LUND
UNIVERSITY

Exploring the Use of Freight Exchange E-marketplaces in Sweden: The Perspective of the Transport Service Provider

by Andres Rios

Supervisor: Henrik Sternberg
Examiner: Klas Hjort

Department of Service Management, Logistics
SMMM20 – Spring 2018

Campus Helsingborg, Sweden 2018

Abstract

A statistic released this year (2018) by the World Road Transport Organization shows that more than 80% of inland freight is moved by road. Frequent e-commerce activities and end-consumer demands on delivery performance have increased transport needs yet fill rates have decreased. Transport is less efficient and unsustainable while profit margins also shrink, motivating fiercer competition among service providers. Thus, the freight transport industry is fragmented; changes take place independently, with little effect on an aggregate level. The industry lacks a unified model; there are many actors with different relationships and decision-making managed in-house.

This unstable and competitive environment has reached new heights through the internet and the benefits that come with access to information worldwide. Among other technologies, business models known as business-to-business (B2B) marketplaces, also called electronic marketplaces (e-marketplaces or EMs) emerged during the 90s. They provide inter-organization information connectivity, real time visibility, and flexible partnership configurations. Specifically, their main purpose is to bring shippers and carriers together to trade goods, services and information. Several researchers have pointed that this topic is relevant and little research has been done around it.

This thesis addresses that research gap and presents an exploratory study on the use of EMs among transport providers in Sweden. Although EMs emerged a few years back, they continue to grow in importance and adoption among freight transport stakeholders. In like manner, they continue awakening interest from academia and industry due to their role as intermediaries among shippers and carriers. In this study, the perspective of the carrier (transport provider) is explored.

Since the topic has not been previously explored through empirical studies, this research employs grounded theory (GT) as method to explore the topic. Further, the researcher employed interviews to access in-depth insight from the transport service providers (TSPs). Through a portfolio framework of analysis, the paper will explore the use e-marketplaces have among TSPs as well as identify the contextual factors that influence the use.

The findings of this study contribute to academics and practitioners. This thesis brings to the attention of managers that the use of EMs among TSPs in Sweden is minimal, secondary and complementary to other options in a portfolio framework. Likewise, EMs are used to perform certain strategic tasks that no other supplier in the portfolio can provide: access to new markets, access to new geographic markets, access to lower-cost providers and capacity maximization among others. The study also contributes to academia, providing insight on e-marketplace use and conditions influencing it, shipper-TSP relationships, SC environmental dynamics and perspectives on portfolio creation of online tools.

Keywords: e-marketplace, freight exchange, logistics, transport service provider, carrier, portfolio.

Acknowledgement

In this section, I want to thank the people and organizations who helped me get to this point of closure in my master studies in Sweden.

First of all, I want thank God as I am grateful for life and the opportunities He has allowed me to pursue in it; for the privilege to further my professional education in this amazing university and country. I would also like to dedicate this work to my parents as without their support I would have never made it to a postgraduate school. Their unconditional love and care has been my strength throughout the years.

Additionally, I would like to thank my supervisor, Professor Henrik Sternberg, for his continuous guidance and support in this process. Thank you for sharing some of your experience and knowledge with me. Likewise, thank you, Professor Stephane Collignon, for providing guidance and supporting me in the development of this study by sharing your knowledge and experience.

I would also like to thank the participating companies, specifically the people who willingly agreed to participate without hesitation. You allowed this research study to happen; without your participation this would have not been possible. Thanks for your time and trust in sharing your thoughts and experience.

Last but not least, I want to thank the Swedish Institute for giving me the opportunity to achieve one of my personal goals, finishing my master's degree. This research work marks the closure of an incredible two-year journey in Sweden thanks to the scholarship granted by SI. Thank you.

Andres Rios

Lund, May 22nd 2018

Contents

List of Figures & Tables

1. Introduction

This section begins providing an overview of the background that led to this research study. Secondly, the main stakeholders involved are identified; consequently, this leads to outlining the problem and the purpose of this study. The purpose is followed by an outline of the research questions, the perspective of the study and lastly, the structure of the report is presented.

1.1. Background

According to the Bureau of Transportation Statistics, in 2015 the U.S. transportation system moved a daily average of 49 million tons of freight valued at more than $52 billion (BTS, 2017). For this, trucking is still the main mode of transportation; on average, more than 80% of inland freight volume is moved by road (World Road Transport Organization, 2018). Further, advanced inventory practices, frequent e-commerce activities and end-consumer demands on delivery performance have increased shippers' transport needs and fill rates have decreased. It is less efficient and environmentally sustainable, while also motivating fiercer competition among small and medium-sized service providers (Moen, 2016; Zhang et al., 2017).

As a result of stiff market competition among small and medium transport service providers (TSP), innovative solutions are necessary to excel from other competitors. Finding a new supplier or service provider is just a click away (Janita and Miranda, 2013). Thus, although slowly, technologies that have emerged throughout the years (e.g. digitalization, web-based cloud computing, ERP systems, EDI and RFID among others) have been adopted in the industry to reduce operation costs, facilitate trade and information exchange and consequently allow easier negotiations and transactions with shippers and customers (Song and Regan, 2003; Kuyzu et al., 2015). It is argued that these new technologies are either of limited efficiency or usually "favor" large carriers since they require significant investment and often are not suitable for the problems faced by small and medium sized TSP (Song and Regan, 2003; Ordanini, 2006). Hence, small and young TSP are the last adopters and unwilling to change (Peter et al., 2001). There is a dichotomy with small number of large carriers on one side and a very large number of small carriers at the other. Such is the case of Sweden, where around 80% of transport providers are small carriers with less than two vehicles and scarce administrative resources (Swedish Association of Road Transport Companies, 2013). These small carriers represent a perfectly competitive market, competing almost solely based on price (Song and Regan, 2003).

Consequently, among other technologies previously mentioned, the increased use of internet by society as whole has led to new business models known as business-to-business (B2B) marketplaces, also called electronic marketplaces (from here on e-marketplaces or EMs). Other names assigned to e-marketplaces are e-hubs, exchanges and catalogue aggregators among others. They have also been given names according to the specific context they are referred to; for instance, in logistics, electronic logistics marketplaces (ELMs) (Wang et al., 2007a); in industrial marketing management, internet-driven marketplaces (IEMPS) (Skjøtt-Larsen et al., 2003) and in transportation, transportation electronic marketplaces (TEM) (Marasco, 2005). E-marketplaces are online websites or platforms which buyers and sellers of a product or service access to interact and exchange business (Janita and Miranda, 2013). They provide advantages in low cost inter-organization information connectivity, real time visibility, and flexible partnership configurations (Wang et al., 2007b). Further, electronic marketplaces (EMs) vary in features, characteristics, options and geographic area they intend to serve.

1.2. The Users

In the traditional logistics triad, the main stakeholders involved are the sender, the receiver of goods and the transport provider. However, in an EM context the receiver and sender of goods are not necessarily involved in the platform; they could also be participating depending on the system's capabilities and specific features, but it is not a requirement for most EMs. The main stakeholders in an EM are the shipper, the transport service provider (TSP) and the technology provider (Chang and Wong, 2010). In some cases, the technology provider can also be either the shipper or the TSP. However, there can also be additional parties involved depending on the complexity of the services provided by the EM (Wang et al., 2007b).

Further, in freight transport traditionally shippers screen carriers, request for quotes (RFQs) or request for proposals (RFPs) and negotiate to form long-term contracts to protect themselves against price volatility, capacity availability and service quality (Andersson and Norman, 2002; Song and Regan, 2003; Sheffi, 2004; Kuyzu et al., 2015). Shippers have realized the importance of treating carriers as strategic partners. However, since transport services have become a commodity with little differentiation from provider to provider, many relationships with TSPs are at arm's length (Andersson and Norman, 2002; Wang et al., 2007b). Some companies operate a handful of trucks, others operate hundreds and thousands of them. Also, some operate only domestically and others in multiple regions. Hence, since not all transport solutions require a close buyer-supplier relationship, shippers usually have a portfolio of transport suppliers to choose from and they assign specific jobs according to their needs and long-term business strategy depending on factors such as collaboration between firms (Liljestrand et al., 2015). The portfolio is usually made up of suppliers within the shipper's network (Sternberg et al., 2013). Trusted suppliers with whom they hold a close relationships and communication and the extended network of acquaintances with whom they don't hold contact regularly but are also known to the transport buyer (Anand, 2005). Consequently, EMs are an additional option to these suppliers.

Furthermore, this arm's length approach is often criticized because it focuses on short-term cost reductions and since the duration of the contract is low so will be the loyalty in the relationship (Skjøtt-Larsen et al., 2003). Nonetheless, this is not an unusual behavior regardless of the industry, when the product or service are identical, the buyers choose the provider with the lowest cost (Bakos, 1991 in Luomakoski and Siivonen, 2010). Thanks to the globalization of trade and the use of internet, the purchaser's choices and access to more suppliers are enlarged (De Boer et al., 2011). EMs are a web-based medium through which shippers and TSP interact for this purpose.

1.3. The Problem

In Sweden like in other parts of the world, the transport systems are fragmented and divided into small networks working together yet divided as a whole. Transport systems need the opposite, they need integration and transparent collaboration among stakeholders to maximize capacity utilization and profitability whilst costs and environmental impact are also minimized. Moreover, the main purpose and benefit of e-marketplace participation is to assist towards achieving these previously mentioned goals. EMs are multi-disciplinary and thus, there is valuable research performed in different fields yet not in logistics. Most studies focus on literature reviews and conceptual studies forgetting that still need to be empirically tested.

Furthermore, Song and Regain (2001) researched emerging freight transportation intermediaries. Figliozzi et al. (2003) provided a framework for transportation auction analysis. The research has focused on the e-marketplaces and the mechanisms used, particularly related to auctions and bidding;

after twelve years of research on e-marketplaces in leading information systems journals, findings suggest that there is a lack of research on the implications of adopting and managing e-marketplaces. The focus needs to be on the process of organizing and managing e-marketplaces rather than on the tools (Standing et al., 2010). Wang et al., (2007a; 2007b) show that there is dearth of research on EMs in logistics, particularly through empirical studies. Nandiraju and Regan (2008) suggest that EM management and choosing which ones to participate in is a key concern of carriers. Also, Holter et al. (2008) suggest that there is an absence of research on the procurement of transport services.

Likewise, Dawn et al. (2008) and Nippa et al. (2011) suggest that the understanding of firm's motivations for adopting some processes and applications over others is pivotal for advancing the current portfolio management concepts. Peter et al. (2011) believe that there is limited empirical research involving TSPs and online tools. Additionally, Janita & Miranda (2013) suggest that there is plenty of business-to-consumer (B2C) research, but not enough business-to-business (B2B). Moreover, even in recent years the topic is still relevant for academia and industry, Kuyzu et al. (2015) suggest that transportation marketplaces will continue to increase in popularity and therefore, research in the field will always be scientifically interesting and valuable from a practical perspective.

Therefore, there is little understanding concerning management of electronic marketplaces (EMs) in logistics and this is the gap the author aims to address through this master thesis. Also, a study by Moen (2016) concluded that the freight service sector in Sweden is considerably conservative and resistant to change and transparent information sharing. This study further encouraged that the study should focus on the Swedish market.

1.4. Purpose & Research Questions

Identifying the lack of research on the topic and motivated by the suggestions of previously mentioned researchers, exploring the topic is relevant and contributes to academia by further developing the academic research around EMs. Likewise, this empirical study could potentially contribute to practitioners: managers of both TSP and e-marketplace technology providers, and even extended to the rest of the supply chain. The freight transport industry is not only fundamental to current trade but there is also plenty of room for improvement in the field, not only in Sweden but globally. Technology developments and information and communication technology (ICT) innovations are assisting firms towards more effective and efficient performance.

Additionally, e-marketplaces have proliferated as potential replacements of the current intermediaries in the industry (e.g. brokers and freight forwarders). However, systems in theory and practice may strongly differ. A closer look into real-world road freight systems reveals that they are complex constellations (Sternberg et al., 2013). So, how do e-marketplaces perform in reality? What is the experience of TSP in Sweden regarding e-marketplace use? Are TSP employing similar tactics to compete? Are e-marketplaces serving their purpose and gaining acceptance throughout the years? Are there any factors affecting their usage?

Thus, the purpose of this study is:

To explore the use of freight exchange e-marketplaces from the perspective of the transport service provider

Further, given the dearth of research and empirical studies around e-marketplaces, this thesis takes an exploratory perspective. Through this study, the author seeks to explore and understand the adoption

and use of e-marketplaces in Sweden from the perspective of the TSP. Thus, the two research questions (RQs) this thesis aims to answer are:

RQ1. What are the usage dynamics of e-marketplaces among TSP operations?

In this question, the author seeks to explore and understand the use assigned to e-marketplaces in TSP operations. Further, the dynamics of use, meaning not only the purpose(s) of their use but also the conditions and determinants behind that use.

RQ2. What leads to the creation of e-marketplace portfolios?

Following up on RQ1, in this question, the author seeks to explore and understand the drivers and conditions that will encourage the adoption of more than one e-marketplace. Just like shippers operate with a portfolio of suppliers depending on their transport needs, TSPs could also develop a portfolio of EMs. In an industry characterized by lack of innovation and resistance to change, this question may reveal valuable and new insight on e-marketplace adoption.

1.5. The Perspective

In this study, the focus is on e-marketplaces as medium of exchange of goods, services and information among transport service providers (TSPs) and shippers. The study was originally meant to address the perspective of the carrier; however, the reader will notice that some carriers in Sweden also offer additional logistics services and are not limited to transport of goods. In Sweden, freight transport operators are usually subcontracted by an intermediary that handles sales and contact with customers (Swedish Association of Road Transport Companies, 2013).

Thus, following Stefansson (2006), it is important to make the distinction now to avoid confusion on different terminology around carriers and other logistics service providers. For this study, the author refers to transport service providers (TSPs) entailing carriers, freight forwarders and third-party logistics service providers. The rationale behind this choosing will be better understood as the study unfolds. The reader will acknowledge the importance intermediaries such as freight forwarders and 3PL have in the freight transport industry in Sweden as fairly large percentage of all transactions performed within the industry go through them.

1.6. Structure of the Thesis

To facilitate the readability of the report and following a recommended structure by Björklund and Paulsson (2014), the study has been divided into six main sections as follows. **FIGURE 1** graphically illustrates the structure and flow of this thesis. First, the problematization and research gap this study aims to address are outlined and described in further detail. The rationale behind the choosing of this topic, the antecedents and previous research projects suggesting the need of an empirical study like this one, as well as the value and contribution of this research for both academics and practitioners are further explained.

Secondly, the study follows with a theoretical frame of reference. This section's purpose is to provide theoretical sensitivity and background knowledge regarding the topic under study; the author does so through a literature review. The review is divided in two main subsections, the first on e-marketplaces (EMs) to clarify their origin, categories, use and context within logistics and supply chain. It was clear during the data collection for the empirical part of this study that even among industry professionals there is confusion on what e-marketplaces are and how they use them. Thus, it is necessary to provide a

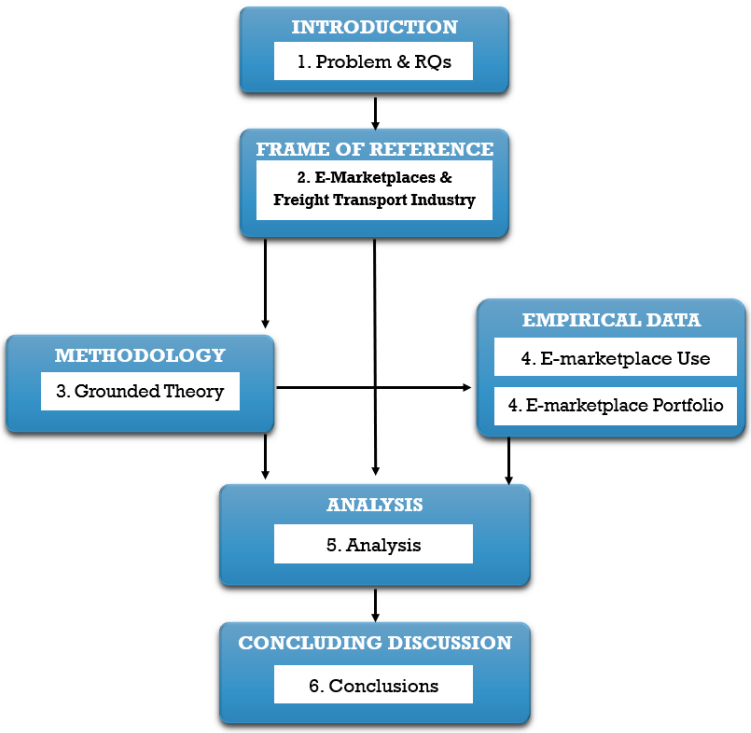
review so that the reader can easily understand the context of what is contained in this study. The second subsection is on the freight transportation industry with a particular focus on the Swedish market to complement the foundation for the development of this study. Hence, the literature review starts from a broad background on e-marketplaces (EMs) and progresses toward a focused lens of EMs in logistics specifically applied to the current situation in the freight transport industry in Sweden.

Third, the methods employed for the completion of this research study are further explained to detail for the reader's reference. The lack of previous studies in the field discussing the topic called for exploratory approach to the research process. Hence, the author decided to employ grounded theory (GT) as main research method for this study. The rationale behind this choosing is explained in this section, as well as the GT approach and process followed for data collection and analysis in this study. Additionally, a step-by-step process is included in which the author details how the results of this research emerge from the data. Lastly, a short description on the epistemological approach of this thesis.

Fourth, the empirical findings of this research are presented. In this section, the data provides answers to the research questions (RQs) that motivated this study. Fifth, based on the empirical findings an in-depth analysis is provided. In this analysis, the author draws on the most interesting findings the study brought up and compares to previous literature and research performed in other fields. This comparison allows to further understand the contribution of this research to academia and industry. The managerial implication derived from this research are also outlined in this section.

Lastly, the conclusions summarize the findings and contribution of this research. In this section, the research limitations and future research directions are also outlined.

FIGURE 1 Thesis Structure - Illustrates the logical process followed in the presentation of this research.



Next, the frame of reference of this study is presented. It provides an overview of the literature and knowledge upon which the study has been developed. It will provide the necessary background information to fully grasp the importance of the present research study.

2. E-marketplaces & The Freight Transport Industry

In this section, the author compiles the works of other researchers to provide a precedent for the present study. Electronic marketplaces (EMs) by definition can be misleading and confused with other online tools; proof of this was the hesitant response from several TSP who were contacted as potential participants of this study. Upon contact over the phone or email, they were unsure whether they used e-marketplaces or not. In several occasions, the author had to clarify what an e-marketplace is, its diverse forms and its use. Thus, it is important to establish a clear description of e-marketplaces, their complexities and components; consequently, the reader will be able to fully grasp the relevance of this study within the context of freight transportation in Sweden.

For this purpose, this literature review has been divided into three main sub-sections. First, an overview of what is known and what has been written regarding electronic marketplaces (EMs), their emergence and adoption in business. It includes a brief recap on research that has been done around EMs from different perspectives and from different fields. In like manner, a breakdown of their main classifications, value for business use as well as the necessary settings for their successful implementation. Secondly, most importantly, a review on the current situation of e-marketplaces (EMs) in logistics in Sweden. Hence, the literature review starts from a broad background on e-marketplaces (EMs) and progresses toward a focused lens of e-marketplaces (EMs) in logistics specifically applied to the current situation in the freight transport industry in Sweden. It should be kept in mind that the author has done his best effort to keep logistics and transportation at the core of the content of this literature review so that the main area of interest is enriched and further explored. Lastly, the third part of the review focuses on providing an overview of the freight transport industry in Europe, particularly in Sweden. Hopefully this will further clear the need and importance of this research project.

2.1. Background on E-marketplaces

In supply chain management, professionals are faced with the challenge of selecting and implementing the most appropriate strategies and tools to meet their firms' needs and objectives (Dawn et al., 2008). Globalization of trade and the use of internet enlarge a purchaser's choices and access to more suppliers; consumer preferences require broader and faster supplier selection (De Boer et al., 2011). Thus, new technologies have been adopted by to reduce operation costs, facilitate information exchange and consequently allow easier negotiations and transactions among business partners (Song and Regan, 2003; Kuyzu et al., 2015). It is argued that these new technologies are either of limited efficiency or usually "favor" large firms since they require significant investment and often are not suitable for the problems faced by small and medium enterprises; consequently, creating fierce competition among service providers with less resources (Song and Regan, 2003; Ordanini, 2006).

As a result, among other technologies, the increased use of internet by society as whole has led to new business models known as business-to-business (B2B) marketplaces, also called electronic marketplaces (e-marketplaces or EMs). E-marketplaces allow buyers and sellers of a product or service access to a website or platform to interact and exchange business (Janita and Miranda, 2013). They provide advantages in low cost inter-organization information connectivity, real time visibility, and flexible partnership configurations (Wang et al., 2007b). Further, electronic marketplaces (EMs) vary in features, characteristics, options and geographic area they intend to serve. E-marketplaces are a sub-category of e-commerce and consequently, multi-disciplinary (Chang and Wong, 2010). There is valuable research performed in different fields, and the topic has been explored from different perspectives on specific areas following the trend of leveraging the internet as a tool to compare suppliers' capabilities and purchase goods and services (Andersson and Norman, 2002; Dawn et al., 2008).

For instance, there are studies providing overviews of business models of transportation EMs (Skjøtt-Larsen et al., 2003; Marasco, 2005; Nandiraju and Regan, 2008; Standing et al., 2010; Janita and Miranda, 2013). At the University of Cardiff, the topic has been explored in depth by Yingli Wang and fellow researchers through several studies on the exploration of EMs and their impact on logistics (2007a; 2007b; 2008; 2011). Batenburg (2007) and Chang and Wong (2010) examine firm performance after the adoption of e-procurement and e-marketplace participation; Huang and Xu (2013) explore double auctions and bilateral exchange in logistics e-marketplaces; another interesting study was performed by Shetty et al. (2014) on the perception and adoption of e-marketplaces; however, it is focused on commuter transport.

Further, other researchers have performed studies focused on specific aspects of EMs. For instance, Pressey et al. (2009) developed a study on the potential drawbacks for e-marketplace participation and other security concerns; later, another similar study by Luomakoski and Siivonen (2010) on why electronic B2B marketplaces fail; Verdonck et al. (2013) focus on the operational planning of horizontal collaboration between carriers; Hassan et al. (2014) explore the extent of e-procurement use in SMEs. Rogerson et al. (2014) explore the influence of context on the freight transport purchasing process.

Other researchers have explored, framed and even proposed solutions to potential problems of engaging in the B2B online world with emphasis on the procurement process (Andersson and Norrman, 2002; Lammgård & Andersson, 2014; Piera et al., 2014; Moen, 2016; Hedvall et al., 2017), the buyer-supplier interaction (Boyson et al., 1999; de Boer et al., 2001; Carbone and Stone, 2005; Dawn et al., 2008; Gadde and Hulthén, 2009; Janita and Miranda, 2013; Govindan et al., 2015) and auction and pricing schemes (Song and Regan, 2003; Elmaghraby, 2004; Anand, 2005; Kuyzu et al., 2015; Wang and Wang 2015).

Keeping in mind the previously presented overview of research done around e-marketplaces, it is no surprise that there are diverse definitions of an e-marketplace (EM). However, they all encompass a very similar concept and general idea.

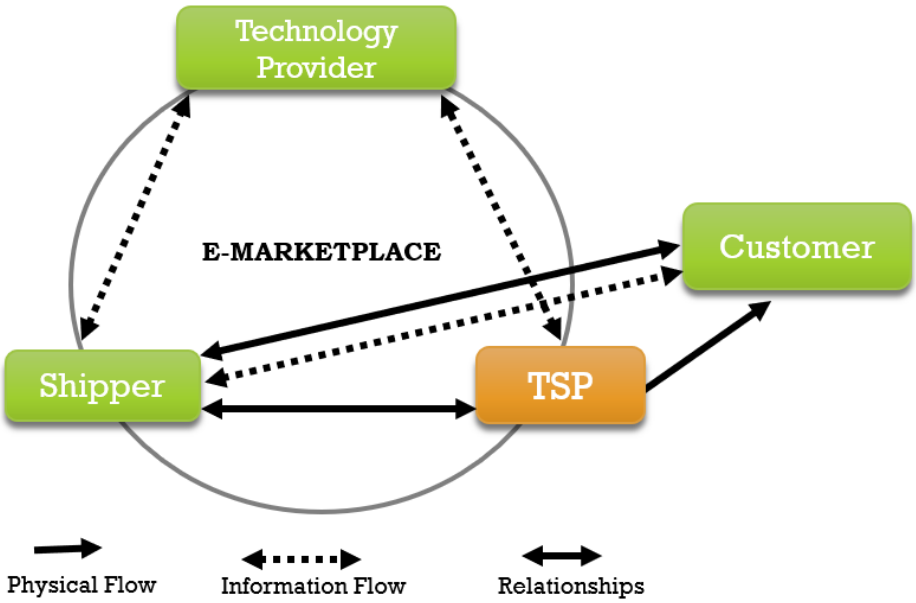
2.1.1. What is an E-marketplace?

Several authors use different names and definitions under different contexts; some terms used include electronic market, e-hub, electronic exchange, portals and marketplace among others. For instance, in logistics: electronic logistics marketplaces (ELMs) (Wang et al., 2007a).; in transportation: transportation electronic marketplaces (TEM) (Marasco, 2005). Capturing the concepts and definitions used by several researchers, the author consolidated the definition of an electronic marketplace in this study as follows:

> The e-marketplace (EM) is an online platform or intermediary designed to provide software, tools and services that establish and facilitate buyer-supplier relationships and transactions. These relationships are often trilateral, involving the buyer (shipper), seller (TSP) and a third-party exchange service provider (e-marketplace provider). Sometimes customers (the product vendor or buyer) can also access the EM but is not the norm (Skjøtt-Larsen et al., 2003; Marasco, 2005; Wang et al., 2007b; Pressey et al., 2009; Chang and Wong, 2010; Huan and Xu, 2013).

Initially, EMs were the medium through which producers and sellers could reach untapped markets and derive a higher salvage value for their unsold units they emerged in both services and goods industries (Elmaghraby, 2004). **FIGURE 2** depicts the main parties involved in an e-marketplace. It illustrates the

main dynamics of flows among stakeholders taking place through EM participation: the physical flow of goods, the information flow and the relationships. The first B2B exchanges were created to facilitate spot trading; cost reduction becomes important and the relationship between buyers and suppliers is limited (Luomakoski and Siivonen, 2010). These e-marketplaces introduced multiple features and charged substantially smaller commissions than the traditional brokers (Luomakoski and Siivonen, 2010). They proliferated in the mid 1990's in both services and goods industries; companies in transportation, plastics, chemicals and papers were among the first to build and use B2B EMs (Elmaghraby, 2004). In transportation, users catered all modes (air, ocean and road), and under different configurations to each niche.



Source: Adapted from Wang et al., 2007b.

FIGURE 2 Parties Involved in E-marketplace - Generally, an e-marketplace is the meeting point for three main parties: the buyer, the seller and the technology provider. In logistics, the parties are the transport buyer (shipper), the transport service provider (TSP) and the technology provider. In some cases, the technology provider can also be either the shipper or the TSP. Also, in some cases the customer may also be involved in the e-marketplace; however, this is not the norm. There can also be additional parties involved (e.g. freight forwarders and financial service providers) depending on the complexity of the services provided by the EM. The ultimate purpose of these platforms is to bring interested parties together and provide a reliable service to final customers. Lastly, this figure shows the dynamics taking place through EM participation: the physical flow of goods, the information flow and the relationships.

E-marketplaces acted as matching platforms for loads but did not assume responsibility for the execution or quality of the service. Consequently, major logistics software providers, 3PL and forwarders jumped into the market with their own marketplaces (Nandiraju and Regan, 2008). World-wide companies succeeded because they were well funded, their value proposition was good, technology was in place and there was strong acceptance by stakeholders (Luomakoski and Siivonen, 2010). Nonetheless, most failed and did not survive too long after launch as either their business models were not profitable or their market share was insufficient. Also, many failed to establish good relationships with carriers and shippers. Shippers who had long-term contracts with carriers were threatened by the idea that these marketplaces would damage their existing relationships. Likewise, carriers did not like the idea that these sites would continue cutting down on their already low margins (Nandiraju and Regan, 2008).

Due to their linkage to reverse auctions and bidding for the lowest cost provider additionally to the large pool of service providers, it is argued that EMs increase the buyers' bargaining power (Andersson and Norman, 2002; Krishna, 2009; Chang and Wong, 2010). For this reason, it is argued that shippers usually tend to have more expectations and motives to participate at e-marketplaces than TSP. The latter's most common motive to join EMs is to maintain a good relationship with shippers and potentially win more contracts in the future (Wang et al., 2011). Hence, TSP that serve different customers may need to log into different systems to communicate with each shipper, which can be costly and time consuming. Nonetheless, often the TSP are not in a powerful position to influence decisions. If they need the business they will need to follow whatever the shipper requires to secure contracts with them (Wang et al., 2007b).

Overall, several industries have been slow to incorporate e-marketplaces to their business transactions, due to the slow pace of technology diffusion and complexity of most B2B transactions (Elmaghraby, 2004). TSP are often more reactive than proactive towards the use of EMs; power plays a significant role. Thus, EMs are majorly driven by shippers (Wang et al., 2007b). For EMs to be viable, customers have to perceive them as effective and efficient (Parasuraman et al. 2005 in Janita and Miranda, 2013). As a result, EMs with unsuccessful business models disappeared or were shut down while others evolved into TSP or formed strategic alliances with other freight industry companies to offer full-service logistics management services (Anand, 2005). Hence, new EMs provide enhanced collaborative services for both shippers and carriers: automating the development of long-term contracts, setting up collaborative networks and providing transportation management software among others (Nandiraju and Regan, 2008). As a result, there are both advanced logistics services and basic services like the freight exchange e-marketplaces. While the advanced may take several years to finalize because they require significant industry-specific expertise in their design, the latter may only be a minute's work (Andersson and Norman, 2002; Elmaghraby, 2004).

2.1.2. E-marketplaces in a Portfolio: Additional Source of Supply

Traditionally, shippers screen carriers, request for quotes (RFQs) or request for proposals (RFPs) and negotiate to form long-term contracts to protect themselves against price volatility, capacity availability and service quality (Andersson and Norman, 2002; Song and Regan, 2003; Sheffi, 2004; Kuyzu et al., 2015). However, not all transport needs necessarily require a close buyer-supplier relationship. Some companies operate a handful of trucks, others operate hundreds and thousands of them. Also, some operate only domestically and others in multiple regions. Hence, shippers usually have multiple service suppliers to choose from if they need additional transport capacity. Kraljic (1983) and Olsen and Ellram (1997) have graphically explained how buyers handle purchases from suppliers and relationships with suppliers respectively by employing a portfolio matrix. Rogerson et al. (2014) also utilized this framework for the analysis of purchasing processes for freight transport services and Skjøtt-Larsen et al. (2003) for a study on EMs and supply chain relationships. The aim has been to develop strategies for supply chain (SC) and purchasing.

They established that the buyer will evaluate relevant factors for specific transactions and categories before making a decision. Naturally, each category is assigned different weights based on the perceived importance according to the buyer. Purchases and relationships are then classified into four categories: bottleneck, strategic, non-critical and leverage (Skjøtt-Larsen et al., 2003). Suppliers are later assigned to each category according to the buyer's decision-makers and influencing factors such as logistical collaboration aligned to their long-term business strategy (Liljestrand et al., 2015). Moreover, the portfolio is usually made up of suppliers within the shipper's network (Sternberg et al., 2013). Trusted

suppliers with whom they hold close relationships and communication and the extended network of acquaintances with whom they don't hold contact regularly but are also known to the transport buyer (Anand, 2005). Lastly, EMs are an additional option in the portfolio yet the familiarity and relationships with the service providers in these platforms is minimal.

Further, although shippers increasingly realize the importance of treating carriers as strategic partners rather than disposable commodities, many relationships with TSPs are at arm's length, like in EMs, since the transport service has become a commodity (Andersson and Norman, 2002; Wang et al., 2007b). There is little differentiation from one provider to another. However, the arm's length approach is often criticized because of its focus on short-term cost reductions since the duration of the contract is low so will be the loyalty in the relationship (Skjøtt-Larsen et al., 2003). This is not an unusual behavior regardless of the industry, when the product or service are identical, the buyers choose the seller with the lowest cost (Bakos, 1991 in Luomakoski and Siivonen, 2010).

Andersson and Norman (2002) suggest that increased use of e-marketplaces leads to faster, but more repetitive purchasing processes. Conversely, and empirical study by Janita and Miranda (2013) suggest that because gaining new customers online can be "expensive" and competition is just a click away, loyalty becomes a critical element for the survival of EMs. It was also revealed from that study that e-marketplace's image, perceived quality and value are important to gain customer loyalty. However, interestingly, user's satisfaction has no direct influence on their loyalty; a result that differs from previous research on B2C and B2B e-commerce (Janita and Miranda, 2013). Managers are still often reluctant to participate in e-marketplaces because of their confusion over the benefits (strategic, tactical and operational) that can be obtained and how to handle them (Standing et al., 2010). Additionally, even those firms that engage in EM trading struggle to develop effective use and participation strategies (Standing et al., 2010).

2.1.3. Types of Freight Transport E-Marketplaces

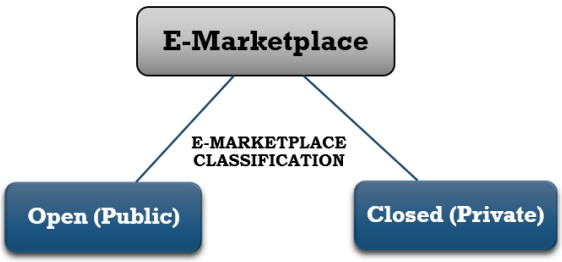
In this section, the author further explains from the perspective of previous research the different divisions and categories of e-marketplaces according to their features, geography and nature of service. Marasco (2005) used the term transportation electronic marketplaces (TEMs) to refer to e-marketplaces within transportation literature. In like manner, Yingli Wang et al., (2007a) coined the concept of electronic logistics marketplace (ELM) to refer to EMs specifically in a logistics context. To the qualities of a generic marketplace earlier mentioned, she added that an ELM is a web-based system where shippers and carriers come together for the purpose of collaboration or trading. The browser-based access means that a low level of training is sufficient to use these platforms (Wang et al., 2011). Additional parties such as freight forwarders and financial service providers may also be involved depending on the functions offered by the ELM; nonetheless, the primary key parties are always the TSP, the shipper and the technology provider (Anand 2005; Wang et al., 2007a).

For this reason, the author acknowledges her contribution to research in the field and builds on her foundation. Consequently, the author refers to EMs and ELMs interchangeably for the remainder of this study.

There are two main objects exchanged in transportation marketplaces: lanes/demands of shipper and carriers' capacities (Huang and Xu, 2013). Further, EMs can be classified in several different categories depending on the tasks performed by the platform, the users allowed to participate and the additional services provided by the system among others. For the purpose of this study, the author does not go into detail about their classification and other differences between systems because that would shift the study

in a different direction than it is intended. In this study, the user (the transport provider) is the main focus, not the tool itself. There are plenty of studies expanding on their features and characteristics that the reader can refer to including Janita and Miranda (2013), Nandiraju and Regan (2008); Standing et al. (2010), Wang et al. (2011) and Skjøtt-Larsen et al. (2003) to name a few.

Nonetheless, there is one classification that is very important for the purpose of this study, open and closed systems. EMs can be public (open) or private (closed) depending on whether all interested parties can participate or if participation is limited to a selected group (Nandiraju and Regan, 2008). **FIGURE 3** illustrates this classification. In a private EM, only the shipper's contracted, in-house and preferred carriers participate; most closed EMs are initiated by shipper(s) as they are in a more powerful position to pull in the carriers they want to work with (Wang et al., 2007a). Conversely, in a public EM all approved carriers can participate (Wang et al., 2011). Some EMs have a certified base group of carriers. Naturally, the reliability of the EM increases if all the participants, both shippers and carriers, have been certified on their business credentials.



Source: Author

FIGURE 3 Illustrates the most important classification of e-marketplaces for the purpose of this study. The distinction between open or public and closed or private systems. In a private EM, only the shipper's contracted, in-house and preferred carriers participate; most closed EMs are initiated by shipper(s) as they are in a more powerful position to pull in the carriers they want to work with (Wang et al., 2007a). Conversely, in a public EM all approved carriers can participate (Wang et al., 2011).

Additionally, per Nandiraju and Regan (2008), EMs can be broadly grouped in the following types depending on the services they provide:

> ***Clearing Houses:*** also called "bulletin boards", in these, shippers post their requirements and carriers post their unutilized capacity. A clearing house usually consists of a database of loads (origin-destination pair and associated time window for pick-up or delivery) posted by the participating TSP (carriers, shippers, forwarders or 3PL). The participating agents can initiate negotiations with other players one-on-one after finding an interesting match for their needs.
>
> ***Auction Houses:*** in these, the items (transportation demands and capacity) being auctioned can be short-term (spot market) or long-term contracts. The typical participating agents are carriers, shippers, forwarders and 3PL. There are four main types of auctions: English, Dutch, first-price sealed-bid and second-price sealed, also called Vickery (Anand, 2005).
>
> ***Freight Exchanges:*** in these, the transport demands and transportation capacity are posted by the participating agent and the EM performs the matchmaking at a competitive price. The exchanges also contribute in the efficient handling of

negotiations and the overseeing of the logistical processes of both the shipper and carriers (Song and Regan, 2001).

The focus of this study is in the third category, the freight exchanges; however, later on, the reader will notice that in practice, the difference among the three categories is not very clear as they overlap. There are elements of all of them integrated in the tools utilized and categorized as freight exchange. For instance, interviewees responded that their use of freight exchange is to fill-up their available capacity or find additional capacity yet they think low price is always the key to participate in them.

2.1.4. E-marketplace's Success and Failure Determinants

Naturally, each particular EM has a variety of capabilities depending on the complexity of the IT employed. Luomakoski and Siivonen (2010) in their review of literature on e-marketplaces compiled and listed a range of settings where an e-marketplace should work best and also where they fail. Their lists also extend to the scope of freight transportation perfectly. The industry settings leading to successful implementation of EMs are the following:

- Products or services should be commodities or near commodities so that trading can be done without seeing the product or service (Elmaghraby, 2004)
- Trading volumes should be massive relative to transaction costs. The number of participants is not crucial as long as the usage and number of transactions remains constant.
- There should be spot trading for evening up different levels of supply and demand
- Logistics can be outsourced (Kuyzu et al., 2015)
- Volatility of demand and prices

On the other hand, there are also issues leading to failure of B2B e-marketplaces:

- Price not being the primary consideration for big business. Supplier reliability and qualifications were a bigger concern than achieving the lowest price
- Internet security precautions (Marasco, 2005)
- Anti-trust concerns (Pressey et al., 2009)

In this first section of the literature review, the author has provided an overview on what is known and what has been written on EMs. The review started from a broad perspective including the historical background, their emergence, purpose and use up to recent years. In like manner, a breakdown of their main classifications, value for business use as well as the necessary settings for their successful implementation has been covered. Moving forward, on the next section the author focuses specifically in the field of logistics and the relevance of EMs in the industry.

2.2 Freight Transportation Industry

Logistics is a crucial part of every business and an important service element; however, it is normally not the major competitive advantage or cost element since there are plenty of service providers (Andersson and Norman, 2002). It is estimated that logistics account for up to 15% of the final cost of finished goods. For this reason, competition of industry sectors (such as the automotive and the food industries) relies heavily on the performance of freight transport and logistics (SETRIS, 2017). Consequently, firms who lack competencies in the operational logistics can still perform successfully

by relying on external providers. By letting the transport provider take on some part, or all, of the transport coordination needed the buying firm may provide its suppliers opportunities to improve the efficiency of their operations and thus to optimize or maximize the vehicle utilization (Hedvall et al., 2017).

The freight transportation industry is a highly competitive field with low profit margins. The rising labor prices, shorter life cycles, growing transport legislation and heightened customer expectations have only contributed to a fiercer competition among shippers and carriers (Song and Regan, 2003; Cruijssen et al. 2007 in Verdonck et al., 2013). In the traditional procurement of transportation service, shippers scout for carriers who can best fit their service levels within a reasonable rate; basic service aspects relating to reliability and transport quality are at the top of the agenda. These two are followed by geographic coverage of the shipper's market area and low price. These priorities have changed much over the last decade (Lammgård & Andersson, 2014).

Additionally, freight transport providers realize the need to invest and develop strong and mutually beneficial solutions (Verdonck et al., 2013). The goal is to maximize the use of empty moves for both carriers and shippers whilst lower costs and transport efficiency are also attained (Huang and Xu, 2013). For this, shippers have a core carrier program in an intent both to reduce its carrier base and to maintain or increase the level of service provided (Song and Regan, 2003). Through partnering with other TSP, carriers may extend their resource portfolio, strengthen their market position and create more efficient transport planning (Krajewska and Kopfer, 2006 in Verdonck, et al., 2013).

A few years ago, logistics services were usually quite easy to define and the purchase decision was mainly based on the price of the service (Andersson and Norman, 2002). Even though these still represent the vast majority of services available, multiple enhanced options through value adding services and IT services have emerged to cover a wider arrange of freight transport solutions. Nowadays, through globalization a completely different landscape is portrayed in the industry with new European and even world-wide networks, so called “Mega Carriers”, able to offer customers a wide arrange of services (Andersson and Norman, 2002). In this mega carrier category fall renown firms such as Schenker and DHL among others. Additionally, to providing their own transportation services, these shippers also host private e-marketplaces where only approved participants receive notifications (Anand, 2005). As a result, they continuously incorporate smaller carriers into their fleet. Some use auction methods to procure transportation services and even more sophisticated models such as combinatorial auctions (Song and Regan, 2003).

Moreover, in logistics, the TSP or carrier is often considered marginal (Mason and Lalwani, 2004 in Sanchez Rodrigues et al., 2008). The companies supplying or demanding the goods are arguably the prime decision makers, holding more power. As a result, it is necessary for TSP to build flexibility into their service offerings in terms of volume, routes, fleet mix, time and cost implications (Sanchez Rodrigues et al., 2008). The service providers need to accommodate to the needs of their customers if they wish to continue doing business together.

Negotiations are held directly in person, over the phone or via e-mail to generate mutually binding contracts. Usually, shippers secure the majority of their demands with contracted carriers and looked at spot markets for unforeseen demands (Song and Regan, 2003; Elmaghraby, 2004; Nandiraju and Regan, 2008). Hence, the tools facilitating information acquisition and management play a crucial role. For this reason, adopting enhanced information and communication technologies and maximizing capacity use is necessary (Song and Regan, 2003; Piera et al., 2014). Nowadays, most TSP, big or small, are equipped with information and communication technologies (Golob and Regan, 2002).

Nonetheless, these complementary technologies, like digital information, do not necessarily improve the industry standards by just adopting them since not all firms possess same quality standards. This lack of requirements for digital information across the industry is yet another example of the resistance and conservative environment that has characterized the transport industry (Teece, 2010; Moen, 2016). Naturally, under such competitive market, this resistance to keep up with technological advances can ultimately result in risk of losing customers to competitors that have properly adapted new technologies and strategies (Chapman et al., 2003). Thus, both transport provider and transport-seeking firms find help in employing freight forwarders and third-party logistics (3PL) to fill-up capacity, optimize their routing and maximize their profit. In the following section, the author explains with help from the literature and other relevant industry data the distinction between EMs and these other TSP.

2.2.1. E-marketplaces and Brokerage in Freight Transport

The ultimate purpose of an EM is to bring vendors and suppliers together to perform trade and other business activities. It acts as a market broker since it facilitates trading between shipper and carriers.; it allows them to share their needs and capacities (Huang and Xu, 2013). In Sweden, the majority of freight transport firms (up to 80%) are small operators with less than two vehicles and scarce administrative resources. These small operators are usually subcontracted by an intermediary that handles sales and contact with customers (Swedish Association of Road Transport Companies, 2013).

In like manner, 80% of the road freight transport is procured through an intermediary, such as 3PL, freight forwarders and other contractors (Transport Analysis, 2014). For this reason, the service provided by e-marketplaces can be confused with that of a freight forwarder or a third-party logistics (3PL) service provider. In other words, if EMs performed effectively, wouldn't they take over the current work performed by forwarders and 3PL? This can cause confusion and hence, needs to be clarified. EMs brought change to traditional operations in the logistics; although the flow of goods is consistent, a new way to communicate and exchange information between shippers and carriers emerged through EMs. Shippers have instant access to multiple carriers and vice versa; the carriers have access to multiple transport buyers looking for transport services.

Traditionally, brokers operated by phone, fax and/or truck stop posting. Recently, with EMs the exchange of additional loads and excess capacity has moved online. It is a competitive market force and is used by almost all shippers and carriers to some extent (Song and Regan, 2003). On one side, e-marketplaces reduce costs for both buyers and sellers by streamlining the transaction process, and in doing this, eliminating intermediaries (Lightfoot and Harris, 2003 in Luomakoski and Siivonen, 2010). These EMs marketplaces introduced multiple features and charged substantially smaller commissions than the traditional brokers (Luomakoski and Siivonen, 2010).

On the other hand, the freight forwarder or 3PL serves as a central decision maker coordinating transportation activities, which is not necessarily the case with an e-marketplace (Verdonck et al., 2013). They provide person-to-person assistance to shippers to discover the "right" service providers at the "right" price to increase their profitability and service levels (Song and Regan, 2003). By year 2005, at least 80% of the Fortune 500 Companies stated that they relied on 3PL; in like manner, growth rates were predicted to be between 15-20% by 2011 in both Western Europe and the US (Deepen et al., 2008 in Gadde and Hulthén, 2009). Also, European forwarders differ from their US counterparts by owning many assets, whereas US forwarders are more pure and sub-contract more extensively (Cooper et al., 1998a in Carbone and Stone, 2005). An advanced EM may be able to provide such features, but an advanced software requires both economical investment and staff know-how. Also, as it has been

mentioned earlier, such software would most likely not be adopted by small and medium enterprises to replace person-to-person assistance. All in all, although both service providers may offer similar functions, they do not replace each other nor are mutually exclusive. Their performance and value-added services differ from one another and their adoption depends on the customer's preference.

Further, there are multiple perspectives to examine the performance of EMs. A study at the end of the 90s revealed that two thirds of logistics service providers (LSPs) were unconvinced about the potential benefits of online tools (Williams, 1999 in Peter et al., 2001). However, there is plenty of valuable research available indicating that there are both benefits and drawbacks to EM use. Next, both sides are shown for the reader's reference. First, the potential benefits of EM adoption.

2.2.2 Benefits of E-marketplace Use

The word "online" is synonymous of internet presence; being "online" represents major benefits in today's logistical operations. Moreover, "online" marketplaces (EMs) have gone a long way since their introduction in the 90s. They have evolved from simple load matching to sources of full-service logistics management services (Anand, 2005). EMs offer advantages over traditional operations and other intermediaries, allowing companies to go one step beyond traditional revenue management techniques (Elmaghraby, 2004). For instance, they may lower costs because traditional staff no longer need to use their time on individual transactional and contractual negotiations; the shippers lower their freight bill and carriers fill their excess capacities; instead of the traditional six to nine months it takes to be awarded new business, suppliers know within days whether they secure or lost the deal (Anand, 2005).

Also, geographic location is no longer a complexity to bring agents together under one platform thus is convenient; shippers and carriers get access to more business opportunities with minimal expenses on advertising; access to real-time information and communication with supply chain partners and gain knowledge about demand elasticity to incorporate into their pricing decisions (Peter et al., 2001; Andersson and Norman, 2002; Song and Regan, 2003; Elmaghraby, 2004; Anand, 2005; Nandiraju and Regan, 2008; Daw et al., 2008; Boyson et al., 1999).

2.2.3. Drawbacks of E-marketplace Use

On the other hand, although EMs have significantly evolved since their proliferation back in the 90s. There are still many flaws perceived from using e-marketplaces. Up to date, many firms are still reluctant to participate in EMs because some of these platforms do not assume responsibility beyond the matching of shipper demand and carrier capacity. There are security concerns in regards to information sharing, transparency, perceived risk and disclosure of sensitive data involved with EM participation (Pressey et al., 2009). In their present state, EMs are virtual places where firms indulge in price wars to remain competitive. This environment is harmful to the industry since it ultimately leads to winners being losers; suppliers cannibalize their own potential profit (Anand, 2005). In like manner, many believe trust is vital for good relationships, and find difficult to build it without person-to-person negotiations; hence, EMs lack of credibility (Song and Regan, 2003; Nandiraju and Regan, 2008).

Further, there is no learning outcome by participating on bidding and auction markets; the information obtained cannot be incorporated for future behavior but it only fosters price cutting behavior. TSP who believe that a buyer is behaving opportunistically have fewer incentives to share information and engage in mutually beneficial cooperation (Anand, 2005). Bob Emiliani, director of the Center for Lean Business Management at Rensselaer Polytechnic Institute, warns that suppliers who feel "cheated" will

look for an opportunity in the future to get even (in Anand, 2005). The only relationship between buyers and sellers cannot be commoditized by e-marketplaces (Luomakoski and Siivonen, 2010).

Moreover, from a service perspective, there are other problems of EM participation including: the cause of poor service performance, inadequate expertise and service performance and inability to deal with special product needs and emergency circumstances (Selviaridis and Spring, 2007 in Gadde and Hulthén, 2009). Additionally, as services are intangible and consumed at the time they're produced, there is often a lack of knowledge of what has been agreed upon in terms of service specifications and freight volume (Andersson and Norman, 2002). It is often the case that the second lowest bidder is provided an opportunity to move the freight because the bidder with the lowest cost is unable to deliver the capacity or the service level required by the shipper (Song and Regan, 2003). For this reason, TSP are often reluctant to join open EMs, as they fear their service quality is reduced to price (Wang et al., 2011). **TABLE 1** Provides a summary of the potential benefits and drawbacks of e-marketplace adoption identified by the literature.

BENEFITS OF E-MARKETPLACE USE	DRAWBACKS OF E-MARTPLACE USE
• Lower operational costs (Chang and Wong, 2010) • Better Use of Time (Piera et al., 2014) • Immediate Communication (Marasco, 2005) • Increase Market Exposure (Song and Regan, 2003) • No Geographic Boundaries (Kuyzu et al., 2015) • Access to Real-Time Information (Anand, 2005)	• No Protection of Participants (Pressey et al., 2009) • Security and Safety Concerns (Song and Regan, 2003) • Price-driven Competition (Anand, 2005) • Lack of Transparency by Users (Nandiraju and Regan, 2008) • Cause of Poor Service Quality (Gadde and Hulthén, 2009) • Communication Issues (Andersson and Norman, 2002)

TABLE 1 Summarizes the potential benefits and drawbacks of e-marketplace adoption identified by the literature previously presented.

2.2.4. Recommended Caution Measures for E-Marketplace Use

Consequently, to protect themselves from negative experiences and potential financial losses both shippers and carriers use contracts as key measures to the establishment of relationships in logistics. These measures are reflected in the inclusion of contractual clauses that explicitly outline the framework, responsibilities and pay rate of the services providers (Boyson et al., 1999). Usually long-term relationship with suppliers are bound by a contractual agreement; thus, they are strategic sources (Skjøtt-Larsen et al., 2003). These long-term relationships are characterized by a sense of mutual trust and open exchange of information; conversely, on an arm's length relationship, as is often the case with EMs, the short duration of the relationship hinders familiarity and personal ties (Skjøtt-Larsen et al., 2003). While some see EM participation as a way of developing a network of partnerships, other suppliers and strategic partners may perceive their use as moving to an arm's length relationship (Standing et al., 2010).

Interestingly, an opposing view on contracts would be that lack of a contract shows the strength of the relationship (Andersson and Norman, 2002). Secondly, it is also suggested by Boyson et al. (1999) that firms should consolidate logistics capabilities within a single office to maintain better organizational control of these relationships. Thirdly, knowledgeable in-house managers must have enough expertise to perform thorough up-front review, audit and control of the systems and capabilities of external service

providers. For this, the use of metrics tools is necessary to manage and evaluate the service levels, performance and financial stability of external service providers (Boyson et al., 1999; Song and Regan 2003). Lastly, it is important that going forward the decisions leading to EM participation go beyond bargaining for the lowest price. Other intangibles, such as buyer-supplier relationships, the quality of the service provided, the supplier's reliability should be assessed before awarding a supply contract (Anand, 2005).

In this second section of the literature review, the author has provided a focused overview on what is known and what has been written on EMs, specifically in logistics and transportation. This included the main stakeholders, the distinction between EMs and other intermediaries in the industry, the benefits and drawbacks of EM participation as well as recommended measures to more confidently participate in online platforms. Next, as the last part of this literature review, the author focuses on the freight transport industry in Europe, particularly in Sweden. Hopefully this will further clear the need and importance of this research project.

2.2.5. The Freight Transport Sector in Scandinavia: Sweden

Freight transport and logistics is key for European industry competitiveness and sustainable growth. Keeping current European leadership in logistics is key for the future. The EU is the world's largest exporter and biggest trader of goods; however, it is estimated that in the next 15 years, 90% of the world's growth will come from outside the EU, so it is crucial for European companies to remain competitive and able to access new markets and benefit from these sources of growth (SETRIS, 2017). Further, road transport is an elementary service and it represents the most flexible transport mode for continental freight transport (Sternberg et al., 2013).

European leaders and authorities acknowledge the need for increased efficiency of road transport. For example, the European Commission's long-term policy increasingly focuses on an integrated European transport system (European Commission, 2011) and several organizations and stakeholder groups agree that future freight transport operations need to be regulated and monitored to ensure safe operations and fair competition in the European market. The environmental purchasing of transport services is greatly influenced by management, company image, customers (of shipper), carriers, and the means of control applied by the government and other authorities (Björklund, 2011; Walker, Di Sisto, & McBain, 2008 in Lammgård & Andersson, 2014). The efficiency of the transport system is dependent on the total resources used: business models, vehicles, drivers, information technology, and infrastructure. Unfortunately for some industry professionals and fortunately for others, different standards, regulations and procedures prevail in the EU member states preventing smooth cross-border transport operations (SETRIS, 2017).

Moreover, changes in the transport system generally take place independently, with little effect on an aggregate level (Moen, 2016). Consequently, the systems are loose and highly complex. There are many actors with different relationships and decision-making managed in-house (Dubois and Hulthén, 2014 in Moen, 2016). The industry lacks a unified business model for transport services; instead, the actors interact with other transport networks through direct links or consolidation of goods procuring efficient utilization of transport resources (Woxenius, 2007). Once a shipper has no sufficient capacity for their dedicated movements, it must then procure transportation services from e-marketplaces (Huang and Xu, 2013).

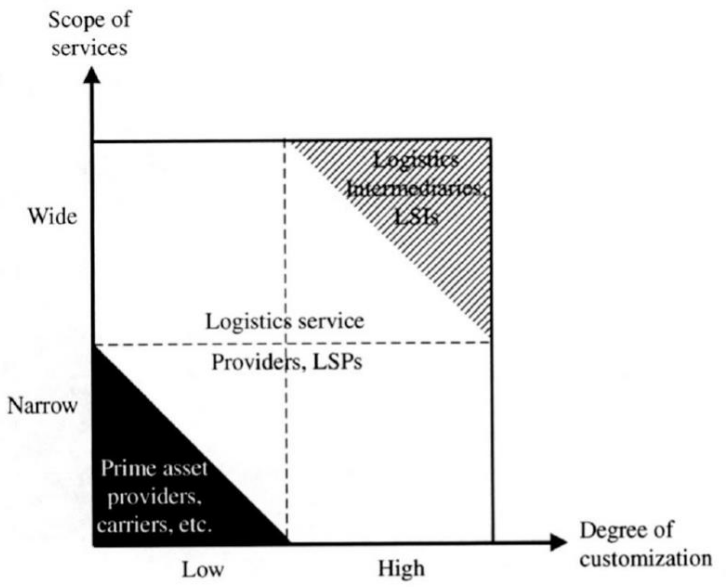
Furthermore, private fleets typically have less efficient operations than for-hire carriers. For hire fleets were considerably more efficient, empty miles for private fleets were reportedly fifty percent higher

than those of for-hire fleets (ICC, 1977 in Song and Regan, 2003). It is estimated that empty miles account for a large percentage of the almost $80 billion wasted in transportation each year (Totalogistix in Anand, 2005). Additionally, this reflects poor vehicle utilization and it can negatively impact transport operations (Esper and Williams, 2003). There appears to be a failure in the way transport has been integrated into supply chains; the freight transport needs to be used in more flexible and responsive ways, to respond effectively to customer demand while minimizing cost and environmental impact (Narus and Anderson, 1996 in Sanchez Rodrigues et al., 2008). Ideally, every time transport is used the capacity should be maximized, using full- truck-load (FTL); however, often times this is not the case and transport is utilized at half-capacity, at less-than-truckload (LTL). Consequently, optimization of processes and resources is not occurring reinforcing the fragmentation of the industry earlier exposed. The goal of the industry and its players is to achieve maximum efficiency and optimization by fully utilizing space capabilities on every trip; however, that goal is still far from the reality because there is little collaboration among industry players. However, EMs are assisting in balancing these supply-demand asymmetries.

In line with the industry in general, the freight transport sector in Sweden is also fragmented. The majority of operating firms (up to 80%) are small operators with less than two vehicles and scarce administrative resources. These small operators are usually subcontracted by an intermediary that handles sales and contact with customers (Swedish Association of Road Transport Companies, 2013). Industry is a context that triggers firms to follow or copy their competitor's behavior (Batenburg, 2007). Thus, the trend of increasing fragmentations in transport flows brings losses in economies of scale due to a lack of consolidation of goods (van Duin et al., 2007). This has significant impact at the macro level of transport demand planning down to the micro level of control of the truck driver (Sternberg et al., 2013) Furthermore, 80% of the road freight transport is procured through an intermediary, such as 3PL, freight forwarders and other contractors (Transport Analysis, 2014). In Sweden, the revenue of 3PL reached US$4.4 billion in 2016 and it has most likely increased since then (Statista, 2018). It is also the highest revenue generated among the Nordic countries. Thus, their importance to the industry in Sweden supported the inclusion of 3PL and freight forwarders as potential participants of this study along with carriers.

Thus, following Stefansson (2006), it is important to make the distinction of the concept for the purpose of this study. **FIGURE 4** below shows the degree of customization of third-party services. They range from basic transport of goods to logistics intermediaries (LSIs), which are no longer concerned with transport alone but multiple more advanced logistics-related tasks (e.g. financial services, customs services, insurance services, etc.) However, for the purpose of this study, LSIs are out of the scope. However, carriers and LSPs offering basic transport service are included in the sample the author wanted to study. The reader will notice that the participants of this study in **TABLE 2**, are mostly carriers (as originally desired); however, even carriers offer additional logistics services. Hence, for the purpose of this study, the author employs the term *transport service providers (TSPs*) referring to carriers and LSPs (freight forwarders and third-party logistics service providers). It is their perspective regarding e-marketplace use that the researcher is interested in exploring further.

Furthermore, in the Swedish freight industry, in practice, the intermediary companies (freight forwarders, 3PL and other agents) cannot fulfill their contractual obligations in a transparent business model. They would cannibalize their own business if they did (Moen, 2016). On the other hand, the transport buyer (shipper) wants to pay for the freight from point A to B only. The risk of being over-capacity or under-capacity is the "responsibility" of the service provider and is out of the scope of interest from the shipper's perspective (Moen, 2016). Moreover, efforts to achieve full truck loads (FTL) reduce both emissions and the cost of transport services (Evangelista, 2014). And contrary to general



Source: Stefansson (2006)

FIGURE 4 Degree of Customization and Scope of Services of Third-Party Services - Is a visual representation of the degree of customization and scope of services of third-party services. They range from basic transport of goods to logistics intermediaries (LSIs). For the purpose of this study, the author employs the term transport service providers (TSPs) referring to carriers and LSPs (freight forwarders and third-party logistics service providers). As seen from the figure, the scope of services and the degree of customization of study participants ranges from low and narrow to wide and high. However, the key and most important service offered by the subject of study, the TSP, is the transport service.

belief, there has not been an increase in environmental awareness when selecting TSP from the shippers' side as long as price is kept low (Lammgård & Andersson, 2014). These intermediaries add complexity to the transport process, since the planning and control of transport is divided between additional parties (planners, drivers and other staff), increasing the need for additional efforts to coordinate resources (Sternberg et al., 2013).

Clearly, the freight transport industry is not only fundamental to current trade but there is also plenty of room for improvement in the field, not only in Sweden but globally. Technology developments and ICT innovations are assisting firms towards more effective and efficient performance through transparent information sharing. In this study, the focus is on e-marketplaces as medium of exchange for trade and information among TSP and shippers. As it has been exposed in this section, the transport systems are fragmented and divided into little networks. However, transport systems need the opposite, they need integration and transparent collaboration among stakeholders in order to maximize capacity utilization and profitability whilst costs and environmental impact are also minimized. One of the main purposes and benefits of e-marketplace participation is to assist towards achieving these previously mentioned goals. However, systems in theory and practice may strongly differ. A closer look into real-world road freight systems reveals that they are complex constellations (Sternberg et al., 2013). How do they perform in reality given the use TSP assign to them?

In this exploratory study the author seeks to get insight from the perspective of TSP in Sweden regarding the use of e-marketplaces to answer the RQs earlier stated. Next, the author proceeds to explain the methods used in the process; the methodology and steps followed for the completion of this study are presented.

3. Methodology

In this section, the author details the methods, processes and rationale followed to complete this thesis. It has been divided into four main sub-topics following the order in which this study is presented. Each sub-topic explains to detail every component included at that stage. It is presented in the following sequence: first, the literature review and the research process behind it; second, the use of grounded theory (GT) as guideline for the data collection and analysis of this study; third, the semi-structured interviews used as main data collection tool and lastly, the data analysis process which has been further divided into the steps followed for the emergence of results under the GT approach.

The aim of this study is exploratory since the author aims to provide initial understanding of EM use among TSP in Sweden. Additionally, it is exploratory in nature since no similar studies have been performed in the field. Consequently, there is no theoretical framework established for this context. Grounded theory (GT) is used when the topic of interest has been ignored or has been given superficial attention. Consequently, the researcher must build a theory from the ground (Goulding, 2002). The researcher has freedom to investigate the phenomena because he or she is not limited to a pre-determined theoretical model. GT allows flexibility to adjust the RQs, procedures and analysis tools as the research evolves (Mello and Flint, 2009). Thus, the reason why an inductive approach through grounded theory (GT) was the best fit to perform this study. The use of GT would allow to develop categories, concepts and hopefully the opportunity to match those findings to previous research and add value to the field. However, no one starts completely from scratch. In order to support the use of GT and confirm the research gap, it was necessary to perform a thorough research on the topic prior to further developing the study. Next, the author explains the process followed to create the literature review.

3.1. The Literature Review

In order to define the research questions for this study, it was necessary to go over the literature that has been written around e-marketplaces. For this, the author did extensive research majorly on literature in logistics and transportation journals; however, in this thesis the author also drew from other studies published on journals of information systems, industrial marketing, industrial engineering, purchasing, transportation, social and behavioral sciences and supply chain management. For some reason, e-marketplaces have a strong relationship with marketing; it was often the case when performing cold-calling to potential interviewees that the person at reception would transfer the request to the marketing department. Hence, it is arguably a topic that is still not fully understood even among professional practitioners.

Furthermore, the main purpose of performing a literature review before tackling the empirical part of the study was to strengthen the theoretical sensitivity for this study on what is known and what has been written about the topic and to confirm the knowledge gap addressed in this research. Reading before entering the field is not forbidden, it is a vital part of GT; however, it is suggested that the researcher avoids bringing preconceptions and expectations based on the work of others (Goulding, 2002). Likewise, the literature review served as focus lens to keep the study within the logistics context, to redefine the research questions this study should address and to add value to the foundation of this study, the EM main participants by Wang et al. (2007b) exhibited in **FIGURE 2** from the perspective of the TSP. The author chose the perspective of the TSP following the advice of previous researchers on the dearth of research in the field, and because it has not been empirically explored in Sweden.

3.1.1. The Research Process

A series of keywords were selected to initiate the searching process. The starting point was "logistics e-marketplace". Later on, more words were added to the searching process, "e-logistics", "procurement", "freight exchange" and "e-procurement". Thus, thorough research on search engines and databases was conducted through Google Scholar, LUB Search, ScienceDirect, Emerald, academic journals, electronic journals, e-books, websites and reports. Additional keywords were added later to the search, these included, "transportation", "outsource" and "3PL". Most importantly, special attention was given to identifying the references cited in these papers to continue the research through a reverse search. Consequently, the researcher noticed who the most cited and prominent researchers are regarding EMs. Thus, the research continued by following their footsteps in other material developed by them. Among other researchers, the most cited were Yingli Wang, Jiongjiong Song and Amelia Regan.

As it was previously mentioned, the data obtained from this initial research was to provide a solid foundation and understanding of the topic to the researcher. However, other than the EM relationship triangle developed by Wang et al. (2007b) in **FIGURE 2**, that is a logical foundation for this study, no theoretical models nor theories were taken from the literature to guide the research process. Later on, the material would be picked up again for the data analysis part. Through constant comparison, an essential part of grounded theory (GT), previous findings and theoretical frameworks of previous research could be used to match, refine and validate the results of the empirical part of this study. More details on constant comparison follow below.

As it has been outlined by several authors in the literature review, little theoretical knowledge and empirical research has been performed in the field. Therefore, an exploratory research technique was necessary to approach this thesis (Locke, 2007). Therefore, the research called for an inductive approach in which the researcher could hopefully better understand phenomena based upon the view of the sample studied (Charmaz, 2006). Conversely to a deductive approach, in this case the theory testing is not the goal, but new data and insight that can later be categorized and matched to existing theory of knowledge. Next, the author further explains the rationale behind the empirical part of this study.

3.2. Grounded Theory

Grounded theory (GT) is a research tradition relying heavily on (but not limited to) depth interviews, observation and document analysis in search of processes employed to address important problems they face (Mello and Flint, 2009). In logistics, like in supply chain, there is various phenomena of complex behavioral dimensions both at individual and organizational level. In order to more fully understand these complex perceptions and behaviors at inter- and intra-organizational level, an inductive approach is necessary. A research methodology that conveys how individuals interact within the whole and seeks to unveil what influences decisions and behaviors (Randall and Mello, 2012). Further, the purpose of this research is exploratory, not explanatory; this is the reason why Grounded Theory (GT) is used (Glaser and Strauss, 1967). Grounded theory (GT) provides the researcher an understanding of human experiences, interactions and relationships that ultimately define company actions and strategies (Mello and Flint, 2009; Randall and Mello, 2012).

Other qualitative methods and theories were also considered; for instance, case studies, which are recommended by several researchers to study rarely explored subjects and answer "why" and "how" questions. Case studies, phenomenology and ethnography are also appropriate to study problems where research and theory are at an early formative stage (Goulding, 2002). In like manner, case studies are close to GT in that both combine a variety of field data collected in order to create theory (Eisenhardt,

1989). However, a case study seeks to uncover "what happened" and often assumes there is a truth to be uncovered. Conversely, phenomenologists seek to understand every day experiences from the perspective of those living them; thus, a strong psychological theoretical background is used. In like manner, ethnographers seek to understand people's cultures. They do so with a strong anthropological theoretical background (Mello and Flint, 2009). In the case of logistics, ethnography can be quite applicable with potential "groups" being shippers, carriers, drivers, managers, etc. Unfortunately, this tradition requires dense expertise for meaningful interpretation to emerge. The academic background of the author of this paper is business administration; consequently, the research expertise is very limited. Further, other quantitative approaches like game theory or auction theory could also have been used per suggestion of experienced researchers, Nandiraju and Regan (2008). However, GT is rooted deep within social sciences to discover and understand the meanings and concepts used by people in social settings while assuming that people are constantly problem-solving actors (Mello and Flint, 2009).

Further, GT has been widely used to develop foundational theory in social sciences (Glaser and Strauss, 1967; Bowen, 2008). For instance, Pappu and Mundy (2002) used GT to explore buyer-seller relationships in transportation. Also, Randall et al. (2010) used it to create a performance-based logistics theory grounded in service dominant logic. GT allows the researcher to access social and structural aspects that other methods cannot achieve; the researcher has freedom to investigate the phenomena because he or she is not limited to a pre-determined theoretical model. GT allows flexibility to adjust the RQs, procedures and analysis tools as the research evolves (Mello and Flint, 2009). It lends itself to the complexity encountered when studying interactions among individuals and firms. For this reason, GT is an appropriate inductive method for this master thesis. The author approached the research process without a priori theory in mind, hoping that relevant and new concepts would emerge from the data gathered without being constrained by previous knowledge. If successfully executed, it would reveal critically important perspectives on new and even well-researched logistics phenomena (Mello and Flint, 2009).

Next, the author makes an important clarification regarding the GT approach used for this study. There two main divisions in GT, the Glaserian and the Straussian approach. Although both are similar in many ways, there are also important distinctions that affect the overall approach to methodology; thus, it is important for the reader to acknowledge these differences and similarities to fully grasp what has been done in this study.

3.2.1. Glaserian & Straussian Approaches to Grounded Theory

Grounded theory (GT) was originally developed in the 60s by Barney G. Glaser and Anselm L. Strauss. They called it GT because through their method, mid-range theory grounded in the behaviors, words, and actions of the participants is developed (Goulding, 2002). However, they eventually parted ways in their interpretation of GT research (Mello and Flint, 2009). For this reason, it is important to understand the differences that were taken into consideration for the data collection and analysis in this study which followed a balance of both approaches.

In logistics, intentionally or unintentionally, most researchers follow Strauss and Corbin (1990); however, they fail to acknowledge that there is more than one path to approaching GT. Strauss and Corbin introduced "coding paradigms" to help develop interpretations of interview transcripts and field notes by establishing processes for coding and fitting those into logical processes that later enable core categories to emerge. They provide an organized and more structured methodology. The researcher always codes for conditions, interaction among actors, strategies and tactics, and consequences of the

above. Conversely, Glaser, the father of the other approach, sees this direction as highly restrictive to the theory emergence and claims that the coding paradigm forces the analyst to ask preconceived questions that may take away the analyst from what the data indicate (Mello and Flint, 2009). Both represent a risk for the researcher, the former runs the risk of being a process too linear and the latter of being too broad and unfocused. After careful examination of research studies of other researchers, the difference between one school or the other is not very clear and everyone somehow apply a combination of both Glaserian and Straussian GT.

Initially, for this study, the author decided on Glaser's approach because he advocates for creativity and openness to interpretation of data (Suddaby, 2006 in Mello and Flint, 2009). Letting the data and concepts emergence as the research evolved without forcing them; leaning towards the orthodox GT. Nonetheless, the Straussian approach helped provide clearer guidance and structure on how to proceed and take description of actions and interactions into abstract conceptualization. Thus, it provides easier to follow guide, especially for novice researchers. This process is fostered by Glaser; however, he is not very clear on how to move from descriptions to conceptual abstractions. Moreover, Strauss calls for breakdown of categories into sub-categories, aiming to identify the when, where, why and how the phenomenon is likely to occur. Sub-categories also have properties and dimensions that refer to conditions, actions/interactions and consequences, further delimiting the properties. Dimensions enable the researcher to differentiate items within classes and show variation. On the other hand, Glasser believes this approach is too restrictive and adds unnecessary layers of analysis that result in description of the phenomenon rather than theory formulation about the phenomenon (Mello and Flint, 2009). Glaser believes that Strauss' approach requires "forcing rules which are hard to follow and very derailing for productivity" (Glaser, 1992, p. 101).

Moreover, Glaser has pointed out the 18 coding families (**Appendix B**) that may be applicable to the phenomenon; however, he warns that the researcher should not focus on them, but rather take guide from the data (1978, p. 73). However, it is important to mention that theoretically relevant codes will generally fall into one of the categories established by Strauss' coding paradigm (Mello and Flint, 2009). Thus, the relative ease for researchers to end up using both approaches intentionally or unintentionally. For Glaser, the emerging concepts are taken directly from the data without going too far into micro-analysis and far-out comparisons because this takes the analyst away from what the data is indicating (Mello and Flint, 2009). It's a less structured approach to coding than Strauss.

3.3. Data Collection

Following the GT approach, data sources can be from single or multiple sources. These include but are not limited to: interviews, observations, life stories, memos and secondary data (Goulding, 2002). For the purpose of this study, the author chose one main method and secondary sources. The main method used for this study is interviews; supported by memos on field notes taken during the interview process. Next, the interviews employed and their process are explained to detail.

3.3.1. Semi-Structured Interviews

The main data collection method employed were semi-structured interviews. With GT the most common form of interviews is, semi-structured, open-ended, in-depth conversational interview (Goulding, 2002). It allows the emergence of dimensions and constructs throughout the interviewing process while maintaining the conversation focused on the topic at hand. Initially, the author considered whole Europe as potential field for gathering empirical data through interviews. However, after consulting the supervisor and careful consideration of the available resources to complete the task (i.e. limited student

budget and geographical reach limitations), it was decided that the main focus to attain the sample would be in Sweden. Particularly, in Malmö, Lund and Helsingborg and vicinity in Skåne, region where the author resided during the development of this study.

3.3.2. Sampling

Theoretical Sampling

Theoretical sampling is another key component of GT. It differs from other qualitative techniques by following the guidance of the developing theory rather than a predetermined one (Goulding, 2002). In GT, the theoretical sampling provides data from which to reveal concepts in support of inductive theory development (Randall and Mello, 2012). It is the purposeful selection of a sample according to the developing categories and emerging theories (Coyle, 1997 in Goulding, 2002). In other words, theoretical sampling is the process the author followed when deciding what data to collect next and where to find it, in order to develop the theory as it emerges.

Further, following the principle of theoretical sampling for GT, the initial scope of the data collection was transport service providers (TSP). For this study, TSP include carriers, freight forwarders and 3PL service providers successfully operating in the region, of a size representative of the industry (majorly small and medium sized enterprises) that utilize or have utilized e-marketplaces. 3PL and freight forwarders were included in the study as part of TSP because of their importance for the industry in Europe and Sweden. This was detailed earlier in the literature review. Both asset based and non-asset-based companies were considered suitable for this study given the difficulty to secure participants. A potential future research could address the distinction between these two categories within the context of EM portfolio use.

Following Glaser and Strauss' suggestion that sampling should be done in groups, the interviews were performed in four rounds. Each round was had three interviewees and one round of four interviewees for a total of 13 interviews. At the conclusion of every round, the principle of theoretical sampling was applied to decide which firms would be suitable for the next round. Next, the author presents the process, challenges and more details on performing the interviews.

Performing the Interviews

The next step was identifying and fulfilling the sample for this study. The author proceeded by performing online searches of TSP in the Skåne region and vicinity. Another strategy utilized was the author identified freight transport trucks on a weekly basis during his commute to university and while traveling around for leisure. Both approaches were random selection and thus, represent a high degree of validity. He would then write down the company names on the trucks and later proceeded to find them online. It is worth mentioning that all companies had online presence, some better than others, but all had a website and contact information available for easy contact.

Initial contact was made through email or cold calling with an introductory presentation of the topic under study. This initial contact was always followed up by email if the initial contact was by phone and vice versa. Most companies excused themselves under the justification that they were too busy and/or had no time to participate. Some others said they did not use e-marketplaces in their operations, so they were not a good fit for this study. On a few occasions the author was transferred to the marketing department after inquiring about the topic, which suggests that even among professionals there is a lack of knowledge about EMs. More details on the challenges faced during this stage are included later on in

the "challenges to complete the study" section. Overall, the author contacted 75 companies by phone and email of which only 15 agreed to participate in the study; later on, three companies declined to their initial confirmation to participate due to time limitations. Consequently, a total of 12 participating TSP completed the interview process.

TABLE 2 shows the list of participants with their company profile. For the sake of anonymity, names of companies and the participants themselves have been concealed under pseudonyms. It will also be noticed in **TABLE 2** that the range of positions of the people interviewed range from logistics coordinator to manager and CEO, depending on the company's preference on who they deemed was the most experienced, knowledgeable and hands-on person regarding e-marketplaces. This allowed for varying dynamics with interviewees and interesting input coming from their representative. More details on this will be presented in the data analysis and results sections. This selective process was time-consuming and sometimes difficult, but it allowed for complete and accurate understanding not only of the interviewee's perspective but also the company's and where they stand regarding e-marketplace use. Moreover, if the content of the responses was leaning outside the scope of an operational level, the interviewer would later request to be referred to someone else at operational level so that the questions that needed clarification would be further explained.

Appendix C shows the protocol followed and questions included in the semi-structured interviews. The interview protocol was tested and refined with help from the thesis supervisor to ensure that the questions were open-ended and consequently, brought up valuable information to be analyzed and conceptualized further on. Once refined, the author proceeded to conduct the interviews. The focus of the questioning related to key aspects of e-marketplace participation. Additionally, background information on each company and the interviewee's role within the organization was obtained. Further, a few of them repeatedly brought up their concerns regarding the confidentiality of the information shared.

Theoretical Sampling	Company	Type	Service Coverage	Position of Interviewee	Own Fleet	Fleet Size	Filling Rate	% of Empty Miles	Number of EMs used	% of EM Use	Annual Revenue
First Round	TSP 1	Carrier[1]	Sweden	CEO	YES	250 trucks	80%	5%	two	<10%	SEK 442 Million
	TSP 2	3PL	Sweden	Owner & CEO	NO	85-90 subcontracted carriers	Unknown	Unknown	two	<10%	N/A
	TSP 3	FF	Europe[2]	COO	NO	100 subcontract	90%	10%	three	<10%	SEK 78 Million
	TSP 4	Carrier[1]	Sweden-Denmark	Logistics Coordinator	NO	N/A	80%	0%	three	10 -15%	SEK 103 Billion
Second Round	TSP 5	FF	Scandinavia[2]	Head of Department	YES	70 trucks	Unknown	Unknown	three	<10%	SEK 62 Million
	TSP 6	Carrier[1]	Europe[2]	Business Development Manager	YES	200 trucks	90%	Unknown	one	<10%	SEK 55 Million
	TSP 7	Carrier[1]	France - Sweden	Imports Transport Manager	YES	50 trucks	90%	2-3%	two	<10%	SEK 400 Million
	TSP 8	Carrier	Europe	Transport Planner & CEO	YES	40 trucks	80%	Unknown	one	<10%	SEK 38 Million
Third Round	TSP 9	Carrier[1]	Sweden[2]	Transport Manager, SE	YES	30 owned & 50 subcontracted	95%	20%	two	<10%	SEK 300 Million
	TSP 10	Carrier[1]	Germany-Sweden	Operations Manager	YES	170 trucks	Unknown	Unknown	one	10%	SEK 500 Million
	TSP 11	Carrier[1]	Sweden-Denmark	Owner & Manager	YES	40 trucks	80-85%	10-15%	two	<10%	SEK 50 Million
	TSP 12	Carrier	Sweden	International Senior Executive Director	YES	30,000 trucks	N/A	N/A	none	0%	SEK 22 Billion

Notes:

[1]Performs other logistics and distribution services such as warehousing, consolidation of cargo, paperwork handling, etc.

[2]The company has offices in other countries operating for other markets. However, the representative interviewed for the office in Sweden serves the market specified in the table.

Unknown: The interviewee acknoledged they do not keep track or measure those rates and figures.

N/A: The interviewee denied revealing this information.

*FF: Freight Forwarder ; 3PL: Third-Party Logistics

TABLE 2 **Company Profile of Study Participants –** This table shows the list of participants along with their company profile. For the sake of anonymity and confidentiality, names of companies and the participants' have been concealed under pseudonyms. It will also be noticed that the range of positions of the people interviewed range from logistics coordinator to manager and CEO, depending on the company's preference on who they

deemed was the most experienced, knowledgeable and hands-on person regarding e-marketplaces. Also, the size in terms of fleet size and revenue varies from firm to firm. Lastly, and most importantly, it can be seen that the use of EMs for the majority of TSPs falls below 10%.

For this reason, it was defined that all participants' profiles would be kept under pseudonyms, following GT practices (Randall and Mello, 2012). Busy or colliding schedules, office geographic location, time restrictions and budget limitations among other limitations, prevented the author to interview every participant in person.

From the 12 participating companies, four were interviewed in person and eight were interviewed over the phone with follow-up by phone and email. The duration of the primary interviews initially ranged from 45 mins to an hour and 15 minutes depending on the interviewee's availability and length of responses. Additionally, all the interviews were recorded and transcribed verbatim afterward. This process allowed the author to actively listen to the interviewee while also incorporating details such as tone, gestures, expressions and certainty into the data in the shape of field memos. The interviews were performed over a two-month span, being one of the most time-consuming and effort-demanding tasks of this study. Further, following GT principles the data collection process under theoretical sampling was divided into three rounds. In the first round of interviews four participants were initially interviewed; in the second round another four and in the last round another four. Since the first round the researcher noticed a pattern emerging from the responses. These patterns were later confirmed on the second round, on the third and final round theoretical saturation had been reached after no new concepts were emerging from the interviews.

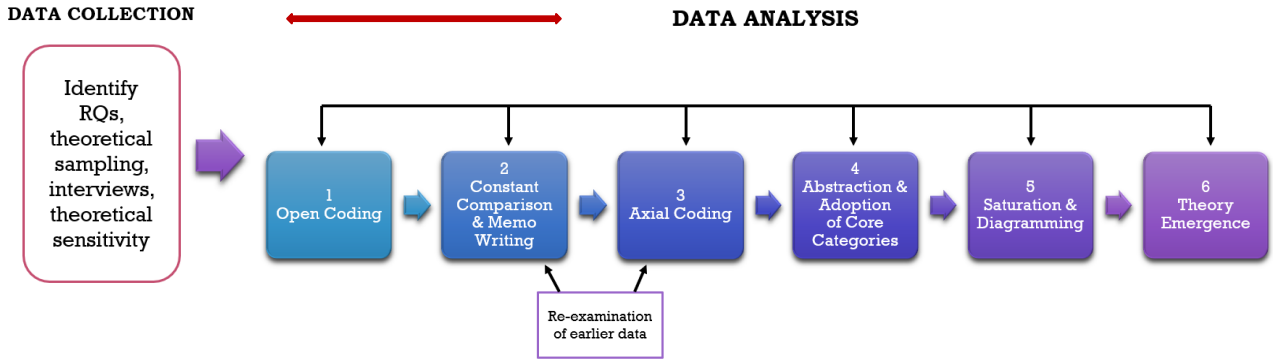
Lastly, during the cold calling process seeking for potential interviewees and after completion of an interview, regardless of the outcome with that particular contact, the author would always finish the conversation by asking if there was someone they could refer for the purpose of this study. However, the response was not very positive as seldom times were others referred, but thanks to that approach the author was able to reach three additional potential interviewees. That is how the author came across an e-marketplace application developer, Tony. Although his profile is out of the scope of the study, following GT principles of focusing on the lead of the emerging data, the author considered it valuable to interview Tony. His input could be contrasted and compared with the other interviews during the data analysis process. His interview was added to the rest of transcripts for a total of 13 interviews. The other two eventually also turned down the invitation to participate under the same justifications mentioned earlier. Next, the author further explains the data analysis process followed complying with principles of GT.

3.4. Data Analysis

Data gathered from any kind of qualitative study are voluminous; thus, it was also challenging to organize the information once it had been obtained from the interviewees. In order to explore and answer the RQs raised at the beginning of this thesis, the author followed the principles of grounded theory (GT) established by Glaser and Strauss (1967), following principles from both schools, Glaserian and Straussian. The researcher chose a middle ground between the methods that will accomplish the research goals of this study. Combining the openness and creativity to let the concepts and emergent theory flow strictly from the data of the Glaserian approach and the guidance and data analysis steps followed by the Straussian approach, which are very helpful for novice researchers. Additionally, the author also employed guidance on GT application for a supply chain and logistics context from Mello and Flint (2009) and Randall and Mello (2012). The first step towards analysis of the data is to have it all available in print; thus, all the interviews, field memos and other notes were transcribed. In order to ease the

productiveness at this stage the researcher leverage himself on computer technology, specifically Microsoft Word, to type instead of writing by hand. This was a personal choice that made the process easier to deal with.

Further, the data analysis followed this process: first, open coding of field notes and interview transcripts; second, constant comparison and memo writing is an-going task throughout the data analysis stage; third, axial coding; fourth, selective coding; fifth, conceptual abstraction and lastly, development of substantive theory. Below a detailed description of each step is provided for the reader's reference. **FIGURE 5** Illustrates the approach to GT followed in this thesis step by step adapted from Randall and Mello (2012). Each step is explained in detail below.



Source: Adapted from Randall and Mello (2012)

FIGURE 5 Data Analysis Process Following Grounded Theory - The GT approach requires constant comparison throughout the development of the study. Although it is majorly an inductive method and ordered procedure towards the development of the theory, the researcher is moving back and forth between steps in the data analysis, even going back to initial insights in the data collection stage. Consequently, the research process is continuously adjusted and adapted according to what the data findings suggest.

STEP 1: Open Coding

Following the Glaserian approach to GT, the author wanted to provide freedom for concepts to emerge organically without forcing them. Thus, open coding was performed on the first round of interviews, comprised of four interviews. Although a lengthy and time-consuming process, these four interview transcripts were initially analyzed into detail line-by-line in order to get acquainted with the coding process and avoid missing any relevant information. Interviews conducted within grounded theory (GT) are analyzed differently than interviews conducted in case studies and other approaches (Mello and Flint, 2009). The author referred to interview transcripts and field notes to identify patterns on responses and meanings from the data; these were written in a separate file to keep record of them as the list grew. There was diversity of opinions, some reinforcing similar ideas and others differing. Over 100 important concepts emerged from this initial process and a pattern began to emerge. For instance, a response from an interviewee, "…is quite well-known trade market and have a quality stamp. It is a safe company to work with" would be coded as *Reputation of EM*. Another example from a response, "it depends on the situation …if you have good time on you, then of course you can check different options, if you have less time then you will have to step out more quickly" would be coded as *time-sensitive*. Further, the author strived to raise the descriptive level early in the analysis so that conceptual abstractions could begin emerging (Goulding, 2002).

The next round of interviews transcribed, were also analyzed through open coding hoping that new additional concepts would emerge. However, this time the author did not go line-by-line but could scan through the transcripts looking for new emerging concepts and similar ones. The results of the open coding process were typed in a Word document labeled under the name of the interviewee along with pseudonym assigned to keep record of them. This process was followed with all 13 interviews until theoretical saturation was reached in the third round of transcripts. Next, the author explains the constant comparison and memo writing processes utilized throughout the data analysis stage.

STEP 2: Constant Comparison and Memo Writing

The abstraction of theoretical concepts from field data is possible through constant comparison across interview transcripts, with the same or different people, numerous field memos, documents and relevant literature; consequently, allowing the researcher to develop higher-level concepts within a theory building framework (Charmaz, 2006; Glaser and Strauss, 1967; Mello and Flint, 2009). The theoretical sampling at each round of interviews was subject to constant comparison on multiple perspectives on descriptions expressed by the other participants, field notes and review of memos. The purpose of constant comparison is to identify similarities and differences between the perceptions of participants. Further, constant comparison builds the theoretical framework through the development of categories, properties and relationships between and across incidents (Cho and Trent, 2006). It is through this comparison process that the author is able to identify similarities and differences that increase the categories' explanatory power (Goulding, 2002).

This pivotal part of GT approach requires the researcher to move back and forth between coding and analyzing data; continuously looking for new properties and categories throughout the research period. For example, codes emerging from the open coding procedure like *benchmark*, *seasonality*, *customer demands*, *capacity maximization*, *cost-cutting* and *search accuracy* by constantly comparing them among each other and the data, the researcher is able to group codes from different interviews into main groups and categories that explain the emerging patterns. In this case, benchmark, capacity maximization and cost-cutting were grouped under "*profitability*". In like manner, seasonality, customer demands and search accuracy were grouped under "*market reach*".
For this constant comparison, GT can also be considered an abductive process since the researcher is constantly going back and forth comparing and revisiting data trying to find patterns and themes for theory emergence. In the words of Goulding (2002 p. 68), it's "based on a happy marriage of induction and deduction". It is rigorous as any other research approach, if not more, and it includes all the elements necessary of good research, clarity, reliability, validity, generalizability and replicability (Charmaz, 2006). As a result of constant comparison, the researcher continuously creates ideas, relationships and connections among the data, sometimes just in thoughts. Nonetheless, in order to advance the development of theory all those ideas need to be written down and followed-up. This process is called memo writing. Next, we look into this procedure parallel to the development of ideas.

Using memos throughout the research journey is another central part of GT (Goulding, 2002). Memos provide guidance towards the emergence of theory; their function is to provide a pool of ideas which can be revised along the research process. They are basically ideas that have been noted during both the data collection and data analysis processes and assist the researcher in constantly reorienting the research. They are a core stage in GT, without them the research is not in fact GT (Glaser, 1978). Thus, they were employed throughout the data collection stage.

The memo is a free-writing process where the author was able to write down ideas generating relationships and elevating descriptions to more abstract conceptualizations. The memos were written mostly departing from the concepts derived from the open coding. However, concepts and memos are

kept separately to avoid mixing them up and maximize their use. Using memos as data is part of the abstraction process, so they are expressed in conceptual terms rather than people terms (Goulding, 2002). For example, in a memo the reader would conceptualize the recorded events during the interview and draw relationships among elements perceived and observed. A memo written after the second round of interviews, "It appears that if there's awareness of more tools, even if appealing, performing the same function firms do not adopt both or more to create a portfolio. Rather stick to one integrated system in their own TMS". When possible, the data gathered from interviews was complemented by other information gained from field notes, to confirm that the opinions expressed reflected actual behavior. It is necessary to lift the analysis from the description of incidents to an abstract level in order to develop theory (Goulding, 2002).

STEP 3: Axial Coding

Continuing with the development of conceptual abstractions from the description of actions and interactions started in the open coding and constant comparison, axial coding helps achieve more sophisticated conceptualization analysis (Goulding, 2002). In this process, the researcher specifies relationships among concepts which is the foundation for the construction of theory. Axial coding allows to develop a category by detailing the conditions that gave rise to it, the context and the action/interactional strategies by which it is managed and performed. These elements of the category tend to be clustered together (Goulding, 2002). For example, no concept can stand-alone, they all have some property or relation to other concepts. In this study, interviewees referred to EMs as short-term solutions that need to be regulated by authorities to improve their image; others said that in EMs there is no regard to service quality nor environmental consciousness and also others pointed that big carriers are the ones abusing the use of EMs and this practice is deemed as irresponsible among industry practitioners. Thus, these ideas and comments were commonly related as *the perception that EM use is not sustainable for the industry*. Further, noting that there is a *stigma* around EM use among transport providers.

STEP 4: Abstraction Process and Adoption of Core Categories

The total of over 100 concepts were reduced to 50. **Appendix D** includes an example of the codes identified from the first round of interview transcripts. These were then grouped into four higher order or core categories. The researcher continued analyzing the data through constant comparison until no further categories emerged, reaching theoretical saturation. The core categories are the basis for the emergent theory; they hold together all components to offer an explanation of the behavior under study. Their emergence has theoretical importance and they should be traceable back through the data, from where they emerged. According to Glaser (1978), a core category is the substance of what is going on in the data, it has to be saturated as much as possible to improve its explanatory power and should be based on full theoretical sampling to maximize the findings of the data. For this purpose, the researcher would examine the data by questioning what are the strategies which result in particular behaviors? What are the different conditions involved? This process helped in elevating the descriptions to more abstract conceptualizations.

STEP 5: Saturation and Diagramming

According to experts, employing theoretical sampling keeps the researcher on the field until no new evidence emerges that adds or contradicts the developing theory (Goulding, 2002). For this study, after the first of round of interviews a pattern was already emerging and the following two rounds confirmed the pattern. In the third round, no new concepts emerged. However, it is very difficult to assure that theoretical saturation was absolutely reached. There will always be firms and people who could have added value to this study and whose opinions are not taken into account; however, given the available

resources in terms of time, money and network, the study provides a clear theoretical saturation for the scope of this study. The incidents discovered in the first round of interviews reoccurred throughout the other two rounds; for this reason, the researcher felt confident that the categories were indeed 'saturated'.

STEP 6: Theory Emergence

Lastly, the ultimate purpose of using GT is to have a "set of well-developed concepts related through statements of relationship, which together constitute an integrated framework that can be used to explain or predict phenomena" (Strauss and Corbin, 1988, p. 22). For this, once the emerging theory had substance on its own, the researcher went back to the logistics literature which had been explored before undergoing the empirical stage. Given the time limitations and research experience of the author, it would be a mistake to intend to develop "new theory" from a small-scale study like this, instead the author aimed to develop substantive theory that adds value to previous studies performed in the field. Thus, the aim of revisiting previous studies was to connect the conceptual ideas that emerged from the data analysis to other ideas and concepts previously established by other researchers while demonstrating the emergence of concepts from the data and how the researcher moved from description to abstraction.

The approach used in this study is to present data as evidence for conclusions, indicating how the analyst obtained theory from the data. Additionally, tables and diagrams help to convey the message. The substantive theory proposed is an integrated set of hypotheses, that still need to be tested for the development of a formal theory. Following the Glaserian approach, the researcher aimed to provide abstract conceptualizations to explain the phenomenon yet also descriptive data is employed that is easy to understand and relate to for the reader. There is more emphasis on keeping focus on the data and less on external conditions as part of the emerging theory. In like manner, the use of visual devices for illustrating theory is less than in Strauss' methods. Further, to support the credibility of the study the researcher quotes directly from interviews, field notes and memos of events during the process.

3.5. The Epistemological Approach to Grounded Theory

Grounded theory (GT) is not confined to any particular epistemological or ontological perspective; however, it can facilitate any philosophical perspective embraced by the researcher (Mello and Flint, 2009). Hence, in this study the researcher utilized majorly Glaser's approach to GT and some guidelines provided by Strauss. The methods based on Glaser's GT approach are both positivist and interpretivist. Further, it has a positivist approach since the emerging theory comes strictly from the data yet the interpretation of the researcher is necessary throughout the process.

Naturally, as in any other research study, the author sought objectivity and procured to avoid personal values and experience to influence the interpretation of the data gathered. However, the nature of the GT approach requires constant comparison and abstraction of event descriptions into conceptualizations to establish relationships between events in the pursuit of theory emergence. Additionally, after careful study and consideration of arguments from the fathers of the theory, Glaser and Strauss (1967), and Charmaz (2006), the approach of GT used in this thesis is both objective and partially constructivist. It is mostly objectivist because the author acted as an unbiased observer and recorded the facts of an external reality as expressed by the interviewees. On the other hand, it is also constructivist because the author is aware that the respondents, regardless of their responses at the time of the interview, construct meanings specific to contexts of time, place and culture. Likewise, the author's own perception, interpretation and understanding of the data gathered may vary based on personal values regardless of the intent to diminish these (Mello and Flint 2009).

4. Empirical Findings

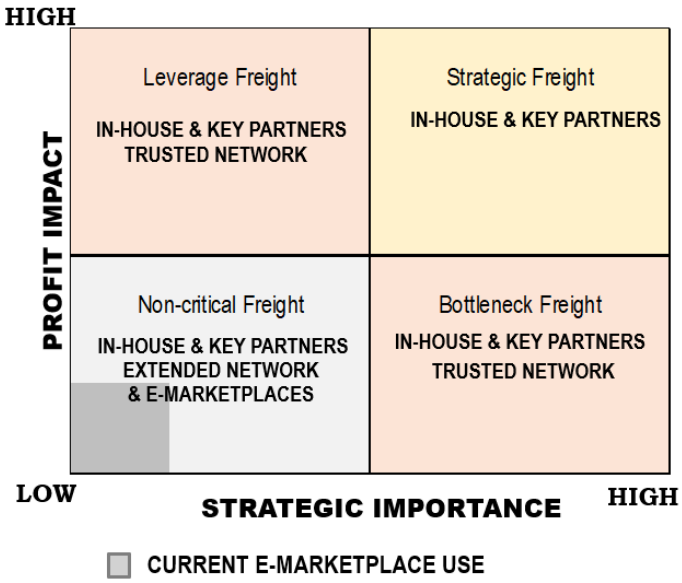
In this section, the researcher presents the results of the empirical part of the study aiming to answer the RQs stated at the beginning of the study. A thorough analysis of these results compared to previous research studies and knowledge in the field is provided in the next section. It is important to keep in mind that the results and analysis are presented from the perspective of the TSP. Hence, comments and direct quotes from the interviewees are included for the reader's reference. Following Glaser's approach, for the emergence of theory there is emphasis on keeping focus on the data and less on external conditions. Thus, the interpretation of results and emerging theory derive entirely from the analysis of data collected from the interviews. In like manner, the use of visual devices for illustrating theory is less than in Strauss' methods (Goulding, 2002). However, the researcher does employ a few visual devices hoping that they will facilitate interpretation and understanding of the phenomenon under study. The reader must be aware that all concepts and findings derived from this study are grounded; thus, they are not proven to be generalized and are presented as substantive theory. The findings presented are only suggested from the analysis the researcher has performed to answer the RQs that motivated this study.

For this purpose, the author employs an adapted version of the earlier presented Kraljic's (1983) Purchasing Portfolio Matrix and Olsen and Ellram's (1997) Portfolio model of supplier relationships as framework to explain and analyze the findings. Several other researchers in the field of procurement and supply chain including Rogerson et al. (2014) in the development of a framework for analysis of purchasing processes for freight transport services; Skjøtt-Larsen et al. (2003) for a study on EMs and supply chain relationships and Andersson and Norman (2002) comparing the purchasing process of advanced and basic logistics services utilize these approaches to explain sourcing and provider selection; thus, its use is also appropriate for this topic since e-marketplaces are part of the portfolio of options TSP rely on for their operations.

Moreover, for easier readability this section has been divided into three subsections. First, the findings on the current state of EM use among TSP in Sweden are explained and compared to the identified potential EMs could deliver based on the findings. Secondly, following the development of results, the drivers and experiences of TSPs influencing EM use are presented in detail. These two first sections address the first RQ. Lastly, developing on the previous two subsections and aiming to answer the second RQ, five key findings potentially explaining the creation of an EM portfolio are outlined.

4.1. E-marketplace Use in TSP Operations in Sweden

After careful examination and following GT procedures to theory emergence, the findings of this study suggest that e-marketplaces have been purposefully placed in a position where their impact and importance to TSP operations are almost non-existent. The author employs an adapted version of Kraljic's (1983) Purchasing Portfolio Matrix and Olsen and Ellram's (1997) Portfolio model of supplier relationships as framework to illustrate the current use of EMs among TSP in Sweden through **FIGURE 6.** In this portfolio, the dynamics and extent of EM use are graphically represented. The whole matrix represents the business model and operations of the TSP and each quadrant illustrates the category of the different challenges faced daily regarding the sourcing of both capacity and freight. The reader will notice the variables on each axis, "profit margin" and "strategic importance". Each ranging from low to high. For this purpose, TSPs source most of their needs from in-house capacity, key partners, their trusted network and extended network employing traditional direct communication through email and telephone. However, more important than comparing and explaining who handles each quadrant (strategic freight, bottleneck freight, leverage freight or non-critical freight), the purpose of this framework is to show the allocation of EMs in the portfolio of sourcing possibilities. E-marketplaces sit



Source: adapted from Kraljic's (1983) Purchasing Portfolio Matrix and Olsen and Ellram's (1997)

FIGURE 6 E-marketplace Use in a Portfolio Framework - It illustrates the dynamics and extent of EM use among TSPs. The matrix represents the business model and operations of the TSP and each quadrant illustrates the different challenges to sourcing both capacity and freight. TSPs source the majority of their needs from in-house capacity, key partners, their trusted network and extended network. Conversely, EMs sit at the lowest end of both profitability impact and strategic importance for TSP operations shown in the small gray box in the left corner, providing little contribution in comparison to the other suppliers.

at the lowest end of both profitability impact and strategic importance for TSP operations shown in the small gray box in the left corner.

Moreover, all participant firms referred to EM use as a last resort, when there are no other sourcing options available. Secondly, the other function EMs are used for is to *fill-up* trucks to maximize capacity usage. For instance, for TSP 1[1] EMs, although in use, they represent 2% of their business. He referred to EMs as, "a good solution to partners helping to maximize capacity usage problem" (85, Transcript 1) TSP4 referred to a particular EM, Timocom, "is a last option, if you don't have any other people to usually take [the load] because there's a lot of problems going that way... I would use it for filling up the truck" (37-38; 47 Transcript 4). The problems TSP 4 referred to will be further explored in the analysis of results section. Moreover, TSP 5 basically summarized the words of all the other participants in the following statement:

"...number one is to see what we have in-house, what do we have? what can we book from our clients? what loads do we have? can we do something? can we move these trucks somehow from A to B to load this at point B tomorrow? That is number one. Number two, is to work with your existing transport network, and then number three, is to work with your network of maybe not the ones that you deal with on a daily basis. Then, number four, I'd say is the freight exchange" (25-29, Transcript 5)

Lastly, TSP 8 also added to this view when speaking about their sourcing methods and preferences, "my customers and network and last resort is the e-marketplace... I think this is the last place where to put some kind of loads" (45, 52, Transcript 8). This pattern emerged from the first round of interviews and

[1] The quotes from interview participants also protect their confidentiality and anonymity. The in-text citations include the lines in the transcript of the interview as well as the number of transcript of the participant.

it was consistent throughout the process turning it into a pivotal part of this study. However, the findings of this study also suggest that this "last resort" reality is far from the potential contribution EMs could deliver if appropriately implemented. This potential is illustrated in **FIGURE 7**, it shows the impact TSPs' current use of EMs could have if their leverage increased. Their use could assist beyond the scope of low profit and low strategic importance and become a reliable resource incorporated to assist with more important tasks (leverage, bottleneck and strategic).

For instance, among other insight provided by interviewees, TSP 2 admitted the minimal use they give to EMs is "to maybe gain more business from new clients" (58, Transcript 2). TSP 1 said, "you actually transport more efficient when you have less units running around one-way with empty inside" (143-144, Transcript 1). In like manner, TSP 9 supported this view by adding, "the freight exchange is part of the solution to get the empty rounding percentage down" (82, Transcript 9). Additionally, TSP 4 suggests, EMs assist on environmental efficiency, ease workload and profitability, "to sell off the goods to a guy who can do it cheaper and make a profit. It's a win-win situation...you have an easier time on the job and no need to stress about so much because you often have a solution for those loads you cannot load...with online tools you're constantly building up a network" (52-53; 61-62; 18-19, Transcript 4).

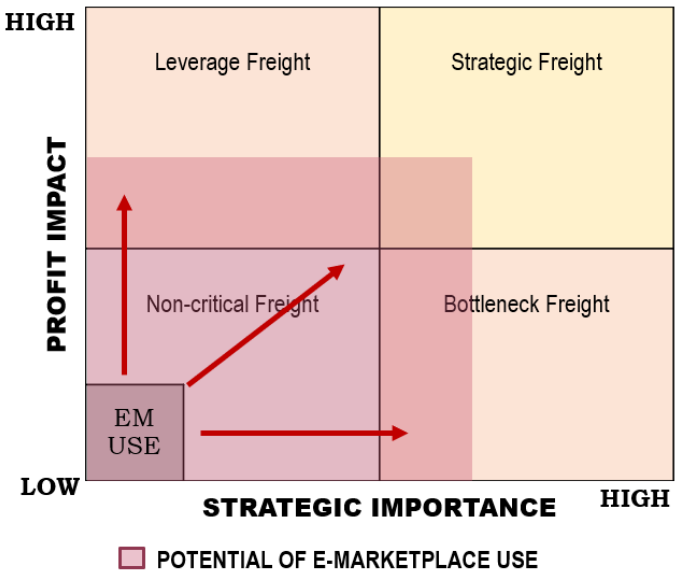


***FIGURE 7* Potential Use of E-marketplaces in a Portfolio Framework** - Illustrates the impact TSPs' current use of EMs could have if their leverage increased. Based on the results of this study, their current use could assist beyond the scope of low profit and low strategic importance and become a reliable resource incorporated to assist with more important tasks (leverage, bottleneck and strategic).

Hence, it can be argued that the perspectives shared are quite positive and promising for the future. However, there is also contrasting views to the previously exposed. For example, among other criticism to EM participation, TSP 1 highlighted that there's possibilities to destroy the market by just participating in the spot market (42, Transcript 1). He suggests that once trust and rapport have been built with new partners reached through EMs, the hope is to leave the marketplace with stronger relations. The perception of the e-marketplace is the dynamics of an auction, cutting down prices for profitability (81-82; 84-87, Transcript 1). Contrasting views supported by first-hand experience and that of others maintain the gap between the potential and the reality of EM use among TSP. Next, more findings from the data gathered and analyzed explain this gap. The reader will realize that there are interesting dynamics affecting use and adoption of EMs among TSPs.

4.2. Drivers & Experiences Affecting E-marketplace Use

As previously exposed, there are mixed opinions about EM use and their leverage for operations among TSP participating in this study. In this section, the author expands on the dynamics use (drivers, conditions and experiences) affecting the use of EMs. In **TABLE 3,** key empirical data gathered from field notes, interviews, memos and literature has been conceptualized into core categories, properties and conditions through the GT data collection and analysis approach. This table summarizes the findings that explain current use of EMs among TSP in Sweden. It provides the foundation for the analysis presented.

The core categories identified, "*Last resort: complementary & secondary*" and "*strategic use*" in the left column, conceptualize the current use of e-marketplaces among participating TSPs in Sweden. In the right column, the properties influencing each category are accompanied by their conditions respectively, both these emerged as patterns through the data analysis process. The categories and properties are further explained below. These findings are the main point of discussion for the analysis in the next section as the author compares them to previous research performed in the field around EMs.

E-marketplace Use: Categories that Emerged from GT Data Analysis	
Core Category	**Properties explaining the Category defined by Conditions**
1. Last Resort: Complementary &Secondary	**a. Price-driven:** Commodity service, cheap labour available, customers push for cheaper solutions, supply surplus & demand shortage, tight margins in industry overall.
	b. Location-Specific: Varies by market, resistant to change, exact location.
	c. Time-sensitive: fast decision-making, updated market knowledge,staff's continuous attention, seasonal.
	d. Not sustainable: Needs regulation and control, stigma around its use (necessary evil), no regard to quality nor environment, potential to destroy market, fast and short-term solution.
	e. Performance: Communication, portfolio-averse, better tools.
2. Strategic Resource	**a. Profitability:** Benchmark, cut costs, maximize capacity usage.
	b. Market Reach: Customer demands, niche market, growth, search accuracy, market penetration, seasonality.
	c. Knowledge & Awareness: Minimum risk, dilligent operations, reference users, not well-educated industry, progressive use.
	d. Availability: Accesible, facilitator, balancing market asymmetries.
	e. Task: Single, double or multiple tasks

TABLE 3 Results from the Grounded Theory Data Analysis – This table summarizes part of the main findings of this study. The core categories, their properties and relationships among them explain the use of EMs among TSP. The core categories identified, "Last resort: complementary & secondary" and "strategic use" in the left column, conceptualize the current use of e-marketplaces among participating TSPs in Sweden. In the right column, the properties influencing each category are accompanied by their conditions respectively, both these emerged as patterns through the data analysis process.

4.2.1. Last Resort: Complementary & Secondary

FIGURE 6 earlier presented graphically illustrated this finding. E-marketplaces are purposefully reduced to a last resort with minimal use and contribution in TSP operations. Additionally, their use is complementary and not key to TSP. However, as part of the research process the author also traced back this finding aiming to further understand the rationale behind this decision. The properties explain why the core categories explaining behavior exist. In the table, each property is accompanied by the conditions identified that build that particular property. The conditions reflect the views on EMs from the perspective of the TSP; in some cases, not only describing EMs but the freight industry overall. The dynamics and characteristics of the EM reflect closely the industry environment as well. Below, the author presents each property along with a general conceptual definition elaborated after the analysis of all interviews.

4.2.1.1. Price-driven: Refers to the perceptions and experiences that competing in EMs is reduced to an auction environment, where service quality and other value-added services are not important but it is all reduced to the lowest-price provider. This nature in an already competitive environment is not appealing for profitability purposes.

4.2.1.2. Location-specific: Refers to the perceptions and experiences that EM participation is dependent on market dynamics according to geographic location. Some countries are more active and engaged in the freight exchange world and Sweden is not one of them.

4.2.1.3. Time-sensitive: Refers to the perceptions and experiences that competing in EMs is a full-time job, it requires attention to detail, current and in-depth knowledge of market information and prices to make immediate decision when an opportunity arises.

4.2.1.4. Not Sustainable: Refers to the perceptions and experiences that EMs are short-term solutions when no other solution is available. In like manner, EMs are negatively perceived as an "trading market" in the industry due to its lack of regulations and control. Everyone uses them, but no one likes to admit they do because of the stigma built around them: high EM use means limited solutions through the firm's network, reliance on the "spot market" and limited source of long-term, stable business flow.

4.2.1.5. Performance: Refers to the perceptions and experiences that good use of EM requires additional efforts and knowledge that in regular communication with partners are not necessary. There is a desire to integrate systems rather than employing multiple systems (a portfolio) to reduce time-consuming activities and maximize productivity when approaching EMs.

The first core category that emerged has also been presented along with its drivers, the properties and conditions. Next, the author presents the second core category that emerged regarding the strategic use of EMs for TSP.

4.2.2. Strategic Resource

FIGURE 7 earlier presented graphically illustrated this finding. According to the insight of this study, TSPs have decided to reduce EM use to minimal contribution to their operations by limiting their function to filling up trucks if there is available capacity to avoid financial loss and maximize capacity usage (85, Transcript 1; 30-38, Transcript 3; 26-28, Transcript 9). However, in this process, although

unintentionally, they have included EMs as part of their business strategy. Interestingly, not all TSPs realize that they are, even if unintentionally or minimally, leveraging on EMs as part of their business strategy. Following Olsen and Ellram (1997) and Kraljic (1983), the identified action plan is to strengthen and leverage EM use according to the long-term of each TSP. EMs are being utilized for very specific tasks which could be leveraged and the results could be significantly better than the currently obtained. In **TABLE 3**, each property is accompanied by the conditions identified that build that particular property. Below, the author presents each property along with a general conceptual definition elaborated after the analysis of all interviews.

4.2.2.1. Profitability: EMs are used to cut costs, maximize capacity usage, reduce empty mileage, find cheaper transport solutions and adjust pricing according to market dynamics.

4.2.2.2. Market Reach: EMs are used to enter new markets, increase network size, grow and establish relationship with customers who demand participation at a specific EM to do business together.

4.2.2.3. Knowledge & Awareness: EMs are used following the adoption by other reference industry competitors and based on information available about them. They are generally perceived a posing "minimum risk"; however, understanding that there is no control over all participants, safety procedures and precautionary measures are implemented.

4.2.2.4. Availability: EMs are used to facilitate the day-to-day work. They are resources available for the use of any TSP in exchange of small fees, if not free, assisting in balancing supply-demand asymmetries characteristic of the industry.

4.2.2.5. Task: EMs are used mostly to buy and sell both capacity and freight; however, they can also provide additional services such as bookings, track and trace among others.

These two sections have presented the findings of this study in regard to the use of EMs and the rationale behind it. These findings provide sufficient ground to answer the first RQ. Next, building on the previous two sub-sections and bringing up additional findings from the data analysis, the author presents the conditions and drivers that lead to the creation of EM portfolios.

4.3. An E-marketplace Portfolio: Why and What for?

In this section, the author presents the findings that help respond the second RQ of this thesis. The word *portfolio* basically means that the TSP is employing two or more EM tools simultaneously or alternatively for similar of different uses. The researcher was intrigued by the drivers and conditions that lead TSP to the adoption of more than one tool, especially if they perform the same or a similar function. The reader should keep in mind the findings previously presented as both RQs are closely related. The EM usage is not increased, nor the purpose of use altered for this question, it is consistent. Moreover, the participants expressed a portfolio-averse perspective; regardless of the usage

intensity and purpose of use, if TSPs could integrate all their tools into their in-house transport management system (TMS) they would avoid managing additional tools.

For instance, TSP 10 justifying their use on a single EM tool, "it costs money and it's not necessary to have many. You can find what you're looking for in Timocom" (34-35, Transcript 10). Likewise, for TSP 9 this is a goal for the near future, "I would like to integrate and have a feature that could drop or pick loads from freight exchanges, directly from the system so to say, so in that case we could reach as many of these exchanges as possible" (36-38, Transcript 9). Also, TSP 5 is looking into "some kind of unified system" (38, Transcript 5). Naturally, for small and medium firms this is a challenge given the IT and financial investments such unified systems require.

Consequently, the reader is now aware that a portfolio of EMs is by no means a goal of any TSP; if possible, they would avoid it. However, after careful examination of the data gathered the results were synthesized to show some valuable insight. There are five key elements that condition and may lead to the creation of EM portfolios. Each element is accompanied by concrete examples from the study participants.

4.3.1. Location-Specific: EM participation is dependent on market dynamics according to geographic location. Some countries are more active and engaged in freight exchange activities; thus, firms operating domestically and abroad will most likely adopt more than one tool according to the needs of each market regardless if it performs the exact same function. The portfolio in this case allows to reach a broader audience. For instance, among the tools used by TSP 5 there's Timocom, "that's mainly because we work with Western Europe and Scandinavia. The freight exchange mainly used for Western Europe and Scandinavia is Timocom". He also adds, "there is some others for South Europe, Spain, South France and so on... But we don't use them because we don't see the benefit of it (81-84, Transcript 5). On the other hand, TSP 7 focused in the Swedish and French market employ both Timocom and Teleroute. "Sometimes there are offers in one of them which are not existing in the other one. So, those two are the biggest ones in the markets we are working with so in this case I use both of them because it might be that some forwarders are only working with Timocom or only with Teleroute" (51-53, Transcript 7).

4.3.2. Customer Demands: Some customers demand participation at a specific EM to do business together, it may be hosted by them or a third party; however, this is enough incentive for TSP to join an EM and possibly even stay active in the platform to negotiate with other participants. For example, TSP 2 started using an EM because a customer required a RFQ through TiContract and since then, they've kept on using it (21-22, Transcript 2). Also, TSP 4 dealing with Danish freight forwarders participates in their private EMs because of their request to participate there (29, Transcript 4).

4.3.3. Different Purpose: Various participants use both public and private EMs. The dynamics within each kind although similar, differ in the peace of mind and safety provided by the legacy and quality stamp of the hosting firm. For example, TSP 1, 5, 7 and 9 participate in DHL's Overflow Schenker's and or Unilever's private EMs. In these platforms, only qualified suppliers are allowed to participate. Additionally, other TSP utilize EMs for different purposes like booking loads. TSP 2 stated that, "Unifaun [they] use to track and trace and make bookings." (34-35, Transcript 2)

4.3.4. Popularity & Mass Adoption: One of the main hooks of EM participation is the behavior and adoption of new technologies by others; hence, if a platform awakened interest of a few the word of mouth through a snowball effect invites the rest to also join. This is the case with the most popular tool in Western Europe and Scandinavia, Timocom. All the participants of this study mentioned the tool at some point in the interviews and they know its use either from personal experience in previous jobs, previous or current use in their firms.

4.3.5. Awareness: Many TSP currently use one or more tools simply because those are the ones they are aware of or have heard from business colleagues or experiences from previous firms, etc. If knowledge and awareness increased regarding the available tools along with their key features, possibly TSP would opt to adopt additional tools. For instance, TSP 11 admitted, "We have so many benefits from the internet, we are just not so well-educated…neither are customers...you know people are conservative." (33-35, Transcript 11). Additionally, TSP 1 said, "per my knowledge, there are not many tools in the market" (33, Transcript 1)

In this last section, the author has synthesized the empirical findings and listed conditions (hypotheses) that would potentially lead a TSP to create a portfolio of e-marketplace tools. Nonetheless, it was also demonstrated that it is not an avenue desired. Contrary to diversification of tools for different use and following the principles of an optimized supply chain, TSP desire integration of these tools into their own TMS. The desire is to eliminate the need of an EM portfolio, and instead replace with both better tools and integrated systems. The rationale is that, although systems are easy to use, it is time consuming at the workplace to alternate between platforms. Thus, these findings provide ground to answer the second RQ. Next, the author presents an analysis of the results in this section in which they are compared to previous studies, theories and existing knowledge in academia.

5. Analysis of Empirical Findings

In this section, an analysis of the empirical findings previously exhibited is presented. The main purpose of this section is to further compare the theory developed in the previous section to other studies in related areas, previous research and knowledge in the field to understand its contribution. Given the time limitations and research experience of the author, it would be a mistake to intend to develop new or formal theory from a small-scale study like this. Hence, the researcher integrates and critiques the results of this study in relation to their use and potential contribution to the development of more formal theory in future studies. The direction and possibilities for analyses of the results are plenty and the length of this report would be significantly extended. However, instead of unnecessarily extending over each finding, the author intends to provide an insightful analysis focused on the most interesting, relevant and value-adding relationships of the findings for both practitioners and academics.

The most important and interesting similarities and differences addressed by the findings of this study are compared to previous research and knowledge. This comparison will demonstrate how theory and practice can be similar or differ.

5.1. Use and Adoption of E-marketplaces among TSP in Sweden

In this subsection, the results shown in the previous section were compared to the literature and previous research work performed in the field looking for similar patterns and similarities in behavior of the

participants. The findings of this study are consistent with and support previous studies performed in the field. They include the following:

The fact that EMs are *secondary and complementary* to TSPs' business strategies; purposefully placed at the lowest point in terms of strategic importance and profitability in a sourcing of suppliers' portfolio. Considered a *last resort* lagging behind key partners, trusted network and extended network of TSP in Sweden. This finding suggests consistency with previous studies reflecting that human relationships are important and not yet replaced by IS such as EMs. For instance, Sternberg et al. (2013) pointed out that an organization invests in relationships with other actors and thus develops knowledge of their partners within the network (Sternberg et al., 2013). In like manner, Hakansson and Snehota (2006) claimed that an organisation operates and interacts with its key stakeholders (in Wang et al., 2011). Originally intended to become intermediaries between shippers and carriers, EMs are successfully performing and evolving in that task throughout the years; however, in Sweden TSPs keep minimum EM usage while preferring direct contact with their trusted network and partners via email and telephone. Additionally, former IT specialist and application developer, Tony, referring to the freight transport industry in Sweden said, "if you think about it, it's an industry that hasn't had the need to innovate…[they] have been on the sweet spot. Everybody can move goods and there is not much you can do to add value. The only way to add value is to grow; become a big company, collecting a lot of goods. Other than, innovation is close to zero" (42-45, Transcript 13). These findings exemplify and support the conclusions of the study by Peter et al. (2001) on how TSP have been laggards in adopting the web for improvement of their operations (Peter et al., 2001). Also, another study by Dawn et al. (2008) found that the most relatively stable industries are less likely to adopt integrative e-procurement applications.

Along the same lines of the previous point, a study by Skjøtt-Larsen et al. (2003) suggested that the basic notions of EMs and supply chain management (SCM) might not fit because SCM aims towards integrated, strong and close relationships whereas EMs usually foster arm's-length relationships. However, in some cases, SCM can use EMs to support its strategic goals, as not all supply chain relationships have to follow tight relations. Reinforcing the notion of EMs as *complementary* tools to the main business strategy, the findings of this study confirm what was previously exposed. For instance, TSP 10 referring to EMs said, "always the lowest prices there and that is not our business, but if you combine it with something else it should be okay" (61, Transcript 10). In like manner, TSP 11 stated, "I think you need both (EMs and company network). As a customer you can have easy cargo like wood that should go from this place to that. But when you need to know when and how it will arrive and that it will not be damaged, I'd recommend that you have a personal contact" (25-27, Transcript 11). These arguments support the dichotomy between EMs and a personal network which justify the decision to keep EMs under a secondary role as a last resort. EMs are not at a developed stage in which they can replace a trusted partner/relationship, yet they are incorporated to the business strategy under the understanding that if properly combined with the other suppliers in the portfolio the results are good.

The *price-driven* and *non-sustainable* nature of EMs negatively perceived by TSP in Sweden confirms the findings of previous studies. For example, 3PL providers and transport providers perceive that their customers are not willing to pay a premium price for more environmentally efficient logistics services (Lammgård, 2012; Rossi et al. 2013) Also, another study by Lammgård and Andersson (2014) concluded that logistics managers also prioritize reliability, transport quality, geographic coverage when selecting transport suppliers; however, price is the most important factor (Lammgård and Andersson 2014). Further, Rossi et al. (2013) found that TSP managers consider the customer to be the main driver towards eco-efficiency. Additionally, not only is this finding consistent with these previous studies but is also fundamental to understand that EMs are not the ultimate responsible for intensifying price competition; opposed to the perception some TSPs have: "those systems are built up to make the

cheapest solution you can, and they don't give a shit about the environment or anything like that" (75, Transcript 10). In reality, the whole supply chain is involved in continuously driving prices down and focusing on it rather than other aspects. TSP 11 explained it well, "today it's just money, money, money. The price should be low price. Customers are not willing to pay for that additional quality. Everyone's cutting 10%, and the next one cuts 10%, and the next cuts 10%, everyone wants to take a piece of the cake" (51-52; 57; 75-76, Transcript 11). In like manner, TSP 3 said, "what the market says is that it's good for the environment, but we don't care. If it costs more, we don't want to pay for it. Sustainability is good, but we don't want to pay more; that's what the market is saying" (96; 101-103, Transcript 3). Moreover, TSP 1 also agreed with this perspective, "the customer is driving high price pressure. It's price that is the main reason to use these tools, to reduce costs" (142-143, Transcript 1). Consequently, it can be argued that EMs are indeed the platform leveraged and used to bring together shippers and carriers looking for cheaper solutions; however, the technology is not responsible but the users and the dynamics and strategies being utilized in this environment. The behavior portrayed in these platforms reflects the nature of a commoditized-service industry where differentiation is scarce and there is plenty of supply price competition is reinforced. This is consistent with generic EM literature earlier exposed. On the other hand, the findings of this study oppose the conclusions of a study by Govindan et al. (2015), which claimed that price is not the most common important criterion for supplier selection, but quality of the service. This conclusion may apply for ethical and sustainability-oriented shippers and vendors. However, according to the findings of this study, in general, price is the ultimate criterion for supplier selection and in the realm of e-marketplaces even more.

Following on the previous point, a study by Boyson et al. (1999) pointed that TSP should not only focus on short-term solution leading to cost savings or revenue enhancements, but also plan for continuous improvements. The study also suggested that TSPs should actively interact with their customers to address necessary changes. Further, these findings confirm the proposed potential use of EMs shown in the last section. Currently, TSP are used for se*condary purposes* and *last resort problem-solvers* for last minute situations. This is the current *strategic* use assigned to EMs. However, as Boyson et al. suggest, by following this strategy TSP fail to plan for the long-term in which they could integrate EM use in more specific tasks, where their contribution would be higher for the profitability and strategic performance of the firm. Additionally, as it was exposed in the previous point, the awareness that it is the customer of the TSP, the shipper and ultimately the product vendor driving the prices down is a concern that should be addressed directly by the TSP. Moreover, it is an issue that concerns the whole supply chain and must be addressed. For instance, TSP 5 have brought up the topics to their customers, "We cannot do it cheap, but we can do it better" (74, Transcript 5). Also, TSP 6 has addressed the topic directly with potential customers who bargain for his services, "we tell the client, 'good luck. When you need some service, call us'" (87, Transcript 6). Moreover, this behavior reinforces the previous points reflecting on *sustainability* and *trusted network partners* and it is a good precedent for the following point on *communication*. Most importantly, this point brings to light an important reflection during the data analysis that emerged when the researcher was conducting phone calls and later the interviews. There is a *stigma* built around EM use among TSP, yet they are widely used; they are a *necessary evil*. In like manner, the limited use of the tools reflected in the results of this study, appeared as responsible use of EMs.

No TSP wants to openly admit they use one or more EMs yet they're key to profitability when margins are small. For instance, referring to the percentage of business handled through EM tools TSP 3 suggested, "if you do it like I do 5% to 10%, but if you soar up to 60% or 100%, you are not looking for new suppliers. You are just trading...you don't need to be good at forwarding anymore" (140-141; 127, Transcript 3). On the other hand, the bigger carriers (e.g. DHL, Schenker, DSV, etc.) are referred as the

firms making the most use of EMs; thus, their operations are perceived as abuse of EM leverage. For instance, TSP 3 commented, "if you would ask DHL or Schenker or any of the big ones, probably like 30 or 40% of their volumes is based on trading and spot market pricing, but we don't do that much...we call them the dragons, they really know how to use the system because they use on a daily basis" (31-33; 60-62, Transcript 3). Furthermore, reinforcing the stigma around EM use another comment by TSP 5, "No one wants to admit they use EMs, to the client" (13, Transcript 5). Thus, this situation illustrates an interesting fact: the customer (shipper/vendor) is demanding cheaper transport solutions, which are not sustainable from the TSP's perspective if they wish to provide good service and quality transport. Consequently, to avoid losing the customer and their business, the TSP then turns to the EM to find another supplier who can perform the service for less so that profitability remains acceptable for the TSP. This practice as earlier explained is perceived as cheating and irresponsible among TSP, hence the stigma around using EMs. Nonetheless, the ultimate responsible of driving price-competition is also the party who should not find out about the use of EM tools to subcontract their cargo to make it profitable. It's contradicting and supporting all the previous points, *non-sustainable*. Lastly, it can be argued that conversely to belief among TSPs in this study, carriers like DHL and Schenker have actually seized the potential EMs can deliver to the business strategy.

A study by Gadde and Hulthén (2009) pointed out that insufficient sharing of information among parties and lack of understanding between them are two of the main reasons why logistics outsourcing fails. Information sharing is critical in the coordination of interdependent activities, especially if the TSP is losing control over the transport activities. Likewise, the results of this study reflect that *communication* and *information sharing* are among the most important flaws identified on EMs. These flaws encourage TSP to reduce the use of the tools and instead opt for their trusted personal contacts with whom *communication* flows naturally and parties understand each other mutually and know exactly what to expect from the counter-party. For instance, TSP 3 reflected on this, "the tools work but there could be a bit lack of communication. That's the biggest thing. A lot of google translate is used" (114-115, Transcript 3). TSP 4 suggested additional efforts are needs to participate in EMs, "you need to put more communication through Timocom, which you don't need to do with a guy you know" (37, Transcript 4). Lastly, TSP 7 also reflected on how the information is not transparent, "it can be a little bit tricky in the way of presenting their contract..." (147, Transcript 7). Further, optimization of logistics activities requires information transparency; however, the EM environment does not encourage this behavior due to the nature of *short-term* transactions, distant relationship and little rapport and trust built among participants.

A study on elements that influence user-loyalty to EMs by Janita and Miranda (2013) concluded that users' satisfaction has no direct influence on their loyalty. Further, industry is a context that encourages organizations to follow or copy their competitor's behavior (Batenburg, 2007). The results of this study are consistent with those findings. For example, other comments from various participants included, "it should have more to offer to be honest. It's an okay tool, but not more than that" ... "per my knowledge, there are not many tools in the market" ... "they have been on the market for many years. In our experience, this is where we find most cargo and some additional capacity". Thus, in this study, the participants demonstrated that factors such as lack of *awareness* about other tools, *knowledge* (or lack of) about the use and features, *location-specific* needs, *demands by customer*, adoption by other industry players and *popularity* of the tool among other factors are enough ground to keep TSPs involved with an EM, even though they are not fully satisfied with the performance and features of the tool.

Another research by Ordanini (2006), suggests that for a B2B exchange to be successful, it should be owned by a well-established company in the business area it is operating. The findings of this study support this conclusion; nonetheless, there is another important detail the author will expand on. As it

was previously exposed in the results, indeed *location-specific needs* and *customer demands* are two key elements that will encourage TSP involvement in EMs and even foster the creation of an EM portfolio. Additionally, it was also exposed that the quality stamp and reputation of the technology provider/host impacts the perception around the EM. For instance, DHL, Schenker, Timocom and Teleroute have built a reputation, legacy and popularity around their business that their users feel secure and trust the platform like they trust the hosting company. Moreover, a study by Pressey et al. (2009) revealed that security concerns at e-marketplaces entail the use of sensitive information provided on these sites to adjust pricing strategies of a few powerful firms ultimately damaging fair buyer-supplier competition.

Nonetheless, the results of this study reflect that neither trust nor safety are concerns of EM use among TSPs in Sweden; regardless if the tool is public or private. The reader will have noticed that price-driven competition, communication, additional effort and time required, controls and regulations among others were the most common cause of concern in EM participation. For instance, TSP1 said, "there is no problem with trust and so on. It works fine and you get paid in the right time and everything is smooth" (106-107, Transcript 1). He also added that the risks at EMs are minimal, not getting paid by the customer would be the same as travelling empty, and if that happened control systems are in place to avoid that. Also, TSP 2 told that the information they share is not company confidential; thus, there is no security concerns whatsoever from them. (44-45, Transcript 2). In like manner, TSP 5 expanded on their cautionary approach when using EMs, "maybe if you are in an open exchange like Timocom, if you get a strange email from a Gmail address in Ukraine then you maybe think, 'Ok. This company, I don't know them. They're writing from a Gmail address.' Then, it doesn't matter how low they bid because I wouldn't give them a load anyway. I don't know the company, I have no history with them". (60-64, Transcript 5). It reflects professionalism, knowledge of the environment, diligence and proactiveness in the usage of public platforms. Thus, it could be argued that naturally, an EM will never be like dealing with a trusted partner yet taking precautionary measures additional to the security controls already provided by the technology providers provide extra protection and peace of mind for the user.

Lastly, agreeing with Wang et al. (2011), the findings of this research study confirm the notion that TSPs are less trusting of their competitors and therefore do not proactively seek horizontal collaboration between themselves. Supporting the study by Moen (2016) which concluded that the freight service sector in Sweden is considerably conservative and resistant to change and transparent information sharing. From a logistics perspective, horizontal collaboration between shippers or between carriers can encourage the reduction of empty running and better utilization of TSP' capacity at a network level (Sherer, 2005 in Wang et al., 2011). However, this collaboration requires the sharing of highly sensitive information such as routes, prices and volumes. (Wang et al., 2011). Furthermore, the road towards SC optimization is through transparent information sharing. EMs are part of the solution to empty rounding by bringing together shippers and carriers regardless of geographic location, reaching new markets and fostering growth beyond current operations, facilitating day-to-day tasks by providing transport solutions a click away and balancing supply-demand asymmetries given that generally there is always more transport than cargo available However, the tools provide a meeting place, not a guideline on freight transport business strategies; the environment surrounding EMs is a reflection of the industry: tight profit margins, stiff price-competition and little regard to quality and value-added services. The quality improvement of EMs and increase in their usage among TSP operations depends on involvement of industry authorities to set standards for participants and standardization of services, but most importantly requires a change in mentality of the users.

In this analysis, the author has expanded on the consistencies and differences this study has compared to previous research studies. As a result, deeper meanings on the findings have emerged reflecting the complexities surrounding EM use within the context of an already competitive freight transport industry in Sweden. In the next section, a concluding discussion on the results of this study as well as the managerial and theoretical implications of the findings are outlined.

6. Concluding Discussion

In this section, the author summarizes the findings responding to the RQs motivating the study. Additionally, the theoretical and managerial implications are outlined. Lastly, the limitations of the findings of this study are listed as well as future research directions suggested by the author.

6.1. Conclusions

First, addressing **RQ1, what are the usage dynamics of e-marketplaces among TSP operations?**

This study has concluded that there are two main categories that describe the use of EMs among TSPs. The first is as *last resort, a complementary and secondary use* within the portfolio of options available to source transport. Secondly, as *strategic resource* used for specific strategic purposes. The former explains the perception and current use while the latter explains the potential contribution identified based on the current use.

Further, the dynamics influencing their use were also identified. It was concluded that EM use is a *last resort* and performs a *complementary and secondary role* because:

a) EM participation is reduced to *price-competition* with no regard to quality nor environmentally conscious services by the buyers
b) The market dynamics of *specific locations* encourage or discourage the use of EMs. Some countries are more engaged in EMs than others, and Sweden is not one of them.
c) EMs are *time-sensitive*. They require attention to detail, current and in-depth knowledge of market information and prices to make immediate decision when an opportunity arises.
d) EMs are *not sustainable*. They are short-term solutions when no other solution is available. Also, they are negatively perceived as an "trading market" in the industry due to its lack of regulations and control which has built a stigma around them and their use.
e) Good EM *performance* requires additional efforts and knowledge that in regular communication with other portfolio partners are not necessary.

On the other hand, the dynamics influencing their use as *strategic resources* were also identified. They are the following:

a) EMs are used for *profitability*: to cut costs, maximize capacity usage, reduce empty mileage, find cheaper transport solutions and adjust pricing according to market dynamics.
b) EMs are used to *reach new markets*, increase network size, grow and establish relationship with customers who demand participation at a specific EM to do business together.
c) EM use requires *knowledge* and *awareness* of competitors. They are used following the adoption by other reference industry competitors and based on information available about them.
d) EMs are used to facilitate the day-to-day work. They are *available* for the use of any TSP in exchange of small fees, if not free, assisting in balancing supply-demand asymmetries characteristic of the industry.
e) EMs are used mostly to buy and sell both capacity and freight; however, they can also perform different *tasks* such as bookings, track and trace among others.

Overall, the core categories and properties previously presented in the findings reflect the power shippers possess in the freight transport industry. It can be argued that TSPs rely heavily on the decision making of their customers. On the other hand, EMs are not different solutions to the current operations of freight transport: moving goods from point A to B, in a timely manner at the lowest possible cost. It appears TSPs are disappointed about this outcome; however, it is not the EMs per se but the nature of

an industry providing a commoditized service and the behaviors of its participants which keep driving the competitiveness down to price.

Additionally, addressing **RQ2, what leads to the creation of e-marketplace portfolios?**

This study identified situations that lead TSPs to the creation of EM portfolios. These are outlined below:

a) *Location-specific:* TSPs operating domestically and abroad will most likely adopt more than one tool according to the needs of each market regardless if it performs the exact same function. The portfolio in this case allows to reach a broader audience.
b) *Customer demands:* Some customers demand participation at a specific EM to do business together, it may be hosted by them or a third party; however, this is enough incentive for TSP to join an EM.
c) *Different purpose:* Various participants use both public and private EMs. Additionally, other TSP utilize EMs for different purposes like booking loads. The portfolio in this case enables different tasks and purposes.
d) *Popularity & mass adoption:* One of the main hooks of EM participation is the behavior and adoption of new technologies by others; hence, if a platform awakened interest of a few the word of mouth through a snowball effect invites the rest to also join.
e) *Awareness*: Many TSP currently use one or more tools simply because those are the ones they are aware of or have heard from business colleagues or experiences from previous firms, etc. If knowledge and awareness increased regarding the available tools along with their key features, possibly TSP would opt to adopt additional tools.

The situations which may potentially lead to the creation of an EM portfolio have been outlined. However, the ideal and desired state is portfolio-averse. This study also concluded that the goal of TSPs is to either replace their current EMs by better tools or integrate them to their in-house TMS so there is no need to navigate in multiple systems because it is time-consuming and requires additional efforts to adapt to different systems. It was also concluded that this goal is difficult to achieve given the limited access to resources most small and medium firms have.

6.2. Managerial Implications

In order for EM use to be more beneficial to TSP operations and shipper-TSP relations, the mentality around EMs must change. The focus needs be sustainability-oriented with quality transport and service at the core. The potential use and leverage of e-marketplaces identified in this study is attainable under the commitment from all stakeholders across the supply chain to an improvement in industry practices overall. This study showed that EMs are the reflection of an industry that due to its commoditized-service, little differentiation in services encourages transport buyers to bargain for lower prices. Thus, the EMs have become the platform where this issue is addressed in order to remain profitable and it has become the norm. The question is whether this change will organically occur from within the industry or through smaller firms and startups interested in sustainable development of the freight transport industry in Sweden.

Additionally, it was exposed that EM participation is widely criticized and frowned upon among TSPs; however, the majority are participating in one or more EMs. They are necessary and perform strategic tasks in today's road freight transportation. However, the study showed that TSPs may often fail to incorporate EM use properly because they are still relative strangers to the area and lack the personnel and experience necessary to thrive in it. There is a lack of knowledge even among industry practitioners

regarding EMs and their use. Moreover, this study also showed that successful implementation of EMs into TSP's operations requires continuously updating market knowledge and insights on supply and demand as well as on-going communication with the trusted network. If the TSP desires to maximize the potential and reap the best benefits of EM participation, it is necessary to invest in educating their staff if they haven't done so yet. The fast-paced technology improvements leveraged by the easy access to the web will continue providing advantages to those firms first adapting to innovation.

Third, it was clearly exposed through the findings of this study and consistent with previous studies on EMs, that the secondary and complementary role of EMs perform for TSP in Sweden is to fill-up trucks, reduce empty miles and maximize capacity utilization to reduce financial losses. EMs provide solutions mainly for less-than-truckload (LTL) rather than full-truckload (FTL). Moreover, it was also pointed out that this focus on LTL is one of the reasons why TSPs do not rely much on EMs. Hence, in practice this identified gap should be noted by technology providers as a potential area to venture on. There is potential to provide alternative and better solutions to the currently offered EMs; the challenge would be to create awareness of the tool and attract loyal users to the platform.

6.3. Theoretical Implications

This study contributes to academia by addressing an empirically unexplored topic suggested as relevant and needed by several researchers mentioned earlier including Nippa et al. (2011), Peter et al. (2011), Janita & Miranda (2013), Kuyzu et al. (2015) and Moen (2016). It provides insight on e-marketplace use and conditions influencing it, shipper-TSP relationships, SC environmental dynamics and perspectives on portfolio creation. Although a small-scale study, it has further developed empirical studies around e-marketplaces and an untapped area of research in Sweden has also been addressed. Consequently, interesting possibilities for future research have emerged. These are outline in the next section. Additionally, the substantive theory or findings of this study may serve as useful contributors to the development of more formal theory. Likewise, this study can be replicated in different contexts, countries and cultures to compare and either support or critique the generalizability of the study.

Also, this study has also revealed a gap between theory and practice in the field. The results of this study suggest that unless EM participants shift mentality around the standards of the freight transport industry overall, there is nothing EMs can contribute to the environment on their own. The purpose of use has to change. This study revealed that green practices and sustainability is "just a talk" because transport service buyers (e.g. vendors, receivers, shippers) are not interested in paying more expensive transport services for these features.

6.4. Limitations

This study is an initial step in the understanding of e-marketplace adoption and use among TSPs in Sweden. It provided valuable insight for both academia and industry; nonetheless, there are a few limitations to this study that must be outlined for the reader. First, this study has examined, although in-depth, the experience of a small group of TSPs in Sweden. Thus, drawing generalizations from these findings is not suggested since even the data collected showed that different results may be found if the study were performed in a different country like Germany or France. In like manner, the findings of this study reflect on the freight transport industry; an industry characterized by very particular dynamics and competition. For this reason, the results need to be carefully interpreted before being assumed for other sectors.

Second, GT requires dimensionality; this means that phenomena need to be seen from various aspects (Randall and Mello, 2012). In this case, the author was able to gather data from several reliable sources; however, the data is based from one member of each organization and not from different management levels as it would have been desired to enhance the richness of the study. The main reason behind this limitation was the denial from the participants originally interviewed at each organization. They denied that contact would be made with other member of the same organization in regard to the study because they either didn't want their employees to take time away from their jobs or it was perceived that the content of the study was confidential and therefore it should be carefully addressed only by certain people. This realization leads to another limitation derived from the GT approach.

GT's greatest drawback is its interpretative nature (Randall and Mello, 2012), and the researcher is aware of the limited ability to interpret data. It is rather difficult to determine whether theoretical saturation was indeed reached since the researcher may have needed to spend significant additional time sampling more organizations and individuals before no new theoretical concepts emerged from the research. However, this was technically impossible given the time limitations to complete this study.

6.5. Future Research Directions

For future research, it would be interesting to enlarge the size of the sample to cover other countries with different cultures and geographical areas to support the generalizability of the study and compare varying results according to location. Second, this study was strictly focused on the perspective of the transport service provider; similar studies with focus on shipper could possibly draw different and valuable insight. Third, details on functionality, features and performance of the e-marketplaces are not specified in this study as the main focus is on understanding the TSPs' perspective as a user. Future research is suggested on tactics and strategies to manage e-marketplace portfolios that successful firms are employing.

Fourth, many of the interview respondents were both operational and managerial decision-makers. For future research, it would be interesting to investigate the role and relationship the leadership-style or the leader's personality have and how they affect the view, adoption and use of EMs in operations. Lastly, in this study the researcher relied fully on the interview responses and behavior displayed by the interviewees as data be analyzed. A similar study based on field observations may provide different insight to what has been discovered in this study.

7. Reference List

Altayyar, A., & Beaumont-Kerridge, J. (2016). External Factors Affecting the Adoption of E-procurement in Saudi Arabian's SMEs. *Procedia - Social And Behavioral Sciences*, *229*(5th International Conference on Leadership, Technology, Innovation and Business Management 2015, ICLTIBM 2015, 10-12 December 2015, Istanbul, Turkey), 363-375. doi:10.1016/j.sbspro.2016.07.147

Anand, N. (2005). Emerging internet-enabled auction mechanisms in supply chain. *Supply Chain Management: An International Journal*, (3), 162. doi:10.1108/13598540510606214

Andersson, D., & Norrman, A. (2002). Procurement of logistics services—a minutes work or a multi-year project?. *European Journal of Purchasing And Supply Management*, *8*(10th Annual IPSERA Conference), 3-14.

Araujo, L., Dubois, A., & Gadde, L. (1999). Managing Interfaces with Suppliers. *Industrial Marketing Management*, *28*(5), 497-506.

Batenburg, R. (2007). E-procurement adoption by European firms: A quantitative analysis. *Journal of Purchasing And Supply Management*, *13*(Special Issue-Methods), 182-192. doi:10.1016/j.pursup.2007.09.014

Björklund, M., & Paulsson, U. (2014). *Academic papers and theses : to write and present and to act as an opponent*. Lund : Studentlitteratur, 2014 (Danmark).

Bowen, G. (2008). Naturalistic inquiry and the saturation concept: a research note. *Qualitative Research*, *8*(1), 137-152.

Boyson, S., Corsi, T., Dresner, M., & Rabinovich, E. (1999). MANAGING EFFECTIVE THIRD PARTY LOGISTICS RELATIONSHIPS: WHAT DOES IT TAKE?. *Journal of Business Logistics*, *20*(1), 73.

Carbone, V., & Stone, M. A. (2005). Growth and relational strategies used by the European logistics service providers: Rationale and outcomes. *Transportation Research Part E*, *41*(Global Logistics), 495-510. doi:10.1016/j.tre.2005.06.001

Carter, C., Kale, R., & Grimm, C. (2000). Environmental purchasing and firm performance: an empirical investigation. *Transportation Research Part E: Logistics And Transportation Review*, *36*(3), 219-228. http://dx.doi.org/10.1016/s1366-5545(99)00034-4

Chang, H. and Wong, K. (2010). Adoption of e-procurement and participation of e-marketplace on firm performance: Trust as a moderator. *Information & Management*, 47(5-6), pp.262-270.

Chapman, R. L., Kandampully, J. & Soosay, C. (2003). Innovation in logistic services and the new business model. International Journal of Physical Distribution & Logistics Management, 33 (7), 630-650.

Charmaz, K. (2006). *Constructing grounded theory:a practical guide through qualitative analysis*. London: SAGE, 2006.

Charmaz, K., & Bryant, A. (n.d). *The SAGE Handbook of Grounded Theory*. SAGE Publications.

Cho, J., & Trent, A. (2006). Validity in qualitative research revisited. *Qualitative Research, 6*(3), 319-340. doi:10.1177/1468794106065006

D. Harrison, M., & Norman L., C. (2001). What Trust Means in E-Commerce Customer Relationships: An Interdisciplinary Conceptual Typology. *International Journal of Electronic Commerce*, (2), 35.

Dawn H., P., Delvon B., P., & Larry C., G. (2008). Using Electronic Procurement to Facilitate Supply Chain Integration: An Exploratory Study of US-based Firms. *American Journal of Business*, (1), 23. doi:10.1108/19355181200800002

de Boer, L., Labro, E., & Morlacchi, P. (2001). A review of methods supporting supplier selection. *European Journal of Purchasing And Supply Management, 7*75-89. doi:10.1016/S0969-7012(00)00028-9

Department for Transport. (2008). *Electronic Logistics Marketplaces Research Report* (pp. 4-32). Cardiff: Cardiff University.

Eisenhardt, K. M. (1989). Building Theories from Case Study Research. *Academy of Management Review*, *14*(4), 532-550. doi:10.5465/AMR.1989.4308385

Elmaghraby, W. (2004). AUCTIONS AND PRICING IN E-MARKETPLACES. *Handbook of Quantitative Supply Chain Analysis: Modeling in The E-Business Era*, 213-245.

ERTRAC SRA. 2010. Towards a 50% More Efficient Road Transport System by 2030. Brussels: ERTRAC.

Esper, T. L., & Williams, L. R. (2003). The Value of Collaborative Transportation Management (CTM): Its Relationship to CPFR and Information Technology. *Transportation Journal (American Society of Transportation & Logistics Inc)*, *42*(4), 55-65.

European Commission. 2011. "Roadmap to a Single European Transport Area – Towards a Competitive and Resource Efficient Transport System." In Mobility and Transport, edited by European Commission. Brussels: European Commission.

Evangelista, P. (2014) Environmental sustainability practices in the transport and logistics service industry: An exploratory case study investigation, Research in Transportation Business & Management, 12, 63-72.

Figliozzi, M., Mahmassani, H., & Jaillet, P. (2003). Framework for Study of Carrier Strategies in Auction-Based Transportation Marketplace. *Transportation Research Record: Journal of The Transportation Research Board, 1854*, 162-170. http://dx.doi.org/10.3141/1854-18

Gadde, L., & Hulthén, K. (2009). Improving logistics outsourcing through increasing buyer–provider interaction. *Industrial Marketing Management, 38*(IMP 2008 - An Interactive Perspective on Business in Practice), 633-640.

Glaser, B. G. (1978). *Theoretical sensitivity: advances in the methodology of grounded theory*. Mill Valley, Calif. : Sociology Press, cop. 1978.

Glaser, B. G. (1992). *Basics of grounded theory analysis: emergence vs forcing*. Mill Valley, Calif. : Sociology Press, cop. 1992.

Glaser, B. G., & Strauss, A. L. (1967). *The discovery of grounded theory : strategies for qualitative research*. Chicago, Aldine, 1967.

Goldsby, T. J., & Eckert, J. A. (2003). Electronic transportation marketplaces: a transaction cost perspective. *Industrial Marketing Management*, *32*(3), 187-198. doi:10.1016/S0019-8501(02)00262-6

Golob, T. F., & Regan, A. C. (2002). Trucking Industry Adoption of Information Technology: A Structural Multivariate Probit Model.

Govindan, K., Rajendran, S., Sarkis, J., & Murugesan, P. (2015). Multi criteria decision making approaches for green supplier evaluation and selection: a literature review. *Journal of Cleaner Production*, *98*(Special Volume: Support your future today! Turn environmental challenges into opportunities.), 66-83. doi:10.1016/j.jclepro.2013.06.046

Hassan, H., Tretiakov, A., Whiddett, D., & Adon, I. (2014). Extent of E-procurement Use in SMEs: A Descriptive Study. *Procedia - Social And Behavioral Sciences*, *164*, 264-270. http://dx.doi.org/10.1016/j.sbspro.2014.11.076

Hedvall, K., Dubois, A., & Lind, F. (2017). Variety in freight transport service procurement approaches. *Transportation Research Procedia*, *25*, 806-823. http://dx.doi.org/10.1016/j.trpro.2017.05.459

Holter, A., Grant, D., Ritchie, J. & Shaw, N. (2008). A Framework for Purchasing Transport Services in Small and Medium Size Enterprises. International Journal of Physical Distribution and Logistics Management, 38 (1), 21–38.

Huang, G., & Xu, S. (2013). Truthful multi-unit transportation procurement auctions for logistics e-marketplaces. *Transportation Research Part B: Methodological*, *47*, 127-148. http://dx.doi.org/10.1016/j.trb.2012.10.002

Janita, M. S., & Miranda, F. J. (2013). The antecedents of client loyalty in business-to-business (B2B) electronic marketplaces. *Industrial Marketing Management*, *42*(Business Models - Exploring value drivers and the role of marketing), 814-823. doi:10.1016/j.indmarman.2013.01.006

Kraljic, P. (1983). Purchasing must become supply management. *Harvard Business Review*, *61*(5), 109.

Kuyzu, G., Akyol, Ç., Ergun, Ö. and Savelsbergh, M. (2015). Bid price optimization for truckload carriers in simultaneous transportation procurement auctions. *Transportation Research Part B: Methodological*, 73, pp.34-58. doi:10.1016/j.trb.2014.11.012

Lammgård, C. Intermodal train services: A business challenge and a measure for decarbonisation for logistics service providers. (2012). *Research in Transportation Business and Management*, (December 2012), 48. doi:10.1016/j.rtbm.2012.11.001

Lammgård, C., & Andersson, D. (2014). Environmental considerations and trade-offs in purchasing of transportation services. *Research In Transportation Business & Management*, *10*, 45-52. http://dx.doi.org/10.1016/j.rtbm.2014.04.003

Liljestrand, K., Christopher, M., & Andersson, D. (2015). Using a transport portfolio framework to reduce carbon footprint. *International Journal Of Logistics Management*, *26*(2), 296. doi:10.1108/IJLM-06-2013-0073

Locke, E. A. (2007). The Case for Inductive Theory Building. *Journal of Management*, *33*(6), 867-890.

Luomakoski, J., & Siivonen, K. (2010). Why did electronic B2B marketplaces fail?. *HAAGA-HELIA Publication Series*, 4-37.

Lynagh, P. M., Murphy, P. R., Poist, R. F., & Grazer, W. F. (2001). Web-Based Informational Practices of Logistics Service Providers: An Empirical Assessment. *Transportation Journal (American Society Of Transportation & Logistics Inc)*, *40*(4), 34.

Marasco, A. (2005). Business Models of Transportation Electronic Marketplaces: An Empirical Survey. *Institute for Service Industry Research (IRAT)*, 42 (1), 77-92.

Mello, J., & Flint, D. J. (2009). A REFINED VIEW OF GROUNDED THEORY AND ITS APPLICATION TO LOGISTICS RESEARCH. *Journal of Business Logistics*, *30*(1), 107-125.

Moen, O. (2016). The Five-step Model – Procurement to Increase Transport Efficiency for an Urban Distribution of Goods. *Transportation Research Procedia*, *12*(Tenth International Conference on City Logistics 17-19 June 2015, Tenerife, Spain), 861-873.

Nandiraju, S., & Regan, A. (2008). Freight Transportation Electronic Marketplaces: A Survey of the Industry and Exploration of Important Research Issues.

Nippa, M., Pidun, U., & Rubner, H. (2011). Corporate Portfolio Management: Appraising Four Decades of Academic Research. *Academy of Management Perspectives*, *25*(4), 50-66. doi:org/10.5465/amp.2010.0164

Olsen, R. F., & Ellram, L. M. (1997). A Portfolio Approach to Supplier Relationships. *Industrial Marketing Management*, *26*(2), 101-113.

Ordanini, A. (2006). WHAT DRIVES MARKET TRANSACTIONS IN B2B EXCHANGES?. *Communications of The ACM*, *49*(4), 89-93. doi:10.1145/1121949.1121953

7.2. Other References

Pappu, M., & Mundy, R. A. (2002). Understanding Strategic Transportation Buyer-Seller Relationships from an Organizational Learning Perspective: A Grounded Theory Approach. *Transportation Journal (American Society Of Transportation & Logistics Inc)*, *41*(4), 36-50.

PETER M., L., PAUL R., M., RICHARD F., P., & WILLIAM F., G. (2001). Web-Based Informational Practices of Logistics Service Providers: An Empirical Assessment. *Transportation Journal*, (4), 34.

Piera, C., Roberto, C., Giuseppe, C., & Teresa, M. (2014). E-procurement and E-supply Chain: Features and Development of E-collaboration. *IERI Procedia*, *6*(2013 International Conference on Future Software Engineering and Multimedia Engineering (ICFM 2013), 8-14. doi:10.1016/j.ieri.2014.03.003

Pressey, A. D., & Ashton, J. K. (2009). The antitrust implications of electronic business-to-business marketplaces. *Industrial Marketing Management*, *38*(Impact of Outsourcing on Business-to-Business Marketing), 468-476. doi:10.1016/j.indmarman.2008.02.012

Pressey, A. D., & Ashton, J. K. (2009). The antitrust implications of electronic business-to-business marketplaces. *Industrial Marketing Management*, *38*(Impact of Outsourcing on Business-to-Business Marketing), 468-476. doi:10.1016/j.indmarman.2008.02.012

Randall, W. S., & Mello, J. E. (2012). Grounded theory: an inductive method for supply chain research. *International Journal of Physical Distribution & Logistics Management*, *42*(8/9), 863-880. doi:10.1108/09600031211269794

Randall, W. S., & Mello, J. E. (2012). Grounded theory: an inductive method for supply chain research. *International Journal of Physical Distribution & Logistics Management*, *42*(8/9), 863-880. doi:10.1108/09600031211269794

Randall, W. S., Pohlen, T. L., & Hanna, J. B. (2010). EVOLVING A THEORY OF PERFORMANCE-BASED LOGISTICS USING INSIGHTS FROM SERVICE DOMINANT LOGIC. *Journal of Business Logistics*, *31*(2), 35-61.

Rogerson, S., Andersson, D., & Johansson M. (2014). Influence of context on the purchasing process for freight transport services. *International Journal of Logistics Research and Applications*, 17(3), 232-248.

Rossi, S., Colicchia, C., Cozzolino, A., & Christopher, M. (2013). The logistics service providers in eco-efficiency innovation: an empirical study. *Supply Chain Management: An International Journal*, (6), 583. doi:10.1108/SCM-02-2012-0053

Sanchez Rodrigues V., Damian, S., Andrew, P., Mohamed, N., & Anthony, W. (2008). Establishing a transport operation focused uncertainty model for the supply chain. *International Journal of Physical Distribution & Logistics Management*, (5), 388. doi:10.1108/09600030810882807

SETRIS. (2017). *A TRULY INTEGRATED TRANSPORT SYSTEM FOR SUSTAINABLE AND EFFICIENT LOGISTICS*. Retrieved from http://www.ertrac.org/uploads/documentsearch/id46/2017%20Integrated%20Logistics%20-20SETRIS.pdf

Sheffi, Y. (2004). Combinatorial Auctions in the Procurement of Transportation Services. *Interfaces*, (4), 245. doi:10.1287/inte.1040.0075

Shetty, D., Raju, R.K., Dinesh, A., & Prabhu, S. (2014). A Study of E-Marketplace Perception and Adoption by Road Transport Industry. *International Journal of Information Systems and Engineering*, *2*(1), 26-31.

Skjøtt-Larsen, T., Kotzab, H., & Grieger, M. (2003). Electronic marketplaces and supply chain relationships. *Industrial Marketing Management*, *32*(3), 199-210. doi:10.1016/S0019-8501(02)00263-8

Song, J., & Regan, A. C. (2001). Transition or Transformation? Emerging Freight Transportation Intermediaries.

Song, J., & Regan, A. C. (2003). An Auction Based Collaborative Carrier Network.

Standing, S., Standing, C., & Love, P. D. (2010). A review of research on e-marketplaces 1997–2008. *Decision Support Systems*, *49*41-51. doi:10.1016/j.dss.2009.12.008

Statista (2018). Revenue of third-party logistics in the Nordic countries 2016 | Statistic. (2018). Retrieved from https://www.statista.com/statistics/805218/revenue-of-third-party-logistics-in-the-nordic-countries/

Stefansson, G. (2006). Collaborative logistics management and the role of third-party service providers. *International Journal of Physical Distribution & Logistics Management*, (2), 76. doi:10.1108/09600030610656413

Sternberg, H., Germann, T., & Klaas-Wissing, T. (2013). Who controls the fleet? Initial insights into road freight transport planning and control from an industrial network perspective. *International Journal of Logistics Research And Applications*, *16*(6), 493-505. http://dx.doi.org/10.1080/13675567.2013.856391

Strauss, A. L., & Corbin, J. M. (1998). *Basics of qualitative research : techniques and procedures for developing grounded theory*. Thousand Oaks, Calif. : SAGE, cop. 1998.

Swedish Association of Road Transport Companies (2013). Fakta om åkerinäringen (Facts about the haulage industry). Pamphlet. Stockholm.

Teece, D. J. (2010). Business Models, Business Strategy and Innovation. Long Range Planning, 43, 172-194.

Transport Analysis (2014). Lastbilstrafik 2013. Swedish national and international road goods transport 2013. Official Statistics of Sweden, Publication 2014:12. Stockholm.

Van Duin, J.H.R., Tavasszy, L.A. & Taniguchi, E. (2007). Real time simulation of auctioning and re-scheduling processes in hybrid freight markets.Transportation Research Part B, 41, 1050-1066

Verdonck, L., Caris, A., Ramaekers, K., & Janssens, G. (2013). Collaborative Logistics from the Perspective of Road Transportation Companies. *Transport Reviews*, *33*(6), 700-719. http://dx.doi.org/10.1080/01441647.2013.853706

Wang, D., & Wang, N. (2015). Quantum computation based bundling optimization for combinatorial auction in freight service procurements. *Computers & Industrial Engineering*, *89*, 186-193. http://dx.doi.org/10.1016/j.cie.2014.11.014

Wang, Y., Potter, A., & Naim, M. (2007a). An Exploratory Study of Electronic Logistics Marketplaces and Its Impact on Customised Logistics. *Cardiff University Innovative Manufacturing Research Centre, Cardiff Business School*.

Wang, Y., Potter, A., Naim, M., & Beevor, D. (2011). A case study exploring drivers and implications of collaborative electronic logistics marketplaces. *Industrial Marketing Management*, *40*(B2B marketing in a Guanxi context: Theoretical development and practices), 612-623. doi:10.1016/j.indmarman.2010.12.015

World Road Transport Organization. (2018). Retrieved from https://www.iru.org/who-we-are/about-mobility/trucks

Woxenius, J. (2007). A generic framework for transport network designs: applications and treatment in intermodal freight transport literature. Transport Reviews: A Transnational Transdisciplinary Journal, 27(6), 733-749.

Yingli, W., Andrew, P., & Mohamed, N. (2007b). Electronic marketplaces for tailored logistics. *Industrial Management & Data Systems*, (8), 1170. doi:10.1108/02635570710822804

Yossi, S. (2004). Combinatorial Auctions in the Procurement of Transportation Services. *Interfaces*, (4), 245. doi:10.1287/inte.1040.0075

Zhang, M., Pratap, S., Huang, G. Q., & Zhao, Z. (2017). Optimal collaborative transportation service trading in B2B e-commerce logistics. *International Journal of Production Research*, *55*(18), 5485-5501.

8. Appendices

Appendix A – Terminology in Grounded Theory

Term	Definition
Axial Coding	Process by which categories are related to sub-categories at the level of properties and dimensions. This type of coding consists of intense analysis done around one category at a time.
Basic Social Processes (BSPs)	One type of core category, often best visualized when the category involves multiple concepts linked together in a larger social process – all BSP's are or involve core variables, but not all core variables are or are part of BSPs.
Coding	This is the conceptualization of data by the constant comparison of incident with incident, and incident with concept, in order to develop categories and their properties.
Coding Paradigm	Analytic tool Strauss and Corbin devised to help integrate structure with process. When using the paradigm, one codes for core phenomena, conditions, actions/interactions, and the consequences of those actions/interactions.
Categories	Abstract, higher, order concepts under which other concepts can be grouped through an underlying shares uniformity. Categories name patterns in the data. They have analytic power because they can be used to explain and predict behavior in a phenomenon.
Coding families	Sets of interrelated theoretical codes. For example, the "cultural family" includes social norms, social values, social beliefs and social sentiments
Conditions	Term used in grounded theory to refer to context. Sets of events that create the situations, issues, and problems within which a phenomenon is manifest and help explain the behavior of individuals or groups. Types of conditions include causal, intervening and contextual conditions
Concept	It is basically the underlying meaning, uniformity and/or/pattern within a set of descriptive incidents.
Constant Comparison	Investigation of similarities and differences across incidents recorded in the data. A technique used to generate concepts and their properties based on repeated patterns of behavior. Comparisons are made within and across data sources.
Core Category	Central category of the phenomenon about which the theory is concerned. May not necessarily be a category originally sought at the beginning of the research study. Explains the majority of the behavior in a phenomenon.
Dimension	Range along which properties of a category vary. Used to provide parameters for the purpose of comparison between categories.
	Theory that is developed for a conceptual area of inquiry at a high level of generality (scope). Formal theory develops through the (continued)…

Formal theory	generalization and modification of substantive theory as it is applied to different areas of inquiry.
Open Coding	This is the initial stage of constant comparison during which the data are scrutinized for every possible meaning.
Process	Sequences of evolving action/interaction taking place over time and that are related to changes in structural conditions
Properties	General or specific characteristics or attributes of a category which allow a category to be defined and given meaning.
Selective Coding	To delimit coding to only those variables that relate to the core variable that has emerged from the study. The analyst links related and subordinate categories to a core category in sufficiently significant ways to assist in the formulation of theory.
Structure	Social conditional context in which a phenomenon is located. Social structure creates the context for action and interaction, and a such is inexorably linked to process.
Substantive Theory	Theory that is specific to time and place. May eventually be extended to a formal theory if becomes supported across multiple contexts.
Theoretical Memos	Written ideas of the researcher concerning codes and their inter-relationships within a phenomenon.
Theoretical Sampling	Process of data collection where the analyst collects, codes and analyzes data and decides what data to collect next and where to find them based entirely upon the emergent theory.
Theoretical Saturation	Point at which no new information appears to emerge during coding and subsequent data collection; i.e., when no new properties, conditions and so on can be attributed to a category.
Theoretical Sensitivity	Researcher's knowledge, understanding and skill which foster the generation of categories and properties and increase the ability to relate them to emergent theoretical codes.

Source: Glaser, 1992; Mello and Flint, 2009

Appendix B – Glaser's 18 Coding Families

Families	Types of Codes Source:
The Six C's	Causes, Context, Contingencies, Consequences, Covariances and Conditions
Process	Stages, Staging, Phases, Phasing, Progressions, Passages, Gradations, Transitions, Steps, Ranks, Careers, Ordering, Trajectories, Chains, Sequencing, Temporaling, Shaping, Cycling.
Degree	Limit, Range, Intensity, Extent, Amount, Polarity, Extreme, Boundary, Rank, Grades, Continuum, Probability, Possibility, Level, Cutting Points, Critical Juncture, Statistical Average, Deviation, Exemplar, Modicum, Full, Partial, Half.
Dimension	Dimensions, Elements, Divisions, Piece of, Properties of, Facet, Slice, Sector, Portion, Segment, Part, Aspect, Section.
Type	Type, Form, Kinds, Styles, Classes, Genre.
Strategy	Strategies, Tactics, Mechanisms, Managed, Way, Manipulation, Maneuvering, dealing with, Handling, Techniques, Ploys, Means, Goal, Arrangements, Dominating, Positioning.
Interactive	Mutual Effects, Reciprocity, Mutual Trajectory, Mutual Dependency, Interdependence, Interaction of effects and Covariance
Identity-Self	Self-image, Self-concept, Self-worth, Self-evaluation, Identity, Social worth, Self-realization, Transformation of self, Conversions of identity.
Cutting Point	Boundary, Critical juncture, Cutting point, Turning point, Benchmark, Division, Cleavage, Scales, In-out, Intra-extra, Tolerance levels, Dichotomy, Trichotomy, Polychotomy, Deviance, Point of no return.
Means-goal	End, Purpose, Goal, Anticipated consequences, Products.
Cultural	Social norms, Social values, Social belief, Social Sentiments.
Consensus	Clusters, Agreements, Contracts, Definitions of Situation, Uniformities, Opinions, Conflict, Dicensus, Differential perception, Cooperation, Homogeneity-heterogeneity, Conformity, Non-conformity, Mutual expectation.
Mainline	Social control, Recruitment, Socialization, Stratification, Status passage, Social organization, Social order, Social interaction, Social mobility.
Theoretical	Parsimony, Scope, Integration, Density, Conceptual level, Relationship to data, Relationship to other theory, Clarity, Fit, Relevance, Modifiability, Utility, Condensability, Inductive-Deductive balance and interfeeding, degree of, Multivariate structure, Use of theoretical codes, Interpretive, Explanatory, Predictive Power.
Ordering or Elaboration	Structural- organization, division, group, subgroup, team, and person. Temporal- one category comes after another in sequence. Conceptual- as in specification of concepts, and in developing properties of categories.
Unit	Collective, Group, Nation, Organization, Aggregate, Situation, Context, Arena, Social world, Behavior pattern, Territorial Units, Society, Family.
Reading	Concepts, Problems, Hypotheses.
Models	Linear model or Property Space.

Source: Mello and Flint (2009)

Appendix C – Interview Protocol and Semi-Structured Interview Questions

Hello (name of interviewee here), I was given your name and contact information by someone I spoke to from your company who explained you would be the best person to talk to about how your company uses online tools/technology to find loads or sell your services. Is this correct?

{If yes: Move on to confidentiality points} {If no: ask to refer us to best person to speak to}

Only if you're comfortable, may we record the conversation?

- It is to make sure that we don't make mistakes when we try to remember what you said
- It also makes it faster for you today because we are not delayed by notes taking
- And we can discuss more freely and pay better attention to you
- We assure you that all dialogue will be kept confidential

Before we start the interview, here is a consent form that we have signed and we would like you to sign that shows we explained everything about this study, that it devoid of risk and retribution, that it is voluntary and that the content of our interview will remain confidential and the results of the study will be anonymous.

1. Can you confirm that your company uses online technology to find loads or sell truck transportation services?

2. Can you describe the way you find loads or sell capacity online? (if not, who can) What procurement methods are used online?

2.1. What are the tools that you use (can you rank them in terms of volume)? Can you provide us with examples of tools? {if some were already mentioned above, then ask if those are all the tools being used}

2.2. {If use only one tool.} Why do you use only one tool?

2.3. {If use several tools.} Why do you use several tools?

2.4. Why this/ these tools rather than others? {Elements we could find: price, quality, features, trustworthiness?} How did you go about making the decision to use the tools chosen? {Understand thought processes and priorities behind decision} {if nothing comes the ask:} For example, do you use different tools for different types of loads?

2.5. Do you consider all sourcing methods when making a decision or do you have a preferred method?

2.6. Do you use these tools concurrently (at the same time) or in a sequence (start with one and move forward as needed)?

2.7. How do they work? (Online contact + offline negotiation, online bids? Other?)

3. How do you measure effectiveness of these tools?

4. How harsh is the competition for getting loads or for selling capacity? {Details we are looking for: Number of people/companies competing for a job. Price competition. Tactics that are being employed.}

4.1. Does that differ from one tool to the other {question depends on if they use several tools or not}?

5. Once you have a hit on a bid do you immediately close the deal/ negotiate or do you wait for as many hits as possible?

6. What is your general experience with the deals you find/close through these tools? (Everything goes well, there are more problems than other sources of business? Etc.) Have you had any issues in the past with certain online tools?

7. Some electronic tools offer decision support for price determination. What do you think about it? Have you used it?

8. How much of business of your company go through these online tools? (10-, 10-20, 20-30, 30-40, 40-50, 50-60, 60+?)

Snow ball sampling question: Can you recommend us to some other companies for us to ask the same questions? {name + contact}

Appendix D – Open Coding Concepts

FIRST ROUND of INTERVIEWS

TSP 1 – From Transcript 1

1. Task-performed: One EM to find both loads and capacity 14-15
2. Ad Hoc Use:
    a. Geography: Better abroad, not for domestic market 16, 138
    b. Performance: not providing solutions, stop using it 17
    c. Suffice Demand: Achieve additional capacity 58-59
    d. Timing: customer pressure to fulfill is critical or time to plan will determine a quick decision 121
3. Market dynamics: cargo vs capacity 18-19
4. Security concerns: reduced by participating on trusted partners' marketplaces DHL 19, 49 is it safe? 75 you don't have control over every participant
5. Problem solver: the goal is to maximize capacity 26-28, 59 the whole point of using them 71-72
6. Knowledge: EMs are chosen based on access to information about their availability 33
7. Reputation: Well-established among industry practitioners either public or private 34, 48, 106
8. Legacy: it has been there for years and still there 34
9. Guarantees: Assumes some risks on behalf of the users to foster usage 34,
    a. Blacklisted: the system takes care of avoiding mischief 101
    b. Background check: a carrier cannot perform relevant credit checks on every supplier 112
10. Mass use: High level of participation: Quite well spread, lots of companies use it, lots of capacity and cargo 37
11. Negative practices: potential to damage the industry by buying only on the spot market 42
12. Participation Fee: monthly for Timocom and free DHL private 45
13. Communication options (negotiation): 64-66
    a. Online: negotiate online
    b. Offline: through direct phone call or email
14. Pool of opportunity: are there enough loads and offers in the EM? 74
15. Strategic hook: Initial interface to establish relation with new suppliers 79

16. Temporary solution: Once you repeat supplier you can negotiate directly and leave the marketplace 81
17. Price-driven competition, cost-cutting: it becomes like an auction, low cost and increase profitability 84, 99, 144, 146
18. Alternative to limited options: if you can't find other solutions through trusted partners and network this is the best solution 85, 93
19. Profit enabler: get suppliers at lower cost for economic reasons, it's better than nothing 87
20. Minimum Risk: worst that can happen is not get paid which will happen anyway if you run empty 116
21. Complementary instrument: Usage of these tools need to be paired with knowledge of the market, prices according to geographic area, market dynamics and how to leverage on your tools Knowledge limitations 92-96, 103
22. Trust: a site hosted by a known party conveys higher degree of rapport to participate in 106
23. Perception of sustainability: it has been a very good development for the environment that we have this kind of tools 144

TSP 2 - from Transcript 2

1. Task-performed: One for RFQs and find loads and another one for track and trace 15
2. Ad Hoc Use: specific function like track and trace and make bookings 19
3. Customer Demands: If customer requires it, supplier will jump on that platform 21
4. Features:
    a. Language limitations: it's a German tool and not everything is translated into English nor Swedish 26-27
5. Knowledge: Even if they're not fully satisfied with quality, it's the one they know. Wish they knew about better tools 25
6. Mass use: acknowledge that many others big and small are using it
7. Strategy: to compete in the market you have to have tools (TiContract and Unifaun) otherwise you are not in the play 29
8. Portfolio averse: reduce the number of systems needed and replace with a better, easier to use, language capable tool 38-41
9. Security Risk: as long as shared information is carefully picked, there is no risk 44
10. Market Penetration: used to gain more business from new clients 52
11. Complementary: It's only 5% of business, the rest is with trusted partners
12. Price-driven competition, cost-cutting: Customers are only interested in price, environmental questions are not important if you need to pay a premium price 67-68 industry-wide it's the same 69
13. Progressive Use: It's getting more and more competitive year after year 72-73

TSP 3 - from Transcript 3

1. Market dynamics: shortage of capacity and high demand leads to use of the online marketplace 13-14
2. Ad Hoc Use:
    a. Seasonality: Holidays, special occasions (e.g. Black Friday) 19-20
    b. Geography: Some tools are better in Eastern Europe, others in Western Europe 52
    c. Task: Find or sell cargo 53
    d. Timing: urgent or can you plan 58
3. Grading suppliers: to measure performance level; exclusive suppliers 16-18
4. Popular Tools: Three tools, basic ones, a lot of people use them, but we not much 26-28

5. Reference users: DHL and Schenker and other big ones are trading and spot market pricing majorly. Half of their cargo is traded 30 & 62
6. Complementary channel: Use it as help to meet demand, to complement, not trade their business online 37-38
7. Growth: EMs are used as alternatives to reach new geographic areas, unexplored markets with no personal contacts 40 and reaching more potential transport suppliers 137
8. Benchmark: EMs are used to compare market prices 42
9. Awareness (Lack of): They employ the tools they do, because those are the ones they know of. They wish they knew features and capabilities of others. 44-46 They don't really analyze it currently 54
10. Lack of transparency: You don't really know who is driving the freight. You don't know what you're buying and selling. 68-71
11. Outcome uncertainty: Delivery accuracy and service quality can be affected if you don't know the supplier 72-73 It's not sustainable 119 a short-term solution 134
12. Features:
    a. Blacklist: 90
    b. Grading system: a feature that would appeal to increase EM use through higher security 90-95
    c. Rating (quality stamp): ISO and on the trucks used 95; selling and buying without any guarantee 128
    d. Language: language limitations so miscommunication is an issue
13. Customer demands: They dictate the behavior, if it costs more they don't want it even if it's environmentally conscious, etc. 101
14. Free Resource: There's little to no charge from several EMs providing a useful service; this contrast or weighs against the risks
15. Risk: You don't know who's driving, quality, engine, etc. 110
16. Facilitator: It's easier and cheaper to trade transport 117-118 before you had to send massive emails 122
17. Progressive Use: Initially is to solve capacity issues, later it turns into transport trading, which is perceived as a detrimental behavior 125

TSP **4** - from Transcript **4**

1. Ad Hoc Use:
    a. Daily Routine: Use it on a daily basis 13
2. Growth: EMs allow constantly building networks 18-19
3. Market capacity/dynamics: sell off if you can't handle the volumes 29, 60
4. Extra Effort: You need to put more communication through Timocom, which you don't need to do with a guy you know 38-39
5. Problem solver: people just want their goods moved. It doesn't matter how you get around. 40
6. Maximize capacity 48-49
7. Financial: The only reason why you really use this is basically to make sure that the traffic does not have a financial loss 50
8. Profit enabler: sell off to someone who can do for cheaper 52-53, 62
9. Task Performed: 52-58
10. Facilitator: 61, 95-96
11. Potential risk: Maybe not more efficient, but better and safer transport if you handle with trusted partners 70
12. User Fee: Monthly fee and free 72-73
13. Communication Limitations: 80-82
14. Time-sensitive competition: After five seconds the load can be gone 99
15. Knowledge: Need to know your surroundings before you are going to send that mail 100
16. Price-based competition: Revenue is everything, if the price is right you will do anything for me 103