarders some of these innovations may seem absurd, considering their current information management. Yet, in the future, data-driven business models will be the ones to improve asset utilization and fuel efficiency (De Clerck, 2017), and any insight that

can help alleviate excess trucking capacity issues will create value, and make SMFs more competitive.

If a logistics provider is already certain of the value of data, the payment-driven business model innovation, may help tie the customer closer. In this approach, data from the shipper serves directly as payment currency for logistics providers. Kersten et al. point out that when the shipper is transparent about their operations, such as loading frequencies and loading periods, the logistics provider can use analytics for route optimisation and better personnel planning, thus generating profit (2017). There may certainly be scenarios where medium-sized forwarders may consider such approaches, but they require strong interfaces that allows for this type of data to be processed. Hence, while not all value created stems from data analytics skills, I assess all of the business model innovation of the small- and medium forwarder to be predicated on investments in a digital infrastructure

### Capability Building

The freight forwarder has old-established systems, and a mind set that does not foster a 'culture of innovation'. For digital transformation to take place, and line with Davenport's statement on IT-driven BPR, research expects IT expertise and organizational capabilities to be essential. In principal, being able to collect available data and analyse big data streams are "no-regret capabilities" that should be acquired starting today (World Economic Forum, 2016). Figure 14 gives an overview of the forwarder's necessary skillset for digital transformation.

**Figure 14: Capabilities for LPs in Digital Transformation**

| **Fast Failure competencies:** | **IT knowledge:** |
|---|---|
| Agility: adjustable, flexible acting | Intuitive handling with IT |
| Positive handling with mistakes | Ability for anaylis of big data |
| Experimentation culture and innovativeness | Extensive programming skills |
| Interdisciplinary thinking | Handling with new communication media |

Source: Kersten, Seiter, von See, Hackius, & Maurer, 2017

The smaller size forwarder is dealt as more agile by nature, and has more control over his cultural norms, so living up to the mentioned fast failure competencies may come natural to this type of organisation. The ability to think in interdisciplinary ways is challenged on a regular basis, and should be able to adjust to the changing environment better (Kersten, Herstatt, von See, Kalogerakis, & Wagenstetter, 2015). Organisations attempting to do "Logistics 4.0" are advised to identify strengths of employees, conducted independent of job and department, and realign them with individual preferences (Iskan, 2017).

Prof. Iskan from the university of Ludwigshafen further argues that such a radical change can only be possible with courageous manager, and that those can often more be found in medium-sized forwarding companies as opposed to logistics groups (Iskan, 2017). In those MNCs, the controlling, securing and giving up on IT systems is more prevalent (Iskan, 2017).

There is mutual agreement around the idea that completely rounded solutions are required. Iskan proposes medium-sized forwarder to build singular web-based, platform-independent systems rather than isolated solutions plugged together. This would reduce complexity, licensing costs and dependency from software companies, and lastly streamline internal and external process organisations (Iskan, 2017).

But with a lack of resources and obstacles to hire the right talent, the common SMF is left looking at different solutions. One approach that is becoming more tried-and-tested are cloud solutions, through companies providing software-as-a-service (SaaS), Infrastructure-as-a-service (IaaS), and payment-as-a-service (PaaS). Primarily tech start-ups with subscription- or usage-based pricings produce relief in this context. Their pricing models mean no or little investment for acquisition of hardware and software and the operating and maintenance costs are lower as software updates or repairing are part of provided service (Kersten, Seiter, von See, Hackius, & Maurer, 2017). Especially IaaS, which allows on-demand usage of compute resources, storage and network capabilities may be useful for SMFs to organise their data management (Gartner, 2017). Little attention to such approaches has been paid, probably because no domain-specific service providers have emerged yet. Especially for the modelling and analysis no fully automated services can be used yet (Kersten, Seiter, von See, Hackius, & Maurer, 2017). While IT competencies may be developed through such offerings,

the competencies to serve the customer better enabled by technology must be acquired differently.

### Drive collaboration

The value of collaborations in the global logistics is indisputable, and for a small- and medium-sized logistics provider, optimizing these partnerships may be invaluable for one's longevity, as research suggests. All actors are challenged to put in a joint effort so that companies as well as industrial locations can position themselves successfully in the contemporary digital contest (Kersten, Seiter, von See, Hackius, & Maurer, 2017). The previously described scenario of the physical internet is generally attainable, as willingness to share data is much higher for smaller companies than for medium or large ones (Kersten, Seiter, von See, Hackius, & Maurer, 2017).

Thus far it appears there has been too little interest to start the collaboration process though. Yet, there are several opportunities, most of them funded by the government. "Logistik Lotsen", for example, a new founded think tank in Bremen, which is part of the Via Bremen Foundation, aids in testing ideas with new methods and enables creative thinking. (Logistik Lotsen, 2017)

The consultancy house Oliver Wyman screened the newly emerged start-up market, and suggest logistics provider to adopt a proactive attitude. The report suggests partnering with start-ups and build processes and culture to foster collaboration and tolerate uncertainty at risk. While financial investment in start-ups is unrealistic for SMFs, the possible benefits that the start-up approach entails, as they fragment existing supply chains and upgrade efficiency and transparency through the application of new tools and technologies complements incumbents' logistics expertise. The energy and agility of the wave of start-up may not last forever – and incumbents risk meeting them head-to-head as competitors in the future (Schambach, Borreck, & d'Incà, 2017).

In the case of Haaf Spedition, the cooperation with regional high schools and universities important for talent recruitment has been a key activity (Müller, 2017). To innovate business models, cooperation with education and research facilities can be equally important and effective. For example, cooperation with research facilities, especially to students with data science qualifications may lead to research projects, discussions and solution generation. In

all such interactions, knowledge would be acquired and new perspectives gained (Kersten, Seiter, von See, Hackius, & Maurer, 2017). Particularly cooperation with universities through augmentation of study programs can yield long-term value, such as by offering individuals thesis project partnerships and recruitment opportunities (Kersten, Seiter, von See, Hackius, & Maurer, 2017).

Lastly, the most important stakeholder, the customer, can be a loyal collaboration partner. As the customer-driven approach promotes, deeper integration can result in mutually beneficial projects with optimized information interfaces and logistical processes. In the frame of a government-funded research project, Prof. Kersten et al. investigated the potential of open innovation concepts between small- and medium-sized stakeholders (2015). During the innovation process, apart from the detection of customer needs, assessment of effort and usability of the logistics innovation, as well as its orientation towards efficiency are keys to success. While price is officially the most important factor – the importance flexibility and innovativeness of solutions is high in demand. For the SMF, the most promising way to develop radical and market-oriented innovations is in collaboration with the customer (Kersten, Herstatt, von See, Kalogerakis, & Wagenstetter, 2015).

Should there be no partners found, and little ideas generated, tech-driven freight marketplaces also offer a good opportunity for growth (Kauschke & Tipping, 2016). However, if the forwarder loses direct contact to shippers and becomes too dependent marketplaces for shipment orders, one runs the risk of becoming commoditized as the transport solution (Marwyk & Treppte, 2016). Companies should define their position toward the booking & optimization platform business model, and understand that the digital ecosystem will eventually interfere with their analogue operations and customer relationships.

## 9. Empirical Findings

This section will highlight the most important insights and opinions of the interviews led with the twelve experts. The prior secondary research determined that there is large inclination to technology, yet limited certainty about which competitive forces will dominate to which extent. The spectrum of perspectives collected in my research reflect this diversity, and I isolate idiosyncrasies of small-scale forwarding, as well as market drivers and strategy approaches that the literature had not identified. Its ramifications for business processes of the SMF will be clarified in the discussion section, but I shall list the found tools and ideas on innovating processes. As outlined in my methodology, I will sometimes refer to the interviewees by grouped specialization, which I will refer to as 1) digital logistics experts (DLs), 2) business technology experts (BTs), 3) industry practitioners (IPs), and 4) supply chain operators (SOs).

### Pervasiveness of Technology in Logistics

The first pervasive notion which became evident in the industry is the idea of what technology represents. None of the interviewees see it as an enemy, but as an enabler of customer interaction, with the important nuance being that what a valuable customer interaction represents for BTs is seamless transactions that are highly efficient. All other groups took distance from that point of view, and responded to the question of which parts should never be automated with: the sales process, where the personal connection is valuable.

Coherent with strategy papers, the technological standards were one aspect that the four groups agreed upon. “There shouldn’t be a big difference between big and small in terms of technology platform” (Petzold, 2017, 10:00-14:15). All forwarders must be able to adjust to the individual customer. Some of the practitioners pointed out, though that many shippers are conservative, and not IT-savvy himself, which results in very few forwarders investing in technology, and the adoption of it will be “like an S-curve” (Sørbø, 2017, 47:25-49:35). To them it is going to be difficult to prove the value in the short-term. The factor of time appears to be the important variable. Whereas for BTs the digital transformation is an inevitable eventuality, its actual occurrence is still nowhere near in the eyes of logistics people. “The train hasn’t left the station”, says Sørbø, and states that Freightos and the other looming tech

platforms and digital freight forwarders have generated very little volume thus far (“10.000 TEU per year”) (2017, 59:28-62:55). He saw consultancy reports ten years ago advising logistics providers to avoid head-on digital competition, and instead specialise in a niche. “But it’s a hype, and user adoption is the biggest challenge” (Sørbø, 2017,42:20-44:35).

### IT & the customer relationship

Henriks (2017, 35:20-39:25) pointed out that Danish banks close their branches in Greater Copenhagen, and they are concurrently opening others in Jyttland. LPs should apply this strategy to their context, and strike a balance between listening to one’s local customers, and digitalizing the business. However, the estimation across the board is that while the big guys will invest, small players may not even “notice all the buzz” (Sørbø, 2017, 51:15-54:45).

Nevertheless, where SMFs would then differentiate himself, provided sufficient technological capabilities to compete with big guys is given, is personal touch (Petzold, 2017,18:30-19:50). IPs argue that all larger deals are made in person and that generally the value of a handshake and a conversation with emotionality, makes the difference. This trust built is not shared by the shippers I interviewed, which admittedly work at large companies though. They prefer to get all types of information that can be done by IT, and “don't want a forwarder as friend, but as information provider” (Schramm, 2017,24:15-27:30). As secondary research showed, track&trace or similar tools that increase supply chain visibility clearly are in demand, and this is also why IT will increase the customer experience and relationship because of transparency, it will make it a more trust-bound industry (Henriks, 2017, 20:00-23:15). Also the ability to see previous engagements with the company contributes value there. Overall, the industry appears to be split on the impact technology will have on the customer relationship, and the interviews confirm that.

The underlying assumption between the two camps, large scale & tech-savvy versus personality is possibly explained by means of the distinction that one industry practitioner draws. Logistics right now is split up in “transactional selling”, where it’s about mass and best market price, meant for standard products with little consulting, and “solution selling” where a specialized service, adjusted to one’s needs with consultancy (Schmersahl, 2017,31:00-34:15). He estimated 60 – 70% to be transactional in the future. The specialized service, though, can be as simple as having “someone to talk to” (Sørbø,2017, 08:10-10:30 ). There is

functional value since “it is quicker than writing an e-mail (Langosch, 2017, 08:20-11:15), and the business might have so many needs and requirements that require interaction. Further, IPs stress that “people like to interact” and “communication is a basic need for humans” that does not get replaced. Consequently, they argue that technology is not a viable solution here.

Technologists believe that the relationship with technology will change and that interactions will become transactional. It appears that they put things in perspective with developments in other domains, and argue that “for normal products and services, with autonomous trucks and vessel, there will be no human in the supply chain, so why do you need a human to manage it?” (Konstantiou, 2017, 15:00-17:15). The queueing when phoning one’s bank is an example where technology provides better service, the supermarket cashier with a bad mood is another (Henriks, 2017,28:30-33:50). When expectations are not met, also in a context of logistics, then the relationship to the service provider worsens, and can be at a tipping point. Technology can give you straight answers, and be programmed to exceed expectations, such as by pointing out capacity shortage in the future to the customer, and informing him to order now to avoid trouble (Henriks, 2017, 28:30-33:50). If applied well, technology can help bring customers closer to the business. In other words, “social capital will not play a role” (Konstantiou, 2017, 15:00-17:15).

### Market segmentation

Transactional relationships is the type of freight forwarding that is a simple brokering, where one buys a service, adds a margin, and sells it out again. This will almost completely disappear, and be done in shipping (Sørbø, 2017, 08:10-10:30). What Sørbø refers to is the point of the obsoleteness of the forwarder as intermediary, as eventually carriers may start to outcompete the forwarder and directly address shippers on a large scale. This market dynamic is a serious one, and acknowledged by all. Yet, IPs then argue that the segmentation of large and small will remain similar to what it is, and don’t deem one player, such as Amazon, to be ruling the market with 70%. The interviews also highlight that smaller players, due to their agility, as we have seen in other industries, eat away from the big fish. Their continuing problem may be financial backing, but it may just be “a matter of time before the financial backing shifts towards smaller players” (Henriks, 2017, 01:02:20-01:06:35).

### Technological foundation

The interviews also manifested the understanding of how technological core functions are far behind its possibilities. The commercial process hasn't changed the last 15 years. Even market leaders K+N staff handles “3-4 orders per day”, for from automatized. Process innovation, and advanced IT applications would not occur before the foundations change. This means:

- EDI: the forwarder must be able to adjust to the different IT systems used, and establish clear interface definitions
- Invoicing tools
- Fast internet connection, especially to upload tracking data in real time
- Structure in their data. “It is unbelievable how they operate” (Sørbø, 2017,03:00-05:50)

This would be standards with which the forwarder could then look into more advanced technological tools. The SMF should be flexible, a generalist in terms of technology, but specialized in terms of content (Petzold, 2017,21:50-24:25).

### Freight networks and platforms

To execute process innovation, the freight forwarder may join forces with a collaboration partner, most notably existing freight networks, in which sharing of logistics services is common. Here, I found that interviewee opinions bifurcated, regardless of background. On one hand, experts argue that the personal interests in such networks outweigh potential benefits. High entry costs for the freight network and little earnings through assigned transports diminish its value (Petzold, 2017, 34:15-38:45). Furthermore, during transports, coordination issues can arise due to capacity problems of third parties, and results in failed pricing to the customer (Röhl, 2017, 41:17-43:30). These bottlenecks also will not get solved with technology at its core, and freight marketplaces present similar concerns. It has, in the past generally been a struggle for “coordinating their efforts before the monopoly comes along” (Konstantiou, 2017, 01:08:20-01:13:20).

On the other hand, there is more optimism from others about the abilities to create value through collaboration. The alliances have strengthened the SMFs and has functioned as

counterbalance to the big guys. The Elvis cargo network which intends to be the biggest LCL network in Europe for example encapsulates over 13.000 trucks, covering all of Europe (Kersten, 2017, 01:08:20-01:12:20). Their advantage is the regional presence and flexibility. The establishment of "certain requirements and payment conditions" already aid in compatibility (Schmersahl, 2017, 05:20-07:51), which facilitates collaborating of the small guys to set up IT systems as a key strategy. The reason being, as DLs pointed out, is that the collective continues to challenge the big ones, and possibly builds up networks that could then form niches, which strengthens the SMF's position further (Sørbø; Kersten; Schmersahl 2017). By means of such niches one could form a special need for a special service, and that is where profits can be earned. If the collaboration efforts are only transactional, they will be outcompeted.

To enable this process and foster open innovation, Kersten helped to establish a dialogue platform in the competence centre. He noted that medium-sized have fear of contact with large logistics groups in this regard because those are too big. But when sitting at a table with equal-minded forwarders that have different focal areas, to share insight, and share the investment, then there is interest (Kersten, Mindermann, 2017). The threshold to invest private capital as business owner may of course hinder it, but it will be imperative (Mindermann, 2017, 17:10-19.50). These cargo alliances will have to innovate in order to remain relevant, and they are looking to make use of platform mechanisms (Kersten, 2017, 13:00-14:15).

In the same vein, while small players may consider building a platform together, there already exist start-ups serving this need. Marseille-based start-up Buyco is a network of forwarder which can share rates and cargo (Sørbø, 2017, 37:00-41:35). The Xeneta co-founder does not see large value in it yet, but he can imagine that this is where technology can really make a difference.

While these platforms can support the forwarder in expanding his business, so can potentially also freight marketplaces in form of Freightos and simpliship. Again, viewpoints diverge in the group of interviewees. The customer is becoming way more small-scale on requirements, inquisitive, and enlightened about the process, and to better serve these, logging in to these platforms can be a survival strategy. Yet, the platform provider may get the SMF's shipment data and customers, and then decide to operate by himself (Schramm, 2017,13:20-17:15). This

indubitably exposes vulnerability in the long run. This is also the reason why big freight forwarders have not pushed their rates on Freightos (Sørbø, 2017,42:20-44:35). But like it has worked in B2C markets like travel and accommodation, it can play a large role for smaller players in B2B logistics and especially for smaller shippers (Henriks, 2017, 01:19:25-01:21:15). The technologists state that if a platform is able to gain critical mass from the customer side, it can tip towards one player, or very few players (Konstantiou, 2017, 11:15-14:30). Nevertheless, all interviewees recognise the purpose of these marketplaces, which is unprecedented transparency over the market. While such platforms are not purely ranking suppliers on price, but transit time, and possibly reliability and quality of service, it may jeopardise the SMF's specialisation capability.

For SMEs, apart from collaboration, looking at scalable core technology instead of large enterprise systems is also an effective measure. Participants from all four groups recommended the small forwarder to look into third-party software solutions. Here, considering crowd-source, or open source systems that can rapidly change and be improved by the masses may be a way. The resources required would be flexible agile enough to be improved by the exterior.

### Drivers of innovation

To fully grasp how SMFs could on a general level innovate processes, I asked whether customers are the driver of innovation, and if they saw other forces. Clearly competition can have an impact on a SMF's strategy, maybe not specifically on its IT systems but at least in domain specialization (Röhl, 2017, 26:20-31:15). The other identified driver can be costs. Costs in the process are characterized with natural waste through waiting time, and handovers between staff (Langosch, 2017, 16:00-19:30). Conversely, if one only drives the business from a cost perspective then one doesn't have time "to sharpen the saw to continue cutting down trees fast". (Henriks, 2017, 41:50-44:25). To put this in context, this means one should improve capabilities to continue to be ahead of the market. One could look at some of the large companies that are making too much money on the brokering, the transactional selling as characterised before. Like Kodak on selling their film, they "have just maximised their earnings, and you won't get them to move away from selling their film" (Sørbø, 2017,23:50-29:25). This would explain why logistics has the longest fuse, and a big bang.

Slightly outside the scope of this thesis, yet a very relevant insight on business models to mention is how competition and customer are driving innovation. Three looming threats of cases where the forwarder significantly loses his leverage, and responses by the freight forwarder are presented in Table 6.

**Table 6: Case Scenarios**

| Case | Solution by the Freight Forwarder |
|---|---|
| There was profitable warehouse in Bremen, 20 years in use for all the cigarette loads of British American Tobacco. Half a year ago, they cancelled the profitable agreement to K+N and everybody else. The explanation was 'we are now doing e-cigarettes'. (Petzold, 2017, 00:00-02:50) | Only solution to losing one's clientele is to sell before the company's social capital decreases. Acquisitions and consolidations are increasingly common in the industry (Konstantiou; Sørbø, 2017). |
| Adidas is opening their new factory in Ansbach. Instead of 15 months from concept to customer, it is now 3-4 hours. 3D printing means all the containers from Asia are simply gone. Or an electric vehicle cockpit also has 75% pieces less (Petzold, 2017, 00:00-02:50). | Instead of done centrally, 3D print can be straight at the point of delivery. For this the shipper requires assets, and partners ath the point of delivery. And who is all over the place - the logistics provider. It is actually an obvious strategy. Sophisticated and expensive at the moment, but when considering metal printing, it will be a mass market (Kersten, 2017,28:50-29:25) |
| In the last ten years, shipping lines cut their work force immensely, and put all the backoffice functions to India, so they have little knowhow in each market. They delegated the contact to the end customer as they were too busy handling their most attractive business. Now, by offering more door-to-door solutions, they desperately want to to take it back (Sørbø, 2017,23:50-29:25). | "If I were able as a forwarder I would say: I am not going to compete with the shipping line, I am going to sell a service to the shipping line on their origin and destination site, to help them be more efficient as a whole to serve the customer on their entire supply chain, instead of making money on transactional sea freight service." (Sørbø, 2017, 23:50-29:25) |

While these scenarios may not directly answer how to use technology to innovate business processes, they can give perspective on the magnitude of the kind of process innovation that must take place. It may be that "in 20 years, there will be no companies anymore" (Konstantiou, 2017, 05:20-6:15). Forwarders need a global lens as Google, Facebook or Amazon can also be their competitors (Henriks, 2017, 01:23:38-01:26:55). Change has always happened, but it is the speed of change that is now different, and 90% of people don't think of the way change occurs either (Petzold, 2017, 48:20-52:50).

### Practicalities of Process Innovation

The sales process, possibly customer service, and categorically all activities that require professional judgement should not be automated. This clearly doesn't say that technology

can be applied to assist in such tasks. The approaches to innovating processes that were mentioned in the conversation were the ones also touched upon by consultancy reports or past Business Process Reengineering literature. One could say that in the 90s it by and large failed and that through digitalisation we are seeing a "second wave of BPR" (Kersten, 2017,18:30-23:50). All interviewees alike were certain that more automation would take place, and that also SMFs should utilise a holistic IT system. Yet, when you are implementing it there are very real risks, and at some point it is an "open-heart operation" (Kersten, 2017,51:15-54:45). The push back from employees, as found in the research can also pose implementation difficulties. Mindermann's experience in HR as part of change management has been that without a story telling the reasons for transformation it can be next to impossible (2017,35:10-37:15). Overall, and this was confirmed by several industry experts is that there is no standard roadmap to innovate. "One cannot just say everybody starts here, or there" (Kersten, 2017, 30:00-33:35).

### Process Innovations for the SMF

Lastly, the conversations gave insight into the potential innovation of a forwarder's activities. Figure Y presents the diverse set of ideas that interviewees could picture happening. The most obvious changes should be made in the booking process. The already IT-intensive aspect of coordinating documents, and overall information exchange is lacking intuitive interfaces, and particularly SOs determine the systems as wasteful in their resources. All kinds of double-entry, re-verification, and "realigning after the reschedule" should be avoided (Devoille; Schramm, 2017). The reoccurring topic of supply chain visibility and comprehensive end-to-end solutions is gradually more called for, and would chiefly bring value to customers (Devoille, 2017, 55:15-59:30). All process groups should be underpinned by robotic process automation for rule-based, repetitive tasks. Whereas this may be out of reach for the common SMF today, starting with digitising documentation by bringing paper-based operations to the server or the cloud, is the essential ask for innovating the invoicing process. Providing credit notes to trusted partners should also be standard here (Petzold, 2017, 27:00-28.35).

An increasingly growing topic, also for the interviewees is blockchain technology, and all groups alike consider it a stepping stone towards intelligent processes. Smart contracts that can be updated by different parties and track changes as well as tradeable bill of ladings to

claim freight shipments only after they have been paid are remedies for the difficult to coordinate documentation process (Schramm; Henriks; Langosch; Kersten; 2017). In a similar vein of how updates are communicated, focusing on events, as in issues during the shipment process, instead of just track&trace, and therefore optimising for resource allocation (Schmersahl, 2017, 58:50-01:01,25). Henriks further points out that once these processes become automated, the human will shift his focus on professional judgement and controlling of automated processes (2017, 46:00-59:35). Humans will be honing in on Quality Assurance, and in the future, due to automation there will be more focus on process than on the end results because that is where the mistakes happen.

**Table 7: Process Innovations from Empirical Research**

| Sales Process | Booking Process | Physical Process | Invoicing Process |
|---|---|---|---|
| Offer generation (Schmersahl, Rhenus, 2017, 08:00-08:30) | Automatic scheduling EDI (Devoille, Nike, 2017, 48:00-54:30) | Automatic synchronization scheduling of orders, all types of orders between supplier, LP, receiver (Devoille, Nike, 2017, 48:00-54:30 ) | Bill generation / Viewing (Schmersahl, Rhenus, 2017, 05:20-07:51) |
| "Consumer behaviour, consumer optimisation, and the entire customer approach – a sort of AI that predicts customer behaviour due to payment possibilities, payment demands, types of requests, amount of requests." (Schmersahl, Rhenus, 2017, 16:52-19:52) | "Talk to my customer, but get the data from him digitally."(Kersten, LogHu, 2017, 39:20-43:35) | Effective and precise conmunication on shipments to improve visibility and resource planning (Devoille, Nike, 2017, 61:00-64:15 ) | e-invoicing as basic procedure for small shippers (Petzold, Change55, 2017, 03:20-07:15) |
| | From example in Brasil: own customs system, sophisticated EDI (Schmersahl, Rhenus, 2017, 52:15-54:25) | Returns management could be handled online and more efficient, with faster and more accurate processes (Devoille, Nike, 2017, 15:00-59:30) | Credit note as norm for large customers and suppliers (Petzold, Change55, 2017, 07:20-28:35) |
| **Outside of Shipment Process: Recruitment** | Electronic Tradeable Bill of Lading with Blockchain Technology (Schramm, HSE24, 2017, 58:30-59:50 ) | Smart contracts: comprehend who last edited documents, where are they, and does my customer actually receive his or her goods? (Henriks, Kersten, LogU, 2017, 03:20-04:50 ) | "Automated invoicing and receiving system. Paypal could be a solution" (Schmersahl, Rhenus, 2017, 05:20-07:51) |
| Offer mobility as part of job for generation Y – "Why don't I work in South Africa" – new work concepts are in demand (Petzold, Change55, 2017, 08:00-08:30) | Event management for exceptional events (focus on problems instead of track&trace)(Schmersahl, Rhenus, 2017, 58:50-61:25) | Gapless tracking, route and time deviations, intermodal programs by means of integrated data exchange (Kersten, LogU, 2017 05:20-07:15) | |
| Do not overcontrol working habits, but autonomy. Unique results can happen:(Petzold, Change55, 2017, 35:12-37:03 | spelling mistakes / multiple ways to write a port name / local language (Langosch, Maersk, 2017, 20:00-23:15) | Flexible inventory, as Amazon has it. Collaboration on this would be exciting (Devoille, Nike, 2017, 23:20-25:15) | |

Source: Own Creation

As sales was often deemed the "only job to never automate" by DLs, IPs, and SOs, it was interesting to learn about a start-up that was identified through the previously mentioned idea platform of Rhenus Logistics. A group of programmers are developing an AI application that predicts customer behaviour due to data on payments, booking requests, and other data to

optimise the entire approach to the customer (Schmersahl, 2017,16:20-19:52). While Rhenus in terms of size is not exactly a common SMF with 25.000 employees, it points towards a different sales approach where technology can enable a better relationship, even without social capital. Kersten also points out that the possibility to talk to the customer but receive booking information digitally is a process to be looked into (2017, 39:20-43:35). Henriks mentioned in connection to sharing data and its value that he and his team do not deem the data as actually that valuable, but what you do with it, implying that “the best analytics company will win” (2017, 01:09:45-01:13:35).

The entire shipment process, comprising pick-up in the consolidation phase to drop-off in the delivery phase holds many more technological innovations that were mentioned during the interviews. As these investments are out of reach for the small LP, the experts focused more on improvements of information exchange in form of track&trace systems in this aspect as well in the interviews.

Lastly, it was worth noting the process outside shipment operations: human resources. Brought up by several IPs, the adoption of more flexible work schedules, and work concepts adjusted to the younger generation are imperative for attracting talent (Mindermann; Petzold, 2017). The internal processes are strongly interdependent to the company’s ability to innovate, as digitizing processes along the value chain enables mobility (i.e. home office, work&travel) as part of the job. Thus, in a broader sense of process innovation, regardless of niche specialisation of the SMF, embracing a tech-driven process chain may capacitate them as employer for attracting talent.

## 10. Discussion

This section will discuss the insights gathered from process innovation literature, current digital logistics publications, and empirical research with an array of experts around logistics and technology to produce a process map for the forwarder. With BPR in mind, I formulated the idea to execute on a holistic plan in small steps with an agile working approach, continuously validating learning. From secondary research, it became evident that smaller forwarders have better chances as specialists and opportunities to collaborate should be seized. Lastly, from my empirical interviews, the notion of 'personal relationship' as core element of value was identified, and stands in contradiction with business models of cloud-based start-ups. A discussion about the ecosystem and changing role of the SMF will lead the reader to the three identified cornerstones of the strategy for the digital SMF. Implications for the forwarder's process chain will ensue.

The findings from the expert interviews gave insight on the nature of personal relationships in freight forwarding. This facet of B2B logistics which is arguably the unique value of an SMF was overlooked in the studied literature. Ironically, personalized service was only mentioned to be executed by start-ups partnering up with 3PLs (Kauschke & Tipping, 2016). Before discussing how the forwarder should redesign his processes, let's comprehend the reason of the SMF's existence. He has understood, through personal engagement to win over customers in his region, and foster a personal relationship. That is his unique asset. Especially the personality can be the deciding factor in securing business during the sales process. Now, this social capital is non-existent in platforms, and barely a factor for customer acquisition on digital freight forwarders, yet they are still gaining market share. Personal relationship and regional proximity must be losing value, are they not?

This discrepancy may be explained by 'solution selling' as part of contract logistics versus 'transactional selling'. This may then also explain why every source suggests the freight forwarder to specialize into his niche, into more solution selling or highly efficient transactional selling. However, this distinction will not uphold in the mid- to long-run. Standards on booking cargo online will increase over time by means of full online documentation service, 24/7 service and door-to-door visibility in real-time. Thus, online forwarders and platforms will become more trustworthy and gradually specialize to certain

types of cargo or become ‘hub specialists’ (Kauschke & Tipping, 2016). Consequently, the value of social capital may eventually diminish completely. It will be an ever receding market volume that is primarily based on personal relationship as IT competency standards grow.

This does not necessarily imply that long-term contract logistics will disappear considering the potential merits a specialised partnership can hold if potential VAS are reaped. But it may simply be that such platforms are better coordinated and more cost-effective than the SMF. It could realistically occur that Amazon is capable to offer more efficient solutions at scale and scope, because they handle all types of cargo, and they can offer it within the scope of long-term agreements as a new specialization. It may also be a fellow larger competitor that is being pushed into this niche by the market, and adjusts with a decentralized strategy in local markets.

Another vulnerability that may not be very obvious to the SMF is the lock-in effect that IT can develop. The ability to collectively tie users to a platform increases through network effects. Online freight platforms will be able to seize this effect, but SMFs have leveraged their ability to lock in very little. Switching costs to another LP is zero. There is a threshold many shippers will eventually meet between paying more for great service and lowest cost possible. In the end it is a matter of time, and of the forwarder’s willingness. The SMF has to balance long-term value versus short-term benefits of inertia to innovate, or in other words: if he’s not willing to give up the ‘people’s business’, your customer will.

The fact remains that up until now the SMF has excelled with authentic personal service, and adaptability that large players simply could not. Provided the service is right and he fulfils necessary technological needs, then personal touch wins. There still is subjective value in having a designated account manager for over three years, a partner who is fully committed to go ‘the extra mile’. Small players, in the light of innovativeness of logistics groups and start-ups have a good shot at shaping the future if they leverage their social capital ahead of time, and begin an evolutionary redesign of their business processes. With his client as consistent centrepiece in the reengineering process, he can use his regional proximity to develop services that no one else could. To spearhead innovation there are three core elements to his strategy that the SMF must execute on:

**1. Grow customer relationships through digital tools with personal touch.**

**2. Continuous service improvement and new value-added service development together with customer, amongst others solutions that build switching costs. Testing ideas should ideally happen in some sort of scientific method.**

**3. Proactively seek like-minded innovation partners that coordinate on the same technological core as you.**

### Digitalise your social capital

Leveraging one's speed, and close ties to the customer are now more valuable than ever, and should be seen as the springboard onto the digital battlefield. The SMF should demand the shipper to take a leap with him and start the journey of digital transformation *together*. The SMF undertakes a co-created redesign of his organisation. By means of the Validated Learning method, the forwarder conceptualises a new value chain with his customer. The forwarder can conduct this, and every other phase of the digitalisation journey, with shippers individually, or as a group; only the co-creative aspect is essential. For the SMF, innovating processes starts and ends with the customer.

The digital customer relationship can take many shapes and forms, depending on the SMF's size, logistics activities and value-added services as well as on the industry of the shipper, and his customer's preferences. It can also concern any of the six processes of a shipment. However, the market overview clearly shows that online forwarding players prioritise accessibility, transparency and instant booking over internal processing of shipments and data analytics.

Sales activities in the digital era drive immense value. Key component for this is a frontend for the shipper to view services and binding prices, and instantly book them (Kühne + Nagel INC., 2014). Accordingly, the SMF should shape his own sales and booking process together with his customer, extracting key features to focus on and start the build-measure-learn engine. Customer behaviour tracking or other intelligence aiding in lead generation is interesting, but succumbs functions that drive value for existing customers. On top of 'usual' online sales process, the personal touch is imperative. The SMF should consider

sophisticated services, such as individualised pricing as well as simply photos, personalised design, and other aspects that improves user experience and extends the personal connection between the partners. There are a multitude of ideas that the SMF can utilise to optimise the booking process, improve efficiencies on information exchange by means of smart documentation or invoice generation etc. yet all these are merely improvements of the redesigned customer relationship.

Consequently, a further discussion of possible process innovations on the physical shipping process and the invoicing will not matter if the accessibility of one's service to the shipper is not optimised. If this part of the shipment process is digitalised, it leaves the shipper little excuse to consider booking at the upstart digital freight forwarder.

### Value-added service innovation

Bearing in mind the already well-established ties to the shipper, it may appear difficult to innovate logistics services further. If EDI or API connections are already established, there is even less of an opportunity to build on the current service. In this vein, considerable investments may be required to expand services. Hardware solutions plus their installation, such as object-self-service solutions, bear costs but can equally produce lock-in effects, committing the shippers long term (Kersten, Seiter, von See, Hackius, & Maurer, 2017).

The journey towards digital transformation of the customer relationship is a step-by-step process. In line with 'lean', minimum viable products should represent the smallest simplest possible form of an idea, or a hypothesis to test. This shapes concepts more concretely, minimizes time wasted, and gives flexibility in project planning. Every project strives to validate learnings, and these should also extend in scope over time. To ask whether the shipper's customer appreciates sustainability, possibly by means of shared logistics and warehousing resources, green logistics or environmental-friendly labelling is one of many possible approaches to innovate processes. Regardless of the process, constant innovation, manifested through avid learning of customer's preferences and technological insight, is required to elevate the customer relationship to a sophisticated level over time. If the digital customer relationship can flourish, one can continuously test ideas and co-create value.

### Execution with resourceful partners

The success of such projects is largely bound to two of the main obstacles in the SMF's digital transformation: scarcity of financial resources and lacking IT capabilities. Financial backing may soon focus on SMEs, as found in the empirical research. To address the more important shortcoming, the SMF can find resourceful partners in a variety of organisations. The most direct connections can be made with software companies and start-ups willing to partner with the SMF. The partnerships can, depending on the service, be business models integrations such as digital freight forwarders have with LPs. Freight networks, or fellow SMFs can also consider collective efforts to appeal to technology-native companies.

However, a more elegant solution would be an HR-based approach in collaboration with shippers. Modern work concept for young IT-savvy individuals can be offered within the scope of a job, thesis assignment, internship, or research project. The person would possibly be mobile between two or more partnering companies and contribute to co-created IT solutions that solve real-world problems. This is a compelling proposition for the younger generation.

### The Learning Organisation

To execute a digital transformation, it stands to reason that an internal willingness to innovate is required, as extensively discussed before. There should be several manifestations of such within the company culture, for example with flexible working concepts, inclusive culture for innovative thinking and entrepreneurship and agile management thinking. Most importantly, learning is to be established as a key metric to foster fast-failure competencies and actively share insights. Moreover, as seen in the case of Schneider National, designated process owners drive the development forward, and teams with autonomy should steer projects (Hammer, 2005). In this manner, any resistance to change through hidden groups of potential significance can be counteracted from the beginning. This is usually easier in SMFs than in MNCs. Equally so, identifying employees' strengths, and preferences, and deploying technology around them to enhance their key activities is something the SMF can excel at due to flat hierarchies and shorter decision paths.

Above all, I believe the perspicacious leader who plays an infinite game and invests in long-term prosperity wins the race as willingness to change is replaced by an obsession to learn.

## 11. Conclusion

This paper has taken a holistic approach to scrutinize the situation of the small- and medium-sized forwarder and proposes a method with which any SMF can ground his market position and innovate his operational processes in order to deliver more value to his customers. In the academic literature, process innovation is often perceived as a more radical approach, enabled by IT. A contemporary interpretation of this is a learning organisation that is not afraid to spearhead innovation, and does so with the lean start-up methodology and the agile working approach.

Logistics is an industry where physical assets, geographical reach and value-added services define the competitive landscape. The disruptive wave of digital innovations, driven by various IT-based market entrants, has challenged the legacy of the 'people's business', especially for the large proportion of freight forwarders of small and medium size. Secondary research found that for the SMF, digital transformation starts with a further specialisation into a niche where they have the 'right to win'. The forwarder has to invest in IT and acquire the skills how to integrate it into his organisation, and find collaboration partners in start-ups, clientele, or educational institutions.

The findings from empirical research identified the key activity of the SMF to be his personal connection to the customer. When IT standards are met, the personal touch in his overall service earns him his position in an increasingly competitive market. Innovating his booking process, smart documentation, and analytics capabilities are some of the many proposed approaches for the SMF. However, the personal contact through sales activities is key, and should never be automated.

For the shipper who expects highly visible, flexible and individualised supply chains, and is now enabled to book freight shipments online instantly, the dilemma to choose between tech and the affable local forwarder will eventually present itself. For the SMF, before the flood is the time to proactively grow the personal customer relationship through digital technology that captures the personal touch. Embarking on the journey of digital transformation together with the customer is the most effective way to stay relevant in a market that is becoming increasingly transactional. The SMF adopts the lean start-up methodology, testing ideas for

a digital customer relationship together with his clients, adjusting every step along the way, and making learning a core metric of the organisation.

After the digital relationship is established, continuous service improvement, and co-created services across the process chain can add unprecedented value and competitive advantage for the shipper and lead to lock-in effects. To address shortcomings during this evolutionary development, the SMF will require tech-driven collaboration partners, in the form of educational institutions, IT-based freight networks, start-ups, or like-minded SMFs. A deeper collaboration with customers, in combination with flexible work concepts, can be decisive for attracting skilled IT talent.

With the mind-set of a learning organisation, every small- and medium-sized freight forwarder can successfully transform his business model, and seize the advent of the digital disruption to deliver more value to his customer with every single process.

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