UNIVERSITY OF GLOUCESTERSHIRE

The Role of Lean and Agile Supply Attributes in the Performance of VAS in Distribution Centres: *An Exploratory Study*

Eduard Klundt

A thesis submitted to
The University of Gloucestershire (UK)
in accordance with the requirements of the degree of
Doctor of Business Administration
in the Gloucestershire Business School

April 2022

Word count (60.350 words)

Declaration of Original Content

I declare that the work in this thesis was carried out in accordance with the regulations of the University of Gloucestershire and is original except where indicated by specific reference in the text. No part of the thesis has been submitted as part of any other academic award. The thesis has not been presented to any other education institution in the United Kingdom or overseas.

Any views expressed in the thesis are those of the author and in no way represent those of the University.

Signed Date 20.04.2022

Eduard Klundt

doi:10.46289/M30Y9K8D

Abstract

Background: The integration of different customised value added services (VAS) in warehouse logistics is an increasing trend. This fact requires logistics managers to identify the most appropriate strategies to meet VAS customer demands and to achieve a superior performance over their competitors. However, as VAS are heterogeneous in nature, the customer demand of these services can vary accordingly. Therefore, distribution centres need to develop those supply attributes, which enable them to respond to each particular VAS customer demand. In this context, the choice between lean and agile supply attributes, which are two contradictory concepts, comes especially into focus. The role of such concepts has been broadly introduced in the context of supply chain performance in the Fisher's framework (1997) and the following models from different researchers. However, the issue of VAS performance in distribution centres under the perspectives of the concepts of lean and agile supply attributes was not considered in the previous warehouse logistics research.

Research Aims*:* This study explored the topic in question from the perspective of distribution centres. The purpose of this study was to gain a greater insight of VAS applications, and particularly, to understand the contributions of lean and agile supply attributes in the performance of VAS in distribution centres. In particular, the study aimed to reframe the meaning of applications of VAS from the perspectives of logistics service providers, to identify the supply attributes necessary to meet VAS customer demands and to understand how managers of distribution centres align their operational strategies with the VAS performance.

Methodology: As the research purpose was explorative in their nature, the empirical process in this study was underpinned by the perspectives of the phenomenological interpretivist paradigm. Thus, a qualitative case study of six distribution centres (six companies) in Germany dealing with VAS was carried out. The data was collected by semi-structured interviews, built on the triangulation of sources and use of quota sampling technique. In doing so, the head manager of distribution centre, the operational manager and the customer manager from each distribution centre were included in the research participant circle. The following analysis of the obtained data was based on the principles of Grounded Analysis method that implied an examination of the data by open, axial and selective coding procedures.

Results: The main conclusion of this study is that the nature of customer demands of such VAS can vary quite a lot depending on the particular business cases and therefore, the concepts of lean and agile supply attributes have a crucial meaning in the context of VAS performance in distribution centres. This became especially true as, some distribution centres associate VAS performance with the lean concepts of "standards" and "productivity", while the others link performance of VAS with the agile concepts of "flexibility" and "customer responsiveness". In addition, the concept of "quality" has a special significance in the context of VAS performance regardless of the nature of customer demand. However, as shown by the analysis of empirical data, concepts of "quality" as well as "customer responsiveness" are not adequately considered in distribution centres.

Furthermore, the research findings indicated that the "material-related" supplementary activities, which logistics service providers physically perform in the operations of their distribution centres in order to gain financial benefits, are the dominant model of VAS in the modern warehouse logistics. Moreover, the applications of such VAS with more agile nature of customer demand can bring higher financial benefit and different non-financial positive effects, but at the same time can lead to higher warehouse complexity.

Implications: This study addressed the research gaps by providing a greater understanding of contributions of lean and agile supply attributes in the performance of VAS in distribution centres. In this respect, this study indicated that the perspectives of Fisher's framework (1997) have high relevance in the particular context of VAS performance in modern warehouse logistics. Moreover, the study identified the significance of different concepts related to the VAS warehouse business such as "lack of non-physical VAS concepts", "peculiarity of non TPL DCs", "issue of quality" and "deficit of customer responsiveness measurements", which need to be further explored by future research.

Key Words: Value Added Services; Warehouse Logistics; Distribution Centres; Leanness; Agility; Performance; Customer Demand.

Acknowledgement

My professional doctorate journey has come to an end. All along this wonderful path, I have come across countless learning experiences that have made profound impacts on my academic and professional development. And as a result, I am happy to see that my efforts have contributed to the scientific matter achieved by the completion of this dissertation. Now, I would like to express my gratitude to all those who supported me during my DBA journey, and in doing so, have contributed to my achievements. I am pretty sure that the successful finalisation of my doctorate approach would not have been possible without those who have guided and supported me along the way.

First and foremost, I would like to give huge thanks to my supervisors Professor Dr Neil Towers and Professor Dr Kamal Bechkoum at the University of Gloucestershire. Your guidance and support in helping me structure my research, generate new ideas and stay motivated during the whole DBA journey was an incalculable source of strength from start to finish. With the same level of gratitude and respect, I would also like to thank Professor Dr Michael Fass and Professor Dr Gerald Watts for their incredible insight into the understanding of the role of reflective practice, which helped me reflect my personal role as researcher and individual in the context of my study.

Special honour to Dr Philippa Ward, Dr Keith Donne, Dr Robin Bown and Dr Douglas Yourston for a high professional management of DBA program, which enabled me (and the other students) to get a smooth learning experience. Furthermore, I am thankful to Denis Wachtel, Andrea Weber and Carsten Skerra - my study classmates - for their insightful and meaningful exchange of ideas and experiences throughout our interactive learning sets.

Last but not least, I would like to express my thanks to my family. I would like to thank my wife, who has supported me throughout this entire endeavour. This was obviously not an easy task, but she was always there for me and continues to believe in me unconditionally. Special thanks to my parents for their obsessive love and trust in me through all of my undertakings. And of course, I would like to thank my sons, who fulfil me with their childlike emotions and encourage me to always strive to do my best.

Thank you all

Eduard Klundt

Table of Contents

Abbreviations

DBA	Doctor of Business Administration
DC	Distribution Centre
CEO	Chief Executive Officer
CRM	Customer Relationship Management
ERP	Enterprise-Resource-Planning
FPS	Ford Production System
JDE	JD Edwards (ERP System)
KPI	Key Performance Indicator
LISC	Line Items Shipped Complete
OEM	Original Equipment Manufacturer
RFID	Radio-Frequency Identification
RPPM	Returned Parts Per Million
SOP	Standard Operating Procedure
TPL	Third Party Logistics (also 3PL)
TPP	Third Party Purchasing
TPS	Toyota Production System
USP	Unique Selling Point
VALS	Value Added Logistics Services
VAS	Value Added Services
WMS	Warehouse Management System

List of Figures

List of Tables

1. Introduction

This introductory chapter serves to provide insight into the background, purposes and the main concepts of this research. Furthermore, this chapter aims to provide a synopsis of the main concepts that are relevant to this study as well as the structure of this thesis. Lastly, this section will provide a personal reflection on how the motivation for conducting a study on the topic in question came to fruition.

The Introduction chapter consists of five parts. The first part (1.1) introduces the topic of VAS and its role in modern warehouse logistics, defines the particular area of the research focus and describes the research problem that is addressed throughout this study. Part two (1.2) outlines the research aim and the research questions, which demonstrate how this study will address the limitations of previous research. Part three (1.3) represents the main definitions of the key concepts relevant to this research. Part four (1.4) delineates the scope and delimitations of the study. The last part (1.5) presents the design and the structure of this DBA thesis. Additionally, the Introduction chapter is followed by the reflection section (Reflection - Part I). This approach applies to each subsequent chapter of this thesis (see part 1.5 for further explanation).

1.1 Research Background

1.1.1 Research Subject in Focus

Since the 1980's global competition has been rapidly intensifying, giving production criteria, such as low costs, high quality and product flexibility, a central role in common corporate objectives (Vacar, 2019). In this context, logistical functions became increasingly viewed as an integral part of the supply chain responsible for the flow of both material and information (Maia and Cerra, 2009). Such tendencies have contributed to the transformation of warehouse logistics which in turn have resulted in a growing dynamic of product flow, the reduction of warehouse facilities and an increased outsourcing of warehouse activities (Higginson and Bookbinder, 2005). Today, well-organised logistics operations are one of the main aspects of superior organisational performance (Rushton, Croucher and Baker, 2014). Therefore, the role of distribution centres, which are a central element of logistics, is crucial to the entire supply chain (Lai, 2004; Lu and Yang, 2010).

The term *distribution centre* refers to the physical facilities within the structure of the distribution network (Onstein, 2015). Such facilities are self-driven by the manufactures

(eg. Nike Distribution Centres)[1], or in the case of outsourcing, operated by third-party logistics (eg. Schenker DB)[2]. The function of distribution centres can be defined as

> "... accumulate and consolidate products from various points of manufacture within a single firm, or from several firms, for combined shipment to common customers…" (Frazelle, 2002a, p. 3).

Inbound, storage and outbound operations can be considered as the main activities which underpin the flow of goods within distribution centre facilities (Van Den Berg, 2007). It is important to note that the function of distribution centres can also be viewed from a narrower perspective, excluding the storage of goods and referring to the receipt and dispatch of goods as the main functions (e.g., Hatton, 1990; Dawe, 1995). However, this study considers distribution centres as a key element of warehouse logistics and, therefore, observes the function of the distribution centre from a broader perspective.

Although inbound, storage and outbound activities represent the main services of distribution centres, there are varying additional services which can be provided to customers (Rivera, Sheffi and Knoppen, 2016). In the existing theory these services are often referred to as *Value Added Services* (Foulds and Luo, 2006; Atkacuna and Furlan, 2009; Rivera, Sheffi and Knoppen, 2016). In some publications, this terminology varies, and these services are also referred to as *Value-Added Processing* (e.g., Bartholdi and Hackman, 2011 or *Value-Added Logistics* (e.g., Van Den Berg, 2007).

Generally, it is not easy to determine whether a particular service constitutes a value added service (Berglund, 2000). As a rule, value added services (VAS) are customer-specific and therefore difficult to generalise. Therefore, current research provides no common definition of VAS in warehouse logistics. In the discussion of VAS in logistics, many researchers refer to the study by Bowersox and Closs (1996), who first attempted to demarcate the term VAS in the logistics field. According to Bowersox and Closs (1996) VAS can be divided into five performance areas:

- customer focused services (eg. customised labeling or packaging)
- promotion-focused services (eg. making point-of-sales displays)
- manufacturing focused services (eg. postponement assembly)
- time focused services (eg. just-in-time)

[1] Nike Opens Its Largest Distribution Center Worldwide In Tennessee - Nike News
[2] DB Schenker | Global Logistics Solutions & Supply Chain Management

- basic services (eg. reverse logistics or quality control).

The demarcation of VAS suggested by Bowersox and Closs (1996) concerns the entire logistics field, which besides warehousing also includes transport logistics. More warehousing dedicated demarcation of VAS can be found in the publication by Furmans and Deml (2014, p. 20):

> "… Value-Added-Services in distribution centres are all additional services that go beyond classic warehouse activities such as product receiving, storage, order picking, packaging and shipping."[3]

This definition refers to the material-related VAS (eg. customised packaging, kitting, labelling, small assembly) which, together with administrative VAS (eg. invoicing, organisation of transport), comprises a general view of VAS in distribution centres (Furmans and Deml, 2014).

As customer requirements are becoming increasingly dynamic and specific in the modern business world, the ability to respond to different demands has taken on a decisive role. Therefore, companies strive to place different VAS at the last possible stage of the supply chain, which is often the distribution centre. This approach refers to the so-called postponement strategy, which implies the delay of final processing or manufacturing activities to the latest decoupling point in the supply chain in order to respond to the customer demand in the most appropriate way (Jafari, Eslami and Paulraj, 2022). This strategy can provide both cost reduction by lower inventories (Seth and Panigrahi, 2015) and higher efficiency by flexibility (Jafari, Nuberg and Hillethofth, 2016).

In turn, the provision of different VAS can be also seen as an advantageous apporach for the operators of distribution centres. Apart from the financial benefits, VAS can help to gain customer satisfaction and unique selling points (Anderson, Coltman, Devinney and Keating, 2011). Therefore, both parties (the operators of distribution centres and their customers) have a win situation by dealing with VAS.

Thus, VAS is a logical extension of distribution centres' activities. With an ever-increasing practical integration of VAS in distribution centres, the attention of researchers and scholars naturally becomes drawn to this topic. Over the past decades, numerous surveys and studies have examined VAS and have confirmed an expanding tendency towards the introduction

[3] Translated from German by the author.

of such services in distribution centres (Straube, 2005; Mayer, Thirty and Frank, 2009; Furmans and Deml, 2014; Michel, 2017; Michel, 2020).

The study carried out by Straube in 2005 was among the first important and impressive studies reflecting the growing relevance of VAS. A survey conducted among 4,000 small, medium and large enterprises showed that 88% of respondents predicted a high growth of VAS in the foreseeable future. Also the potential of steadily growing significance of VAS can be seen in the 6th European A.T. Kearney/ELA Logistics Study from 2008-2009. In this study, 81% of surveyed companies forecasted an increase of VAS logistics costs until 2013 (Mayer, Thirty and Frank, 2009).

These estimations were reflected in the previously mentioned study carried out by Furmans and Deml (2014), where VAS in distribution centres fall under the umbrella of the research project that was requested by the Karlsruhe Institute for Technology and promoted by the German Ministry of Economy and Technology. In particular, these researchers conducted a survey to investigate 21 logistics companies throughout Europe and found out that 20 of the companies interviewed were operating VAS in their distribution centres. Moreover, the researchers identified 19 different types of VAS performed in these distribution centres, which illustrated a higher diversity of these services in practice. In addition, the respondents predicted a further increase in both the number and significance of VAS in distribution centres in the years to come.

The recent surveys of warehouse and logistics professionals showed that the upward trend of implementing VAS in distribution centres remains strong. In the study carried out by Michel (2017), for example, more than 90% of the respondents confirmed the implementation of VAS in distribution centres. Such a high percentage was captured for the first time in this annual study. Moreover, in the study done by Michel from 2020, it was discovered that 8% of respondents cited VAS as the most congested area in distribution centres. In contrast, e-commerce processing, for example, was cited by only 5% of respondents. These results were particularly surprising as the survey was carried out during the COVID 19 pandemic - a time when the importance of the e-commerce sector had increased dramatically. Yet, such outcomes particularly highlight the importance of VAS in today's warehouse logistics environment once again.

1.1.2 Research Area in Focus

The increasing trend of VAS in distribution centres leads to higher diversity of customer requirements that the distribution centres need to manage at the operational level (Lao and

Choy, 2012). Moreover, customer orders, which include VAS activities, are often associated with high product variety and small quantities (Lam, Choy, Ho, Cheng and Lee, 2015). Hence, the VAS implementation in distribution centres can be a significant challenge in terms of satisfying all customer specific needs. To be able to achieve a superior performance, distribution centres are required to be highly aware of customer demand. Otherwise, they risk not meeting customer expectations which in turn can lead to poorer service quality (Huang and Hsu, 2016).

The fundamental principles of a superior performance imply that supply strategy is aligned with the nature of customer demand (Fisher, 1997; Lee, 2002). According to these principles, the products or services characterised by stable customer demand require supply attributes to be oriented towards cost efficiency. In the context of the supply chain such supply attributes are referred to as *Lean Supply Attributes* (Mason-Jones, Naylor and Towill, 2000b). In contrast, the products with unstable customer demand need supply attributes that can ensure higher customer responsiveness. These types of supply attributes are named A*gile Supply Attributes* (Mason-Jones, Naylor and Towill, 2000b). A mismatch could mean a dissallignment between the provided products or services and customer expectations.

1.1.3 Research Problem

The paradigm of the necessity to align supply attributes with the nature of customer demand has been broadly adopted in previous research on supply chain performance. However, in the context of performance of VAS in distribution centres, this paradigm has received very little attention thus far. This statement is based on the detailed analysis of the existing scientific publications (See chapter Literature Review). There are in particular three areas which reflect the existing research limitations:

1. So far, the introduction of VAS has been widely discussed at the level of strategic relationships between distribution centre operators and their customers (e.g., Soinio, Tanskanen and Finne, 2012; Okorie, Tipi and Hubbard, 2016; Shi, Arthanari and Wood, 2017). However, the literature reflects little understanding of how the application of these services is perceived at the operations management level of distribution centres.

2. Very little has been covered in the existing literature on the nature of customer demand in distribution centres related to VAS. Thus, existing studies reveals little

evidence as to which supply attributes are required to respond to customer demand for VAS in distribution centres.

3. There are various important studies at the operational level of the distribution centres on the performance of main warehouse operations, such as picking, put away and storage efficiency (Giannikas, Lu, Robertson and McFarlane, 2017; Ardjmand, Shakeri, Singh and Bajgiran, 2018; Guimarães and Alves, 2021). Yet, there are only a few publications on VAS performance in distribution centres. By examining these publications one comes to conclude that the existing research on VAS in distribution centres lacks the perspectives of aligning supply attributes and customer demand. Therefore, the existing literature offers no insight into how distribution centre managers adapt their operational strategies to assessing performance of VAS.

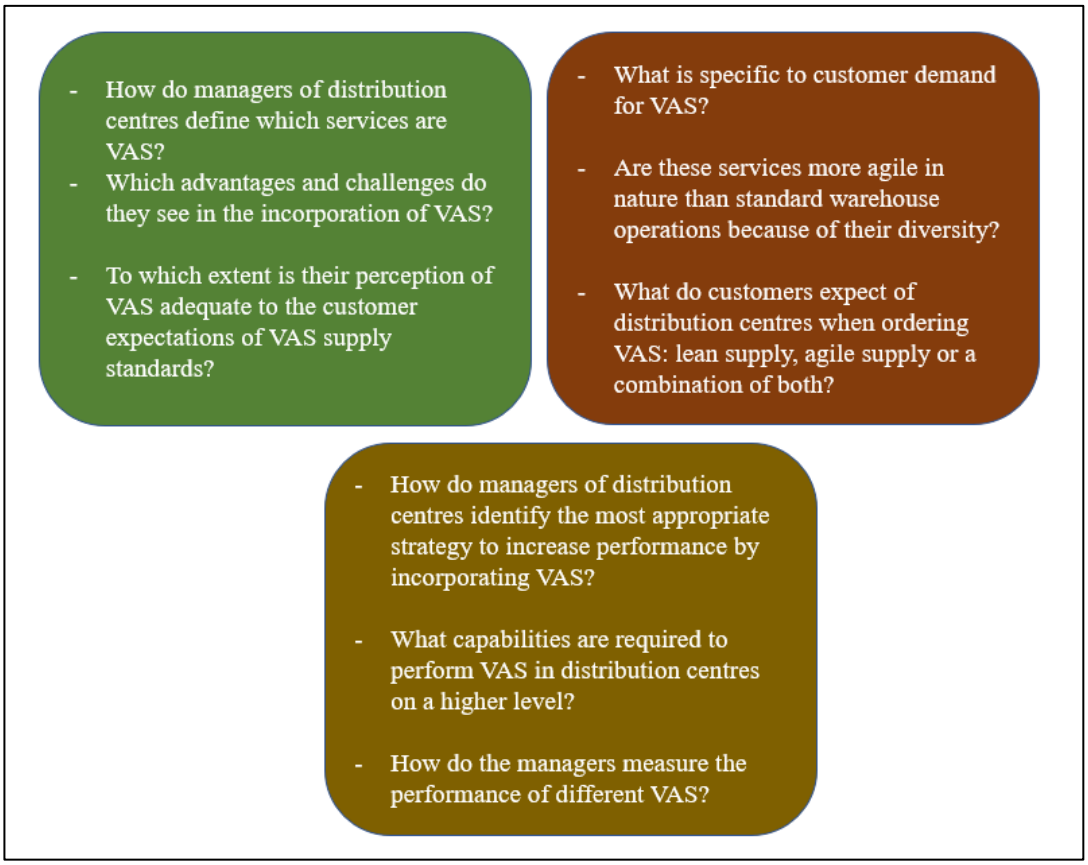


Figure 1. Three Areas of Research Problem

1.2 Research Aim and Research Questions

To address the research gaps, an empirical study was conducted. This study explored the topic of VAS on the system level of distribution centre operations. Thus, the perspectives taken in this research are not limited to third-party logistics, but include distribution centres

in general, independent of the type of company they are run by (TPL, wholesalers, retailers or manufacturing). The research aim was **to understand the contribution of supply attributes in the performance of VAS in distribution centres**. In doing so, the following research questions were identified:

1. What is understood by the application of VAS in distribution centres?
2. What are the supply attributes necessary to respond to VAS customer demand in distribution centres?
3. How are the distribution centres' operational strategies aligned with the performance of VAS?

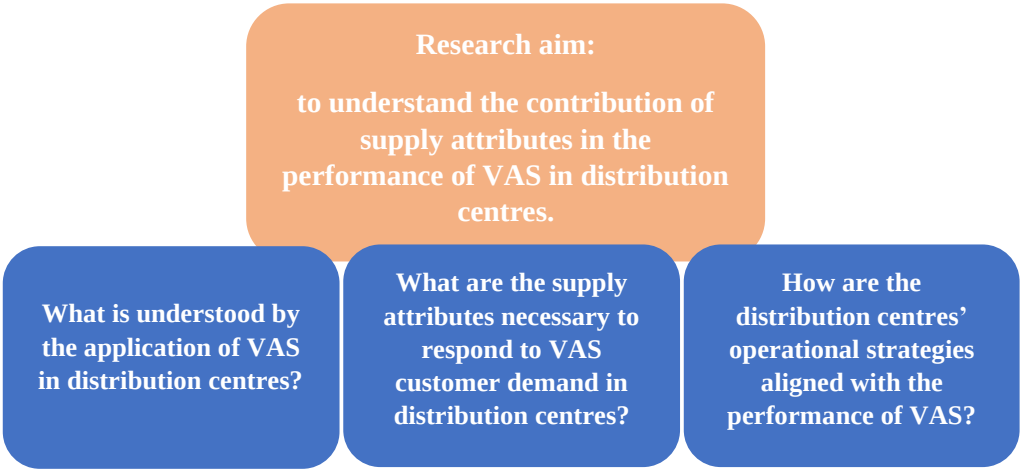


Figure 2. Research Aim and Research Questions

The research questions are exploratory in nature, as they aim to gain insight into the underlying fundamentals of the topic of VAS in distribution centres. The purposes of this study were therefore limited by the principles of qualitative research, which imply that the research findings are context specific in nature and cannot be generalised to all circumstances. Thus, this research is invaluable due to its in-depth understanding of the explored topic, rather than due to the generalisation of the research outcomes.

Based on the principles of qualitative research, a case study in distribution centres was carried out. By doing so, empirical data was collected by interviewing the managers of distribution centres. In order to consider the topic from different angles, principles of the triangulation method were applied. Triangulation in research implies the collection of data by multiple methods or use of multiple data sources in order to gain a greater understanding of phenomena (Platton, 1999). The collection of data from multiple respondents that perform various roles in distribution centres made it possible to examine the subject from

customer and operations perspectives at the same time (See more details in the chapter Methodology).

In following such a strategy, this study aims to contribute to both theory and practice, which is a standard requirement for a DBA thesis. In terms of theoretical relevance, this study seeks to provide scientific input to three specific research areas. Firstly, this study contributes to the existing knowledge of the performance of distribution centres. In this study, in contrast to previous research, the performance of VAS was considered in the context of the nature of customer demand. Thus, this study delivers a deeper understanding of the underlying construct of VAS performance in distribution centres. Secondly, this study contributes to the scientific area of supply chain management. In particular, lean and agile supply attributes are explored in the specific context of VAS in distribution centres. Therefore, this study can be viewed as part of a significant research stream on supply chain performance alignment driven by the framework of Fisher (1997). Finally, this study continues the discussion on the contribution of VAS to distribution centre strategy. VAS were examined from the position of the distribution centres managers who are responsible for their application at the operational level. Thus, this study contributes to the existing knowledge by providing a novel insight to the meaning and role of VAS in warehouse logistics.

In the context of practical area of VAS applications, this study provides knowledge on supply attributes necessary to meet customer demand for VAS in distribution centres in the most adequate way possible. This scientific contribution is especially important in today's business environment, where an increased number of VAS are being implemented in distribution centres. Thus, the main stakeholders of the research results are the distribution centres operators and their customers. The findings of this study can be used to build, promote and improve relationships with customers and strengthen their loyalty. Due to its triangulation, this study makes it possible to identify the areas for improvement in the current operational strategies of distribution centres.

1.3 Demarcation of Main Definitions

The terminology of some key concepts used in this dissertation has been interpreted differently by various scholars in previous scientific papers. Therefore, it is necessary to demarcate these terms to the definitions which need to be adopted in this study. The summary of the demarcation of main definitions is presented below.

"Distribution centres"

Physical facilities, where the goods from one or more suppliers are stored and then picked, packed and shipped according to customer's orders.

Difference between *"Distribution centre" and "warehouse"*

The parameters differentiating these two terms vary from one researcher to another. In some publications these terms are used as synonyms (e.g., Jelen and Kolinska, 2016). In this study, the parameters are used to identify the difference between distribution centres and warehouses are in accordance with the definition by Jaller and Pineda (2017).

Distribution centres "… have more frequent shipments but in smaller quantities that respond to time constraint schedules. They are usually larger than warehouses, hosting many operations or value-added activities rather than just storage of goods, such as pick and pack or multi-vendor consolidation, and make high use of automation and information technologies" (Jaller and Pineda, 2017, p. 5)

"Value added services"

As discussed in previous sections, the term VAS in distribution centres is difficult to generalise because of the high degree of their customisation. Hence, in this study the term VAS is not demarcated to some particular definition. Thus, in the process of data collection, the research participants were asked about their interpretation of VAS in distribution centres (See interview questions in Appendix II).

"Leanness and Agility"

Leanness and agility have been used as umbrella terms throughout this study to explore supply attributes contributing to the performance of VAS in distribution centres. The definition of the term "leanness" by Naylor, Naim and Berry (1999) has been adopted for the purpose of this study:

"Leanness means developing a value stream to eliminate all waste, including time, and to ensure a level schedule…" (Naylor *et al*., p. 108).

Many definitions of "agility" can be identified in the existing publications. Some of them, however, can be seen as rather limited to the particular concept used in this study (e.g., Vokurka and Fliedner, 1998; Storey, Emberson and Reade, 2005).

The definition of the term “agility” is given by Narasimhan et al. is adopted for this study:

“…ability to efficiently change operating states in response to uncertain and changing demands placed upon it” (Narasimhan, Swink and Kim, 2006, p. 443)

The terms leanness and agility are discussed in detail in the third section of the chapter “Literature Review”.

“Customer responsiveness”

Customer responsiveness is primarily understood in this paper as the ability to react to customer orders rapidly (Upton , 1995).

“Supply chain”

Supply chain “…is the global network used to deliver products and services from raw materials to end customers through an engineered flow of information and physical distribution. The supply chain management system focuses on resolving business process problems that are important to the customer” (Gunasekaran, 1999, p. 90).

“The supply chain includes not only manufacturers and suppliers, but also transporters, warehouses, retailers, and even customers themselves” (Chopra and Meindl, 2007, p. 3).

“Third party logistics”

“Warehouses operated on behalf of another firm are part of the larger trend towards third-party logistics (3PL). Many manufacturers and retailers have outsourced logistics meaning that key activities associated with the shipment of goods from one firm (i.e. the first party) to another (i.e. the second party) are handled by a 3PL provider” (Bowen Jr, 2008, p. 380).

3PL and TPL are the abbreviation for the term “Third party logistics”, which are used in this study interchangeably

“Operations strategy”

Operations strategy is the “…pattern of decisions which shape the long-term capabilities of any type of operations and their contribution to overall strategy, through the

reconciliation of market requirements with operations resources" (Slack and Lewis, 2002, p. 16).

"Warehouse management"

"Analogous to production management …, the objective of warehouse management is to efficiently and effectively coordinate all warehouse processes and activities… Warehouse management includes all planning and control procedures to operate the warehouse" (Faber, De Koster and Smidts, 2013).

"Functional VAS and Innovative VAS"

Functional VAS and Innovative VAS are two terms which are formulated in this study in accordance with Fishers' model (1997) and represent two types of services, which have opposite criteria of the nature of customer demand. The nature of customer demand, in turn, can be determined by different criteria such as stability and predictability of demand. In this context, Functional VAS are those by which demand tend to be stable and predictable, while Innovative VAS are associated with dynamic and unpredictable customer orders.

"Quality of VAS"

The quality of VAS in this study is determined, in analogy to product quality and represents the measure, which indicates whether the completion of a value-added service is in accordance with the requirements of the customer. Thus, the term "quality" is a performance indicator, which together with cost and time build a "magic triangle".

"Logistics service providers (LSP)"

The logistics service providers are typically perceived as the external logistics partner, who runs the outsourced activities in its house. As this study is not limited to third-party logistics but focused on distribution centres in general, the frame of the term of logistics service providers is accordingly enhanced. The internal driven distribution centres of non-TPL companies (e.g. manufacturing) are also considered in this study as logistics service providers, as in fact such distribution centres provide logistics services for "internal" customers (e.g. production sites).

"Traditional warehouse operations"

The traditional warehouse operations are those activities of distribution centres, which are not linked to the customer specific requirements. Therefore, such activities as put away, replenishment, pick and pack (without customized specification) defined as the traditional warehouse operations.

1.4 Scope and Delimitations of the Study

Along with the demarcation of definitions, another important step is to determine the scope and delimitation of research. In the context of this study, the scope and delimitations are particularly related to the following criteria: *subject, context, research participants, geographical aspects and timeline*.

Subject. The subject in focus of this study are VAS in distribution centres. In this respect, this study deals with those VAS, which are performed in the area of warehouse logistics. Thus, the concepts of VAS that are related to the operations of transport logistics are beyond the scope of this study. For the same reason, the VAS, which are provided in manufacturing sites of production companies have also been excluded from this academic work.

Context. As distribution centres can be driven by different supply chain parties, this study is not only limited to the distribution centres of third-party logistics. Essentially, this means all distribution centres, which are suitable to the definition determined for this research (see section 1.1) are in focus of this study regardless of their affiliation.

Research participants. The empirical approach of this study is strictly limited to the perspectives of managers from different distribution centres. Thus, potential logistics company experts outside distribution centres, such as consulting specialists or academics, are not incorporated in the data collection process. The customers of distribution centres are also outside the consideration of this study.

Geographical aspects. In terms of geography, all distribution centres which participated in the study are located in Germany. The highly developed German logistics industry makes it possible to find suitable distribution centres for this research within the border of this country. The consideration of socio-specific aspects of people across different cultures was not required for the purposes of this study.

Timeline. In terms of timeline the deadline for the submission of the DBA thesis was by May 2022. Therefore, the clarification of the interview questions by pilot interviews, the data collection and data analysis needed to be finished by the end of the year 2021. The Table 1 represents the timeline of the main milestones of this study.

	2019		2020				2021				2022	
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
Pilot Interviews												
Data Collection												
Data analysis												
DBA submission first draft												
DBA submission final draft												

Table 1. Timeline of Milestones of the Study

1.5 Structure of the Thesis

This thesis contains the main part which reports the procedures and outcomes of the dissertation phases and the additional parts which comprises the personal reflections.

1.5.1 Structure of the Main Part

The main part consists of this introduction, four main body chapters and a conclusion. The four main body chapters include the literature review, methodology, results and discussion. Each of these four chapters, in turn, includes an introduction section. All of which serve to help the reader understand the aims and the constructs of each particular chapter. At the end of each chapter is a summary section where one will be provided with a recap of the key points of discussions and outcomes. Moreover, each subsection on the second level of the main body chapters (e.g., 2.1) begins with a brief introduction of its purpose, which should help the reader stay on track

The chapter “Literature Review” presents an analysis of previous research publications and highlights the status quo of the current theory on the studied topic. In this respect, the literature review helps clarify the research limitations in the existing research paper, which, in turn, need to be addressed by the research aim and research questions of this study. Moreover, the review of the existing literature initiates the development of a conceptual framework and the research objectives that underpin the construction of the data collection approach.

The “Methodology” chapter summarises the discussion on research design of this study. In this context, this chapter shows the “decision making process” regarding the most suitable methodological approach for this research. Furthermore, this chapter presents the detailed research design, which amounts to the set-up of data collection and data analysis procedures. Additionally, the discourse on the research value, research ethics and the role of the researcher in the context of this study is also an integral part of this chapter.

The “Results” chapter introduces the processing and outputs of each phase of data analysis and the final product of this process. The saturation of the collected data – namely the stage of the research at which the collected data begins to demonstrate repeatability indicating the sufficient depth of the research – is also presented in this section. It is important to point out that this chapter merely reports on the “raw” findings of the data analysis without further interpretation of the outcome.

The interpretation of the research findings is, in turn, represented in the chapter “Discussion”. This procedure is based on the evaluation of the research findings by reflecting these findings in the context of the research purposes of this study as well as of the current knowledge on the topic in question, which makes it possible to understand the novel theoretical implications of this study.

The “Conclusion” chapter recaps the main research results reflecting the purposes of the study and highlights the theoretical and practical contributions achieved by carrying out this research. Furthermore, the research limitations and opportunities that have been identified for further research on the topic in question are outlined.

1.5.2 Structure of the Personal Reflection Sections

Along with the main part, this thesis includes five further sections, which demonstrate my personal reflections on different aspects of the content of this scientific work. These reflections refer to different points in time of my DBA journey from the beginning of the process of developing my dissertation until its final stage. Thus, the reflective sections serve to provide the reader with insight into personal reflections that have abetted the entire DBA journey. While the main part of the thesis is characterised by a reporting nature and therefore written in passive voice (as usually required in scientific papers), the sections including personal reflections are written in the active voice, which is an integral part of reflective writing (Moon, 2004).

The first section “Reflection – Part I” follows this “Introduction” chapter and demonstrates a portion of my discourse on the studied topic at the earliest phase of the research. In particular, this segment provides my own personal perspectives of the issue of VAS in distribution centres as well as my motivations to conduct this study.

The following section titled, “Reflection – Part II”, covers a piece of discussion papers, which takes into account my personal view on the limitations of the current research in the framework of the purposes of my study. Thus, this discussion goes beyond the scope of the main part of literature review and provides my individual perceptions of the gaps in knowledge of the topic in question.

The “Reflection – Part III” is, in turn, the result of a critical assessment of the methodological approaches of the current studies in the context of their adaptability to my research. This part helps the reader gain a greater insight into the background of the peculiar design of my methodological construct, which, in fact, is a product of my in-depth reflection.

The section “Reflection – Part IV”, which was created following the outcomes of the study, represents my perception of the acquired results. This perception, in turn, contains my reflection of the results within their historical context, which was possible due to my academic and professional background and experience on the studied topic.

The “Reflection – Part V” is my self- reflection on my personal values and beliefs and on their impact on the results of my study. Particularly, my ontological and epistemological perspectives and reflection on them in the context of the nature of conducted study served as a basis for this last reflection part, which is placed at the end of this thesis. Figure 3 presents the main milestones of the structure of my thesis.

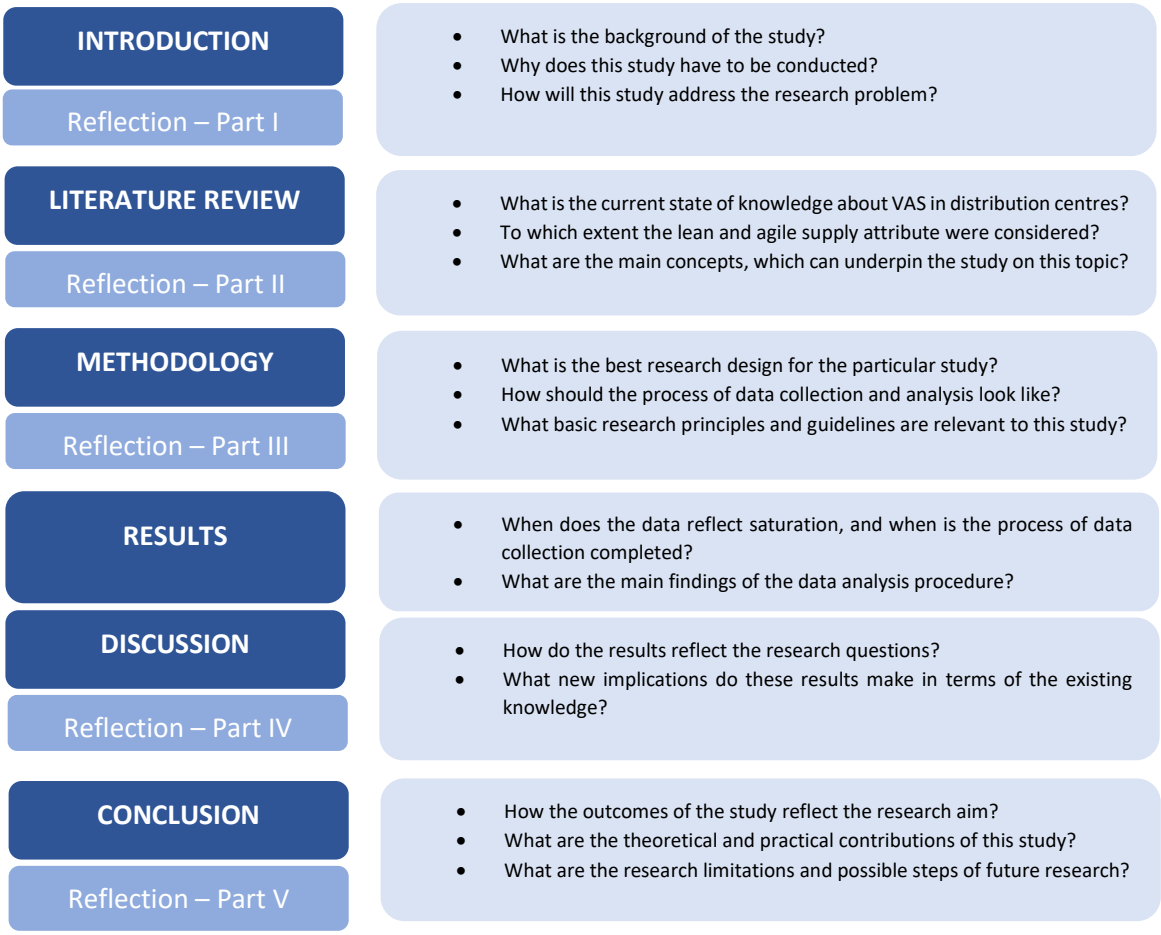


Figure 3. Structure of the Thesis – an Overview

Reflection - Part I

Due to its diversity and heterogeneous contexts, it is difficult to categorise value added service under one single definition. However, one thing is clear: the concept of value added service goes together with the idea of the "Value Added". In turn, the "Value added" itself can not be considered as homogeneous in its nature, as the way how this concept is perceived is manifold. One way to consider the concept of "Value Added" is that value is created by continious progressive activities, which aim to meet customer needs (Porter, 1985). In this context, added value can be measured by the increase in customer satisfaction. The other view on "Value Added" is that companies improve their strength, for example, by implementing innovative technologies and thus gaining a competitive advantage (Fletcher and Hardill, 1995). In this case, added value results from one's self differentiation from their competitors. Finally, the understanding of "Value Added" can be an economics perspective, where added value is defined as the difference between total value of sold products or services and costs (Wilson, 1979). From these perspectives "Value Added" depends on the efficiency and effectiveness of the company.

When looking at this discourse in the context of warehouse logistics, ones can raise the question: what does the idea of added value, from the point of view of the logistics service providers, stand for when applying VAS in distribution centres? In the light of the existing publications, VAS is a promising concept which can provide distribution centres operators with all the types of different values discussed above. However, when looking behind the scenes of modern logistics, it seems that this theoretical assumtion deviates from the reality of the industry. This was at least my impression throughout my perennial experience in the logistics industry. For example, if one distribution centre provides a value added service like simple relabelling, does it follow that the logistics service provider gains such benefits as increased customer satisfaction, unique selling point or higher financial profit? It seems ironical, but a detailed consideration shows that this question is sensible.

In particular, when considering "Value Added" as a concept, where added value is measured by customer satisfaction, it is difficult to tell whether customers are more satisfied because of the provision of simple relabelling. The same can be said about the concept of "Value Added" where added value is created by a unique selling point. Presumably, other logistics providers are also able to offer this relabelling activity in their distribution centres. Therefore, this kind of VAS can not be seen as a resource, which makes a distribution centre different to its competitors. Also, when looking at this example in the context of the "Value Added" concepts where created value is a financial benefit, it is not clear whether such relabelling activity will actually result in higher revenue. Potentially, customers will be willing to pay for the additional process, but distribution centres will need additional resources to perform this value-added service. From these perspectives, it seems to be more logical that the value-added effects can be not gained by the fact itself that "we offer VAS", at least in the case of such VAS like relabelling, but rather from how successfully distribution centres manage these services.

Eventually, another question arises: how should managers of distribution centres proceed in order to achieve higher performance by VAS? When looking at the perspective of the theory of the Resource-Based View by Barkley (1991), ones may conclude that the creation of unique resources and capability is a powerful procedure which can lead to a higher performance level than by competitors. But what are the resources and capabilities needed for the purpose of performing VAS in distribution centres? When reflecting on the heterogeneous nature of these services, it doesn't take long for one to conclude that there is no unique answer to this question. The importance of particular resources and capabilities

can be seen as relative perception when considering VAS performance from the Fisher perspectives. Because, when reflecting the strategy of performance alignment suggested by Fisher, it becomes clear: the nature of customer demand is decisive by developing operational resources and capabilities. And this is not surprising, as what is the VAS from the customer demand point of view? In an extreme situation, it is the customer specific requirements with each new business case.

Working in the warehouse logistics field, I had the opportunity to consider how customised natures of different VAS influence the operational structures of distribution centres. I observed the increasing trend towards customer specific requirements in the warehouse logistics industry and could feel the growing significance of VAS provided in distribution centres. It becomes increasingly obvious to me that managers of distribution centres, who integrate more and more VAS, have a new strategic and operational challenge in front of them. These perspectives inspired me to initiate and develop my research on this area of study, and in doing so, help managers of distribution centres achieve "Value Added" effects by incorporating VAS.

2. Literature Review

2.1 Introduction to Literature Review

This literature review can be seen as the part of DBA journey which is a continuous process that lasts from the beginning to the submission of the final draft. Therefore, the portfolio of the reviewed research papers has been permanently extended to include new publications: either "new" from the perspective of their appearance date or from the point of view of their relevance for the particular study. The focus area of this literature review was a compilation of the general topic of VAS in distribution centres, and in particular, the performance of VAS in the context of theories concerning supply attributes. For this reason, the existing publications were reviewed in three areas of research: publications on VAS in warehouse logistics, publications on theories of supply attributes and publications on the VAS performance in distribution centres.

Thus, the first area of literature review included main concepts around VAS in warehouse logistics. For these publications, the following key words and combinations of them were used*: "value added services", "postponements", "distribution centres", "warehouses", "third party logistics", "logistics service providers".* As VAS in logistics is not a new concept, it was important to consider not only the latest publications, but also to evaluate previously written papers in case their relevance was not rejected by later research. Therefore, the sources for this area of literature review were not restricted to a particular period of time.

The second area of the literature review focused on gaining an insight into the constructs underlying supply attributes in the theories of supply chain management. In order to examine this area of research, the following keywords were utilised: "lean", "agile", "leagile", "supply chain", "supply attributes", "supply chain strategies", "production" and "manufacturing". As the work of Fisher (1997) is seen as a basis for further discussion of of the alignment of supply strategies with customer demand, the focus of the review relied on studies published after the year 1997. Thus, the scientific works based on the Fisher' idea of supply strategies, which were publiched between 1997 and 2022, are considered by the literature review.

The third area of review included all publications that make it possible to understand the current state of knowledge of VAS performance in distribution centres under consideration of the context of the theories of supply attributes. For this purpose, the key words were

determined as follows: *"VAS in distribution centres", "VAS in warehouses", "VAS and supply attributes", "VAS performance", "VAS and lean", "VAS and agile", "VAS supply attributes", "operational strategies", "performance measures", "third party logistics", "logistics service providers".* This search process, in contrast to the previous two steps, mainly concentrated on studies published in the last ten years. Before and during the process of literature review some questions were created in order to support the process of evaluating existing publications in terms of their relevance to the topic (Table 2).

Research area	**Key words**	**Supporting questions**
Publications on VAS in warehouse logistics	value added services, postponements, distribution centres, warehouses, third party logistics, logistics service providers.	What are VAS in distribution centres? Which types of VAS exist? What are the main concepts linked to VAS in warehouse logistics? Which benefits do VAS offer for logistics service providers and their customers? Which challenges do distribution centres face by increasing customer demand for VAS?
Publications on theories of supply attributes	lean, agile, leagile, supply chain, supply attributes, supply chain strategies, production, manufacturing	What do lean and agile paradigms mean? What are the main differences between lean and agile manufacturing? How are these concepts integrated into supply chain strategies? What are the main frameworks / theories in this field of knowledge? How relevant is this topic in supply chain research today?
Publications on VAS performance in distribution centres	VAS in distribution centres, VAS in warehouses, VAS and supply attributes, VAS performance, VAS and lean, VAS and agile, VAS supply attributes, operational strategies, performance measures, third party logistics, logistics service providers	How do distribution centres in general, and VAS in particular, contribute to supply chain strategies? How relevant is it for logistics service providers to differentiate supply attributes according to customer demands? How do distribution centres align / or need to align their operational strategies with the performance of VAS?

Table 2. Questions Underpinning the Process of Literature Review

The search process mainly relied on the following databases: ABI/INFORM Global, Business Source Complete, EBSCO eBook Collection and Google Scholar. The identified papers were evaluated and recorded accoding to five categories (see Annex 1):

- *Highly cited sources - Books*. The number of books was restricted in this section, as the focus of the review was on journal articles. Nevertheless, it was important to include such significant authors as, for example, Ohno (1988), Womack and Jones (1996), who stood at the origins of the theories utilized in this study.

- *Highly cited sources - Journal reports*. Furthermore, highly cited journal reports (for example Fisher, 1997) were part of the theoretical background. These journal reports played a relevant role for the particular literature review as these publications presented frameworks which were quoted by multiple researchers. Thus, it was important to review the original sources in order to understand the position of the authors who developed these frameworks.

- *Main sources - Journal articles.* These scientific works included up-to-date sources. The objectives, the methodology and the results of each of these publications were examined and recorded. These publications served as a foundation for the understanding of the current state of knowledge and its limitations.

- *Additional sources – Books and journal articles.* These sources cannot be classified in the main sources category, as they have rather a support function in developing an understanding of the topic in question. Yet, these sources were also utilised by the construction of this literature review.

- *Bibliography - Journal articles.* The sources helped to understand the studied topic but were not included in the written literature review.

Based on the collected articles, a literature review was developed, whereby the examined areas were logically connected. The structure of this literature review is in line with the approach “move from a broad perspective to the specific points” (Figure 4).

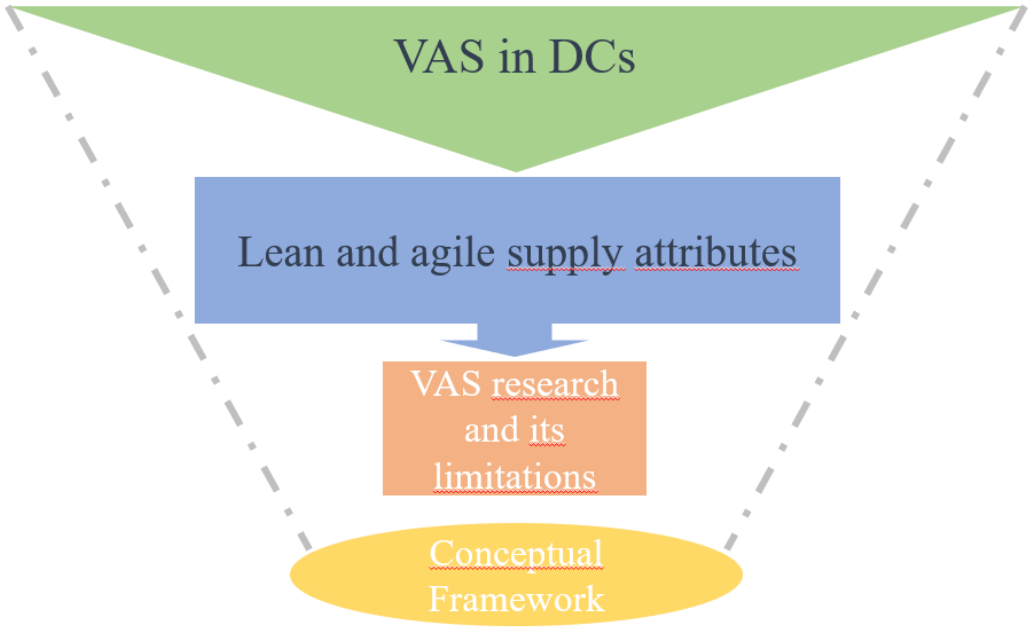


Figure 4. Structure of Literature Review

Thus, the following section of this literature review (2.2) begins with a debate on VAS and types of VAS in distribution centres that throw a light on the perspectives of different researchers of this topic (2.2.1). This section is followed by the discussion of VAS in the general context of companies' "outsourcing" strategy (2.2.2) and then demonstrates the advantageous effects which motivate logistics service providers and their customers to develop different VAS in the warehouse logistics field (2.2.3). Finally, the impact of VAS application on the performance of distribution centres is presented and the importance of understanding the supply attributes that are necessary for responding VAS customer demands is emphasised (2.2.4).

The next section (2.3) deals with the theoretical concepts of supply attributes. In particular, this section first presents the lean and agile paradigms in their historical context and then discusses these paradigms in the context of the topic of supply attributes. Thus, this part of literature review provides an insight into which different frameworks on supply attributes were developed and how these frameworks are interconnected. Finally, this section shows the relevance of this topic in current research.

The following section (2.4) brings the discussion to the main point of this study, whereby the topic of supply attributes is considered within the context of VAS performance in distribution centres. Thus, this chapter presents the contribution of previous research to VAS performance in distribution centres as well as the limitations of existing knowledge,

which makes it possible to understand the research gaps that need to be addressed by an empirical study.

Section (2.5) represents the conceptual framework, which derives from the concepts and issues that were identified and evaluated in the literature review. The literature review ends with a summary (2.6), which gives an overview of the overall results of the conducted literature review. Additionally, a section is included which presents a reflection on the conducted literature review process and on the literature findings (Reflection – Part II).

2.2 VAS in Warehouse Logistics

This part of the literature review encompasses the discussion and analytical synthesis of the topic on VAS in distribution centres. The aim of this section is to enable the reader to understand the theoretical conceptualisation of this topic in the existing research publications.

2.2.1 VAS and Types of VAS

2.2.1.1 VAS in Logistics Area

Generally, it is not easy to determine whether a particular service constitutes a value added service (Berglund, 2000). As a rule, value added services (VAS) are customer-specific and therefore difficult to generalise. According to Berglund (2000), for example, VAS in the logistics context can be understood as … "services that add extra features, form, or function to the basic service" (p. 83). Thus, such interpretation of logistics VAS includes all possible activities of logistics service providers apart from transport and warehousing (Atkacuna and Furlan, 2009). Bowersox and Closs (1996) suggested that VAS term can be demarcated by five performance areas customer-focused, promotion-focused, manufacturing-focused, time-focused and basis service.

- *Customer-focused VAS.* This means that logistics service providers can distribute products in a manner valuable to the customer such as direct store delivery or home delivery. Moreover, the picking, packing or repacking activities made it possible to deliver a standard product according to individual customer configuration. By offering this type of VAS, logistics service providers help their clients to meet end-customer demands.
- *Promotion-focused VAS.* This performance area includes different VAS that aim to help the customers of logistics service providers stimulate sales. An example of such activities is the building of point-of-sale displays, which logistics operators perform

in their distribution centres. In this case, distribution centres support the marketing strategies of their customers.

- *Manufacturing-focused VAS.* In terms of manufacturing-focused VAS, production companies (customers of LSP) postpone their activities to the point in time when customers confirm their orders. Thus, the finalisation of the product takes place in the distribution centres where the product is stored. For example, distribution centres can assume the responsibility for assembling two components to complete the product. In this way, make-to-assemble strategy can be applied in the most effective manner.

- *Time-focused VAS.* This type of VAS implies that the logistics service providers are able to sort the products and deliver them in the required time and sequence. Thus, the logistics service providers support factories by just-in-time and just-in-sequence delivery.

- *Basic services.* These services refer to basic services which customers outsource to logistics service providers. Such services can include inventory management, invoicing, order proceeding or reverse logistics.

The logistics service providers, however, can also develop different types of VAS, which go beyond these five categories. Previous studies on VAS in logistics highlighted that the provision of such services can be an advantageous approach for logistics service operators. The research publications by Soinio, Tanskanen, and Finne (2012) and Shi, Arthanari and Wood (2017) are two pieces of evidence for this argument.

Soinio et al (2012), for example, explored how logistics service providers can develop VAS for small and medium-sized enterprises. The researchers collected data from a large logistics company in Finland, as well as its client companies and other logistics experts in order to evaluate the three types of additional services that logistics service providers can offer to their customers: ”3PL with planning”; “consulting” and “outsourced chief logistics officers”. The result of the study by Sonio et al. indicated that VAS in the form of “3PL with planning” and “outsourced chief logistics officers” can be advantageous but are difficult to implement in practice. Consulting service, in turn, seems to be feasible and highly beneficial at the same.

In turn, Shi, Arthanari and Wood (2017) highlighted third-party purchasing (TPP), as a potential type of VAS. TPP means "…that the customer firm outsources the purchasing function to the 3PL, who then have the role of a group purchasing agent" (pp. 40-41). To gain an understanding of how logistics providers perceive the potential benefits of TPP, the researchers conducted a survey of 166 third-party logistics service providers in New Zealand. Yet, they found that none of the interviewed companies offered such a service up to the time that the survey was conducted. The conclusion of the study, however, indicates that logistics service providers see TPP as a potentially advantageous instrument to increase their own competitiveness. This result, in fact, confirms the previous study by Shi, Zang, Arthanari, Liu and Cheng (2016) on the TPP, which were based on the data of 245 Chinese third-party logistics providers.

2.2.1.2 VAS in Distribution Centres

The VAS definitions suggested above concern the field of logistics in general and therefore are more appropriated when consider this term on the level of logistics service provider. A more DC dedicated demarcation of VAS was worked out in the publication by Furmans and Deml (2014, p. 20):

> "… Value-Added-Services in distribution centres are all additional services that go beyond classic warehouse activities such as product receiving, storage, order picking, packaging and shipping." (Translated from German by author)

This definition refers to the material-related VAS (e.g. customised packaging, kitting, labelling, small assembly). A frequent reason for developing such services on the site of logistics service providers is the fact that production companies strive to place different VAS at the last possible stage of the supply chain, which is often the distribution centre. This approach refers to the so-called postponement strategy, which implies the delay of final processing or manufacturing activities to the latest possible decoupling point in the supply chain in order to respond to customer demands in the most appropriate way (Jafari, Eslami and Paulraj, 2022). This strategy can provide both cost reduction by lower inventories (Seth and Panigrahi, 2015) and higher efficiency by increased flexibility (Jafari, Nuberg and Hillethofth, 2016).

The term "postponement" can be referred to as the approach "…by which the commitment of a product to its final form or location is delayed for as long as possible" (Christopher, 2005). Thus, the basic characteristic of postponement strategy "…is to obtain more actual

information in order to define and translate the customer's needs into a concrete product or service specification" (Yang, Yang and Wijngaard, 2007, p. 973). For this reason companies are required to transform "centralised production" to "product customization" and therefore "…companies are postponing product customization to the DCs at destinations" (Chakravarty, 2014, p. 8).

When looking at different types of postponement, it becomes evidently clear that postponement is a strategy directly linked to the concept of VAS in distribution centres. Supplementary services such as customised labelling, packaging or assembly, for example, (form postponement) are moved to the last point in the supply chain, which is often a distribution centre (time and place postponements). As soon as such supplementary services are placed in distribution centres, these activities can be defined - from the view of logistic service providers - as VAS, as these activities go beyond the standard warehousing process. Table 3 shows the supplementary postponement activities of third-party logistics according to the research by Van Hoek (2000) and VAS in distribution centres according to the research by Furmans and Deml (2014). The presentation of both these concepts (postponement activities and VAS in distribution centres) in this table clearly indicates the closer relationship between these two concepts.

Supplementary services postponed to TPL according to Van Hoek (2000)	**VAS services in distribution centres according Furmans and Deml (2014)**
Packaging activities; Final Assembly; Product configuration; Reconditioning of products; Advice about logistics concepts of customers as a separate service; Financing inventories; Billing the final customer; Testing repair of products; Installation of products as final customer's site; Building of displays with products; Receiving and inspecting return shipments; Sizing products; Adding product features; Inventory management and registration	Repackage of the goods; Customised labelling; Quality check; Customised packaging; Bottling; Small assembly; Management of returns; Adding of inserts; Customs processing; Cutting; Management of empties; Display construction; Sleeven; JIS delivery; JIT delivery; Product securing; Pricing; Part shipping SKD; Part shipping CKD

Table 3. Postponed Supplementary Services and VAS (*derived from Van Hoek, 2000, p. 39 and Furmans and Deml, 2014, p. 21*).

Moreover, when looking at this definition of VAS from the perspectives Furmans and Deml (2014), it can be concluded that all five types of VAS described by Bowersox and Closs are performed in practice. Table 4 shows the result of the survey by Furman and Deml (2014) that was evaluated in this thesis in sequence with the types of VAS that was coined by Bowersox and Closs (1996).

Type of VAS identified by Furman and Deml (2014)	**Possible performance area of Bowersox and Closs concept (1996) (assigned by author)**
repackaging of goods	customer-focused VAS
customised labelling	customer-focused VAS
quality check	basic service
customised packaging	customer-focused VAS
Bottling	customer-focused VAS
small assembly	manufacturing-focused VAS
management of returns	basic service
adding of inserts	customer-focused VAS
customs processing	basic service
Cutting	manufacturing-focused VAS
management of empties	basic service
display construction	promotion-focused VAS
Foiling	customer-focused VAS
just-in-sequence delivery	time-focused VAS
just-in time delivery	time-focused VAS
product safety	customer-focused VAS
Pricing	promotion-focused VAS
part shipping SKD	manufacturing-focused VAS
part shipping CKD	manufacturing-focused VAS

Table 4. Types of VAS in Distribution Centres

However, such VAS, according to Furmans and Deml, (2014) do not represent all types of VAS in distribution centres. Thus, the researchers indicate that there are also the information-related VAS that logistics service providers can offer to their customers. Herrera and Yang (2017) suggested that in respect of non-material related VAS, logistics service providers can extend their service portfolio with such VAS as IT assistance, e-commerce, purchasing, consulting or financial support (table 5).

VAS Type	Example services
IT	Tracking, transparency, order booking, self-service access
Product related	Product assembly, postponement, labelling, packaging, just-in time support
Customer-focused	Direct delivery, cross-docking
E-Commerce	Payment platform
Promotional	Point-of-sale displays, promotional materials, telemarketing
Reverse logistics	Repair, recycling
Administrative	Purchasing, order processing, invoicing, export/import, customs brokerage
Customer service	Phone support
Consulting	Supply chain optimization
Financial	Stock ownership

Table 5. VAS in a Broader Sense *(Herrera and Yang, 2017, p. 23*)

2.2.1.3 Perspectives of this Research

It can be concluded that the different services on the physical and administrative levels of customised activities which can be performed in DCs can be referred to as VAS. However, in the context of the discussion regarding the terminology of VAS, it must be noted that the definitions of VAS can be inconsistence with the ongoing business environment of warehouse logistics. The reason is that the perception of VAS in distribution centres can be transformed in the time, which can lead to the situation that VAS today could be seen as basic services tomorrow. Moreover, the extent of VAS in each particular distribution centre can vary and the demarcation of the term of VAS might be different. Therefore, the term VAS in this study is not fixed to one of the theoretical perspectives represented above but rather derived from the perspectives of distribution centre managers who took part in the empirical process of this research (see section 3.3.1). Such an approach makes it possible to consider the term "VAS" in the current state of the business environment.

2.2.2 Role of VAS in Concept of Outsourcing Strategies

In general, the companies, which are potential customers of logistics service providers, can manage their logistics partly or completely on their own by running private warehouses and distribution centres. Such "self – service" can be seen as an advantageous approach to get a higher level of control over the product movement through the entire supply chain (Yu, Wang, Zhong and Huang, 2017). Yet, in reality, many companies strive to outsource their

logistics services - or part of them - to the Third-Party Logistics (TPL) providers (Hultman, Hertz, Johnsen and Johnsen, 2009). Various positive effects can be achieved by including logistics service providers in the supply chain. The most common reasons for outsourcing, besides the possibility to focus on the core competence, can be the improvement of different performance aspects such as process responsiveness, supply chain flexibility, logistics costs, customer service, conformance quality, process capability and process lead time (Rajamony, Ganesh and Pugazhendhi, 2013; Arif and Jawab, 2018).

Outsourcing, however, implies that TPLs accept responsibility for performing logistics activities, which, along with transport and warehousing, include different VAS (Khan, Iftikhar and Khan, 2015). In this constellation, the availability of VAS in the portfolio of TPL is particularly valuable. In his comprehensive annual study on outsourcing logistics, Langley (2007), interviewed different industry experts on the role of VAS in the outsourcing strategy. The results showed that 62% of respondents saw availability of VAS as a major factor in the choice for a TPL provider (Langley C, 2007, p. 37). This finding, in turn, seems to be logical in light of the fact that the later studies clearly indicated that the logistics service providers, their clients and the end-customers can gain a number of different positive effects when the logistics service providers are able to offer a higher range of different VAS (e.g., Ho and Chang, 2015; Aziz et al., 2017; Tian, Elinger and Chen, 2010; Okorie, Tipi and Hubbard, 2016).

Ho and Chang (2015), for instance, provided evidence for the positive effects of VAS extention for the logistics service providers. In particular, the researchers analysed the factors that can contribute to *innovation capabilities*, *service capabilities* and *corporate performance* in logistics services and how these three categories link to each other. They found out that service capabilities have an impact on logistics corporate performance. In the context of these findings, the researchers concluded that the ability to offer a wide range of VAS in today's market is one of the crucial factors contributing to the superior performance of logistic service providers.

Similar conclusions were identified in the research carried out by Aziz et al., (2017). These researchers conducted a quantitative study of logistics service providers in Malaysia in order to identify the causal relationship between value added capabilities (as well as logistics flexibility) and the logistics performance of these providers. Based on the cross-sectional data collection approach, the researchers developed the statistical data, which proved that value added capability has a direct impact on logistics performance.

Tian, Elinger and Chen (2010), in turn, found that the implementation of several VAS by logistics service providers can improve the organisational logistics performance of the customers. The researchers conducted a survey of 124 manufacturing customer firms in China in order to analyse the relationship between customer orientation of third-party logistics (3PL) and the efficiency of customer companies. Ultimately, Tian et al. (2010) concluded that service diversity, namely the range of logistics services that 3PL providers offer their customers, has a positive impact on improving the logistics of customer companies.

Okorie, Tipi and Hubbard (2016), for their part, indicated the correlation between VAS and an increased attractiveness of the offered services to the end-customers. Using the cross-cultural multiple case study approach, the researchers investigated the potential of VAS implementation for port logistics providers. The researchers evaluated the empirical data gathered from 240 port-user companies and concluded that VAS have the potential to attract and keep port-users, who consider the involvement of third-party logistics with a wide portfolio of VAS as advantageous.

Considering benefits, which different supply chain parties can gain from the provision of VAS, the high significance of VAS in the context of outsourcing becomes clear. At the same time, this means that the logistics service providers need to be aware of the positive as well as negative consequences, which outsourcing of VAS to distribution centres brings with it.

2.2.3 Role of VAS for Logistics Service Providers

According to Bowersox, Closs and Cooper (2010), VAS in logistics enables logistics service providers to increase turnover, customer satisfaction and gain a competitive advantage. Such a statement was confirmed by the researchers, who dealt with the perspectives of logistics service providers and indicate that the integration of VAS in distribution centres is perceived as an advantageous approach by different managers of distribution centres (Furmans and Deml, 2014; Herrera and Yang 2017).

Thus, according to the result of a survey of distribution centres operators in Germany conducted by the “Institute of Conveyor Technologies and Logistics Systems” in 2009, “customer satisfaction”, “demarcation from competitor” and “higher return” are the motives for providing VAS (Furmans and Deml, 2014). The statistical analysis of this survey showed that “customer satisfaction” is the most frequent reason for offering this type of

service. The study on VAS in TPLs by Herrera and Yang (2017), also indicates that the provision of different VAS is seen by logistics managers as an advantageous approach. In particular, the researchers applied an impressive survey of 38 TPLs and 48 logistics user companies as well as seven semi-structured interviews with TPLs and concluded that both financial benefit and non financial benefits of VAS are the driver for providing such services. Still, the researchers stressed that the development of VAS in logistics centres is a customer driven process in which logistics service providers usually respond to customer wishes if there is financial benefit.

An application of VAS however, cannot only be seen as a benefitial measure, but also as a barrier for distribution centre operators because of the difficulty of having to coordinate many different services (Atkacuna and Furlan, 2009). Various studies in the field of warehouse logistics indicated that such diversity and specification could lead to a higher complexity of warehouse processes (Karagiannaki, Papakiriakopoulos and Bardaki, 2011; Faber, De Koster and Smidts, 2013; Lao, Choy, Ho, and Yam, 2012; Jaaron and Backhouse, 2016).

Karagiannaki et al (2011), provided a framework to identify key factors influencing the impact of RFID (radio frequency identification) on warehouse performance. The researchers suggest that RFID implementation may lead to high productivity in some, but not all warehouses. The reason for this discrepancy lies in the nature of the processes performed in different warehouses. While some warehouses are driven by the simple storage of goods, others include various value-adding activities. According to Karagiannaki et al., warehouses with an extensive portfolio of VAS have more complex warehouse processes, which can have a negative influence on the application of RFID.

A similar conclusion can be drown from the research by Faber et al (2013). Based on an impressive survey of 215 product warehouses and distribution centres in the Netherlands and Flanders (Belgium) the researchers suggested that the extent of warehouse planning and complexity of decision rules directly depends on the complexity of warehouse tasks. According to Faber et al., one of the main reasons for task complexity is the number and diversity of the processes that warehouses and distribution centres need to perform. Thus, the authors stressed that additionally implemented VAS are one of the main factors of process complexity.

Lao et al (2012), moreover, highlighted the increasing complexity of the goods receiving process in the food industry is triggered by the growing demand for VAS. According to Lao

et al., an incorporation of VAS in warehouses can mean that even a single inbound delivery of a food item requires several services at different workstations before storage. Such complexity greatly increases the difficulty of arranging the operational routine, resulting in a potentially chaotic planning process.

The provision of a special type of VAS such as “reverse logistics” can lead to a similar challenge. Jaaron and Backhouse (2016) highlighted this in their study on the problem of reverse logistics in the logistics systems of housing repair and maintenance in the UK. The researchers suggested applying an integrated systems approach “Vanguard Method” to create self-organizing services to help increase efficiency and reduce the costs of reverse logistics. In this study, Jaaron and Backhouse stressed that returning products, as a part of reverse logistics activities, is a sensitive VAS for many companies, as this needs to be properly organised to avoid additional costs.

Therefore, the application of VAS is a challenge distribution centre managers need to meet in order to achieve different added value effects from this procedure. For this reason, the performance of distribution centres, where these services are handled on tne operational level, takes centre stage.

2.2.4 DC Performance and VAS Customer Demand

The warehouse performance is in the loop of the current studies, which consider this topic from different angles such as warehouse improvement models (e.g. Ribino et al., 2018; Qi et al., 2018), warehouse performance measures (e.g. Laosirihongthong et al., 2018; Kursini, Novendri and Helia, 2018; Phyllis, 2021); WMS and supportive models (e.g. Hamdy, Mostafa and Elawady, 2018; Baruffaldi, Accorsi and Manzini, 2019). All of these aspects are crusilal for effective warehouse management that incudes planing decision and control of the warehouse operations (Faber, De Koster and Smidts (2013). In this context, the key factor is the nature of customer demand, which indicates how warehouse operations need to proceed. Faber, De Koster and Smidts (2018), for example, stressed that marketing demand is one of the main parameters which impacts the underlying construct of warehouse management. These researhcer conducted a survey of 111 distribution warehouses in the Netherlands and Belgium and concluded that, in order to achieve a high level of performance, warehouse management structure needs to be adapted to the context of customer demand. In turn, n their study of Taiwan’s international distribution centres, Huang and Hsu (2016), proposed that in order to achieve high service quality, managers of

distribution centres need to fully understand customer demand and develop those supply attributes which can make it possible to adequately respond to it.

Previous studies indicated that the customer demand in distribution centres can be quite heterogeneous, which can require the development of different supply attributes depending on each concrete business case. Such evidence can be found in the results of the study by Anderson et al. (2011). The researchers conducted a quantitative analysis in order to understand the drivers for choosing of a TPL provider. For this purpose, small, medium and large companies from different industries and countries were selected and various attributes that might be the reason for choosing TPL were determined. Based on an experimental approach, Anderson et al. assessed the significance of each attribute. The result of this study showed that for some companies "price" was vital, while other companies attached more importance to "delivery performance". Mokadem (2017), in turn, indicated that t differing choice preferences of the supplier resulted from the supply strategies of the manufacturing companies themselves. The researcher evaluated how industrial companies select their suppliers depending on their own supply chain strategies and ultimately, stressed that if manufacturing pursues a lean strategy, it will select suppliers who can help to improve *efficiency*, while manufacturing that is focused on an agile strategy, will give preference to suppliers, who can contribute to it *responsiveness*.

When considering the application of different VAS in the context of the conclusion of Anderson et al. (2011) and Mokadem (2017), it becomes clear that this procedure can increase the heterogeneity of customer demands in distribution centres, as these serveices are characterised by a high degree of customisation (Bowersox, Closs and Cooper, 2010). Guo (2017) in his papers on the core competence of the TPL recommended that logistics service providers pay high attention to customer demand for VAS:

> "…expansion of the value-added logistics services is the problem the third party logistics enterprise must face, try to put themselves in the whole supply chain and provide customers with complete and efficient supply chain services. First of all, to accurately understand and grasp what demand customers have, which is the key of the third party logistics enterprise to enhance the core competitiveness. It is well-known that the need of the customers often is various, of uncertain factors, we need to carefully analyze, and improve the occasion" (Guo, 2017, pp. 228-229)

Therefore, when considering VAS performance, it is important to take into account the context of the customer demand and react by developing adequate supply attributes. Putnik and Putnik (2012), in their managerial research, emphasised that in dynamic and uncertain settings, lean and agile are two commonly adopted strategies that managers should refer to depending on their context of action.

2.3 Supply attributes

This part of the literature review deals with the topic of lean and agile supply attributes and thus, enables the reader to understand the conceptual area of this research which is linked to these two concepts. This section gives a brief overview of the theoretical constructs of the concepts of leanness and agility. The purpose of this part is to outline the main frameworks and models, which were developed by various researchers with respect to the theory of alignment of the supply attributes (section 2.3.1) as well as to provide an insight into the current research streams of lean and agile supply attributes and to demonstrate the relevance of these concepts in modern business research (section 2.3.2).

2.3.1 Theories of Supply Attributes

2.3.2.1 Fisher's Framework

Lean and agile paradigms have formed the foundation for the frameworks, models and theories of performance alignement in supply chain research. Among the first of such frameworks, one would find the publication "What is the Right Supply Chain for your product?" by Fisher (1997). In this paper, Fisher pointed out that although many efforts were made to improve supply chain performance, they were still being carried out on a low level. The reason for the low supply chain performance, according to Fisher, is that the supply chain strategy for particular products is not tailored to the nature of customer demand. In the context of these perspectives, Fisher claimed that the products are generally either functional or innovative. Functional products are associated with predictable demand characterised by longer life cycles, low product variety, low margin and high lead time. Innovative products, in contrast, are related to unpredictable demand characterised by shorter life cycles, high product variety, high margin and low lead time. Therefore, functional and innovative products according to Fisher (1997) need different constructs of the supply chain. In particular, functional products require an efficient supply chain, while innovative products demand a supply chain that is more market responsive (Table 6).

	Functional Product	**Innovative product**
Product life cycle	more than 2 years	3 month to 1 year
Contribution margin	5% to 20%	20% to 60%
Product variety	low (10-20 variants per category)	high (often millions of variants per category)
Average margin of error in the forecast at the time production is committed	10%	49% to 100%
Average stockout rate	1% to 2%	10% to 40%
Average forced end-of-season markdown as percentage of full price	0%	10% to 25%
Lead time required for made to order products	6 months to 1 year	1 day to 2 weeks
Type of required supply chain	Physical efficient process	Market-Responsiveness process
Primary purpose	Supply predictable demand efficiently at the lowest possible costs	Respond quickly to unpredictable demand, and obsolete inventory

Table 6. Fisher's Characteristics of Functional and Innovative Products
(*derived from Fisher's Frameworks, 1997, pp. 107-108*)

2.3.2.2 Lean, Agile and Leagile Supply Strategies

The two types of supply chain (physical efficient and market-responsiveness) that Fisher (1997) outlined in his paper are close to the characteristics of lean and agile manufacturing paradigms. In this respect, Naylor, Naim and Berry (1999) referred to these two types of supply chain as "*lean supply chain*" and "*agile supply chain*". According to Naylor et al. volatile demand needs to be managed by agile methodology, while in the case of more predictable customer demand, lean manufacturing technique is more appropriate. Furthermore, the researchers pointed out that these two paradigms are not mutually exclusive and can be combined by using a decoupling point where lean manufacturing is transformed to the agily supply in order to meet volatile customer demand. The authors called such a mixed supply chain strategy "leagility".

The concept of leagility in terms of supply chain strategies was further discussed in the work by Mason-Jones, Naylor and Towill (2000). The authors focused on three real cases that were explored in previous studies (pp. 4067-4069):

- "The lean global supply chain: case study of precision mechanical products" (Towill and McCullen, 1999)
- "Parallel, lean and agile supply chains: the USA carpet maker" (Johansson, McHugh, Pendlebury and Wheeler, 1993)
- "The leagile global supply chain: electronics products" (Naylor et al., 1999)

Based on these findings, Mason-Jones et al. (2000) concluded that all three supply attributes (lean, agile and leagile) exist in supply chain practice. Therefore, the researchers suggested that the supply attributes of each particular product can be grouped according to these three categories (See Figure 5).

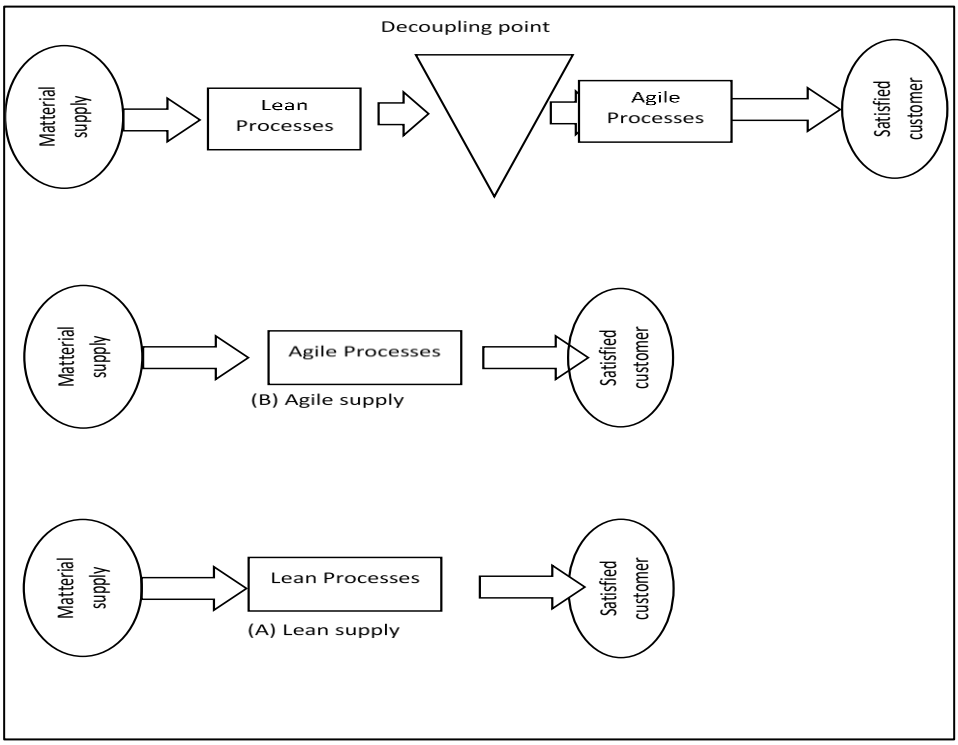


Figure 5. Three Groups of Supply Attributes (*Mason-Jones et al., 2000, p. 4065*)

In the context of the discussion of different supply attributes, Mason-Jones et al. (2000) highlighted that supply attributes are crucial to gain competitive advantages. Using the "Market Winners – Market Qualifiers" model by Hill (1993), the researchers suggested that the key attribute of an agile market is the "service level", while in the case of lean supply the "cost" is decisive (Figure 6).

	Market Qualifiers	Market Winners
Agile supply	○ Quality ○ Cost ○ Lead Time	○ Service Level
Lean supply	○ Quality ○ Lead time ○ Service level	○ Cost

Figure 6. Market Winners – Market Qualifiers *(Mason-Jones et al., 2000, p. 4064*).

Mason-Jones, Naylor and Towill (2000b), in their following work "Engineering the leagile supply chain", presented a more detailed overview of how to distinguish between lean and agile attributes in the context of different criteria (Table 7). This framework is on a more extensive level, when compared with the model of Fisher (1997), as the researchers also included such criteria as "*stockout penalties*", "*purchasing policy*", "*information enrichment*" and "*forecasting mechanism*".

Distinguishing Attributes	**Lean Supply**	**Agile Supply**
Typical products	Commodities	Fashion Goods
Marketplace Demand	Predictable	Volatile
Product Variety	Low	High
Product life Cycle	Long	Short
Customer Drivers	Cost	Availability
Profit Margin	Low	High
Dominant costs	Physical Costs	Marketability costs
Stockout penalties	Long Term Contractual	Immediate and Volatile
Purchasing Policy	Buy Materials	Assign Capacity
Information Enrichment	Highly Desirable	Obligatory
Forecasting Mechanism	Algorithmic	Consultative

Table 7. Market Winners – Supply Attributes (*Mason-Jones, et al., 2000b*).

The discussion on the alignment of supply attributes was continued by extending these theories to the concept of capability and performance measures. Morash (2001) extended the concept of supply attributes by presenting a model of "*supply chain strategy, capabilities and performance*". According to this scheme, lean and agile supply chain strategies require different capabilities and emphasis on performance measures (Figure 7). In the context of this model, VAS was considered as one of the most important types of customer service capabilities in the field of the agile supply chain.

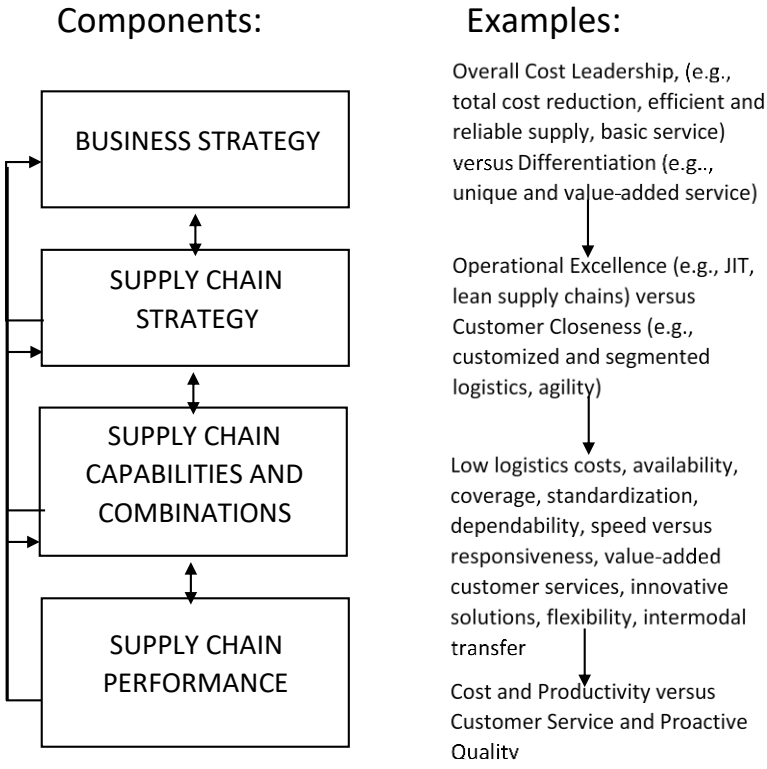


Figure 7. Model of Supply Chain Strategy, Capabilities and Performance (*Morash, 2001, p. 38*)

Following the logic that performance measures need to be aligned to the supply strategy, Griffis, Cooper, Goldsby and Closs (2004) suggested a framework that can help managers to select logistics measures suitable for particular objectives (Figure 8). According to this framework, logistics measures can be considered from three perspectives: measurement focus (operational vs strategic), measurement frequency (monitoring vs diagnostic) and competitive basis (efficiency vs responsiveness). To determine the criteria for a competitive basis, the researchers used the framework by Fisher (1997) and suggested that the lean strategy needs to be monitored by performance measures related to efficiency, while the agile supply chain requires responsiveness performance measures. In this way, the framework of performance measures developed by Griffis et al (2004) reflected the

principles of the "Market Qualifiers - Market Winners" framework by Mason-Jones et al. (2000).

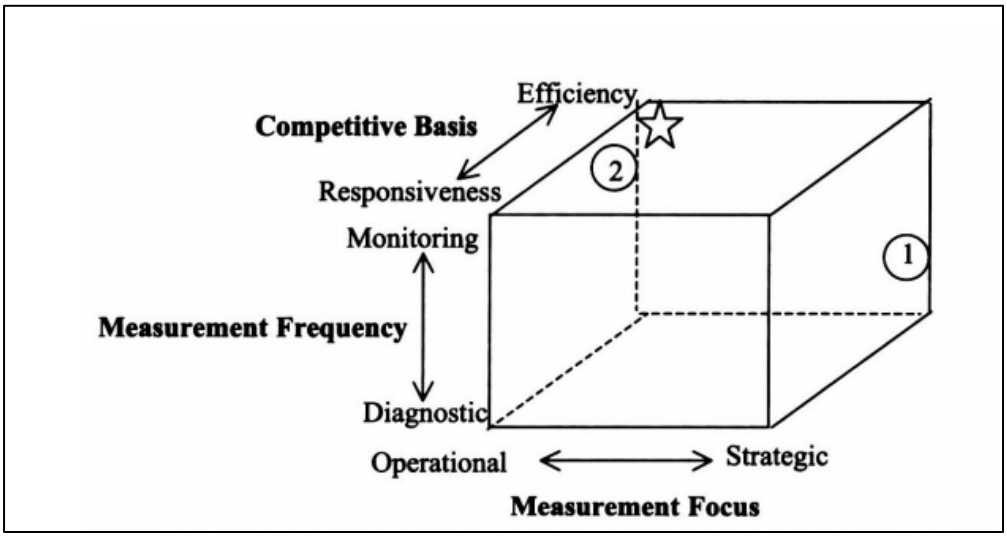


Figure 8. Three Dimensions of Measurement (*Griffis et al., 2004, p. 109*)

2.3.2.3 Modified Supply Chain Frameworks

However, some researchers claimed that the adoption of the principle of distinguishing between lean and agile supply chain strategies (or the combination of both in terms of leagile supply chain strategy) has its limitation in the context of supply chain perspectives. These researchers suggested modified concepts, which included four supply chain strategies that can be derived for each particular product (Lee, 2002; Purvis, Gosling and Naim, 2014; Sabet, Stephans and Yatdani, 2014).

Lee (2002), for example, pointed out that to determine a supply chain strategy for a product it is necessary to consider both demand uncertainty and supply uncertainty. This way, Lee modified the concept of Fisher's functional and innovative products by conceptualising supply chain strategies into four categories:

> *Efficient supply chain.* This type of supply chain is needed if the product is functional and the supply process is stable. Following this supply chain strategy companies need to focus on cost efficiency improvement by eliminating all non-value added activities. Non-value added activities in this case are all activities that, according to the lean philosophy, refer to waste in the process (Rother, 1999).
>
> *Risk-hedging supply chain.* In case of high supply uncertainty of a functional product the adoption of a *risk-hedging supply* chain is a more appropriate

strategy. This strategy implies that the company needs to find further suppliers for this product and thus minimise the supply risks.

Responsive supply chain. The strategy regarding innovative products reflects either a responsive or agile supply chain. A responsive supply chain requires high flexibility to react quickly to a specific customer demand, while the supply is stable.

Agile supply chain. In contrast to the responsive supply chain, an agile supply chain needs to be set up when both customer demand and supply are uncertain. Therefore, an agile supply chain is a mix of risk-hedging and responsive supply chain strategies.

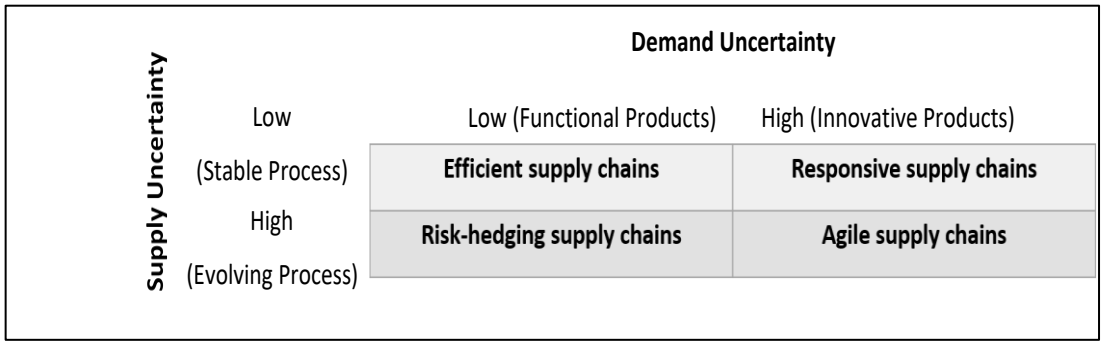


Figure 9. Supply Chain Strategies (*Lee, 2002, pp. 114*).

Purvis, Gosling and Naim (2014) modified the concept of leagility. The researchers suggested that the "*simple material flow decoupling point concept*" is a limited perspective. Thus, the authors suggested an extention of the leagility concept according to two different "flexibility" types of sources: "vendor flexibility" and "sourcing flexibility". Vendor flexibility is the ability of the vendor to react in flexible manner, while sourcing flexibility is the ability of the coordinator to have a flexible choice of the vendor. In this way, the following supply strategies were proposed: "Lean", "Leagile with vendor flexibility", "Leagile with sourcing flexibility" and "Agile" (Figure 10).

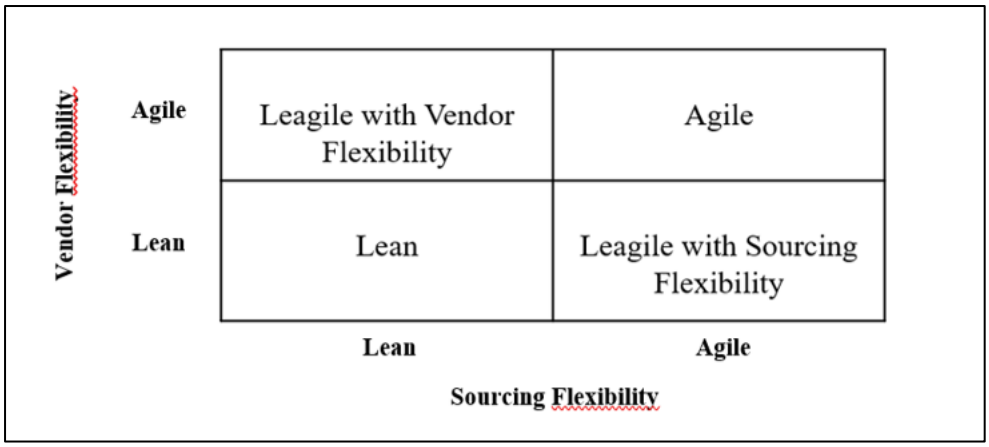


Figure 10. Supply Network Flexibility (*Purvis et al., 2014, p. 108*)

Sabet et al (2014), in turn, utilised Lee's framework (2012) by adjusting this framework to the special context of fast moving product supply chains. The researchers stated that the lean supply strategy is not relevant in the case of the fast moving product supply chain. Instead, Sabet determined a high and very high uncertainty of supply and suggested combining these parameters with high and very high importance of supply products for the core business. Based on this approach, four strategies were determined, which according to the researchers need to be considered in the context of agile supply chain : "vertical integration", "strategic partnership", "flexible supply chain contracts" and "long-term and capacity-based supply chain contracts" (Figure 11).

		The importance of the supplied product/service for the core business	
		High	**Very High**
Supply chain uncertainty	**High**	Flexible supply chain contracts (Vendor Managed Inventory, Made-to-assemble, Made-to-order)	Vertical Integration
	Very High	Long-term and capacity-based supply chain contracts (capacity buffering)	Strategic Partnership

Figure 11. Supply Strategies in Fast Moving Industry (*Sabet et al., 2014*).

2.3.2 Relevance of Fisher's Research Stream

The theories of "supply attributes alignement", presented above, can be seen as highly valuable concepts. This statement is not only based on the notion that the perspectives of these theories are logically constructed, but also on the fact that the validity of these concepts have also been also proven by quantitative examinations (e.g., Harris,

Componation and Farrington, 2010; Kumar, Garg and Agarwal, 2019). Thus, it seems rational that the concepts of alignment of supply attributes find a broad utilisation from different researchers, who applied this theoretical paradigm for various purposes.

Some researchers applied these concepts for the purpose of developing strategic models, which can be used in the business environment. For example, the principles of "product characteristics" (Fisher, 1997), "lean, agile and leagility" concepts (Naylor et al., 1999; Mason-Jones et al., 2000) and "capability and performance alignment" (Morash, 2001; Griffis, Cooper, Goldsby and Closs, 2004) were included in a comprehensive "guideline-framework" developed by Nel and Badenhorst-Weiss (2010) which serves as a basis for companies to design their supply chain in such a way that it is aligned to the objectives of organisations. A further modelling of the principles of supply attributes can be also found in the following work by Ambe (2012).

Such conceptual models are particularly important considering the fact that the principles of supply attributes alignment can be relevant in various business contexts. In particular, the concepts of Fisher (1997) and his followers proved their relevance in the context of the studies on different industries, such as "textiles and clothing industry" (Bruce, Daly and Towers, 2004) or "perishable foods" (Castro and Jaimes, 2017), as well as in the context of the studies on different countries such as the Polish market (Kisperska-Moron and De Haan, 2011). Moreover, the results of a comprehensive systematic literature review of supply chain management research by Sharma, et al. (2020) indicated that the concepts of lean and agile can also play a role in the context of modern business environment topics such as "green", "sustainable" and "resilient" paradigms. (e.g. Lotfi and Saghiri, 2018; Mohammadzadeh, Sobhanallahi and Khamseh, 2020). The latest literature review by Bhamra, et al (2021), in turn, highlighted the particular importance of the leagile concept in the context of lean and agile research debates.

Thus, by concluding the discussion on supply attributes, it can be stated that the paradigm of supply attributes alignment is a broadly introduced component in the current business research. Now, coming back to the context of this particular study, ones comes to question how this paradigm has been adopted for the explored issue of VAS performance in distribution centres.

2.4 Supply Attributes in the Context of VAS Performance

This part of the literature review is a critical reflection of the existing VAS research in its relation to the lean and agile supply attributes in the context of VAS performance in distribution centres. Thus, this section presents the theoretical contributions of previous studies and provides evidence of the needs for further exploration on the topic in question.

2.4.1 Lean and Agile Paradigms in Distribution Centres

When examining the research publications concerning the lean and agile paradigms in the context of warehouse logistics, ones come to accept that the lean remains a dominant concept of current research in the warehouse logistics field. Many contemporary studies continue to indicate the opportunity of performance increase by applying different lean methods in the warehouse logistics environment (e.g., Baby, Prasanth and Jebadurai, 2018; Freitas, et al., 2019; Abideen and Mohamad, 2020). Moreover, the positive effects of lean approach for warehouse logistics were recently proven by Abushaikha, Salhieh and Towers (2018), who identified the causal relationship between waste reduction based on lean strategy and warehouse operational performance.

On the other hand, the concept of agility seems to be not less important considering the fact that the adoption of agile supply attributes across the supply chain leads to the situation that the distribution centres need to be able to adequately support such strategies. For example, the responsive supply chain strategy may require an increase in warehouse stock in order to respond to the customer demand, which would mean that distribution centres must be able to provide a higher storage capacity (Ikechukwu, 2019). According to the result of a study by Jermsittiparsert, Sutduean and Sriyakul (2019) the warehouse attributes in terms of responsiveness can play a significant role in the performance of warehouses. In particular, the researchers carried out a statistical analysis of the warehouses in Indonesia and concluded that the ability to quickly respond to customer orders can contribute to the warehouse supply chain efficiency. Therefore, it can be concluded that both lean and agile paradigms can be relevant for distribution centres when developing supply attributes necessary to respond to different customer demands.

As early as 2004, Baker investigated how distribution centres align their operational strategies with the theory of lean and agile supply chain. The researcher conducted a survey of 45 distribution centres in the UK in order to understand to which extent the operations of distribution centres are adjusted to these two paradigms. As a result, Baker highlighted that

distribution centres strive to focus on different performance drivers which cater to both lean and agile requirements. Moreover, in his later publication "The role, design and operation of distribution centres in an agile supply chain", Baker (2008) provided a framework that can support distribution centres to align themselves to perform in the agile environment.

The later study on performance drivers in distribution centres by Laosirihongthong et al (2018), however, showed that distribution centres are still cost driven organisations. The researchers conducted a study on different warehouses operated by manufacturing, TPLs and retailers. Using fuzzy analytical hierarchy, the researchers evaluated different performance measure categories as to their significance for logistics service operators. The results of this study showed that the performance dimensions related to efficiency, namely "insurance cost", "shipping cost", "storage cost", "equipment utilisation picking" and "labour productivity and utilisation" are highly significant categories, while performance dimensions linked to responsiveness and flexibility are clearly less important.

These perspectives, however, are mainly related to the traditional warehouse operations, which are not in focus of this research. Threfore, in the context of this study, these conclutions can not be accepted in full. In particular, it can be assumed that the role of supply attributes in the concrete environment of VAS performance in distribution centres can be different due to the peculiarity of VAS in contrast to the traditional warehouse operations. Thus, an understanding of this topic requires a research examination in the concrete context of VAS.

2.4.2 Main Perspectives of Literature

Previous studies provided different theoretical insights that contributed to the conceptualization of the study on the topic in question. In this context, three main research streams, which are relevant for the explored topic, were identified in the literature. These research streams represent the perspectives of existing publications in the field of "*logistics research*", "*warehousing research*" and "*supply chain research*".

Logistics research, which is dominated by the study on third-party logistics, provided strategical perspectives of the concept of VAS in the logistics area. In particular, these studies indicated the importance of developing different VAS for both logistics service providers and their customers, and identified the risks and challenges associated with incorporating a wider range of customised services (e.g. Atkacuna and Furlan, 2009; Furmans and Deml, 2014; Andersson and Roso, (2016); Okorie et al. (2016); Herrera and

Yang, 2017). Thus, the studies of logistics research indicated the necessity to bring a high focus on the management of different customised activities in the most appropriate way. These activities, in turn, are primarily performed in the operational area of distribution centres.

By contrast, the studies in the field of warehouse research, which are concentrated on the performance of traditional warehouse operations, showed that the consideration of the nature of customer demand is a crucial element of performance in distribution centres. These studies indicated that customer demand in warehouse logistics can highly vary, and the performance of distribution centres depends on the level of response to different customer demands in warehouse operations. Therefore, these studies underlined that in order to achieve superior performance the managers of distribution centres need to adopt those supply attributes, which can help to respond adequately to different customer demands (e.g. Faber et al., 2013; Huang and Hsu, 2016; Faber et al., 2018; Laosirihongthong et al., 2018).

Finally, the publications in the field of supply chain research contributed to a deep understanding of the underlying constructs of lean and agile supply attributes. These publications represent different frameworks in the context of supply chain performance in general (Fisher, 1997; Lee, 2002; Purvis, et al., 2014; Sabet et al. 2014), as well as the use of these concepts in the field of VAS (e.g. Chen and Notteboom, 2012; Chen and Notteboom, 2014). Thus, the theoretical models of these publications contribute to the development of the conceptual framework in the context of the explored topic.

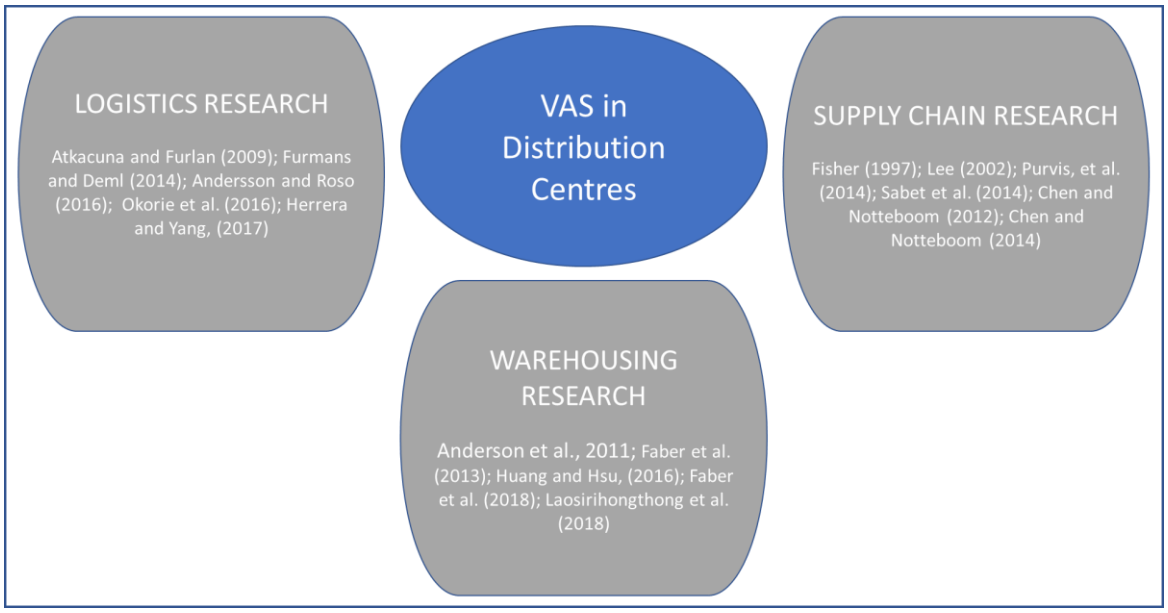


Figure 12. Domain Perspectives of Literature

2.4.3 VAS Research and Limitations

The topic of VAS in distribution centres was explored by previous research in various contexts and with different focuses (Table 8). However, when analysing these publications it becomes clear that the previous studies are in lack of a comprehensive examination of how lean and agile paradigm are adopted in the supply attributes of VAS in the modern warehouse logistics.

Some studies, for example, are concerned with more strategic perspectives of developing peculiar types of VAS which goes beyond the border of the physical supplementary activities. To such studies can be attitude already mentioned research by Soinio, Tannskanen and Finne (2012), Shi, Arthanari and Wood (2017), as well as the study on VAS in finance area by Lv and Chen (2013). Some studies are linked to the investigation of the VAS opportunities in the specific industrial contexts, which can go beyond the frame of the warehouse logistics (e.g. in the context of intermodal inland terminals by Protic, Fikar, Voegl and Gronalt, 2020; port logistics by Andersson and Roso, 2016 and Menegaki and Alexopoulos, 2017). The study by Tang, Qian and Wang (2018), in contrast, is dealing with the understanding of the role of VAS in the specific geographical contex (Yunnan Province in China). Other studies are quantitative in their natures and therefore, deal with research issues regarding causal relationships (Chen and Notteboom, 2012(b); Rivera, Sheffi and Knoppen, 2016; Okorie, Tipi and Hubbard, 2016; Russo and Gronalt, 2021). In

particular, Chen and Notteboom, 2012(b) identified the effects of the characteristics of cold supply chain on the decision regarding location of VAS. Rivera, Sheffi and Knoppen (2016) proved that within the context of logistics clusters, agglomeration in logistics parks and training can positively impact the provision of VAS. Okorie, Tipi and Hubbard (2016) provided evidence for the increase of port attractiveness by a higher range of offered VAS. Russo and Gronalt (2021) find out that offering VAS can positively impact the performance of the intermodal inland terminals.

By contrast, the research by Atkacuna and Furlan (2009) and later by Herrera and Yang (2017) are more explorative in their nature and based on the data which is gathered by the survey of managers of logistics service providers and their customers. However, both lacked in considering the perspectives of different natures of customer demands and, in this way, the concepts of lean and agile supply attributes were not included in these studies.

The study by Furmans and Deml (2013), in turn, can be seen as valuable scientific contributions when considering VAS performance in the context of a lean environment. In particular, Furmans and Deml (2013) developed an impressive "performance assessment model" that can help distribution centres evaluate their efficiency, and, if necessary, to benchmark against other distribution centre operators. Thus, this study provided novel theoretical concepts in the issue of VAS efficiency in distribution centres. Nevertheless, due to their heavy focus on cost efficiency issue, the results of this study seem to be less adequate for the context of an agile environment.

In fact, the literature review shows that the topic of VAS in distribution centres in the combination with the concepts of lean and agile supply attributes can be found only in the publications by Chen and Notteboum: "Determinants for assigning value-added logistics services to logistics centers within a supply chain configuration" (2012) and "A cost perspective on the location of value-added logistics services in supply chains" (2014). These studies were based on the perspectives of the previous framework of Fisher (1997) and his followers for determining the criteria of the natures of customer demand of VAS. However, these studies dealt with the issue of DC locations for performing VAS and therefore, considered VAS from the supply chain perspectives. Meanwhile, supply attributes in distribution centres themselves were not explored in these studies.

Thus, the existing studies on VAS are not providing an understanding about the contribution of supply attributes in the performance of VAS in distribution centres. For this reason, further empirical research is required in order to obtain additional knowledge of this topic.

Authors	Year	Name of publication	Aim of the study	Methodology
Atkacuna & Furlan	2009	Value-Added Services in Third Party Logistics: A study from the TPLs providers' perspectives about value-added services, driving forces and barriers	To investigate how TPLs create value-added services and to understand the driving forces and barriers of this procedure.	Qualitative multiple case studies. The empirical data gathered from three TPLs: Bring Logistics Solutions, Aditro Logistics and Schenker Logistics.
Soinio, Tannskanen & Finne	2012	How logistics-service providers can develop value-added services for SMEs: A dyadic perspective	To create a theory-based and initially tested model which helps to identify the opportunities of further development of advantageous VAS.	The semi-structured interviews within a case company (a large Finnish logistics service provider), its customers, and experts from the area of logistics services.
Chen & Notteboom	2012	Determinants for assigning value-added logistics services to logistics centers within a supply chain configuration	To develop a framework that helps to identify the most appropriate location (DC) for the VALS based on different factors including product characteristics.	Analytical approach of understanding different business concepts and their connections and additionally the investigation of case studies.
Chen & Notteboom	2012	Distribution and value added logistics in the cold chain product market with application to the role of seaports.	To understand the development and specific of the cold chain product market and to identify how its specificities influence the location decisions regarding VALS	Case studies on bananas, pineapples and kiwifruits cold chain.
Furmans & Deml	2013	Systematische Bewertung von Value-Added-Services in Distributionzentren (eng. Systematic Evaluation of VAS in DCs)	To develop a universal approach to assess VAS in distribution centres.	A quantitative survey of 21 distribution centres in Europe and following development of analytical models
Lv & Chen	2013	The Extension of Third-Party Logistics Value-Added Services in the Financial Field	To explore the advantages and disadvantages of two financial services which can be provided by TPLs: Agent Supervision Service and	Case studies of two TPLs in China

			Agent Purchasing Service	
Chen & Notteboom	2014	A cost perspective on the location of value-added logistics services in supply chains	To understand the impact of locations of VAS on the supply chain configurations and logistics costs.	Analytical developed model, which is finally evaluated by the examination of a case study
Okorie, Tipi & Hubbard	2016	Analysis of the potential contribution of value-adding services (VAS) to the competitive logistics strategy of ports	To understand the potential contribution of VAS to port logistics strategy of competitiveness.	A mixed methods' research. The data gathered from a multiple case-study of different ports.
Rivera, Sheffi & Knoppen	2016	Logistics clusters: The impact of further agglomeration, training and firm size on collaboration and value added services	To identify the causality between the benefits of logistics clusters (in terms of collaboration and VAS provision) and agglomeration and training opportunities.	Quantitative study, which used structural equation modelling to analyse data from a survey conducted in the Zaragoza (Spain) Logistics Cluster.
Andersson & Roso	2016	Developing dry ports through the use of value-added services	To understand the role of VAS in developing a conventional inland terminal into a dry port as well as the role of VAS in developing of an existing dry port.	Combination of literature review with empirical data collected via interviews with terminal managers, operators and customers and via gathering secondary data.
Herrera & Yang	2017	Understanding value-added service offering by 3PL providers: VAS as a source of competitive advantage for the provider and the customer	To understand how a 3PL determines which VAS can be profitable, and which service-development strategies are appropriate in which context.	Survey of 38 3PLs and 48 logistics user companies and additionally semi-structured interviews with seven 3PL companies.
Shi, Arthanari & Wood	2017	Developing third-party purchase (3PP) services: New Zealand third-party logistics providers' perspectives	To understand the advantages for third-party logistics providers if developing further VAS in the form of Third-Party Purchasing.	A structural equation modelling test of the data gathered from the 166 3PLs in New Zealand.
Menegaki & Alexopoulos	2017	Evolution of Logistics Centers and Value-Added Services Offered in Port Areas and the Importance of Marketing	To examine the historical development of logistics centres and VAS in the port industry and to understand the future VAS opportunities and the role of the marketing in this context	Review of current research on the topic in question

Tang, Qian & Wang	2018	Analysis on the Development of Value-added Services of Logistics Enterprises in Yunnan.	To understand the status-quo of VAS performed by logistics service providers in Yunnan Province	Examination of current research on VAS ans analysis of the statistical data of Yunnan Province industry
Protic, Fikar, Voegl & Gronalt	2020	Analysing the impact of value added services at intermodal inland terminals	To identify the drivers of a strong service offer by terminal operators, to recognise new VAS and the impact of new VAS on the performance of terminals.	Workshops and interviews with experts in Belgium and Austria. The results were validated by two cases.
Russo & Gronalt	2021	Value added services at intermodal inland terminals and the importance of choosing a moderate innovation path	To understand the impact of offering VAS (train OCR gates and a fast lane service for trucks) on a terminal's operational performance.	Quantitative analysis based on the generic system dynamics

Table 8. Previous Studies on VAS in Logistics

2.4.4 Research Gaps in Focus

In particular, there are three aspects which have been neglected in previous research and which are in need of further investigation in the context of this particular study:

1. *Understanding of VAS application in distribution centres in the context of customer demand*.

From a theoretical standpoint, the scope of understanding VAS is broad. Yet, how managers of distribution centres interpret "what is VAS?" is less explored in the latest research. Moreover, previous studies provide evidence that VAS can contribute to a number of different advantages such as financial benefits, customer satisfaction and unique selling point on the one hand (Atkacuna and Furlan, 2009; Herrera and Yang, 2017), and, on the other hand, bring higher complexity into warehouse processes (Karagiannaki et al. 2011; Faber et al., 2013; Lao, 2012). However, the methodologies used for these studies make it impossible to understand the role of these effects under the conditions of different natures of customer demands.

2. *Understanding the supply attributes necessary to respond to customer demand for VAS in distribution centres.*

The concept of lean and agile attributes is broadly presented in the context of supply chain performance strategies (e.g., Bruce, Daly and Towers, 2004; Nel and Badenhorst-Weiss, 2010; Mohammadzadeh et al., 2020; Bhamra, et al., 2021). Thus, it seems obvious that VAS, which are an important component of supply chain, were also discussed in the

previous research from the position of customers of logistics service providers (e.g., Chen and Notteboom, 2014). Yet, the literature review reveals that no prior theory can explain what supply attributes are necessary to respond to VAS customer demand in distribution centres themselves.

3. *Understanding the operational strategies of distribution centres towards VAS performance.*

Several studies indicated the importance of aligning warehouse strategies with the customer demand (e.g., Faber et al., 2013; Huang and Hsu, 2016; Faber et al., 2018). However, when considering studies having to do with the strategic aspects of distribution centres, it becomes clear that they are mainly focused on the traditional warehouse operations such as storage, pick, pack and ship activities (e.g., Johnson and McGinnis, 2011; Ramaa, Subramanya and Rangaswamy, 2012; Kursini, Novendri and Helia, 2018; Salhieh and Alswaer, 2021). By contrast, the operational strategies in the conttext of the VAS customer demands are not sufficiently investigated by previous research.

Hence, in order to address these research gaps, the following research questions were derived:

1. What is understood by the application of VAS in distribution centres?
2. What are the supply attributes necessary to respond to VAS customer demand in distribution centres?
3. How are the distribution centres operational strategies aligned with the performance of VAS?

2.5 Conceptual Framework

The underlying basis of the developing a conceptial framework is an intense analysis of the knowledge gained by conducting the literature review on the studied topic. Key topics and issues that stem from the literature review represent different theoretical concepts, which were not previously linked to one model. The aim of this section of the literature review chapter is to make evident the connection between these concepts based on the paradigmatic position of this research (2.5.1). The connected scheme of the theoretical concepts leads to the understanding of the research objectives (2.5.2) and the conceptual framework (2.5.3) needed to conduct this study.

2.5.1 Main Concepts and Their Relations

The key variables of the explored topic are “VAS performance in distribution centres” and “supply attributes”. Basically, the conclusion that was collected from the reviewed

publication is that the fundamental concept, which connected these two variables together, is the nature of customer demand. In particular, an incorporation of VAS in the service portfolios of distribution centres can lead to higher customisation of the customer orders (Bowersox et al., 2010; Guo, 2017). In turn, the nature of customer orders can be characterised by different criteria such as demand stability, demand predictability, lead time and value of the customer orders (Mason-Jones et al., 2000b.; Bruce, 2004; Chen and Notteboom, 2014). The analysis of supply chain literature makes it possible to conclude that depending on the nature of customer demands, three components of the VAS business structure can be influenced.

First, differing nature of customer demand is attributable to different characteristics of the product or services, which in the case of more stable demand is "functional" and in dynamic environment is "innovative" (Fisher, 1997). The characteristics of the VAS , in turn, are linked to the factors, which reflect the advantages and disadvantages of their applications. In this context, the advantages are different added-values, which can be derived from VAS (Atkacuna and Furlan, 2009; Furmans and Deml, 2013; Okorie et al., 2016; Rivera et al, 2016; Herrera and Yang, 2017), and the disadvantages are the operational complexity, which can increase due to high heterogeneity and customisation of these services (Karagiannaki et al., 2011; Faber et al., 2013; Lao, 2012).

Second, the nature of customer demand is a basis to design the supply attributes (Fisher, 1997, Mason-Jones et al., 2000b.). In this context, the concepts of lean and agile attributes are at the front. At this point, it is important to mention that while lean and agile paradigms can be reflected in the operational concept of distribution centres, the paradigm of leagility seems to be less adoptable in this context. Leagility is considered from the supply chain position, where the supply and demand can have different dynamics (Mason-Jones et al., 2000; Lee 2002, Purvis et al., 2014; Sabet, et al., 2014; Bhamra, et al., 2021). In the case of distribution centre operations, the supplier and the client is represented by the same party. Thus, the different possible natures of customer demand in the specific context of VAS in distribution centres need to be claimed as "lean and agile" rather than "leaqgile".

Third, the nature of customer demand requires different strategies, which are typified by different capabilities (Morash, 2001) and different performance measures (Griffis et al., 2004). In this context, the concept of capabilities is associated with confrontation of standardisation and flexibility, while the relevant paradigms for the discourse of concept of

performance measures are cost efficiency versus customer responsiveness (Nel and Badenhorst-Weiss, 2010; Ambe, 2012).

The Figure 13, frames the main concepts identified during the review of the literature and their correlations.

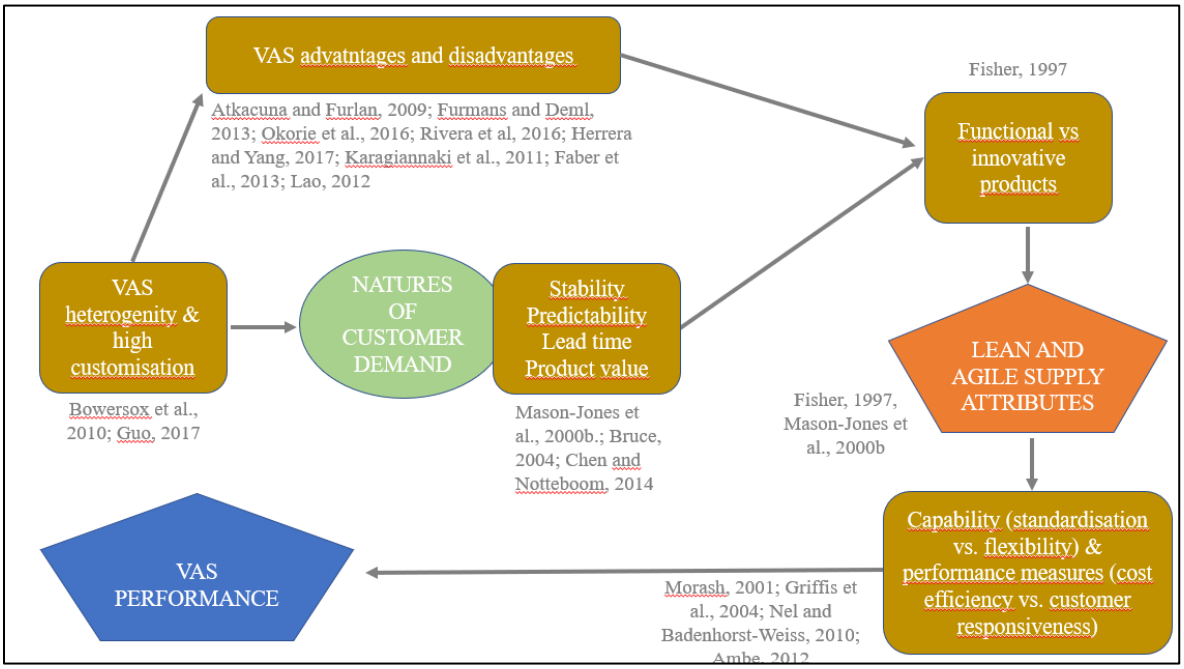


Figure 13. Main concepts and their relationships

2.5.2 Research Objectives

The conceptualised model of the main concepts leads to the inference that in order to address the research questions the following research objectives need to be achieved:

1. To understand the different characteristics of VAS in warehouse logistics
2. To examine the underlying constructs of VAS customer demands
3. To identify the performance drivers of operational strategies in distribution centres.

2.5.3 Conceptualised model

Conclusively, the conceptual framework was determined based on these results (Figure 14). This framework serves as an underpinning construct for a further development of the data collection procedure.

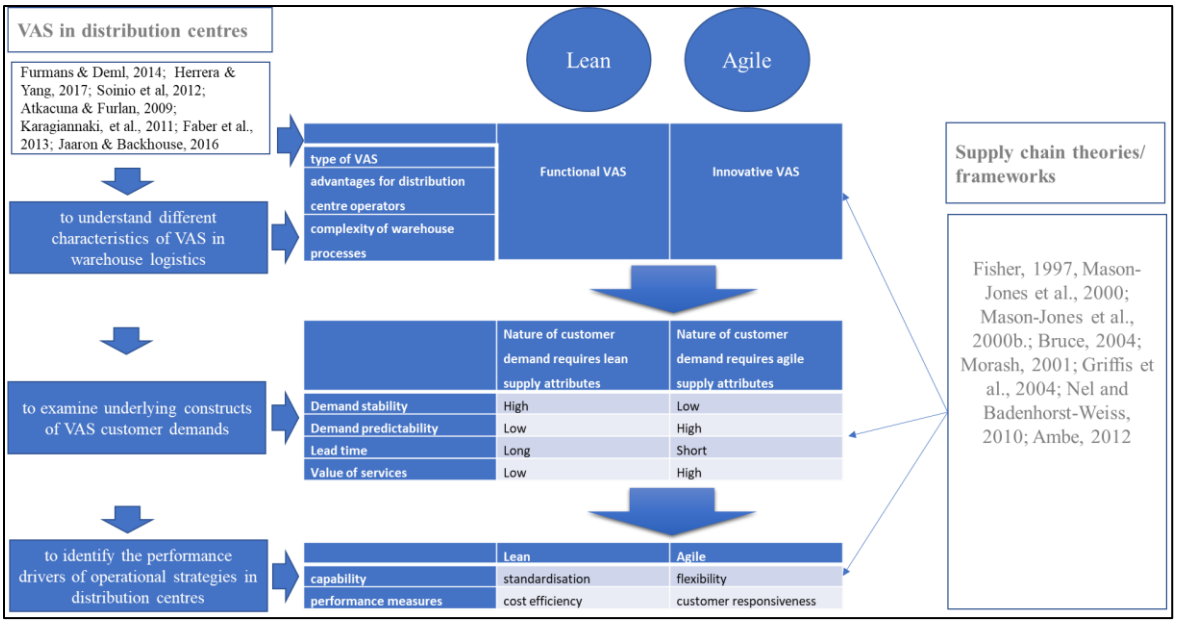


Figure 14. Conceptual Framework

2.6 Summary of Literature Review

This literature review ascertained that VAS in the field of warehouse logistics is a manifold concept which can include simple supplementary activities performed in distribution centres as well as very specific capabilities that logistics service providers develop to increase their competitiveness. Thus, VAS in distribution centres is a multifunctional element of modern logistics. On one hand, they are a crucial factor in postponement and outsourcing strategies companies apply their product through the supply chain. On the other hand, they serve as strategic tools for logistics service providers to enhance their performance. Different quantitative and quantitative studies identified by this literature review, verified that the provision of VAS in distribution centres can be seen as an advantageous approach for logistics service providers and their customers. Therefore, distribution centres play a key role in the supply chain and are required to align their operational strategies to VAS in order to achieve superior performance by providing different services. Yet, previous studies stressed that, due to high diversity and heterogeneity of the services, managers of distribution centres need to fully understand customer demand in order to create adequate supply attributes.

The topic of aligning supply attributes with the nature of customer demand was broadly discussed in previous studies of supply chain management. In this context, the perspectives of lean and agile paradigms were used as a basis for designing supply attributes, which need

to be adopted depending on the nature of customer demand. However, upon reviewing existing studies it was indicated that no theory concerning the alignment of supply attributes in the context of VAS performance in distribution centres currently exists. Hence, this literature review identified the research gaps which reflect the necessity of a further empirical study based on the research questions and objectives carried out in this academic paper. Moreover, in order to address the limitations of previous studies in an adequate manner, the required research objectives, as well as a conceptual framework were developed based on the reviewed literature (Figure 15).

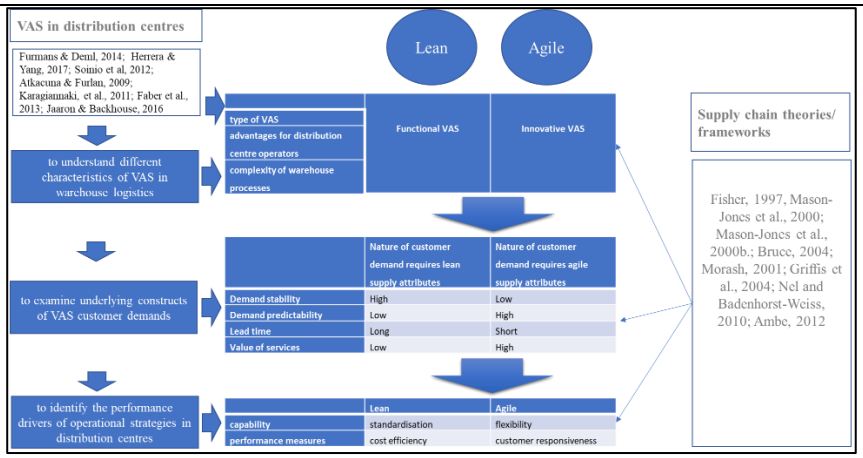
Research aim	to understand the contribution of supply attributes in the performance of VAS in distribution centres
Research questions	- what is understood by the application of VAS in distribution centres? - what are the supply attributes necessary to respond to VAS customer demand in distribution centres? - how are the distribution centres operational strategies aligned with the performance of VAS?
Research objectives	- to understand different characteristics of VAS in warehouse logistics - to examine underlying constructs of VAS customer demands - to identify the performance drivers of operational strategies in distribution centres.
Conceptual framework	

Figure 15. Outputs from Literature Review Procedure

Reflection - Part II

The literature review reflected that the paradigm of alignment of supply attributes with customer demand in the context of manufacturing and supply chain performance is extensively introduced in the current research. This fact is not surprising, as the popularisation of this topic dates back to the final decade of the last century, when the postulate of Ford production system was recognized as inappropriate to meet the increasing

trend for customer specific needs. The two approaches, leanness and agility, found their place in the scientific studies and consequently into practical use by today's global supply chain. However, the examination of literature review leads one to the conclusion that previous studies in the context of VAS in distribution centres have overlooked this perspective.

As far back as 2008, Backer referred to distribution centres as a "forgotten area" in terms of Fishers' conceptualisation of lean and agile supply attributes. Although twelve years have passed since Backers' publication, I would still agree with this position when considering the particular context of VAS in distribution centres. Having said this, I am not claiming that the topic of VAS in distribution centres has not been excluded entirely from the scientific debates on supply strategy alignments. On the contrary, the role of VAS in the performance of the entire supply chain has been highlighted by numerous researchers. Their focus, however, rests on the perspective of production companies that strive to improve performance by outsourcing different VAS to the last stage of their supply chain. In this way, the highly beneficial concept of supply chain postponement strategy is brought to the forefront. And the important role of distribution centres in this context is not surprising as, apart from factories and retail shops, the decoupling point in postponement can be performed at the warehouse level. For example, nowadays it is common to see light manufacturing processes in the fashion industry such as the ironing of clothes after order confirmation, or attaching security and price tags, conducted at warehouses. This, of course, is only one of many examples, as different VAS can also be performed at warehouses in other industries.

Therefore, it seems logical that the concept of VAS in modern warehouse logistics is closely linked to the outsourcing of relatively simple activities to distribution centres. Although Soinio et al, (2012) or Shi et al, (2017), stated that VAS can be perceived as something more than "simple" postponement activities and suggested developing "outstanding" services, like "consulting" or "third-party purchasing", it can be assumed that these concepts are theoretical in their nature. By contrast, basic VAS such kitting, repackaging or small assembly, as shown in the examination of distribution centres by Atkacuna and Furlan (2009), Furmans and Deml (2014) and Herrera and Yang (2017), proved their real existence in the practice. However, basic VAS do not necessarily imply that they are simple to apply. Especially, when thinking about distribution centres which were mainly storage driven and

are now facing the challenge of performing different types of VAS. Therefore, now it can be asked how can we perform these services in distribution centre successfully?

In the context of this question, the suggestion by Trebilcock (2011), according to which VAS in distribution centres need to be considered and dealt with as production rather than logistics operations, looks quite adequate. Even if the services might not be as complex as "classical" production (for example in terms of the degree of automation), one can agree that the concept of these VAS is more reminiscent of production than of warehouse processes. Yet, does this mean that the concept of lean and agile supply attributes alignment is as relevant to VAS in distribution centres as to manufacturing?

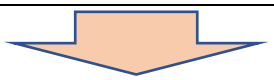
The research stream of warehouse logistics in general and of VAS in distribution centres in particular lacks consideration of how the supply attributes topic contributes to VAS performance in distribution centres. Previous studies do not reflect which supply attributes are really relevant for VAS in distribution centres and how managers align their strategies with different customer demands. From my perspective, this limitation of the current research might have negative consequences in practice. As a customer of logistics service providers, a manufacturing company expects that a distribution centre will provide assistance by responding to different customer demands. However, if one were to assume that a cost driven warehouse provides VAS following a lean operational strategy when in fact an agile approach is required, the result may be negative and can have a fatal impact on its own performance as well as the performance of its customer. Naturally, the possible misalignment between strategy used and strategy required is speculative, as this field of research has, until now, been vaguely explored. All the more an in-depth study of supply attributes in the context of VAS in distribution centres seems to be needed.

3. Methodology

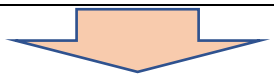
3.1 Introduction to Methodology

This methodology chapter represents the outcomes of the second phase of the DBA journey following the review, analysis and synthesis of scientific publications. While the process of the literature review strived to identify what needed to be studied, the aim of the methodology was to determine how the study should be constructed. The development of methodology followed three phases. The first phase included a reflection of different research approaches in the context of the purposes of this study and a choice of the most appropriate strategy. The second phase implied the determination of the detailed research design, whereby the interview questions, research participant groups, case companies and the steps of data analysis were defined. The last phase dealt with identifying the basic research principles that underpinned this research design such as research quality, research ethics and the role of researcher (Figure 16). The results of these three phases are presented in the following three parts accordingly (Sections 3.2, 3.3 and 3.4). In the last part of this chapter (3.5), the outcomes of the three phases of developing methodological constructs for this study are summarized.

Phase 1: Choice of the most appropriate research approach	What is the research paradigm that underpins this study?
	What is the most appropriate research strategy?
	What is /are the most appropriate method(s) of obtaining data?
	What is / are the most appropriate method(s) of sampling?
	What is the most appropriate data analysis technique?



Phase 2: Determination of the research design	What are the adequate interview questions?
	What are the research participants groups?
	Which companies are included in the data obtaining process?
	What is the structure of the data analysis?



Phase 3: Identification of the research principles	What are the main aspects of the research quality?
	Which research ethical guidelines need to be considered?
	What is the role of the researcher?

Figure 16. Three Phases of the Methodology Development

3.2 Choice of Research Approach

This part presents the first step of developing the methodological procedure and is therefore dedicated to highlighting the ways in which the research approach for this study was chosen. Essentially, an examination of different alternative approaches and finally choice of the most appropriate "*research paradigm*", "*research strategy*", "*method of obtaining data"*, "*sampling technique*" and "*method of data analysis*" are the main components of this discussion.

In order to make the most adequate choice for each part of designing the methodological construct for this study, three steps were adopted. In the first step the possible suitable alternatives were identified. This step required considering the nature of this research in order to select only those alternatives that might be in accordance with this study. The second step implied identifying the most typical criteria of each selected alternative. Finally, the reflection of these alternatives in the context of the research purposes made it possible to understand the advantages and limitations of these alternatives for this study and to determine the most appropriate choice (Figure 17).

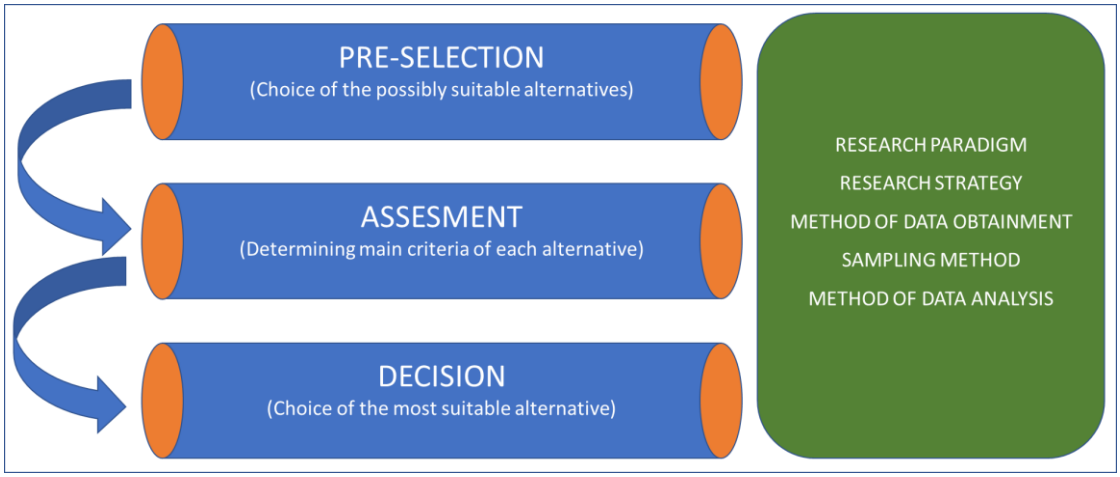


Figure 17. Process to Choose of Research Design

3.2.1 Research Paradigm

3.2.1.1 Main Principles of Research Paradigms

The perspectives of research paradigms are an important element of scientific work. These perspectives are attached to the personal beliefs and values of the researcher, as well as to the nature of the study and have a significant impact on different aspects of the research (Easterby-Smith, Thorpe and Lowe, 1991; Hussey and Hussey, 1997). A clear understanding of which paradigm underpins the research is crucial to finding an appropriate strategy to conduct a scientific study (Pasian, 2015). Therefore, the first step in developing

a methodology was to understand the research paradigm relevant for this research and, based on this understanding, to derive a research approach which would guide the design of the following empirical study.

The fundamental principles of research paradigms are based on different philosophical approaches, which are formed because of heterogeneity in the ontological, epistemological and axiological perspectives. Ontology is a philosophical concept which relates to the understanding of the nature of reality and considers the way reality is perceived. Epistemology deals with the question of what is known and how knowledge is acquired (Easterby-Smith, Thorpe and Jackson, 2012). Axiology refers to a philosophical perspective which reflects the role of individual values in research.

As researchers' values and beliefs differ, their ontological, epistemological and axiological positions build two contradictive perspectives which represent positivist and phenomenological principles of research (Table 14). In the context of positivist and phenomenological research there are different research paradigms, which were the basis for the development of previous studies and need to be considered by the choice of the most adequate paradigm for this study. A deeper consideration of the research paradigms in the area of science made it possible to claim that the perspectives of positivist research are commonly reflected by the concepts of "Positivism" and "Modernism", while the phenomenological research is broadly introduced by the perspectives of "Phenomenological Interpretivism", "Social Constructivism", "Post-Positivism" and "Post-Modernism" (Table 9). The perspectives of these research paradigms have been evaluated according to their applicability for this study.

	Principles of positivist research	**Principles of phenomenological research**
Ontology	Objectivism (realism)	Constructionism (relativism)
Epistemology	Positivism	Interpretivism
Axiology	Value-free	Value-bound
Research approach	Deductive	Inductive
Type of research	Quantitative Research	Qualitative research
Typical research methods	Observation, statistical survey, experiments	In-depth interviews of small samples

Preselected research paradigms	Positivism, Modernism	Phenomenological Interpretivism, Social Constructivism, Post-Positivism and Post-Modernism

Table 9. Basic Principles of Positivist and Phenomenological Research

3.2.1.2 Research Paradigms in Focus

In the context of positivist and phenomenological research there are different research paradigms, which were the basis for the development of previous studies and need to be considered by the choice of the most adequate paradigm for this study. A deeper consideration of the research paradigms in the area of science made it possible to claim that the perspectives of positivist research are commonly reflected by the concepts of "*Positivism*" and "*Modernism*", while the phenomenological research is broadly introduced by the perspectives of "*Phenomenological Interpretivism*", "*Social Constructivism*", "*Post-Positivism*" and "*Post-Modernism*".

Positivism is a research paradigm, which is in the context of scientific studies underpinned by the strong positivist perspective. Meaning that the social world exists externally, and different aspects of this world can be only understood by a use of objective methods. "The philosophical system which confines itself to the data of experience and experimentation and excludes the metaphysical and theological speculation is known as positivism" (Majeed, 2019, p. 119). Therefore, the perspectives of the positivism paradigm can be usually found in the deductive studies which are driven by the research that aims to measure the cause and effects on the basis of quantifiable data. Thus, the core aspect of the study, which is based on the perspectives of the positivist paradigm, is that researcher strives to achieve a research setting "…where variables can be controlled and manipulated" (Park, Artino and Konge, 2020; p. 692).

Modernism is another research paradigm which is underpinned by the ontological perspectives of an objectivist. "Modernism is seen as positivism in science beyond the reflection of its relationship with human being in a passive way" (Kahraman, 2015, p. 3994). The perspectives of modernism imply to consider the world as "…a system which comes increasingly under human control as our knowledge of it increases" (Clegg and Kornberger, 2003, p. 57). In this respect, the scientific enterprise is a key aspect that is placed in the middle of the modernist paradigm (Liu and Liu, 1997). The methodology of modernism is

based on the principles of knowledge-creation following an analytical approach by perceiving the world in the context of realism.

Phenomenological Interpretivism, in contrast to positivism and modernism, is a research paradigm, which accurately reflects the fundamental principles of phenomenological research. The reality is relative and perceived by each person differently (Guba and Lincoln, 1994). The main principles of this approach are that it implies to acquire the knowledge by own interpretation of the words and gathered experiences from other individuals. Thus, phenomenological interpretivism is closely related to the hermeneutic procedure. The core point of the methodological concept of phenomenological interpretivism is a strive for understanding both an action and its related context. "To understand a particular action requires an understanding of the context within which it takes place, and to understand the context within which it takes place requires an understanding of the particular actions" (Smith, 1983, p. 12).

Social Constructivism is another phenomenological paradigm which reflects the ontological notions of relativism. "Social constructivists believe that one singular and objective reality (or "truth") exists but by collecting the actor's lived experiences and perceptions, the researcher can get closer to the many truths" (Towers, Abushaikha, Ritchie and Holter, 2020, p. 445). The epistemological perspectives of social constructivist are underpinned by the position that reality is constructed and in each particular context can be different and changeable. "Knowledge is accumulated through informed and sophisticated reconstructions and vicarious experience while the quality of the criteria relies on trustworthiness and authenticity." (Boyland, 2019, p. 31). In contrast to a phenomenological interpretivist, who focuses on an in-depth exploration of a research issue within its context, the constructivist research can be characterised by a strive to generate a novel solution (Mendibil and MacBryde, 2005).

Post-positivism is a product of critical assessment of the possibility of understanding of objective reality as reflected in the perspectives of positivism. In particular, perspectives of post-positivism reject the autonomy between the researcher and the observed issue recognising the role of researcher's background, values and beliefs in this context (Robson, 2002). In this respect, the ontological views of post-positivism pursues the principles of critical realism, which implies that "…the social world and social relations are real, but that this reality is variously explained and interpreted" (Fletcher A., 2020, p. 4). Thus, a post-positivist agrees that there is a single reality, however, stresses that reality cannot be

perfectly understood. Therefore, a post-positivist approach often follows the pragmatic methodology and recognises the use of a mixed method approach that implies a combination of quantitative and qualitative research methods. Moreover, the philosophical position of the post-positivist accepts the value of the application of the abductive approach.

An abductive approach is an integral part of the phenomenological strategies utilised in the methodological constructs of the modern business studies (Towers et al., 2020). This approach is linked to the research aims, which point to searching for an explanation of a phenomenon. While deduction and induction are based on the linear stream of reasoning, abductive theorising is a hybrid, in which the observed phenomenon is explained by the most suitable theory. Thus, the researcher following an abductive approach attempts to arrive at the best possible predictions on the basis of incomplete observations (Paul, 1993; Kovács and Spens, 2005).

Post-Modernism can be seen as scepticism towards the rational rules of philosophical notions of modernism, as it is bases on the position of strong relativism, which considers that there is no real explanation of the world. The rejection of modernism characterised by "denying everything that was prevalent on the Modernism stage and considers that the pursuit of the ultimate truth is the largest human error committed in the course of scientific and practical goal, and the basic idea of Postmodernism is that it's impossible to reach the truth" (Elaati, 2016, p. 3). More specifically, postmodernism is a refusal of the generalisation and validity of the positivist conclusions to all social, ethical and cultural segments of mankind. By contrast, post-modernism claims that the socio-historical context is formed by the discourse (Trivedi, 2020). Hence, a post-modernist argues that "emancipation from linguistically induced exploitation can be gained only through awareness of how language embedded in discourse produces reality" (Hatch, 2018, p. 14). In the context of epistemological constructs of a post-modernist, the dialogic and dialectical procedures come to the forefront.

3.2.1.3 Adopted Research Paradigm

The presented above research paradigms were evaluated in terms of their suitability for the particular study. For this purpose, the nature of the research aim and research questions were considered. As there is no prior theory on the supply attributes in the context of VAS performance in distribution centres, the research aim and research questions in this study are explorative in their nature. Hence, this research highlights the necessity to gain knowledge by means of understanding the perception of logistics experts on the contribution

of various supply attributes to the performance of VAS in distribution centres. In this way, the particular study is not striving to achieve a generalisable result but is rather attempting to comprehend the underlying construct of VAS performance "realities" using an inductive-based approach. Hence, the construction of the research design needed to be underpinned by the perspectives of qualitative research.

For this reason, the principles of the positivist research were rather inadequate for the purposes of this study. Thus, positivism and modernism research paradigms were discarded as not being adequate to the context of this research. In the context of phenomenological research, the perspectives of post-positivism, social constructivism and post-modernism were also recognised as inappropriate. The refusal of each of these paradigms, however, were attributable to different reasons. The perspective of a social constructionist and post-positivist is critically assessed due to their ontological positions which imply the search of an objective reality. Although social constructivist ontology of relativism and the post-positivist epistemology bring these paradigms closer to the notions of qualitative research, they are not able to reflect the particular aim of this study. By contrast, the post-modernism research paradigm is considered as too radical for the scientific approach related to the studied topic due to its abstract and chaotic system.

The characteristics of a phenomenological interpretivist paradigm, in contrast, reflects the purpose of this research. It makes it possible to explore the reality as constructs of managers' perceptions from the interpretive focus by placing the aspects of explored issues within their contexts. Thus, the perspectives of phenomenological interpretivism served as a basis for the formation of the following research strategy for this study.

3.2.2 Research Strategy

3.2.2.1 Preselection of Research Strategies

The research strategy presents an overall plan to address the research aim and can be considered as a procedural connection between the research paradigm and the methods of data obtainment and data analysis (Denzin and Lincoln, 2005). In the context of business research, such types of research strategies as *experiment*s, *survey*, *archival research*, *case study*, *ethnography*, *action research*, *grounded theory* and *narrative inquiry* are frequently used (Saunders, Lewis and Thornhill, 2012).

As this research is based on the phenomenological interpretivist paradigm underpinned by the principles of qualitative approach, those research strategies which are in line with the qualitative methodology were selected for the purpose of the following evaluation on their suitability for this study. Therefore, *experiment* and *survey* were excluded from further consideration, as these two strategies are relevant for quantitative rather than qualitative research. *Action research*, *ethnography*, *case study* and *archival research* can be applied in quantitative studies as well. These research strategies, however, are also widely used in qualitative research. *Grounded theory* and *narrative inquiry*, in turn, are the approaches strongly associated with qualitative research. Therefore, action research, ethnography, case study, grounded theory, narrative inquiry and archival research were determined for the assessment of the research strategies as to their suitability for the particular study (Figure 18).

Figure 18. Selected Research Strategies

3.2.2.2 Research Strategies in Focus

Action Research, which is also referred to as interventionist research, has gained popularity in recent business research (Myers, 2019). This research strategy implies gaining data by means of cooperative and interactive approaches. The main aim of this strategy is "…to identify problematic situations or issues considered by the participants to be worthy of investigation in order to bring about critically informed changes in practice" (Cornwell, 1999, p. 5). Therefore, action research needs to be adopted when the creation of new

knowledge is underpinned by making changes and solving a problem in an organisation (Coghlan, 2011). The researchers themselves become in this case a moderator in the process of change (Somekh, 2005).

Ethnography deals with "…the discovery and description of culture of a group" (Sharma and Sarkar, 2019). Hence, the ethnographic research strategy is often used to investigate the behaviour, social interactions, events and rituals of different cultural groups (Easterby-Smith, et al., 2012). Same as in the action research, the ethnographic approach implies that the researcher is integrated in the organisation to be studied. In this way, the researcher becomes part of an investigated group or event in order to understand the social behaviour from within (Reeves, Kuper and Hodges, 2008; Murchison, 2010). The researcher, however, does not influence the process as in action research, but creates a stream of knowledge from personal experience.

Case study research, similar to action research and ethnography, strives to acquire knowledge in the real-life context (Yin, 1984). However, in contrast to these research strategies, case study follows the rule that the researcher is not involved in the organisation but gains the knowledge from the accessible sources, such as surveys or interviews of the company experts. In this way, the data can be collected from single or from multiple cases (Yin, 2009). In accordance with the case study approach, the researcher explores the topic in question within its context (Zainal, 2007; Hafiz, 2008). Therefore, the concept of triangulation can play a crucial role in the case study strategy (Crowe, et al., 2011). Thus, case study often relies on the use of both quantitative and qualitative methods of gathering data in order to gain a valuable result.

Grounded theory, in contrast, is highly dedicated to exploratory research and is therefore primarily based on qualitative methodology. The aim of this research strategy is to discover or generate a theory grounded on the data from the accounts of the social actors (Saunders et al., 2012). Grounded theory was developed by Glaser and Strauss (1967) as an opposite position to extreme positivism (Suddaby, 2006). Therefore, grounded theory suggests developing research by generating data without prior review of the existing theories (El Hussein, Hirst, Salyers and Osuji, 2014).

Narrative approach is a further example of an "extremely qualitative" research strategy. Based on the personal experience of the research participants, this research strategy strives to understand complex processes of an organisation (Fetters, Curry and Creswell, 2013). In this way, the research participants narrate a complete story rather than simply responding

to given questions (Creswell, Hanson and Clark Plano, 2007). Hence, this research strategy allows the scientists to gain an understanding of complex processes in an organisation by comparing different stories and examining relationships between them in order to create new knowledge.

Archival research represents a unique approach, as the knowledge is not gained from the individuals, but from different historical records and documents. Thus, in the context of business study such research strategy implies "…a broad range of activities applied to facilitate the investigation of documents and textual materials produced by and about organizations" (Mohr and Ventresca, 2002, p. 2). This strategy enables the researcher to examine the topic in its historical context and detect the changes which have taken place (Eilifsen and Messier Jr, 2000; Mills and Helms Mills, 2018). Thus, the researcher accesses the existing data in order to develop further knowledge of the studied topic.

3.2.2.3 Choice of Research Strategy

To choose the most suitable research strategy, the methodological aspects of each selected research strategy were evaluated in the context of the research aim and the research objectives of the particular study (Table 15). Based on this evaluation, the case study approach was determined as the most adequate research strategy for this study. In turn, the other research strategies had limitations as to the purposes of the particular research.

Research strategy	**Main characteristics**
Action research	• Creating knowledge by active change of studied environment • Researcher is involved in the change process as moderator • Practical solution is the result of the study
Ethnography	• Observations and witnesses • Researcher becomes part of the studied environment • Personal experience and perceptions are the outcomes of study
Case study	• The approach of gaining knowledge is variable and flexible • Research is outside of the studied environment • In-depth comprehension of the topic within its context is the result of the study
Grounded theory	• Knowledge is newly created, no previous theories • Data speaks for itself • Generation of new theory as research outcome
Narrative inquiry	• Knowledge is gained from individual stories

	• The researcher is reporter and interpreter of data • In-depth understanding of specific phenomena
Archival research	• Gain of knowledge by review of archival data • Documents and text instead of individuals • Understanding of the scene and events in the context of the past

Table 10. Identified Characteristics of Research Strategies in Focus

The archival research strategy, which is concerned with past events, was not suitable, as the particular study focuses on the topic of VAS in distribution centres in the current business environment. The active research strategy, in contrast, is concerned with the topic in the present. However, active research was also determined as inappropriate, as this research strategy strives to change the environment, while the particular study attempts to understand the environment as it is.

Grounded theory does not conform with this study, as this research strategy implies beginning the empirical study without a theoretical basis, whereas the particular research is underpinned by a conceptual framework contributed by previous research. Furthermore, grounded theory implies the creation of a theory as a final result, while the particular study aims to gain a better understanding of the investigated topic. For similar reasons, the adoption of narrative approach was also determined as inappropriate.

In fact, two research strategies, ethnography and case study can be seen as the adoptable alternative for the particular research. Ethnography, however, implies that the researcher is integrated in the organisation to explore the topic in question. In the context of this particular study, that would mean that the researcher needs to experience different functions in different distribution centres. The risk of this approach is that on the one hand the data created by the early stage of the study will be outdated at the end of the research because of the long research process, and on the other hand, that access to different organisations can be difficult for the researcher.

Case study, in contrast, makes it possible to obtain data from a small group of experts, which is a more appropriate methodology in this particular context. Moreover, the advantage of this approach is that case study is not limited to a specific design and enables the researcher to construct the data collection process according to the purposes of the particular study. As the purpose of this research was to explore the alignment of VAS performance strategies from different distribution centres with the nature of customer demands, it was necessary to consider the perspectives of different distribution centres. Thus, the qualitative multiple-

case study was determined to gain greater insight from the analysis of the investigation. The "cases" represent different distribution centres belonging to different companies (See section 3.3.3). This strategy served as the overall methodology of this study and underpinned the design of the following research steps.

3.2.3 Method of Data Obtainment

3.2.3.1 Preselection of Data Obtainment

The adoption of qualitative case study implies the process of gathering data based on qualitative procedures. The most common tool used to collect data in terms of qualitative business research are interviews (Jamshed, 2014). The interview method provides the researcher with data on individual opinions and interpretations of different social and organisational realities (Easterby-Smith et al., 2012). By applying this method, structured, semi-structured and unstructured interviews are three types of individual interviews typically used in scientific study (Easwaramoorthy and Zaripoush, 2006; Qu and Dumay, 2011). Beyond individual interviews, however, the method of interviewing several research participants at the same time, which is known as focus group interview method, can be also applied for research purposes (Edmunds, 1999; Stewart, Shamdasani and Rook, 2009).

Another typical method of collecting data for qualitative research is observation. In the sociological context, this method is based on the observation of participants behaviour and therefore, is often utilised in ethnographic approaches (Easterby-Smith, et al, 2012). "The researcher adapts to the context and interaction and tries not to influence the course of events and to exert minimal influence on the environment" (Ciesielska, Boström and Öhlander, 2018, p. 36). Similar to interview methods, the method of observation can also be structured or unstructured depending on the nature and purposes of a study (Gillham, 2008).

Apart from primary data gathering by interviews and observation, qualitative research can be underpinned by collecting secondary data (Hox and Boeije, 2005). This could be achieved by obtaining of text and non-text data (Church, 2002). In this way, the obtainment of the text data implies collecting information from different documentary sources, such as minutes of meetings, reports and diaries, while non-text documentary can include different sources like official company videos, for example.

As far as the purpose of the particular research is concerned, the methods of observation and secondary data collecting are inadequate approaches, as they do not enable the researcher to gain the data from the experts' perspectives on VAS in distribution centres.

For this reason, only different types of interview methods were analysed to understand which method of data collection is the most suitable for the particular study.

3.2.3.2 Interview Types in Focus

Structured interviews operate on the basis of prepared questionnaires, whereby the researcher knows which kind of information is required (Saunders et al., 2012). In this case all interviewees answer the same questions, however, the researcher may eventually identify further details essential for the research, making it necessary to extend the interview by additional questions (Sekaran, 1992).

In contrast to structured interviews, semi-structured interviews are based on open-ended questions that enable the researcher to obtain data when there are no theories to support a study (Magaldi and Berler, 2020). This kind of interview implies flexibility in determining questions that can be pre-defined prior to data gathering or may vary from one interview to another (Sekaran, 1992).

Unstructured interviews, in turn, are not based on predetermined questions at all. The purpose of such interviews is to detect some preliminary issue in which the researcher finds clues to the topic to be explored (Zhang and Wildemuth, 2009). Unstructured interviews, however, often require a long research process, which is why scientists tend to prefer other methods, for example, semi-structured interviews (Jamshed, 2014).

The focus group interviews can be seen as a unique approach, as this method makes it possible to conduct interviews in groups and in this way leads to large amounts of valuable data in a short time (Shoaf and Shoaf, 2006). The interaction within one group allows the participants to share ideas with other interviewees, which would not be possible in one-to-one interviews. However, the disadvantage of this method is less confidentiality compared to individual interviews (Short, 2006).

3.2.3.3 Choice of Data Obtaining Method

Considering the different possibilities of interviewing discussed above, the use of semi-structured interviews was identified as the most suitable method of data obtainment for this particular research. While structured, unstructured and focus group interviews have constraints for the purpose of this study (see Table 11) the method of semi-structured interviews is in line with the methodological process necessary for this research.

In particular, the process of data collection for this study requires that interview questions are open-ended (as there is no theoretical framework to study the topic in question in a

deductive manner) and pre-determined (as this research is underpinned by a pre-set conceptual framework derived from the literature review). The method of semi-structured interviews can address both of these aspects. In contrast to structured interviews, the method of semi-structured interviews implies creating open-ended questions and, contrary to unstructured interviews, this method makes it possible to pre-determine questions before data collection. Moreover, unlike the focus group technique, the method of semi-structured interviews enables the researcher to maintain confidentiality and to avoid reciprocal influence of individual ideas or opinions, which is a crucial aspect of the process of data collecting in the particular research.

Type of interview	**Main characteristics**	**Constraints for the particular study**
Structured interview	interview questions are predetermined and close-ended	interviews based on yes and no questions
Unstructured interview	flexible shaping of interview process without predetermined questions	no pre-set framework required
Focus group	interviewing of two or more participants at the same time	confidentiality is not given

Table 11. Limited Types of Interviews

3.2.4 Research sampling

3.2.4.1 Preselection of Methods of Sampling

The determination of the sampling method in research strongly depends on whether the research is based on quantitative or on qualitative approaches (Taherdoost, 2016). In the case of quantitative methodology, probability sampling techniques are often the method of choice (Marshall, 1996). Qualitative studies, in contrast, are usually based on a non-probability sampling process, which requires only a small population to explore a specific topic (Llewellyn, Sullivan and Minichiello, 2004). As this research is underpinned by a qualitative approach, the sampling strategy was based on a non-probability sampling procedure.

The choice of sampling in qualitative study is an exceedingly complex process and needs to be carried out accordingly, as it has a direct influence on the quality of the research (Coyne, 1997). Examining the existing sampling processes, four commonly used non-

profitability sampling techniques in qualitative studies were identified and examined as to their adaptability for this particular research: “convenience sampling”, “theoretical sampling”, “purposive sampling” and “quota sampling”.

3.2.4.2 Sampling Techniques in Focus

Convenience sampling, also referred to as opportunity sampling, is an approach where the setting of samples depends on their accessibility (Etikan, Musa and Alkassim, 2016). This means that convenience sampling implies a chaotic process of data collection based only on the responses from available research participants. For this reason, this type of sampling method is often link with scientific bias (Mackey and Gass, 2005). Nevertheless, convenience sampling is often used in the research, especially in the process of conducting pilot-interviews, where the use of this type of sampling technique may be seen as appropriate.

Theoretical sampling, on the contrary, is theory-oriented technique. This approach aims to determine samples in a way that allows researcher to generate a theory at the end of the data collection and data analysis process (Glaser and Strauss, 2017; Butler, Copnell and Hall, 2018). Therefore, this sampling method is often connected with the methodological perspectives of grounded theory. According to the methodology of theoretical sampling procedure, there are no predetermined sample groups for the whole empirical process at the beginning of data gathering. By contrast, the researcher defines first an initial sample group, then gathers and analyses the data and finally decides which research participants need to be included next.

Purposive sampling, in turn, is a mainly objective-focused procedure in which research participants need to be selected according to the purpose of study. In contrast to convenience and theoretical sampling techniques, purposive sampling implies that the data need to be gathered from the groups or persons, which were defined before the empirical procedure is launched (Mason, 2002). The data gathering process is typically completed when data saturation is achieved (Sandelowski, 1995; Morse, 2015; Hennink and Kaiser, 2021).

Quota sampling, similar to purposive sampling, is an objective-oriented approach and is also based on preselected group of research participants. Hence, quota sampling is closely linked to purposive sampling and can be perceived as a subcategory of the purposive approach (Lopez and Whitehead, 2013). However, quota sampling is different from purposive sampling as the data in quota sampling is collected from different research participant groups with heterogeneous attributes. Therefore, the researchers who apply this

approach strive to compare the results of different groups with each other (Sharma G., 2017). Same as in the purposive sampling, the data saturation can serve as a trigger to cease the data collection process.

3.2.4.3 Choice of Research Sampling Technique

The examination of the discussed research sampling techniques led to the conclusion that convenience, theoretical and purposive samplings are inappropriate strategies for this study. The convenience sampling was linked to the risks that the research aim would be not reflected adequately, as this procedure is oriented only on the available sources. In the case of this study, such an approach was not required, as the access to the necessary companies (distribution centres) was given. The theoretical sampling procedure was also considered as an inadequate strategy as it aims to generate a theory. This, in turn, does not reflect the purpose of this particular study.

The rejection of application of purposive sampling was related to the fact that this sampling procedure made it impossible to explore the perspectives of company managers by considering the strategy of triangulation of sources (Table 12). In particular, the concept of this study implied that different managers within a distribution centre with different functions might have different perspectives on various aspects of the studied topic (see Reflection – Part III). From this point of view, the comparison of the collected data from different distribution centres and different groups of managers with the same position across different companies was a necessary component of this study. Therefore, it was important to gain the data from different predetermined research participant groups which are characterised by different attributes.

The quota sampling technique is based on the form of heterogeneous groups, which gives the possibility to consider such triangulation approaches. Therefore, quota sampling was determined as the most appropriate method of choice to select research participants for this study.

Sampling methods	**Main characteristics**	**Limitation for the particular study**
Convenience sampling	selection of research participants based on their accessibility for the researcher	Risks of inappropriate /incomplete exploration. No needs for this approach, as the company access is given

Theoretical sampling	selection of suitable research participants for the creation of the theory	Mismatch between the purposes of this sampling techniques and the aim of the study
Purposive sampling	Pre-selection of participants groups according to the purpose of study	Lack in the possibility to consider the triangulation of sources necessary for this study

Table 12. Limited Sampling Methods

3.2.5 Data Analysis

3.2.5.1 Selection of the Methods of Data Analysis

There are different ways to analyse and frame data in qualitative research. According to Bernard (2000) the methods such as *hermeneutics / interpretive analysis*, *narrative / performance analysis*, *discourse analysis*, *grounded analysis*, *content analysis* and *cross-culture* analysis can be adopted for the purpose of analysing qualitative data. A deeper consideration of these methods makes it possible to conclude that hermeneutics / interpretive analysis, narrative / performance analysis, discourse analysis and cross-culture analysis are considerably relevant for the studies with peculiar purposes, which are not in line with the aim of this study.

In particular, the hermeneutics / interpretive analysis implies strong interconnection between the subjective ideas of researchers and the outputs of the data analysis as it is based on the interpretations of the meaning and directives of words (Kawulich, 2004). Narrative/ performance analysis is more applicable for the context of narrative research strategy as it aims to use "stories to describe human experience and action" (Oliver, 1998, p. 244). Discourse analysis "…takes discourse as its object of analysis. Its data is talk; not what the talk refers to but the talk itself." (Frohmann, 1994, p. 120). Cross-culture analysis aims to "distinguish between those regularities in social behaviour that are system specific and those that are universal" (Grimshaw, 1973, p. 5).

By contrast, content analysis and grounded analysis can be adopted for a broader context of qualitative research. For this reason, these two methods were considered as the possible alternatives for this data analysis process and were assessed based on their applicability for the particular study.

3.2.5.2 Methods of Data Analysis in Focus

Content analysis and *Grounded Analysis* are two approaches, which are similar in such a way that both are used to analyse the qualitative data based on the coding procedure. Furthermore, the researchers, who follow the strategy of content and grounded analysis often underpin their process by applying CAQDAS (Computer Aided Qualitative Data Analysis Software). However, from the perspective of the methodological procedure, these two methods of data analysis are quite different and, in some respects, even opposite.

Thus, for example, content analysis includes some ideas of positivistic perspectives, as it often requires prior concepts for the coding, and implies that an examination of the data is carried out in a more deductive manner (Easterby-Smith et al., 2012). Grounded Analysis, in contrast, pursues a strongly inductive technique of data evaluation. This approach is not based on predefined concepts of coding but implies that these concepts need to be developed only from the collected data (Easterby-Smith et al., 2012).

According to the steps of content analysis, the examination of the data usually begins when all the data has been collected. In the case of grounded analysis, the examination and interpretation of data starts at the point when the first data is available. This means, the grounded analysis, on the contrary to content analysis, does not require one process to be completed before the researcher moves on to the next, but implies a more circular procedure, whereas data collection and analysis are permanently alternating processes (Brown, Stevens, Troiano and Schneider, 2002).

The methodology of the coding process in the content analysis is not based on any defined rules, which makes it possible to develop a flexible, self-organised approach. In turn, the grounded approach is highly structured. In particular, the use of Grounded Analysis implies an application of three stages of coding the empirical data which need to be carried out during data analysis and interpretation (Figure 19). The first phase of the data analysis is usually called *open coding* (Urquhart, 2012). During this phase, the data, namely, independent words or complete comments, is allocated to different categories (Urquhart, 2012). The second phase of the grounded analysis is referred to as *axial coding* and develops the connection between existing categories or subcategories (Oktay, 2012). This way, two or more open codes can be integrated into a single, overshadowing category. The purpose of the last phase of the data analysis is the *selective coding* (Mills, Durepos and Wiebe, 2009). In this part of the analysis, the main category is identified, and the other ones are logically attached, so that the explored data is converted into one story.

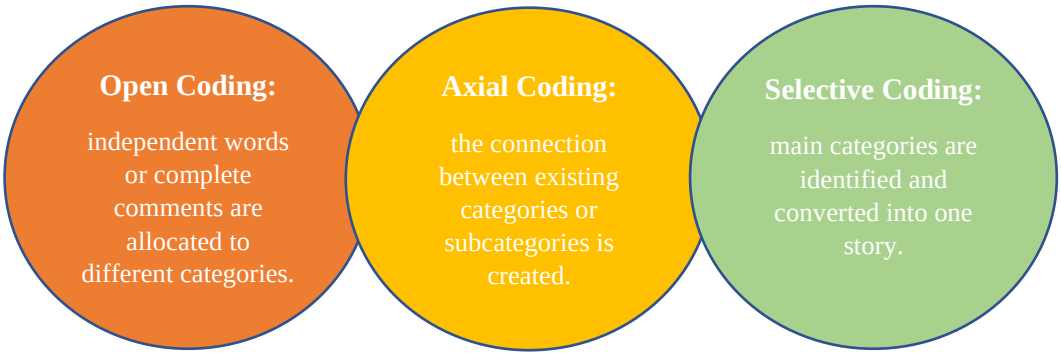


Figure 19. Three Stages of Grounded Analysis

3.2.5.3 Choice of the Data Analysis Method

The nature of this particular research is explorative. Therefore, the process of data analysis implied an inductive procedure, whereby the codes were not predetermined, but derived from the collected data. Moreover, as the data is gathered by using a triangulation of different sources, it was important to compare different attributes of research participants groups when analysing the data. The inductive procedure and comparison of different attributes are the criteria, which correspond with the characteristics of grounded analysis rather than with content analysis. For these reasons, the grounded analysis was determined as the more suitable method of analysing data in this study.

3.3 Determination of Research Design

This chapter reflects the second step of creation of methodological procedure, which was applied after the choice of the research approach was completed. Thus, this part of the methodology chapter presents the outcomes of the determination of the research design, which included the development of the detailed frameworks for interview questions, sampling groups, case companies and data analysis procedure.

3.3.1 Interview Questions

3.3.1.1 Structure of Interview Questions

The process of developing interview questions followed three steps: creation of the interview questions, their evaluation by pilot interviews and determination of the final setup. Such a strategy was necessary for the process of data obtainment as it implied raising the same questions with all research participants and therefore, the later change in the structure of interview questions was inappropriate.

Furthermore, the creation of interview questions was based on the previously presented framework from the review and analysis of the existing publications on the studied topic. This approach made it possible to reflect the research objectives and, in this way, to gather

data which was adequate to achieve the aim of the study. Therefore, each of the developed interview questions was linked to one of three research objectives (Figure 20).

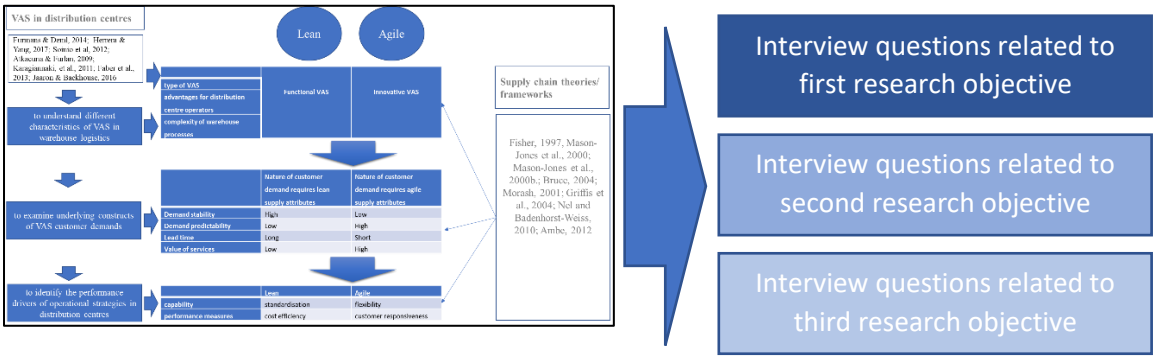


Figure 20. Concept of Developing Interview Questions

Based on this concept, the first three interview questions were connected to the first research objective and aimed at gaining a general comprehension of VAS application in DCs. Particularly, these questions focused on the investigation of different types of VAS currently performed in distribution centres and their advantages and complexities from managerial points of view (Table 13).

Research objective	**Interview questions**
To understand different characteristics of VAS in warehouse logistics	How do you define VAS and what types of VAS does your DC provide?
	What advantages do VAS provide?
	What challenges does the implementation of VAS imply?

Table 13. Interview Questions Related to the First Research Objective

The following four interview questions were related to the second research objective and dealt with the examination of customer demands (Table 14). Thus, the purpose of these questions was to determine whether lean or agile environment is relevant for different distribution centres in the context of VAS.

Research objective	**Interview questions**
To examine underlying constructs of VAS customer demands	Is the customer demand for VAS in your DC more stable or fluctuating?
	Is the demand on VAS orders more predictable or more unpredictable?
	Does the lead time of the VAS customer orders tend to be long or short?

	Is the value of VAS customer orders in your DC high or low?

Table 14. Interview Questions Related to the Second Research Objective

The interview questions related to the third research objective served to comprehend which capabilities managers perceive as necessary to incorporate VAS, and which performance measures need to be adopted (Table 15). Thus, the data collected by these interview questions had to facilitate the examination of how managers of distribution centres align their operational strategies with the performance of VAS.

Research objective	**Interview questions**
To identify the performance drivers of operational strategies in distribution centres.	Which capabilities does the DC require to successfully implement VAS?
	Do VAS require more standardisation or flexibility in the processes?
	Which performance measures show that the implementation of VAS is successful?
	How important is the cost efficiency and which measurements are you using to track it?
	How important is customer responsiveness and how do you measure customer responsiveness?
	How do you know that the customer is satisfied, and which performance measures indicate customer satisfaction?

Table 15. Interview Questions Related to the Third Research Objective

3.3.1.2 Pilot Interviews

In order to justify and improve the questions before gathering the necessary data, pilot interviews were carried out. The aim of the pilot interviews was not to acquire data for the analysis, but to understand how appropriate the questions are, and which adjustments are needed before proceeding with the main stage of the data collection. The experts' answers were analysed using the following criteria:

1. Is the question clear to the interviewees (Can interviewees respond to the question without reformulation of the questions?)
2. Are the questions formulated appropriately? (Are the answers which are given by respondents in line with the purposes of questions?)

3. Can the experts answer the questions, or are there any questions that require specific knowledge? (Do the interviewees feel confidence with the concepts and terminology highlighted in the questions?)
4. Do the answers fully cover the expectation from the data or are further questions necessary? (Is there a need for creating of further interview questions?)

These interviews were conducted with three experts from the distribution centre of a company – classified in this paper as "company 1", where the final data was also collected. Importantly, the managers that participated in the pilot interviews did not take part in the final phase of the data gathering process. Pilot interviews were carried out with "lean manager", "project manager" and "warehouse manager" from "company 1". After each interview, the interview questions were improved before proceeding with the next interview. During and after the interviews the experts were asked about the clarity and coherence of the questions. As a result, some adjustments in the formulation of the questions were made (see next section).

3.3.1.3 Interview Setup Finalisation

In the case of the interview questions related to the first research objective, the interviewees reflected on the general understanding of VAS rather than particular VAS in their distribution centres. In particular, in terms of questions "what are VAS?" and "what are their advantages?" the managers referred to general ideas. Thus, to avoid such discrepancies in the final phase of data collection, the interview questions were adjusted by a more specific "your DCs" wording (table 16).

Research objective	**Interview questions**
To understand different characteristics of VAS in warehouse logistics	How do you define VAS in your DC and what types of VAS does your DC provide?
	What advantages do VAS provide your DC?
	What challenges does the implementation of VAS imply?

Table 16. Adjusted Interview Questions Related to the First Research Objective

Concerning the second block of interview questions, all of the interviewees were confused by the question "does the lead time of the VAS customer orders tend to be long or short?", as the meaning of "lead time" was not understandable in this context. Therefore, to make this point clearer, this question was rephrased (Table 17).

Research objective	Interview questions
To examine underlying constructs of VAS customer demands	Is the customer demand for VAS in your DC more stable or fluctuating?
	Is the demand on VAS orders more predictable or more unpredictable?
	Does the customer expect a short completion of VAS orders or is the lead time of the customer orders adequately long?
	Is the value of VAS customer orders in your DC high or low?

Table 17. Adjusted Interview Questions Related to the Second Research Objective

Also, in the questions related to the third research objectives, one adjustment was needed. This adjustment refers to the term "customer responsiveness", which was not totally clear from the interviewees point of view. In order to improve this question, this term "customer responsiveness" was specified by the phrase "… which are extremely dynamic" (Table 18).

Research objective	Interview questions
To identify the performance drivers of operational strategies in distribution centres.	Which capabilities does the DC require to successfully implement VAS?
	Do VAS require more standardisation or flexibility in the processes?
	Which performance measures show that the implementation of VAS is successful?
	How important is the cost efficiency and which measurements are you using to track it?
	How important is customer responsiveness and how do you measure performance of such VAS which are extremely dynamic and require particular customer responsiveness?
	How do you know that the customer is satisfied, and which performance measures indicate customer satisfaction?

Table 18. Adjusted Interview Questions Related to the Third Research Objective

3.3.2 Research Participant Groups

The samples in this research are represented by the managers of distribution centres. Thus, to design the empirical process the distribution centres and the mangers had to be selected. The choice of distribution centres was a random approach, as this study is not limited to any specific criteria such as industry or company size. However, it was crucial that distribution centres perform VAS. Moreover, in selecting distribution centres, it was important to

include distribution centres from different companies. This strategy was necessary to consider possible heterogeneous customer demands, which in the case of different companies are more likely than in the case of one organisation. Thus, each company in this study is represented by one distribution centre.

The research participants (managers of distribution centre), in contrast, were selected according to the quota sampling approach (See section 3.2.4). In particular, it was crucial that the setup of research sampling groups considers different perspectives. For this purpose, the principles of the triangulation method were applied. Triangulation in research implies the collection of data by multiple methods or use of multiple data sources in order to gain a greater understanding of phenomena (Platton, 1999). Hence, the procedure of including different experts in the interview process was not a random approach but was based on predetermined types of research participant groups. Such a strategy made it possible to collect data from different expert groups with heterogeneous attributes. Following this strategy, three groups of experts, namely "Distribution Centre Managers", "Customer Managers" and "Operations Managers" were determined for the purpose of gathering data (Figure 21).

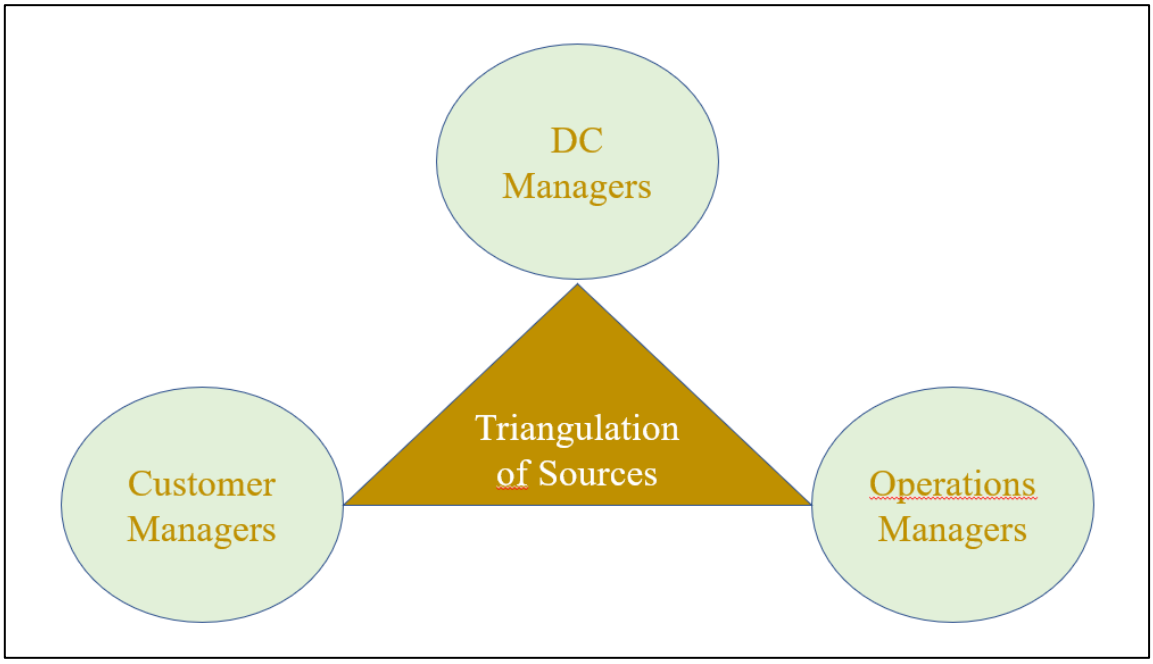


Figure 21. Groups of Research Participants

The group "Distribution Centre Managers" included those company experts who have overall responsibility for one or more distribution centres in their organisations. Thus, in some cases such managers are logistics unit leaders, in others these managers can be in the function of CEOs or even owners of the company. The data collection from these groups of

research participants made it possible to gain an understanding of how distribution centre executives perceive the contribution of supply attributes in the performance of VAS in distribution centres and hence, to consider strategic perspectives of logistics service providers.

The group of research participants defined as “Customer Managers” consisted of managers in charge of handling customer demand. In this way, those managers who interact with customers on daily-business-related or project-related levels were selected for this particular group. Including managers with a wide customer expertise in the process of data collection helped to gain a better understanding of customer perspectives on the topic in question.

The research participants group “Operations Managers”, in contrast, included managers who are partly or fully responsible for the daily operational process in terms of VAS in distribution centres. Thus, this group consisted of different operational supervisors, such as operations managers, warehouse managers or team leaders. The data gathered from this group of research participants helped to understand operational practice in distribution centres and see how distribution centres align their strategy with customer demands in order to achieve superior VAS performance.

3.3.3 Case Companies

3.3.3.1 Selection of Cases

In contrast to the groups of research participants who were determined based on the quota sampling method, the selection of the company cases followed the approach of convenience sampling strategy, which implies the principle of accessibility. Therefore, the selection of companies was a random approach, whereby only two fundamental criteria needed to be fulfilled: the company runs its own distribution centres and different types of VAS are performed in these centres. Following this strategy, six companies were selected for the purpose of data collection. These six distribution centres, which are run by six different companies, constitute the “cases” in this research.

All distribution centres participating in this study are located in the west of Germany. Due to the high concentration of different logistics units in this part of the country, there are numerous logistics service providers performing VAS throughout. Hence, further geographical extension was unnecessary in the context of the particular study.

3.3.3.2 Six Companies in Focus

Company 1

The first company, which is referred to as "Company 1" in this study, is a US manufacturing corporation specialising in motion and control technology. At the time of data collection, around 60.000 people were working for this company worldwide. The company runs its own distribution centres, where the finished products are stored and shipped to the distributor or to the end customers. The distribution centre, which took part in the particular study, is a central distribution centre of EMEA logistics chain of Company 1. This distribution centre mainly focuses on storage activities, however, different supplementary logistical services are also performed in this centre. The portfolio of VAS in this distribution centre can be divided into two groups: different "postponement" activities which are triggered by the production sites of Company 1, who outsourced their storage operations, and VAS which are driven by the OEM business requirements. Activities such as "kitting", "relabelling" and "repacking" are the most frequently performed VAS in this distribution centre.

Company 2

While Company 1 is a production enterprise, the other five companies involved in this study are third-party logistics (TPL). Company 2 is a relatively small TPL with about 230 employees that concentrates on offering different logistics solutions. The distribution centre in this study is one of three distribution centres this company is operating in Germany. In contrast to the distribution centre of Company 1, the distribution centre of Company 2 is driven by various customised services. Thus, the main driver of the company turnover is not simple warehousing but VAS. Similar activities as in Company 1 are a part of the VAS in the distribution centre of Company 2. Additionally, different rework activities such as inlaying country-specific power cords or warranty cards belong to the VAS offered in this distribution centre.

Company 3

The third company is a big, international service enterprise. Company 3 own 85 locations in 20 countries with more than 70.000 associates worldwide. Apart from CRM, IT and finance fields, logistics are considered an important segment of Company 3. When it comes to logistical solutions, the company is active in different industries like fashion, tech, healthcare, telecommunication and automotive. The distribution centre participating in this study is the largest logistics location of Company 1, where the products of all these

industries are represented. Similar to Company 1 and Company 2, the VAS in form of "postponement" activities are performed in the distribution centres of Company 3.

Company 4

Company 4 is a family enterprise and resembles mid-size TPL, with around 4, 500 workers in 42 locations throughout Germany, Europe, the United States and the Arabian Peninsula. Both, transport logistics and warehouse logistics are included in the portfolio of the company's services, which are offered in different business segments. The distribution centre, which was the primary focus of this particular study, concentrates on the storing and distribution of products from the field of trade logistics. Apart from the simple labelling and packaging VAS, the range of VAS offered in this distribution centre includes quality control, which occurs in the inbound as well as in the outbound areas.

Company 5

Company 5 is a TPL which owns 10 logistics sites in Germany with a large logistics surface and an own fleet. This company it has its biggest focus on e-commerce fulfilment business and can be seen as fast-growing company. The range of VAS offered in the distribution centre used for the process of data obtainment is quite wide. Primarily, the activities run in this distribution centre in term of VAS include such services as pre-assembly, refinement of goods or neutralisation of the products which are stored in this warehouse.

Company 6

Company 6 is a TPL which is known in Germany as an expert in transport logistics. The difference between Company 6 and the other five companies in question is that this company has long-term experience in transport logistics but can be seen as a relatively new player in terms of warehousing. Today, the company strives to develop different logistics services for their customers. The distribution centre included in this study represents a location, where outsourced warehouse activities from a customer are carried out by Company 6. As this type of logistics service is quite novel for Company 6, there is no fixed portfolio of VAS provided by this distribution centre. Indeed, the development of VAS can be seen as an ongoing learning process in this distribution centre. The main part of such VAS includes basic supplementary activities, such as customised labelling and packaging.

	Company 1	**Company 2**	**Company 3**	**Company 4**	**Company 5**	**Company 6**
Number of employees in total	50.000	200	68.000	5.000	1200	400
Countries	50 Countries	2 Locations in Germany	36 Countries	9 Countries	13 Locations in Germany	2 Locations in Germany
Company type	Production	Third Party Logistics	Fifth Party Logistics	Third Party Logistics	Third Party Logistics	Third Party Logistics

Main Industries	Aerospace, Electronics, Healthcare, Refrige	Food and pharma products	Energy, Utilities, Health, Pharma	Automotive sector	Pharma and Food products	Diverse (bulk and cargo)
Main products or service	Cylinders and Actuators, Pumps, Hose, Seals	Packaging, Production supply, Warehouse Logistics	CIM, CRM, Financial, IT, SCM, Logistics	Warehouse logistics, Plant Logistics	Contract Logistics, E-Com., Warehouse Logistics	Transport Logistics
Geographical position of DC (in focus)	West-Germany	West-Germany	West-Germany	West-Germany	West-Germany	West-Germany
Number of employees in DC	180	120	280	150	160	45
Main VAS types in DC	Kitting, Re-packaging / labeling, small assembly	Customised packaging, rework, forming	Re-packaging / labeling / assembly	Quality control, Re-packaging	Pre-assembly, refinement of goods, scraping	No fixed offers (new field)

Table 19. Main Criteria of Case Companies

3.3.3.3 Result of Data Collection

By incorporating these companies in the process of data analysis it was possible to conduct eighteen interviews with managers from different distribution centres (Figure 22). Some interviews were conducted directly in the companies, others, because of Covid19, were carried out by using Microsoft Teams software. All interviews were documented via the audio recorder and afterwards transcribed. As the interviews were conducted in German, they were additionally translated to English.

	2019	**2020**		
	Q4	Q1	Q2	Q3
Company 1				
Company 2				
Company 3				
Company 4				
Company 5				
Company 6				

Figure 22. Time of Conducted Interviews

3.3.4 Data Grounded Analysis

The fundamental principle of the method of grounded analysis is that the evaluation of the data should begin as soon as the data from the first interview has been collected and transcribed. This principle was adopted in the particular process of data analysis and thus,

the first results of data evaluation were produced before the entire process of data collecting was completed.

Before coding and analysing the data, the research objectives and interview questions were pre-coded, in order to simplify the structure of data analysis in Nvivo. In this way, the research objectives were referred to as "O" (for *objective*) followed by the number of the research objective (eg. O2 – second objective). In the same way, the interview questions were coded as "Q" (for question) followed by the number of the question. The combination of both, coded research objective and research question, presented the codes which were used in the data analysis. Additionally, each code was described by a key concept, which provides an understanding of the meaning of the particular code (see Table 20).

Research Objective	**Interview Question**	**Code**	**Code description**
RO: to understand different characteristics of VAS in warehouse logistics	How do you define VAS in your DC and what types of VAS does your DC provide?	O1_Q1	Definition & Types of VAS
	What advantages do VAS provide your DC?	O1_Q2	Advantages
	What challenges does the implementation of VAS imply?	O1_Q3	Challenges
RO: to examine underlying constructs of VAS customer demands	Is the customer demand for VAS in your DC more stable or fluctuating?	O2_Q4	Stability of customer demand
	Is the demand on VAS orders more predictable or more unpredictable?	O2_Q5	Predictability of customer demand
	Does the customer expect a short completion of VAS orders or is the lead time of the customer orders adequately long?	O2_Q6	Lead time
	Is the value of VAS customer orders in your DC high or low?	O2_Q7	Value of VAS
RO: to identify the performance drivers of operational strategies in distribution centres.	Which capabilities does the DC require to successfully implement VAS?	O1_Q8	Capabilities needed
	Do VAS require more standardisation or flexibility in the processes?	O2_Q9	Standard vs. flexibility
	Which performance measures show that the implementation of VAS is successful?	O3_Q10	Performance measures
	How important is the cost efficiency and which measurements are you using to track it?	O3_Q11	Cost efficiency
	How do you measure performance of such VAS which are extremely dynamic and require particular customer responsiveness?	O3_Q12	Customer responsiveness
	How do you know that the customer is satisfied, and which performance	O3_Q13	Customer satisfaction

	measures indicate customer satisfaction?		

Table 20. Pre-coded Research Objectives and Interview Questions

In the same way, the attributes of the company experts participating in this study were pre-coded. The six companies the managers work for were coded as "C" (for *company*) followed by the company number. The roles of the managers in their organisation, namely distribution centre manager, customer manager and operations manager, were accordingly referred to as "DM", "CM" and "OM". Thus, the combination of coded company and role of manager presented the coded attributes of the research participants (Table 21).

	Distribution centre manager (DM)	**Customer manager (CM)**	**Operations manager (OM)**
Company 1 (C1)	C1_DM	C1_CM	C1_OM
Company 2 (C2)	C2_DM	C2_CM	C2_OM
Company 3 (C3)	C3_DM	C3_CM	C3_OM
Company 4 (C4)	C4_DM	C4_CM	C4_OM
Company 5 (C5)	C5_DM	C5_CM	C5_OM
Company 6 (C6)	C6_DM	C6_CM	C6_OM

Table 21. Pre-coded Research Participants Attributes

Based on these pre-codes the transcribed data was analysed according to open-, axial- and selective coding steps. In the first step of analysis, the transcripts unloaded in Nvivo were read line-by-line and conceptualised as "*open*" codes. To make sure that important concepts from the transcripts were not overlooked, the "Word Cloud" and "Word Tree" tools were additionally utilised.

In the second phase of the data analysis, the open codes were transformed according to the procedure of axial coding. This means that some open codes with similar characteristics were put together in one code, reducing the overall number of codes. These new codes were used to analyse the data in the context of predefined attributes. Moreover, the evaluation of these codes served as an indicator of data saturation.

In the last phase of the data analysis, "Selective Coding", the main concept of the analysed data was identified, and the other codes were logically connected to this concept. In this manner, the final scheme of the process of data analysis was created. This scheme served as the basis for the discussion of the results of the data analysis in the context of the research objectives and research questions.

3.4 Identification of Research Principles

This part of the Methodology chapter will exhibit the results of the final step in the development of the methodological construction, which dealt with the identification of the main research principles underpinned in this study. The concepts of the "research quality", "research ethics" and "role of researcher" were in the focus of this procedure.

3.4.1 Research Quality

The quality of a research study is commonly associated with three terms: validity, objectivity and reliability. However, while these concepts are highly applicable in quantitative study, their application to qualitative research is often criticized by different scientists. Such criticism is linked to the idea that qualitative study, in contrast to quantitative, does not provide generalisable outcomes, and therefore, the concepts of validity, objectivity and reliability are less applicable in this context. Thus, Flick (2005) suggested that researchers, who follow the principles of qualitative research, must instead utilize such criteria such as *transparency*, *intersubjectivity* and *extensivity*. As this particular study followed the principles of qualitative research, these criteria have been considered by the development of research methodology.

Transparency can be seen as an integrated criterion of qualitative study, which is similar to the *validity* known in quantitative research. To ensure transparency of this study, each phase developing methodological design was clearly presented and reported in this paper. In this manner, the step of construction of research design, such as determination of research paradigm, research strategy, method of data collecting data, sampling technique and data analysis based on the discussion of *what exists* and *what is more applicable to this particular context (see section 3.2)*. This should enable the reader to understand why the particular approach was chosen. Furthermore, the presentation of data analysis in this paper includes a highly comprehensive description of how the transcripts were coded, which makes it possible to understand this process in detail.

Intersubjectivity is another aspect of research quality which was integrated into this study. Particularly, intersubjectivity means a collection and analysis of the qualitative data in the most objective way. Hence, intersubjectivity is an alternative of the *objectivity* that otherwise cannot be fully achieved in a qualitative research. In the context of this study, in both data collection and data analysis processes, the aspects of intersubjectivity were considered.

During the process of gathering data, all research participants answered the questions without being influenced by the interviewer's comments. Only in two cases were additional questions raised: the interviewees obviously did not understand the question correctly or the interviewees were talking about some general concept, which needed to be clarified. Such a strategy made it possible to avoid researcher bias and to gather data in a more objective way.

In terms of the data analysis process, intersubjectivity was achieved through the use of grounded analysis technique that implies an explorative process of data evaluation. In this way, there were no predetermined codes, but the codes were derived from the data. Moreover, the use of Nvivo features made it possible to verify if any important concepts have been missed by the coding procedure.

Extensivity is the last but not the least criteria that have been considered in this study to achieve high research quality. The idea of this concept reflects the aspects of reliability in quantitative study. Thus, extensivity is needed to demonstrate that the collected data is comprehensive for the purpose of a qualitative study. In regard to this study, two concepts, *triangulation of sources* and *data saturation*, supported the aspects of extensivity.

Particularly, the concept of triangulation underpinned the data collection approach. Triangulation in qualitative research refers to the idea of utilization of multiple methods of data collection or multiple data sources in order to gain a full understanding of phenomena (Patton, 1999). The triangulation in this study was based on the collection of data from managers with different roles in their respected organizations. Considering the explored topic from different perspectives made it possible to increase the comprehensiveness of collected data and, in this way, to ensure extensiveness of research. Data saturation, in turn, underpinned the process of data analysis in qualitative research. Generally, data saturation refers to the idea that the data collection process can cease, as the last analysed data does not provide new information (Sandra, Faulkner, Stormy and Trotter, 2017). Thus, only after it was discovered that the empirical data would not lead to the new codes, the collection of data in this study was finished.

3.4.2 Research Ethics

Research ethics accompanied the whole study and became of especial importance when the interviews began, and the research participants had successively been involved in the procedure of obtaining empirical data. In this context, such ethical principles as *respect, welfare, justice* and *confidentiality* were taken into focus.

In terms of respect, all communications with the research participants, before, while and after the interviews were carried out were done so in an honest and polite manner. The participants were informed about key elements of this study and how the data would be evaluated.

Regarding welfare principle, the research participants were provided with full information on how their individual distribution centres as well as their organisations in particular could benefit from this study. Moreover, the research participants were informed that justification is at the foundation of this research and therefore, they would all equally benefit from the result of this study.

To maintain discretion among involved companies and persons, the principles of confidentiality were incorporated in this research. Thus, the names of the companies participating in this study were anonymised (e.g., "Company 1", "Company 2", etc.). The names of the research participants, as well as all further possible information about the person were not reported in this thesis. Moreover, throughout the interviews, several of the participants mentioned the names of other companies such as their customers or competitors. The names of these companies have also been changed in the transcription of the data for the confidentiality's sake.

3.4.3 Role of Researcher

The role of a researcher doing a qualitative study is especially critical, as the researcher is taking the responsibility to collect and evaluate data based on their own experiences, beliefs and perceptions (Creswell, 2007). Therefore, it was important to avoid the individual biases of a researcher. Thus, the role of researcher in this study can be seen as the role of "moderator", who leads a meeting, asks the questions and summarises the inputs of different participants without giving their own ideas and preferences. The key aspect of this task was that the research quality and ethical principles presented above are fully integrated. In this context, the researcher had the protection of privacy, autonomy and confidentiality of the people involved in this study.

3.5 Summary of Methodology

The discussion on philosophical perspectives in the context of the particular study led to the conclusion that inductive methodology based on the phenomenological interpretivist paradigm is the most appropriate way to underpin the design of particular study. Thus, the following steps of constructing methodology were based on the elements of the qualitative

research. In this way, the qualitative, multiple case study was chosen as the research strategy for the empirical process. In terms of data collection and analysis, the method of semi-structured interviews by quota sampling technique and grounded analysis procedure were determined as the most adequate approaches for the purposes of this study (Table 22).

Issue	**Chosen approach**
Research paradigm	Phenomenological interpretivist
Research strategy	Qualitative multiple-case study
Method of data obtainment	Semi-structured interviews
Sampling technique	Quota sampling
Method of data analysis	Grounded analysis

Table 22. Summary of the Choice of Research Design

Based on these steps, a detailed plan for both the data collection and analysis process was designed and applied (Table 23). In this manner, thirteen interview questions were developed and improved by the pilot interview process. Finally, managers who had the role of heads of distribution centres, customer managers and operation managers from six companies have been interviewed. The data gathered was conceptualised according to open, axial and selective coding procedure with the help of Nvivo software.

Issue	**Aspects of research design**
Interview questions	*Research objective 1:* - how do you define VAS in your DC and what types of VAS does your DC provide? - what advantages do VAS provide your DC with? - what challenges does the implementation of VAS imply? *Research objective 2:* - is the customer demand for VAS in your DC more stable or fluctuating? - is the demand on VAS orders more predictable or more unpredictable? - does the customer expect a short completion of VAS orders or is the lead time of the customer orders adequately long? - is the value of VAS customer orders in your DC high or low? *Research objective 3:* - which capabilities does the DC require to successfully implement VAS? - do VAS require more standardisation or flexibility in the processes? - which performance measures show that the implementation of VAS is successful? - how important is the cost efficiency and which measurements are you using to track it?

	- how important is quick reaction to customer demand and which measures are you using to track customer responsiveness? - how do you know that the customer is satisfied, and which performance measures indicate customer satisfaction?
Research participants	*Distribution centre manager* – head of the distribution centres *Operation manager* – expert of daily DC operations, among other VAS *Customer manager* – experts in the VAS customer requirements in DC
Case companies	Six companies, distribution centres tn the west part of Germany
Steps of data analysis	*Open coding* – words and phrases from interview transcripts are coded *Axial coding* – codes are integrated to over categories / codes *Selective coding* – codes are connected into one story

Table 23. Summary of the Main Aspects of Research Design

In order to ensure the quality of this study, the principles of qualitative research quality have been adopted (Table 24). Particular aspects such as transparent reporting, intersubjective data collection and analysis, triangulation and data saturation were considered to enhance the research quality of this study. Moreover, as this study implied the collection of data from people, ethical aspects of this study were based on respect, welfare, legality and confidentiality. In doing so, the role of researcher was to ensure privacy, autonomy and confidentiality of all parties involved in the research.

Issue	**Aspects of scientific principles**
Research quality	*Transparency* – detailed reporting of designing methodology and data analysis process *Intersubjectivity* – avoiding researcher bias during interviews and using inductive approaches based on Nvivo software while analysing data *Extensivity* – triangulation of sources and data saturation principles
Research ethics	*Respect* – *being* honest and polite. The participants know how the data will be evaluated *Welfare* – the participants are aware of the benefits from the study *Justice* – all research participants equally benefit from the study

	Confidentiality – names of companies, research participants as well as further names from the transcripts are not reported
Role of researcher	Ensuring privacy, autonomy and confidentiality of all parties involved

Table 24. Summary of the Main Aspects of Scientific Principles

Reflection - Part III

The methodological construct of my study represents the approach in which I obtained and analysed data. With this approach, I adopted the most sensible and adaptable design for the purposes of my research. Not the last role in this process had been playing my critical evaluations and reflections of the methodological procedures of previous studies. In the context of this process, previous studies on VAS in distribution centres, and especially those which were underpinned by the principles of qualitative research, were taken into the focus of my reflective examination. In this respect, I tried to understand the extent in which the methodological constructs of these studies could be applied to the concept of my particular research. In doing so, I came to understand the limitations that require going beyond the borders of previous constructs by creating new methodological elements aligned with the purposes of my study.

As a result, one of the novel elements of my methodological constructs became the triangulation approach of study, whereby each distribution centre participating in the study was represented by different managers with different functions in their organisation. The application of this triangulation approach is a direct result of my critical reframing of the selection of research participants in the previous scientific works. Essentially, my critical view highlighted the fact that methodological constructs in previous studies on VAS in distribution centres were largely based on the principles of inclusion in the empirical process one representative of each logistics service provider (usually a CEO), who is, in turn, able to reflect on all perspectives of the logistic unit. The key questions in the context of my critique were: “Would the CEO, who considers VAS business from a more strategic position, have the same perspectives of customer needs as an operational manager, who is faced with the every-day challenges of completing the VAS customer orders on the operational level?” And “How would these perspectives match with the views of those managers, who are responsible for the customer management, and in this way may perceive VAS business from other angle than operations view?”.

Huang and Hsu (2016) with his publication “A knowledge gap model for improving service quality of international distribution centres” makes clear that the perspectives of distribution centre managers on “what customer needs” can be different from the “real” expectation of customers. In the context of this conclusion, I would go further and claim that the perspectives of distribution centre managers within one distribution centre might not be homogeneous, as managers with different functions can have different understandings of customer demand. From this perspective, I would assume that in the case of VAS, which are characterised by a higher level of customisation in contrast to traditional warehouse operations, this effect can be especially relevant. Therefore, my position - that the forming of research sampling groups utilised in the methodologies of previous studies on VAS in distribution centres - can provide only restrictive data in the context of the phenomenological exploration of DC managers' perspectives and that a triangulation of internal sources of logistics units can be considered the more appropriate strategy.

At this point, it is important to add that the triangulation strategy of internal sources in my study confronted the understanding of a triangulation approach suggested by Denzin (1970), whose ideas are broadly famous in the context of epistemological debates on the role of triangulation in social research. To be more precise, Denzin’s position is based on the perspectives that an obtainment of the “second” portion of data through for example an application of an additional method is required to validate the data gained from the “first” method. In turn, my personal perspective of the triangulation approach is in line with those researchers, who stand in contrast to Denzin’s perspectives. It became especially clear to me once I discovered the publication of Flick (2004), who formulated his style of understanding triangulation strategy in qualitative research on the critical consideration of Denzin’s framework. In essence, I came to identify two novel aspects of the concept of triangulation, which are inherently contradictory to Denzin's idea. First, the triangulation regardless of the form (data triangulation, method triangulation, theory triangulation, researcher triangulation etc.) aims not to validate the primary data, but to acquire the empirical data, which are rather more heterogeneous in nature. This means if, for instance, in the case of method triangulation the data obtained by the second method does not confirm the result of the first method, it can be considered as a rather positive fact. Second, data gained from the use of the second sources or methods for example is equally significant as the data gained from the first sources or methods. Both of these aspects were fundamental principles of triangulation which were applied in my study.

My critical assessment of the methodological procedure of previous studies relates not only to how the data was collected in the previous studies but also how the gathered data was analysed. In particular, this touched on the lack of using the method of Grounded Analysis in the research on VAS in distribution centres. The restrictive perception of the advantages of this data analysis procedure from researchers can be linked with the fact that this method is often considered as a part of Grounded Theory. This, in turn, can lead to the notion that Grounded Analysis is out of focus from the researchers, who are not following the Grounded Theory approach in their studies. My reflection of this methodology, however, led me to the conclusion that the application of Grounded Analysis can be a sensible strategy outside the Grounded Theory approach. This became especially clear by studying the perspectives of Easterby-Smith et al (2013) on this methodology. In particular, the reflection of these perspectives has enabled me to realise that the concept of Grounded Analysis is a more advantageous strategy of data analysis than the other methods when the data needs to be understood in their context (which is a common case of exploratory research). Therefore, the application of Grounded Analysis technique, along with the triangulation of internal sources, was another outcome of my critical reflection of the methodological constructs of previous studies. Looking forward, I can say that both of these aspects of the design of my methodology made it possible to achieve the contributions to the methodology of scientific matter.

4. Results

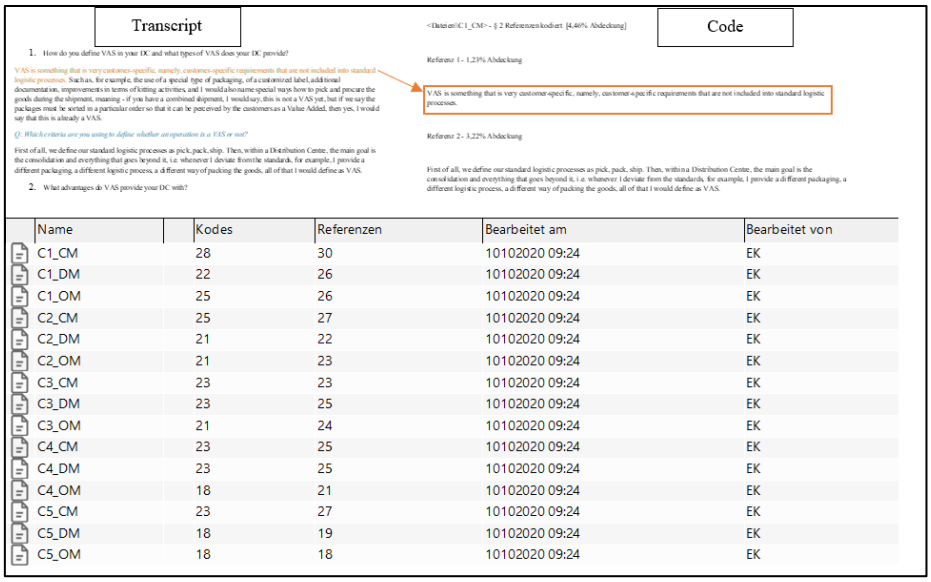
4.1 Introduction to Results

This section presents the results of the analysis of empirical data collected by conducting semi-structured interviews with different managers from the six case companies. As this study deals with VAS in the context of the operational performance in distribution centres, the system level of the data analysis was based on the perspectives of distribution centres and not on the general strategical perspectives of the companies that run these distribution centres.

The presented results are structured according to the three phases of the grounded analysis procedure: open coding, axial coding and selective coding. Thus, the subsequent part of this chapter (4.2) shows the conceptualisation of the data, whereby the transcripts of conducted interviews were transformed into the open codes. The next part (4.3) demonstrates the conversion of the open codes into axial codes and an examination of these codes in the context of research participant attributes (companies, where the managers work and the roles of managers in their organisation). The following part (4.4) presents the selective coding procedure, whereby the axial codes are integrated into one scheme that demonstrates the final results of the coding process. The next section (4.5) reflects this final scheme and shows the research findings that result from the data analysis procedure. The last part, "Summary", recaps the results of the entire process of data analysis.

4.2 Open Coding

The aim of the open coding was to identify and record all concepts based on the line-by - line analysis of transcribed data. This process was supported by Nvivo software, which made it possible to simplify the examination of the data. In doing so, the eighteen transcripts were uploaded to Nvivo and the coding of data occurred directly in this program (Figure 23).



Name	Kodes	Referenzen	Bearbeitet am	Bearbeitet von
C1_CM	28	30	10102020 09:24	EK
C1_DM	22	26	10102020 09:24	EK
C1_OM	25	26	10102020 09:24	EK
C2_CM	25	27	10102020 09:24	EK
C2_DM	21	22	10102020 09:24	EK
C2_OM	21	23	10102020 09:24	EK
C3_CM	23	23	10102020 09:24	EK
C3_DM	23	25	10102020 09:24	EK
C3_OM	21	24	10102020 09:24	EK
C4_CM	23	25	10102020 09:24	EK
C4_DM	23	25	10102020 09:24	EK
C4_OM	18	21	10102020 09:24	EK
C5_CM	23	27	10102020 09:24	EK
C5_DM	18	19	10102020 09:24	EK
C5_OM	18	18	10102020 09:24	EK

Figure 23. Extract from the Nvivo Coding Procedure

To ensure that some important concepts were not missed, WordCloud and WordTree analyses were also run with the help of the Nvivo software. The main objective of the WordCloud was to identify key words that were the most frequently used by interviewees, while the function of the WordTree analysis was to investigate these words in the context of their "input-output" (see Section 4.2.2). Thus, the combination of these tools allowed for the re-analysis of data from a different angle and justified the results of the open coding procedure.

4.2.1 Open Coding by Companies

4.2.1.1 Coding Results - Company 1

Thus, based on the open coding, the transcribed interviews from the distribution centre manager, customer manager and operational manager of Company 1have been analysed and coded. Table 25 shows the codes, which were developed by this procedure.

Classification	**Initial Codes**	**Quotations**
RO1_Q1 Definition & Types of VAS	Customized, beyond standard	"VAS is something that is very customer-specific, namely, customer-specific requirements that are not included into standard logistic processes." (CM) "…whenever I deviate from the standards, for example, I provide a different packaging, a different logistic process, a different way of packing the goods, all of that I would define as VAS." (CM) "VAS are all processes that are more or less not part of a standard process, that cannot be handled within the normal material flow and that add value for customers beyond the standard" (DM)

		"…I have to get away from my own requirements and standard processes, go to my customers and try to add value for them with a special area I have here through the VAS" (DM)
	Physical change of outbound specification	"…special type of packaging, of a customized label, additional documentation, improvements in terms of kitting activities…" (CM), "If a customer wants to have a kit made from different manufacturing fields, and I build a kit for him with the help of a fitting, a seal and a rubber ring…" (DM) "For example, assembling two filters to send them as a complete filter system." (OM) "…we make a kitting out of different products, or we also create a set… This package then becomes a set, which consists of three individual components." (OM)
RO1_Q2 Advantages	Disadvantages as internal service provider	"We as EDC are service providers in-house, which means that there are actually very few advantages for us… we actually don't create any more business operations, or something that an external service provider could generate." (CM) "We are the cost centre and therefore, from the DC perspective, VAS bring us no advantages" (DM) "…there are only a few advantages for us – if any at all – as we are only investing money in a service that we offer to customers." (OM)
	Higher costs and less advantages	"…VAS usually implies that we have to do something that is somehow beyond our standards, as a result, higher costs are generated, and we actually don't create any more business operations..." (CM) "…we naturally generate additional costs, because we are not selling the products at a higher price" (OM)
RO1_Q3 Challenges	Capacity planning accuracy	"That is a challenge within the day-to-day operations, because how much capacity do I really need? And at what point do I need the capacity? The accurate assessment of this is thus one of the difficulties for the warehouse manager and the team leader." (CM) "…what do I need for a tool, or maybe even a machine? For example, if something needs to be forged, I would need a welding machine, that means that must be evaluated beforehand" (OM)
	Cost calculation	"…how much would the whole thing mean in terms of effort? Such a calculation should be carried out in order to determine how complex this process is" (OM)
	Higher costs	"It makes our operations more expensive because we tend to need more people, or more resources to implement something" (CM) "…VAS basically mean increased costs… and I generate additional expenses in my logistics centre, whether I am talking about space, resources, technology, or infrastructure - everywhere I have increased costs." (DM) "…they are simply associated with higher costs" (OM)
	Lower productivity	"…EDC is focused on productivity and is best compared to others. But while running VAS we need to implement something that deviates from the standard processes…" (CM)
	Needs to go beyond standard	"…it means that I am leaving the standard process, because within a normal process I do not necessarily carry out the packaging…" (OM)
	No big challenge	"There are no challenges within such services, but as I already mentioned, they are simply associated with higher costs." (OM)
	Quality issue	"…the more difficult it becomes to recognize error-situations correctly. And then we still have to be able to ensure that we can provide the quality service customers expect from us." (CM)

	Understanding of customer needs	"…you first have to understand what exactly it is that the customer wants… The customer wants something else, so we have got to understand, what does he want? Have we had such requirements from other customers yet?" (CM)
	VAS Expertise	"…the employees have to be able to recognize and realize that they have to do something new" (CM) "…we can read the packaging-and-delivery instructions of the customer, and we need great know-how of what is industry specific" (OM)
	Wide range of VAS	"The range of VAS is very broad, because every customer has his own requirements." (CM)
RO2_Q4 Stability of customer demand	Rather stable demand	"Generally, the demand on such customer orders is quite stable. We have some exceptions, for example, in the case of the OEM customers, when the customers are on holiday from August to the middle of September." (CM) "I would describe the customer demand for VAS in our DC as stable. Of course, we have some deviation, but by most customers the demand implies similar workload every month." (DM) "Such customers whose demand is always fluctuating exist, but they are not being represented here" (OM)
RO2_Q5 Predictability of customer demand	Rather predictable demand	"A VAS that you offer to a customer is actually something that repeats itself. I don't offer a service only once, but I usually do it every week, every month, or every day. Thus, in most of the cases we can predict the demand of VAS customer orders in advance." (CM) "…in the VAS, we always have very well-structured forecast figures." (DM) "The demand is predictable for us, as we are working with the customers on long term relationship bases. We know the demand in advance, and this enables us to plan out our capacity." (OM)
RO2_Q6 Lead time	Rather long lead time	"We have a deal with our customers in terms of lead time… date and I can complete the order with no stress." (CM) "In the VAS area, we have longer lead time in comparison to the orders, which need to be picked and packed without additional services" (DM) "We sometimes have customers who order a lot, but we don't have any customers who expect us to deliver this quantity immediately." (OM)
RO2_Q7 Value of VAS	Disadvantage as internal service provider	"We are the cost centre in the "Company1" Group. We are not able to generate the turnover and we are not creating any profit from VAS. So, for us VAS mean higher costs, but no monetary value." (CM) "…we don't charge our customers with the additional price. Not as EDC. So, for us the VAS is just cost increase, which we need to manage every day." (OM)
	Higher value	The value of VAS is higher when compared to standard warehouse operations, because VAS essentially means standard warehouse operations like put away, picking and packing plus some additional activities we have to do… VAS implies higher effort and therefore, should have higher value." (DM)
RO3_Q8 Capabilities needed	Adoptable IT systems	"…as a customer in terms of a VAS I would like to have a 3D barcode, but this 3D barcode has to come from the same printer as my 2D barcode because I cannot adjust and change the whole process just because of one label. So, this system has to support the whole process." (CM)

	Closer customer relationship	"We need to be very close to the customer, which means we really need to understand why the customer wants this service from us, and we need to understand the requirements clearly" (DM)
	Experts and expertise	"We need good process thinkers who thoroughly think things through. On the one hand, we must understand what the customers really want. And on the other hand, how these services could be implemented in distribution centres" (CM) "…in a way that we can read the packaging-and-delivery instructions of the customer, and we need great know-how of what is industry specific" (OM)
	Knowledge of product	"…what we also need to some degree is the product knowledge. Namely, when we have 1,500 products in stock, and possess some product knowledge…" (OM)
	Place	"…we have to manage the space…both for the individual components and for the components that are needed afterwards for the kitting." (OM)
	Supply Chain planning accuracy	"…there is a need of stable systems and the capacity planning of the individual products" (OM)
RO3_Q9 Standard vs. flexibility	Standard importance	"…we must focus on standardisation as much as possible. Where do I need flexibility? I do need it if I have to perform something completely different from the standard very quickly… Then I have to do something special here in the logistics. But this is rarely the case." (CM) "When I talk about kitting exclusively, then I can speak of a high standardization of these processes…The fact that we can now divide our processes according to work waves and certain shipping days means that we can more or less talk about fixed standards, and we don't have to bring a certain flexibility, so that we have to change our processes a lot within a working day" (DM) "…you need standards everywhere. Flexibility also has its own standards… where exactly do we need flexibility? Flexibility in terms of the time – maybe yes, flexibility in terms of the processes – no." (OM)
RO3_Q10 Performance measures	Cost measures	"…you always have to take the costs into account." (CM) "…as we are a cost centre, we have extremely high focus on costs." (DM)
	Increasing demand of VAS	"I'd define success as an increasing demand on VAS. This is success for me, because the fact that the customers are appreciative of the additional service we offer here and want even more, speaks for itself." (OM)
	On Time delivery measures	"…we still have time metrics, for example the time performance, that can accordingly be measured with the LISC. So, we, as EDC have to benchmark ourselves with the help of the SHOT, but within "Company 1" as a supply chain, of course we should use LISC to see how capable we are." (CM) "…we measure quality by RPPM (return part per million), services by SHOT." (DM)
	Performance categories determined by Group	"In the Company 1 Group, we have determined categories of performance measures, which we must track for all kind of businesses we are performing. This includes quality, services and costs." (DM)

	Complexity of productivity evaluation	"…I actually worked with 6 items, but in the end, I say I produced a single product. Therefore, it is very difficult to analyse the productivity of singular parts of a VAS." (OM)
	Quality emphasis	"…we should put quality first because the customer decides whether he is willing to pay for these requirements or not… in terms of the standard business the emphasis shifts more towards the productivity." (CM)
	Quality measures	"One of the metrics is the Returned Parts Per Million (RPPM)." (CM) "This includes quality, services and costs. So, we measure quality by RPPM…" (DM) "What we strive for in terms of the key figures is, first of all, the number of complaints, the number of unsubscribed Work Orders, and the number of orders that are being cancelled." (OM)
	Supply chain financial performance	"…this will enable "Company 1" to recognize whether VAS bring in profit by considering all supply chain costs and the incomes we have from our customers" (CM) "I know how many sales we have done in the month. Therefore, I measure cost of sales ratio. This is the most important measure I have to report every month to the corporate leader…" (DM)
RO3_Q11 Cost efficiency	Impact on financial performance	"I have to evaluate whether it at all lies within the margin I have from one customer. Because, from my perspective, this is a cost of sales ratio that needs to be redistributed…" (CM)
	Productivity	"We measure the whole thing by having productivity metrics that indicate what output I have generated in a day and what staff I need to do it" (DM)
	Strive for decrease costs	"I offer an additional service and that's an extra effort for me… the only way to justify the effort is to decrease costs." (OM)
RO3_Q12 Customer responsiveness	Cost measures	"We always have to measure our Cost-to-Sales Ratio. We can't influence the sales, that means we can only work with the costs." (CM) "…there is no difference at all. The cost measurement is always important…" (OM)
	No need to react quickly	"In terms of our business, I am not required to react quickly." (DM)
	No performance alignment	"I will take the quality first as well. But also here, I will take the costs into consideration" (DM)
RO3_Q13 Customer satisfaction	Customers' performance measures	"…the question is, how does the customer measure delivery performance?... they track when we have sent them the commodity exit message. If I miss that point, but I pack the product as nicely as he wants, he won't be satisfied…" (CM)
	Service quality	"You could speculate on the LISC or the RPPM ratios again, which would provide a quantitative assessment for the time being." (CM) "Firstly, figures related to quality. Secondly, the planner examines the LISC…" (OM)
	Questionnaires (Surveys)	"…you could also include the qualitative measurements, such as the Likelihood to Recommend (RTTR), which is also a metric where the customer evaluates the quality with the help of a questionnaire." (CM)

		"…I can also measure how many queries there were from customers (what we do every 2-3 years) by conducting an international customer survey. (DM)
	Repeating business	"I can tell customer satisfaction, if there is additional, repeating business with the customers. So, this is my feedback from the customers in the VAS area." (DM)

Table 25. Open Codes - Company 1

The open coding procedure of transcripts from the first company resulted in 74 labeled concepts that led to the creation of 44 different codes. In particular, the data related to the first research objective (where the interviewers addressed the definitions, types, advantages and challenges of VAS) was conceptualized by 14 different codes. The next 5 codes derived from the reading and reflection of data related to the second research objective, which was aimed at understanding the underlying construct of VAS customer demand. The coding of the data linked to the last research objective, which focused on the capabilities and performance measures needed in the context of VAS, resulted in the additional 25 codes.

4.1.1.2 Coding Results - Company 2

Through the use of this same logic, the data of the second company was analysed and coded. Table 26 demonstrates the codes which were created by examining the data of Company 2 (the new codes are highlighted in bold).

Classification	**Codes**	**Quotations**
RO1_Q1 Definition & Types of VAS	Additional service	"VAS are all additional services that we offer to our customers." (OM) "…if the customer wants to have some additional services apart from the storage of their goods in our warehouse, we determine this as VAS" (CM)
	Customized, beyond standard	"… a VAS is every service and every employee activity that goes beyond the standard processes of product delivery and shipment." (DM)
	Physical change of outbound specification	"…we implement… orders, which include the repackaging for the customer or enclosure of the warranty cards." (CM) "…we also have simple orders, for example the packaging unit simply does not correspond to what the end customer requires, so we have to unpack the products." (CM) "…all components of the product related to the guarantee have to be replaced" (DM) "… we implement the labelling of these products" (DM) "…we often add the printer cartridges for the printer manufacturers…" (OM)
RO1_Q2 Advantages	Customer loyalty	"…customer loyalty is increased through providing such services…" (CM) "…offering VAS leads to increased customer loyalty…" (OM)
	Financial benefit	"…the advantage is definitely that providing VAS increases our profit." (CM) "… these additional services generate revenue…" (CM)

		"…the majority of our profits are generated from providing VAS…" (DM) "…customers order some VAS and have to pay more for them. Otherwise, we will not be able to generate profit." (OM)
	Unique selling point	"…we have a unique selling point by providing VAS immediately and very quickly…" (DM)
RO1_Q3 Challenges	Dynamic workload	"…that we have a very dynamic workload, while having to do a lot of work with external employees..." (DM)
	Higher costs are covered by price calculation	"…VAS that is being delivered always interrupts the process chain in the house which results in increased costs. But this is, then accordingly, taken into account in terms of the price calculation." (DM) "…we should expect additional costs, which result from these services and thus it is important to charge the customers with higher prices for these orders." (OM)
	Manpower	"A very big aspect in the whole thing is always the staff. The difficulties lie in recruitment, and in the right selection of staff." (OM)
	Process determination	"…the processes themselves. We enjoy a great amount of experience in the subject, but still, there are always new processes and we have to refresh ourselves again and again in what we do and make ourselves up-to-date." (OM) "…implementation of VAS is different from the standard operations implementation…. the process of our additional services or our VAS has to be combined with many further processes. It also becomes very specific in terms of the division of the work steps." (OM)
	Quality issue through short lead time	"…to provide the quality expected by the customer. What the customer also definitely expects is, for example, when he places the order, it has to be implemented accordingly." (CM)
	Time pressure	"…time pressure arises in particular areas which results in the hectic processes and cost increase." (CM) "The processes and the time pressure are much more complex within VAS, which is not the case with such standard processes as picking" (OM)
RO2_Q4 Stability of customer demand	Rather unstable demand	"In the case of VAS, the demand is very unstable. And we have to be able to react on this demand very quickly." (CM) "The demand is very dynamic. Some days we have no VAS on the products at all…, and then some days within 48 hours we may work up to 400-500 hours more to perform the VAS…" (DM) "VAS are absolutely dynamic, so more fluctuating." (OM)
RO2_Q5 Predictability of customer demand	Acceptance of ad hoc customer orders	"…the so-called Priority Orders, whereas quantities flow in that have not been planned beforehand, but of course we take them as well." (DM)
	Rather less predictable demand	"We cannot really forecast the demand. We have historical data of the customer orders, but we can't really rely on it… the customer demand varies and therefore making a forecast for VAS is quite difficult." (CM) "We do very little forecasting, if any at all… VAS are actually becoming less predictable and therefore even more dynamic." (DM) It is difficult to make any forecast for VAS…ou always have to change a lot in the process after the first day of production, such as the number of employees, and manage the process again." (OM)

RO2_Q6 Lead time	Ability of high customer responsiveness	"The customers know that we can react on very short-term VAS orders…." (CM) "…to react quickly. This is the customer's expectation, but it is what makes our company different" (OM)
	Rather short lead time	"The customers expect to have the order in the short time, so they don't give us more time, but they expect that we will be able to adopt our capacity in the way that we can provide this order in the defined time scope." (CM) "…they expect us to provide VAS quickly." (DM) "We normally have to react quickly. This is the customer's expectation…" (OM)
RO2_Q7 Value of VAS	Higher profit derived from VAS	"VAS is the main part of our profit. We offer VAS and charge our customers, which stimulates our revenue." (CM) "We are making a profit from providing VAS." (DM)
	High value	"…VAS customer orders tend to have higher value." (CM) "I would say the value is high." (DM) "…VAS is very highly valued for us." (OM)
RO3_Q8 Capabilities needed	Closer customer relationship	"…what plays the central role in reaching success is our understanding of customer requirements" (CM)
	Flexibility in manpower	"…we have to be flexible enough to find…" (CM) "We need to be very flexible. What do I mean by that? I mean the flexibility in the workforce…" (DM)
	Flexibility in process	"…flexibility in the workforce, place, processes. This is very specific to our company…" (DM)
	Management team	"…the capacity of the team management are required…" (OM)
	Physical resources	"…technical prerequisites play an extremely important role." (OM) "Another important issue is place." (OM)
	Place flexibility	"This means that we have to be flexible enough to find… storage place in time." (CM) "the flexibility in the workforce, place, processes" (DM)
	Quick reaction	"The most important capability is quick reaction… that can always come around unpredictably" (OM)
RO3_Q9 Standard vs. Flexibility	Flexibility importance	"…we are facing dynamic demand, so the standardization of processes is not possible for us, and it does not really make sense. So, flexibility is what we need in order to be more competitive as a small logistic company in contrast to the big players." (CM) "Flexibility is the most important… We often work with those orders that cannot be planned… this all requires highly flexible processes." (DM) "Flexibility is the key element of our success. We don't have the chance to standardize these services, as the customer demand is dynamic…" (OM)
RO3_Q10 Performance measures	Cost measures	"…we run the internal measurement and look at the costs. That means we already have a particular cost estimation for the customers…" (CM) "…there is cost accounting, which goes deeper into details of how much space or how much costs for this space have been needed…" (DM)
	Financial performance	"…we see it afterwards when the prices that we have calculated cover the costs and also bring in a profit." (CM) "…it is important how much turnover we have made, how many hours we have spent for it, and, most importantly, how many hours have we sold…" (DM) "…, it should always be about in balance of around 30€ generated turnover per hour." (OM)

	Quality emphasis	"You cannot avoid tracking profit, but tracking quality is extremely important in the case of VAS" (CM)
RO3_Q11 Cost efficiency	Impact on financial performance	"…the most important aspect… is that the price of VAS covers the costs so that we generate higher profit" (CM) "…we have to make an extra calculation of 30-40% for each service and have to make a price offer… we have to know the costs of personnel, space and all additional process costs." (DM) "…the most important measure is euro-per-hour that workers should generate in order to cover all the costs." (OM)
	No productivity per hour	"…we cannot measure productivity per hour, as we have no comparison." (DM)
	Order simulation and time calculation	"…we have to make an extra calculation of 30-40% for each service and have to make a price offer. And therefore, the most important metric and the final result for the employee group, for the department, and for the whole operating department - is Euro per hour" (DM)
RO3_Q12 Customer responsiveness	Financial performance measures	"There is no difference whether I provide dynamic services or not. At the end of the day I expect to generate the turnover and create the profit by providing VAS." (CM) "…the most important KPI is the hours sold of those services that go beyond the standard." (DM)
	No customer responsiveness measures	"…we don't implement such measurement in our DC." (DC) "Our company is not measuring customer responsiveness, but I personally would determine it as accepting the orders of our customers when they come and very rarely having to reject the orders." (OM)
RO3_Q13 Customer satisfaction	Customer feedback	"…we often have feedback from our customers that we have done something particularly fast or particularly well" (OM)
	Service quality	"…we measure quality which also indicates that the customer is satisfied. We track the complaint rate to see whether our customers are happy." (CM) "There are two aspects of the customer satisfaction – one is, of course, the delivery reliability, meaning we are ready with the service exactly at the desired delivery date, and the second is that we deliver the product at the level of quality that the customer expects" (DM)
	Questionnaires (Surveys)	"We use the yearly customer survey… the survey always takes place at the end of the year, and it is published at the beginning of the year" (CM) "…we implement customer surveys once a year. We run them, this is being implemented via the sales department…" (DM) "We always carry out the certified questionnaires." (OM)
	Repeating business	"…we know that customer is satisfied if we get new orders." (CM)

Table 26. Open Codes - Company 2

The coding process of the second company produced 38 codes in total, 29 of which were initial codes that were not identified by the analysis of data of the first company. Moreover, the data analysis of the transcript from Company 2 provided new codes to each interview questions' category.

4.1.1.3 Coding Results - Company 3

When comparing the coded data from Company 1 and Company 2, one can conclude that they strongly vary. From the data saturation point of view, this variation shows the need for a continuation of the empirical process. Thus, the managers of Company 3 were interviewed and the transcripts were coded accordingly (See Table 27 below).

Classification	Codes	Quotations
RO1_Q1 Definition & Types of VAS	Customized, beyond standard	"…all kinds of services that go beyond the actual standard. Sometimes VAS are implemented as an individual and autonomous service process, which falls beyond the actual scope of the so-called "normal" process." (CM) "VAS fall beyond the standard, so customer requirements and expectations are different… VAS are always something above the standard…" (CM) "…then we have every process that goes beyond that, meaning it is implemented outside the standard business – and that is a VAS" (DM)
	Physical change of outbound specification	"…putting labels or stickers or sending leaflets… as soon as I have the product changing activities that increase the value of the product sold and shipped – this is a VAS for me" (DM) "…we must have a special label on these products… These country-specific labels are VAS." (OM)
	Technical quality check	"…the special quality check we provide in our quality department for the pharmaceutics industry." (CM)
RO1_Q2 Advantages	Competitive advantage	"…if you only offer standard storage and outsource, then you have more competition. Whereas by offering additional services, you have competitive advantage…" (DM)
	Financial benefit	"VAS provide us with the possibility of increasing the turnover by charging our customers for providing additional services." (CM) "By providing VAS you can calculate higher profit margins and generate higher benefit from sales." (DM) "VAS generate additional business. And this, in turn, increased sales and brings more revenue." (OM)
	Unique selling point	"VAS provide a Distribution Centre with the Unique Selling Proposition. I believe that increased agility brings more flexibility." (CM)
RO1_Q3 Challenges	Cost calculation	"…difficulty is the calculation, meaning how high the costs will be, how high are the raw material costs, which of the costs are internal, and what price can we now calculate for the customer on the market." (CM)
	Higher costs	"The challenge we are facing is managing the costs which are increased by implementing VAS, and the dynamics that come in with implementing VAS." (OM)
	Needs to go beyond standard	"VAS fall beyond the standard, so customer requirements and expectations are different." (CM) "…almost every customer has certain expectations as to what VAS processes should look like when they require them from us." (OM)
	VAS Expertise	"…we need the personnel which realises that providing VAS is definitely something that is has market demand …combining departments and bringing necessary people on board is the first difficulty when setting the regulation for the VAS" (CM)

		"…we need people who understand what they are doing. That means the employees have to be trained, we need technology…" (DM)
	Wide range of VAS	"We are serving almost 30 customers here… almost every customer has certain expectations as to what VAS processes should look like when they require them from us…" OM
RO2_Q4 Stability of customer demand	Stable and unstable depending on customer	"VAS are very dynamic. We do also have VAS, where the customer demand is more stable, it's just that the dynamic VAS came to my mind so immediately because they have created more difficulties for us in the past." (CM) "You can't say VAS are always dynamic or always stable. It depends on the industry and the customers, because some of them are completely unstable." (DM) "It depends….When looking at the Belgium label example, this business is a very stable one… when I think about medical machinery, there are manufacturers who send their goods to Asia… we only know there is shipping to China every week, but we do not know whether we are going to ship 10,000 pieces, 3,000 pieces or 50,000 pieces." (OM)
RO2_Q5 Predictability of customer demand	Predictability depends on the customer	"Orders that are well established – such VAS we are supposed to implement for several customers – tend to be more predictable…. On the other hand, we also have unpredictability, which is commonly associated with ad hoc customer orders." (CM) "I would say that the predictability really depends on the company we provide VAS for." (DM) "In the case of the labelling for Belgium, the VAS are quite stable and thus the demand is quite predictable. In case of Asia goods, the demand is very unpredictable." (OM)
RO2_Q6 Lead time	Long and short depending on the customer	"The lead times tend to differ from order to order. It's better to say this depends on the business case. We have here two different kinds of VAS." (CM) "This again depends on the business segment…." (OM)
	Rather long lead time	"The majority of customer orders we handle in DC have a long lead time" (DM)
RO2_Q7 Value of VAS	Dynamic VAS have higher value	"Some VAS mean for us really high investments, high cost increase, and the value of these services is then higher than of those VAS we can simply integrate in our standard." (CM) "…we must understand whether we can zero-in on this in the short time. Then we must see if the customers has to pay more for such orders and we calculate the cost to understand if we gain profit for this action." (DM) "…the provision of VAS bring us higher margin. But if we develop some VAS like simply putting some parts together, this can be seen as VAS with low value in contrast." (DM) "…for the China labelling we have more effort, need to react quicker, take on more costs, and thus, charge the customers more." (OM)
	Higher value	"Normally, the provision of VAS bring us higher margin." (DM)
RO3_Q8 Capabilities needed	Adoptable IT systems	"…we need to be able to manage a complicated IT-system to be able to run the processes correctly." (DM)
	Closer customer relationship	"…I see the main aspect of success in the communication with the customer. We really need to understand what customers want..." (CM)
	Experts and expertise	"We need trained people…that enable us to integrate such VAS." (DM)

		"In terms of pharmaceuticals, we definitely need the expertise of the quality assurance department. We need pharmacists, so they can judge afterwards whether everything has been done correctly…" (OM)
	Flexibility in process	"…we have to be able to provide these services both on time and by meeting the quality expectations. And this again requires flexibility in the process" (CM) "…flexible processes that enable us to integrate such VAS" (DM)
	Management team	"In the medical machinery field, a lot more pressure is put on the personnel. Staff has to be trained very well…" (OM)
RO3_Q9 Standard vs. Flexibility	Both standard and flexibility are necessary	"I would say both…. pharmaceutical industry where we provide quality checks… the process flow is standardized….we will also need flexibility if the customers have ad rock orders" (CM) "We can provide both. And I think the VAS require both." (DM) "…we follow the path of standardization in all the processes we have for our customers, but we are also very flexible in the time frame within which we apply the services." (OM)
	Lean productivity and quality vs flexibility and reaction	"We implement our process based on the lean principles. For us, keeping standard means for us better productivity and quality. But we are flexible in the case of space and highly educated staff. So, we are able react on the specific customer requirements" (DM)
RO3_Q10 Performance measures	Cost measures	"I would also analyse the costs and sales. I have the commission prices and storage prices, I have shipping prices, which means I can estimate how much the pick-pack-ship performance costs, where I generated sales, and again, how expensive they were." (DM) "…we estimate the costs of conditioning, and these has to be equal to our sales." (DM)
	Quality, on time delivery, costs	"…it is the time, quality, and cost value ratio – the so-called magic triangle - which is ultimately relevant for the customer satisfaction" (CM)
	Financial performance	"…the calculation of the profit we are getting from these VAS when the implementation is completed." (CM) "…we cover the other costs and run through profit. I record revenue in reporting and analysing and that's how I see if I'm profitable or not." (DM) "…by the end of the day we have to be sure that the VAS we are providing in our DC bring us the financial benefit" (CM)
	On Time delivery measures	"…first is the "accordance to the timeline", which means we have to get a certain delivery done by a certain delivery day." (OM)
	Productivity	"We also want to make sure the staff did a good job. Thus, we measure quality and productivity…" (DM)
	Quality measures	"We also measure the quality. In marketing we control whether our staff reaches the appropriate contact person…" (DM)
	Quick implementation of VAS	"Mostly it is the timing. So, how quickly are we ready to implement the VAS…" (CM)
RO3_Q11	Impact on financial performance	"The costs are very important. And here the cost-value ratio is the most important measurement of VAS." (CM)

Cost efficiency		"Cost efficiency is very important. We have to look at how long this process takes to calculate prices for customers because they also have their own margins." (OM)
	Order simulation and time calculation	"Depending on how large the scope is for a VAS, we just provide the calculation department with every cost and let them calculate what the internal costs are." (CM)
	Productivity	"…the cost efficiency is the basis for us. So, the most important measurement for me is whether we are productive" (DM)
RO3_Q12 Customer responsiveness	No performance alignment	"It doesn't matter whether we provide stable or dynamic VAS. The cost tracking is equally important for these services as well." (OM)
	Quality, on time delivery, costs	"First of all, the quality has to be perfect. Moreover, there has to be a balance between time and costs." (CM)
	Quick implementation (price not important)	"The cost and quality again. At the end, the price doesn't matter for the customers." (DM)
RO3_Q13 Customer satisfaction	Customer feedback	"We either ask him at the end when we are through with the VAS implementation" ((CM) "We regularly gather feedback." (DM) "In this respect, we receive feedback very quickly, whether positive or negative. We often get feedback from the customer that…" (OM)
	Service quality	"…customers are satisfied when there are no claims…" (OM)
	Questionnaires (Surveys)	"…, we are also conducting sustainability-graduation surveys whereas the customer has to reply whether he is satisfied or not." (DM) ". There is a customer survey every 3 months, including a standardized questionnaire to fill out and so we get feedback that is measurable for all customers…" (OM)
	Repeating business	"In the best-case scenario the customer asks us to implement the service again, which means for us we have done everything well." (CM)

Table 27. Open Codes – Company 3

The data retrieved from Company 3 made it possible to create 41 codes in total. It also contributed to the list of labeled concepts by adding to it a further 13 initial codes. In this respect, initial codes were not created in each interview questions category. However, when considering the codes in the context of the research objectives, new codes were identified in each research objectives field. The data analysis of Company 3 propagated new codes especially to the area related to the second and the third research objectives.

4.1.1.4 Coding Results - Company 4

As the data saturation was not indicated by the coding procedure of the transcripts of Company 3, the process of collecting and analysing data was continued. Table 28 presents

the results of the coded data that was collected from the interviews with the distribution centre manager, customer manager and operational manager of Company 4.

Classification	Codes	Quotations
RO1_Q1 Definition & Types of VAS	Additional service	"…what the customer books additionally can be interpreted as VAS." (OM)
	Customized, beyond standard	"VAS is a special process above the standard." (DM)
	Logistics quality check	"…VAS in term of the quality checks and weighing of goods which we do before they are going into stock" (DM) "The customer wants to know what efforts in receiving the products, weighing them, and sending them to the customer represents" (OM)
	Physical change of outbound specification	"…is the transformation of goods, meaning we change the goods that our customer has stored…" (CM) "…a VAS is the repackaging. Imagine the goods coming from a customer's production in a specific packing scheme in a pallet…" (CM) "…pack the products in special packages according to the requirements of our clients." (DM) "…we sometimes provide not only new cartons, but possibly also new content to the packaging." (OM)
RO1_Q2 Advantages	Financial benefit	"Money from the customers. At the end of the day, we provide a service for the goods with the help of technical equipment or our personnel…" (CM) "Higher sales and return on investment. This is our advantage…" (DM) "To us, VAS brings profit" (OM)
	VAS as standard	"…we implement VAS in the same way as standard operations." (DM)
	No big challenge	"VAS are not challenging for us at all. They require more cost spending by providing additional staff, but this is precalculated and considered by the pricing." (DM)
	Quality issue	"We have to create closer relationship with our customers to understand the specifications. Otherwise we cannot provide VAS in the quality they expect from us." (CM) "We face some difficulties by implementing VAS…if some customer wants his products to be weighed and inspected, for example. That is, we have to check the entire range all at once and we also have to be very precise in making sure we do not make a mistake." (OM)
	Productivity of new VAS	"…the calculation of productivity is becoming more complex." (CM)
RO2_Q4 Stability of customer demand	Rather stable demand	"The situation whereby we have fluctuating demand is relatively rare. I would say in 99 % of the customer demand on VAS is stable" (CM) "For us VAS orders are static, we always know beforehand what we have to do. We have very few customers whose demand is dynamic…" (DM) "The demand is stable. We work with some customers over a long period of time…" (OM)
RO2_Q5	Rather predictable demand	"More predictable. Especially by our loyal customers we have a certain experience…" (CM) "…very predictable demand. Our customers have previews of processes for two to three months ahead." (DM)

Predictability of customer demand		"VAS is something that we organize with the customer in advance. During the process a customer may be able to express an additional wish. In general, it is something that is not spontaneous…" (OM)
RO2_Q6 Lead time	Rather long lead time	"We have actually never had a customer say that they would like us to get the products ready by tomorrow." (CM) "The lead time is always discussed in the contracts with customers. The time to produce each order is calculated and if we need more time, we will have it." (DM) "The majority of the orders are planned in advance, and even if such an order is placed at our DC, we will expect to get enough time to complete this order." (DM) "…an employee may have to spend a week completely implementing this task. We plan this in advance and the customer must also understand that it takes some time." (OM)
RO2_Q7 Value of VAS	Higher profit derived from VAS	"We definitely generate higher incomes from implementing VAS…" (OM)
	Higher value	"Each VAS order we send to our customers costs them more than the orders which don't need to be specified." (CM) "…if we create additional services…this process is then more expensive than the normal process and the price for this process is then made higher accordingly." (DM)
	High productivity is necessary	"We strive to provide VAS in most efficient way in order to create a higher competitive advantage…" (CM)
RO3_Q8 Capabilities needed	Closer customer relationship	"We have to be on a very good communication level with the customers…" (CM)
	High productivity	"…we always have to look at the productivity level" (CM)
	Management team	"Same as by standard warehouse processes. We need qualified staff, we need a structured process and a team leader who is able to manage the efficiency of all these activities…" (DM)
	Physical resources	", it is essential to have all the necessities whether that's' in the form of staff, available place and equipment." (CM) "We need to have enough space and personnel to do that…" (OM)
RO3_Q9 Standard vs. Flexibility	Productivity is main driver of competitive advantage	"The goal of this is to achieve high efficiency in all administrative and operative processes." (DM)
	Standard importance	"Our goal at providing VAS is to put these into our standard as much as possible." (CM) "Standardization. We, as quite a big player in the warehouse logistics in Germany, strive to create and adopt the standards in the all DCs." (DM) "We are striving to implement standard processes in our DC…We have the same rules and the same standard for standard operations as well as for the VAS… Standardization is always the priority" (OM)
RO3_Q10 Performance measures	Financial performance	"This creates the basis for a variable billing calculation, including the prices, the costs due to of personnel expenses, coordination expenses and technical equipment." (CM) "Return on investment ratio is the key performance measure for us." (DM)

		"…the financial results - did our costs match with what was calculated beforehand and what did we achieve in the end." (OM)
	On Time delivery measures	"...we measure all other KPIs in the VAS area, like shipping on time…" (DM)
	Productivity	"…we measure productivity in addition to return on investment…Meaning, how productive was the worker when performing a VAS customer order…" (DM)
	Quality emphasis	"…especially in the VAS area, the measuring of quality is the other aspect that needs to be tracked very well." (CM)
	Quality measures	"We are using the claims rate in the customer department to monitor customer compliance." (CM)
RO3_Q11 Cost efficiency	Impact on financial performance	"If we want the customers to work with us and not switch to the competitor, we have to make sure to create an attractive price for the customers on one hand and still have a higher return on investment on the other hand." (DM) "…cost efficiency is the most important point for our DC. We, as the operative part, need to work on cost efficiency daily." (OM)
	Productivity	"We have extremely detailed productivity measurements, that is, whether it is a normal storage process (such as pick-pack), or a VAS where we have measurements that are calculated and finally compared against the "real" values." "…we measure pieces per hour and know whether we are efficient enough or not." (CM)
RO3_Q12 Customer responsiveness	No need to react quickly	"…this is not really a relevant case for us." (CM) "We have some orders like that, but they are relatively rare." (DM) "We don't have any such orders at all." (OM)
RO3_Q13 Customer satisfaction	Customer feedback	"We regularly conduct conversations with customers, with some customers even daily." (CM) "We call customers every day and all deviations are being reported." (OM) "I'm on the phone talking to the customers every morning and this gives them every opportunity to say what they doesn't like or what might be not going right." (OM)
	Service quality	"…we also receive complaints if the goods are damaged or if there has been a transport damage." (CM) "We measure customer satisfaction with the help of complaint rates." (DM)

Table 28. Open Codes – Company 4

The coding of the fourth batch of transcripts resulted in 32 codes. However, only six new codes were identified by the coding of the transcripts of the Company 4, which indicated the beginning of the data saturation. Nevertheless, as in the case of Company 3, the data analysis of Company 4 provided each of the research objective areas with the new codes.

4.1.1.5 Coding Results - Company 5

The coding of the data of Company 5 was essential to understand whether the data saturation will be confirmed, or whether further steps of collecting empirical data are necessary. The results of the coded data are summarised in the Table 29 (see below).

Classification	Codes	Quotations
RO1_Q1 Definition & Types of VAS	Additional service	"VAS in our DC is everything we provide to the customers according to their specific needs in addition to warehouse services" (OM)
	Customized, beyond standard	"VAS are services that go beyond the standard processes, like warehousing: storage and retrieval. " (CM)
	Logistics quality check	"…this would be something like…incoming goods inspection…(CM) ", we implement the controlling of bottles. For example, the controller says that there are 50 thousand bottles, but in reality, it's not true." (OM)
	Physical change of outbound specification	"…this would be something like display construction…" (CM) "…we go into such VAS like display construction, labelling, etc." ((DM) "…we implemented the confectioning. Meaning we put a number of small, different pieces in special bags, packed them for the customer and sent them out." (OM)
	Technical quality check	"We also repack and provide quality control." (DM)
RO1_Q2 Advantages	Customer loyalty	"…customer loyalty. We have customers in the transport sector who demand such services, and VAS enables us to retain them very strongly." (CM)
	Financial benefit	"Increase of turnover and return first of all." (CM) "…this is a win-win strategy as the customers save costs and we generate higher profit" (DM) "…the client has to pay for the services we provide. Otherwise, we wouldn't consider these to be advantages." (OM)
RO1_Q3 Challenges	Cost calculation	"…VAS are difficult if they are not known and the effort involved cannot be estimated. Cost calculation is a huge and challenging issue." (CM)
	Dynamic workload	"…sometimes VAS is a seasonal business, so I always have to see if I have enough staff at the moment for this business." (CM)
	Quality issue	"…the quality management becoming complex by providing wider range of different VAS" (CM)
	Seasonality	"We supply the Advent calendar industry around Christmas every year, which is naturally very seasonal." (CM)
RO2_Q4 Stability of customer demand	Rather unstable demand	"…demand is more dynamic than the standard business. If I compare VAS with the classic warehouse activities, VAS are ad rock…" (CM) "…special services like packing the displays or quality control are quite unstable. That always comes up…" (DM) "…the requirements are fluctuating. Even the customers we work with have their own customers who in turn demand something from them. And every order is not the same…" (OM)
RO2_Q5 Predictability of customer demand	Rather less predictable demand	"Forecasting and planning demand is complicated. The business of VAS is very difficult to predict." (CM) "Unpredictable. That is a big part of our business. We do not know today what we will – or will not – do for our customers in the coming weeks." (DM) "We can predict that there is going to be an order, but we can never predict how big it will be, because again it depends on the customer because it is he, who in turn, has demands from his customers." (OM)

RO2_Q6 Lead time	Ability of high customer responsiveness	"…Customers expect from us quick reaction and our structure enables us to react accordingly." (DM) "…we have to act relatively quickly. However, we are dealing with personnel service providers, who can act flexibly…" (OM)
	Rather short lead time	"VAS are often associated with short lead time in our company. The customer often orders something… it has to be implemented at a very short term." (CM) "The leads time is often short. Customers expect from us quick reaction" (DM) "Most of the customers require short lead time." (OM)
RO2_Q7 Value of VAS	Dynamic VAS have higher value	"…things can definitely be implemented so spontaneously, which brings more benefit than standardised processes that everyone can follow." (DM) "…we need flexible spaces for storage and flexible storage areas are naturally more expensive than the permanently occupied storage areas." (OM)
	Higher value	"Basically, we expect to create higher value from VAS" (CM) "If we provide VAS, it always translates to higher value we create on the service we provide" (OM)
RO3_Q8 Capabilities needed	Closer customer relationship	"…we have much more communication with the customers at VAS department than within standard operations." (CM)
	Ability to estimate effort	"…you need to be competent in controlling your projects so that you can reasonably estimate effort." (CM)
	Experts and expertise	"…we need professional competencies such as the personnel that performs VAS (the professional competencies must be even on a problem recognition level)." (OM)
	Flexibility in manpower	"…That means I always have to consider whether I have enough resources. We need to be very quick and flexible" (CM)
	IT expertise	"What we definitely need is a high level of IT competence…" (DM)
	Quick reaction	"We need to be very quick and flexible" (CM)
	Quick reaction & attractive price at the same time	"…we have to fulfil two points: be flexible, i.e. have to be able to react quickly, and to offer the services at reasonable prices…" (OM)
RO3_Q9 Standard vs. Flexibility	Flexibility importance	"We are absolutely talking about flexibility in the VAS area." (CM) "…there are always these special processes where the customer suddenly has a request and we have to complete a task as quickly and flexibly as possible. This cannot be integrated into standard processes." (DM) "Flexibility is essential to providing VAS because that is exactly what the customer expects from us." (OM)
	Orders spontaneously	"…there are always these special processes where the customer suddenly has a request and we have to complete a task as quickly and flexibly as possible" (DM)
RO3_Q10 Performance measures	Repeating business	You are also successful if the customer comes back again and again and places the orders even if we are not the cheapest option. (DM) "The key figure is for example if the customer is satisfied and gives us orders again and again." (OM)

	Financial performance	"…financially you can evaluate the cost centres when you make the price allocation. We also do that to see if the costs are covered." (CM) "…from the financial point of view, it is relatively easy. Revenue minus costs is my success." (DM) "…we can generate the profit, then we know we are successful." (OM)
	Quality measures	"…often, in the VAS area, the customer quality indicators are also agreed upon. Depending on which VAS that is, we measure the complaint indicators." (CM)
RO3_Q11 Cost efficiency	Impact on financial performance	"…it is already a task of the logistics service provider to work on cost efficiency." (CM) "The costs play a large role. We measure the personal costs and the cost of space…we have to be able to stay within the cost calculation in order to achieve the margin we calculated before." (OM)
	Order simulation and time calculation	"…how much packaging we have to do in one hour, the number of forklift hours needed, etc., all of which is measured. It's all in the tables, we can evaluate it." (DM)
	Yearly increase of fix costs	"The wages are rising every year, as well as energy costs and of this leaves me with less and less of a profit margin." (CM)
RO3_Q12 Customer responsiveness	Financial performance measures	"At the end of the day, when I have written a bill and see that I have profit, then I have been successful" (DM)
	No customer responsiveness measures	"…Unfortunately, we don't have performance measures which indicate customer responsiveness or better to say our flexibility to act quickly." (CM) "We measure the costs, but we don't use any performance measures that indicates customer responsiveness. It is rather a gut feeling." (OM)
RO3_Q13 Customer satisfaction	Customer feedback	"…we have at least annual meetings with the customers…" (CM) "…in logistics, I measure the direct feedback of my customers…" (DM)
	Service quality	"…if the customer never complains, we know we have good quality." (OM)
	Questionnaires (Surveys)	"We actually have the customer survey once a year in the freight business." (DM)
	Repeating business	"I evaluate the management and see if the customer still wants to keep doing business with us." (CM) "…as long as we continue to get orders from the customers, it proves to me that everything was done right." (OM)

Table 29. Open Codes – Company 5

Similar to the data coding of Company 4, only few new concepts were identified by the analysis of the data from Company 5. Essentially, from a total of 38 codes, only seven codes were new. These new codes contributed to the areas of the first and third research objectives. Unlike the previous four companies, some of the new codes were clearly linked to the concept of "seasonality", which is an important business aspect of Company 5.

4.1.1.6 Coding Results - Company 6

The data analysis of Company 5 clearly indicated the tendency of data saturation. To confirm this assertion, Company 6 was included in the process of data collection. The data gathered from this distribution centre was coded in the same way as was carried out in the case of the previous five companies (see the results of coding data of Company 6 in the Table 30 below).

Classification	**Codes**	**Quotations**
RO1_Q1 Definition & Types of VAS	Additional service	"…they are additional or value-adding services, that is to evaluate a product in some way and make it more interesting for the end user." (CM)
	Customized, beyond standard	"…VAS can be recognised by the processes that do not comply with the standard." (CM) "…all such operations that fall beyond the standard we call VAS" (OM)
	Physical change of outbound specification	"We have the co-packing, the confectioning…" (CM) "…the classical assortment construction. So, I take a box and create an assortment. Thus, from mono cartons I create a mixed set." (DM) "…the subscription box models in the field of e-commerce where different products are repacked according to different packing patterns." (DM) "In our logistics centre VAS mainly are display construction and special packaging for shipping the goods - which the local manufacturer cannot provide" (OM)
	Technical quality check	"…panel quality control. For example, at a customer's site we check if there is a defect in the product. Each carton is opened and checked" (DM)
RO1_Q2 Advantages	Customer loyalty	"…if you can offer VAS, you can win customers. We are supposed to have the classic transport or storage business, but if we have an additional service, then our business will be more attractive." (CM)
	Financial benefit	"…to have high return on investment. In this case VAS is an especially beneficial business…" (CM) "…through these services, we generate our salary. Thus, if we can provide an additional service, we can of course increase our turnover." (DM) "…generates our turnover and enables us to earn more money than through basic storage of products." (OM)
	Unique selling point	"…VAS provide an opportunity of saying we are versatile, flexible, can face new challenges every day. VAS are not standard…" (CM)
RO1_Q3 Challenges	Heterogeneous, dynamic VAS	"…that every day can be different. That there is no standard." (CM)
	Manpower	"The personnel in VAS is what you need most." (DM)
	Seasonality	"Then comes the seasonality which influences personnel… Seasonality means that we have almost double the number of staff here during the Christmas season." (DM) "…now which is a strongly fluctuating seasonal business. This is typically on Easter/Christmas and in between the demand is relatively" (OM)

RO2_Q4 Stability of customer demand	Rather unstable demand	"I think it is a bit sporadic. There can be a lot today, but not much tomorrow." (CM) "Mostly fluctuating. We do have some VAS orders that are stable every year… But mostly VAS customer demand is really unstable." (DM) "The demand is extremely dynamic. As I said, it fluctuates seasonally" (OM)
RO2_Q5 Predictability of customer demand	Rather less predictable demand	"…actually there is no forecast in the field of VAS, it's all just a tendency." (CM) "It really depends on the customer. However, we have a lot of customers where we only know the demand when we are already in the business process." (DM) "Personally, I find it very difficult to forecast in advance. I don't know the customer activities on the market…" (OM)
	Reliability and on time delivery are more important than price	"…the price is really no longer so important because the reliability, adherence to delivery dates and such things are of course much more important for the manufacturer than a price difference of 0.05 €." (OM)
	Unstable demand due to e-commerce	"If you look at the e-commerce sector, it is possible that a YouTube blogger carries out a promotion on one evening and we don't even know about this order. So, the demand is less predictable." (DM)
RO2_Q6 Lead time	Ability of high customer responsiveness	"we already have the advantage that we can say "okay, send 20 people over here today to help my colleagues, but next week we will send another 20 people over to you if you need them, so we are very flexible internally" (OM)
	Rather short lead time	"Unfortunately, the customer doesn't give us in advance in which week we have to manufacture the products" (CM) "…even if the customer orders unplanned quantities he expects us to carry them out quickly" (DM) "…the majority of the customers I personally deal with now call us and ask whether we can handle double the amount until a deadline." (OM)
RO2_Q7 Value of VAS	Dynamic VAS have higher value	"…if the client orders high quantity and expects us to perform the order in a short period of time, the margin of such VAS is in turn higher." (DM)
	Higher value	"VAS have high value. I mean, there are a lot of processes behind them, thus, the product becomes automatically more expensive and has to become more expensive." (CM) "VAS is nothing else than a standard process plus further additional services which cost money. Therefore, customers pay more for orders like that." (DM) "…it costs more money for the customer. Our service and our work must also be paid for." (OM)
RO3_Q8 Capabilities needed	Adoptable IT systems	"IT-system is always very important." (DM)
	Closer customer relationship	"That is why VAS require especially close relationships with the customer." (CM)
	Ability to estimate effort	"How can you calculate, what is needed, what experience is there, what has to be repacked and how much time do we really need for each order." (OM)
	Experts and expertise	"…a process and project manager, who implement VAS…" (CM)

	Flexibility in manpower	"…personnel and space are always variating." (DM)
	IT expertise	"When I think about the eCommerce sector, you need a lot of IT people because of course it is all very IT-demanding." (OM)
	Management team	"Personnel management, so we need team leaders who are trained." (DM)
	Place flexibility	"…personnel and space are always variating" (DM)
RO3_Q9 Standard vs. Flexibility	Flexibility importance	"…because VAS are in my opinion very flexible, it is more about flexibility." (CM) "Flexibility is more important. Surely it depends on which area of VAS we are in, but especially in the area of display construction - the displays change very quickly…" (DM) "We need extreme flexibility, as the customer requirements permanently change and we win more and more customers, that have individual requirements" (OM)
RO3_Q10 Performance measures	Financial performance	"At the end of the day we want to see whether we have reached the planned return on investment." (DM)
	Repeating business	I get the feedback from the customer or I see customers coming back again - that tells me that the customer is satisfied. (OM)
	Production time	"Production times. So, these are calculable values for each order. And then they are always calculated and updated daily by our system, which tells us how much has already been stored and scanned in again, and then you can see what the production status is." (CM)
RO3_Q11 Cost efficiency	Impact on financial performance	"…we only do VAS if we get paid well." (CM)
	Order simulation and time calculation	"…this calculation we make for the articles includes on the one hand reasonable times, on the other hand fix and variable costs." (CM)
RO3_Q12 Customer responsiveness	Monitoring daily production progressing	"Actually, we act more like this: some of our employees are performance-oriented and keep an eye on it the whole day…" (CM)
	No customer responsiveness measures	"Actually, we act more like this…" (CM)
	Quality, on time delivery, costs	"…by all the orders there is a delivery deadline, and it is always met, so we don't have delays. Of course, as I said, costs play an important role as well" (DM)
	Quick implementation (price not important)	"…we have to work overtime, however, it costs more money. Then these are additional costs, and the customer does not mind paying them as a rule, because he himself has a due date." (OM)
RO3_Q13 Customer satisfaction	Customer feedback	"When it comes to VAS, we have a short meeting session every day at 10:00 a.m.; it's all about going through everything…" (CM) "We are in very close contact with large customers as well. We ask them if they are satisfied…" (DM) "…we get this feedback. On a personal level." (OM)

	Questionnaires (Surveys)	"We do have customer questionnaires, exactly. Especially in the e-commerce sector it is very important." (DM)

Table 30. Open Codes – Company 6

The data analysis of the last company also provided only few further initial codes to the codes-portfolio. Thus, from the 38 codes originated from the transcripts of Company 6, five of them were new codes. While the concept of "seasonality" was a special element of Company 5, "e-commerce" was a relevant business concept for Company 6. Hence, the concept of e-commerce was found in the transcripts of Company 6, which led to the creation of new codes.

4.2.2 WordCloud and WordThree Analysis

The application of WordCloud- and WordTree analyses can be seen as alternative approaches to the line-by-line examination of data presented in the previous section. As mentioned before, the main purpose of WordCloud was to identify the most commonly used words in the transcripts, while the main function of WordThree was to explore these words in the context of their inputs and outputs.

As a result, WordCloud revealed that the words "customer", "process" and "need" are the most frequently used words followed by "measure"; "standard", "service", "costs", "product", "orders", and "means". These words were then taken into focus for a further, more detailed exploration using the WordTree analysis (see Figure 24 and Annex III).

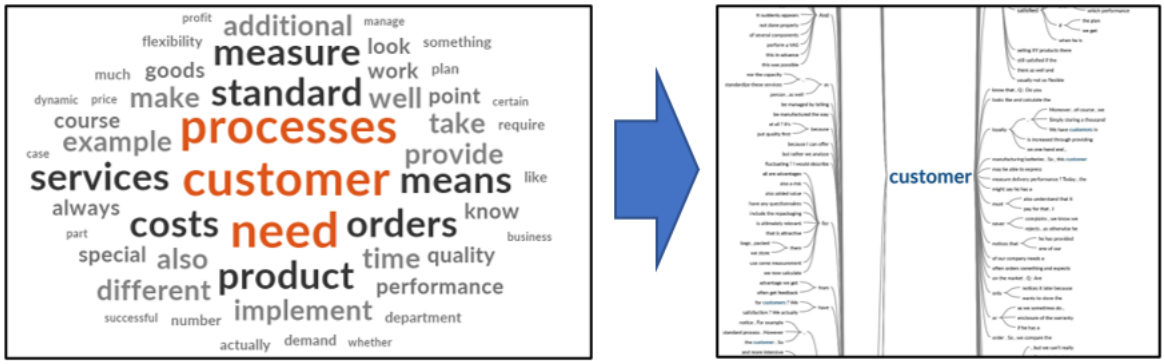


Figure 24. WordCloud and Extract from WordTree

Overall, this analysis confirmed that the concepts related to these words were completely coded during the previous procedure and the creation of further codes was therefore not necessary. However, the examination of the word "customer" by WordTree led to an interesting conclusion, which was not recognised by the previous process of data analysis. Particularly, it was noted that the interviewers of Company 1, in contrast to the other five

companies, responding to the questions related to the "customers", were not talking about the client placing VAS in their distribution centre, but about the end-customers they physically supplied. In essence, it can be explained by the fact that the managers of Company 1 represented distribution centres, which is a part of the manufacturing organisation, and get the customer orders directly from the end-customers. This is essentially antithetical to the other companies, which are 3PLs. Identifying this important additional finding was taken into consideration when developing the final output of data analysis.

4.2.3 Open Coding Finalisation

Totally, 104 codes across all categories of "research objective / interview question" were acquired from the open coding procedure (Table 31). In accordance with the systematics of the process of Grounded Analyses, these codes served as a basis for the following axial coding procedure.

Classification	**Codes**
RO1_Q1 Definition & Types of VAS	"Customized, beyond standard"; "Physical change of outbound specification"; "Additional services"; "Technical quality check"; "Logistic quality check"
RO1_Q2 Advantages	"Disadvantage for internal service provider"; "Higher costs and less advantage"; "Customer loyalty"; "Financial benefit"; "Unique selling point"; "Competitive advantage"; "VAS as standard"
RO1_Q3 Challenges	"Capacity planning accuracy"; "Cost calculation"; "Higher costs"; "Lower productivity"; "Needs to go beyond standard"; "No big challenge"; "Quality issue"; "Understanding of customer needs"; "VAS expertise"; "Wide range of VAS"; "Dynamic workload"; "Higher costs are covered by price calculation"; "Manpower; "Process determination"; "Quality issues through short lead time"; "Time pressure"; "Productivity of new VAS"; "Seasonality"; "Heterogeneous, dynamic VAS"
RO2_Q4 Customer demand stability	"Rather stable demand"; "Rather unstable demand"; "Stable and unstable depending on customer"
RO2_Q5 Customer demand predictability	"Rather predictable demand"; "Acceptance of ad hoc customer orders"; "Rather less predictable demand"; "Predictability depend on the customer"; "Reliability and on time delivery are more important than price"; "Unstable demand due to e-commerce"

RO2_Q6 Orders lead time	“Rather long lead time”; “Ability of high customer responsiveness”; “Rather short lead time”; “Long and short depending on the customer”
RO2_Q7 Service value	“Disadvantage for internal service provider”; “High value”; “Higher profit derived from VAS”; “Dynamic VAS have higher value”; “High productivity is necessary”
RO3_Q8 Capabilities needed	“Adoptable IT systems”; “Closer customer relationship”; “Experts and expertise”; “Knowledge of product”; “Place”; “Supply chain planning accuracy”; “Flexibility in manpower”; “Flexibility in process”; “Management team”; “Physical resources”; “Place flexibility”; “Quick reaction”; “Productivity”; “Ability to estimate effort”; “IT expertise”; “Quick reaction and attractive price at the same time”
RO3_Q9 Standard vs flexibility	“Standard importance”; “Flexibility importance”; “Both standard and flexibility are necessary”; “Lean - productivity & quality vs flexibility & quick reaction”; “Productivity is the main driver of competitive advantage”; “Order spontaneously”
RO3_Q10 Performance measures	“Cost measures”; “Increasing demand of VAS”; “On time delivery measures”; “Performance categories determined by Group”; “Complexity of productivity evaluation”; “Quality emphasis”; “Quality measures”; “Supply chain financial performance”; “Financial performance”; “Quality, on time delivery, costs”; “Productivity”; “Quick implementation of VAS”; “Repeating business”; “Production time”
RO3_Q11 Cost efficiency	“Impact on financial performance”; “Productivity”; “Strive to decrease costs”; “No productivity per hours”; “Order simulation and time calculation”; “Yearly increase of fix costs”
RO3_Q12 Customer responsiveness	“Cost measures”; “No need to react quickly”; “No performance alignment”; “Financial performance measures”; “No customer responsiveness measures”; “Quality, on-time delivery, costs”; “Quick implementation (price not important)”; “Monitoring daily production progressing”
RO3_Q13 Customer satisfaction	“Customers' performance measures”; “Service quality”; “Questionnaires (Surveys)”; “Repeating business”; “Customer feedback”

Table 31. Results of Open Coding

4.3 Axial Coding

The main objectives of the axial coding used in the particular context of this data analysis were: first, to transform the open coding concepts into axial codes, secondly, based on these axial codes, to identify data saturation, and finally to evaluate these codes in connection with different attributes such as company and the role of managers in their organisations.

4.3.1 Axial Coding Procedure

The axial coding procedure was used to identify thematic patterns, which can summarise more codes into one concept. This process was not based on predetermined categories, as in the case of the open coding. In turn, to develop an axial code, all open codes independent to their previous classifications were evaluated on their suitability for each particular axial concept. Following this approach, 104 open codes were transformed into 31 axial codes (Table 32). All of these codes can be divided into the following topics:

Definitions and types. The open codes related to the definitions and types of VAS were integrated into an axial code further referred to as "physical postponement activities". Even if the variety of different VAS highlighted by the interviewers was broad, they were all in fact limited to the postponed activities driven by the customers of surveyed logistics service providers.

Advantages and disadvantages. In terms of VAS advantages and disadvantages, eight main themes were identified where all open codes related to the advantages and challenges of VAS could be placed. These codes were referred to as "VAS as disadvantage for internal logistic service provider", "VAS increase value for both service providers and their customers", "VAS bring financial benefit", "VAS application has no difference with standard operations", "VAS application is complex due to dynamics" and "Dynamic VAS are calculated with high margin", "Wide range of VAS as a challenge" and "Process determination as challenge".

Customer demands. The open codes related to customer demands clearly indicated that VAS customer demands of the participating companies can be characterised by three criteria: lean, agile or both lean and agile environment. Therefore, such axial codes as "Lean supply environment", "Agile supply environment" and "Lean and agile environment" were referred to as the axial codes.

Capability. When looking at how logistics managers considered what capabilities are needed to provide VAS successfully, there was a high range of different open codes that

reflected the concept of capability making it possible to create several axial codes in this topic area. Particularly, codes such as “Strive for high productivity and efficiency”, “Quality has special significance in context of VAS”, “Needs of physical and IT resources”, “Needs of VAS knowhow”, “Needs of closer customer relationship”, “Strive to improve flexibility in operation process”, “Strive to increase customer responsiveness”, “Strive to improve standard in operation process”, “Strive to improve both standard and flexibility in operation process” and “Needs to go beyond standard as a challenge” were developed.

Performance measures. Similar to capability, a high range of open codes also contributed to the topic of VAS performance measures. Thus, using the axial coding procedure, numerous codes were produced in this area. These codes were referred to as “Importance of costs”; “Financial performance measures are most significant”; “Triangle performance measures”; “Customer feedback as measurement of customer satisfaction”; “Lack of customer responsiveness measures”; “Repeating demand as measurement of success”, “Focus on Group performance”, “Importance of tracking customers’ performance measures”; “Increasing demand as measurement of success”.

Axial Codes	**Open Codes**
“Physical postponement activities”	“Customized, beyond standard”; “Physical change of outbound specification”; “Additional services”; “Technical quality check”; “Logistic quality check”
“VAS as disadvantage for internal logistic service provider”;	“Disadvantage for internal service provider (RO1_Q2)”; “Higher costs and less advantage”; “Disadvantage for internal service provider (RO2_Q7)”;
“VAS increase value for both service providers and their customers”;	“Customer loyalty”; “Unique selling point”; “Competitive advantage”
“VAS bring financial benefit”	“Financial benefit”; “Higher profit derived from VAS”; “High value”
“VAS application has no difference with standard operations”	“VAS as standard”; “No big challenge”;
“VAS application is complex due to dynamics”	“Dynamic workload”; “Time pressure”; “Heterogeneous, dynamic VAS”; “Quality issues through short lead time”
“Strive for high productivity and efficiency”	“Capacity planning accuracy”; “Lower productivity”; “Higher costs”; “Productivity (RO3_Q8)”; “Productivity is

	the main driver of competitive advantage"; "Productivity (RQ3_Q10); "Productivity (RQ3_11); "Productivity of new VAS"; "High productivity is necessary"; "Complexity of productivity evaluation"; "Strive to decrease costs"
"Quality has special significance in context of VAS"	"Quality issue"; "Quality emphasis";
"Needs of physical and IT resources"	"Manpower"; "Adoptable IT systems"; "Place"; "Physical resources"; "Management team";
"Needs of VAS knowhow"	"VAS expertise"; "Experts and expertise"; "Knowledge of product"; "IT expertise";
"Needs of closer customer relationship"	"Understanding of customer needs"; "Closer customer relationship"; "Importance of tracking customers' performance measures"
"Lean environment"	"Rather stable demand"; "Rather predictable demand"; "Rather long lead time";
"Agile environment"	"Seasonality"; "Rather unstable demand"; "Rather less predictable demand"; "Unstable demand due to e-commerce"; "Rather short lead time"; "Order spontaneously";
"Lean and agile environment"	"Stable and unstable depending on customer"; "Predictability depend on the customer"; "Long and short depending on the customer"; "Flexibility importance";
"Strive to improve flexibility in operation process"	"Flexibility in manpower"; "Flexibility in process"; "Place flexibility";
"Strive to increase customer responsiveness"	"Acceptance of ad hoc customer orders"; "Reliability and on time delivery are more important than price"; "Ability of high customer responsiveness"; "Quick reaction"; "Quick reaction and attractive price at the same time"; "Quick implementation (price not important)"; "Quick implementation of VAS"; "Production time"; "No productivity per hours"; "Monitoring daily production progressing"
"Strive to improve standard in operation process"	"Standard importance"

“Strive to improve both standard and flexibility in operation process”	“Both standard and flexibility are necessary”; “Lean - productivity & quality vs flexibility & quick reaction”
“Importance of costs”	“Cost calculation”; “Ability to estimate effort”; “Yearly increase of fix costs”
“Financial performance measures are most significant”	“Financial performance”; “Impact on financial performance”; “Financial performance measures”;
“Triangle performance measures”	“Cost measures” (RO3_Q10); “On time delivery measures”; “Quality measures”; “Quality, on time delivery, costs” (RO3_Q10); “Quality, on-time delivery, costs (RO3_Q12); “Cost measures” (RO3_Q12); “Service quality”
“Customer feedback as measurement of customer satisfaction”	“Questionnaires (Surveys)”; “Customer feedback”
“Lack of customer responsiveness measures”	“No need to react quickly”; “No performance alignment”; “No customer responsiveness measures”;
“Repeating demand as measurement of success”	“Increasing demand of VAS”; “Repeating business” (RO3_Q10); “Repeating business” (RO3_Q13);
“Dynamic VAS are calculated with high margin”	“Higher costs are covered by price calculation”; “Dynamic VAS have higher value”; “Order simulation and time calculation”;
“Focus on Group performance”	“Supply chain planning accuracy”; “Performance categories determined by Group”; “Supply chain financial performance”
“Needs to go beyond standard as a challenge”	“Needs to go beyond standard”
“Wide range of VAS as a challenge”	“Wide range of VAS”
“Process determination as challenge”	“Process determination”
“Importance of tracking customers’ performance measures”	“Customers' performance measures”
“Increasing demand as measurement of success”	“Increasing demand of VAS”

Table 32. Results of Axial Coding

4.3.2 Data Saturation

The main trigger for data saturation was the lack of new codes that were identified during the evaluation of codes created by the axial coding procedure. Indeed, there were a few initial open codes that could be derived from previous transcripts. However, when it came to the level of axial coding, no initial codes were identified after the data of Company 3 was examined. Fundamentally, this meant that the data from Company 4, Company 5 and Company 6 provided no further new concepts in the context of axial coding (Figure 25). Therefore, the data collection was terminated, and the case size of this empirical study was restricted to these six companies.

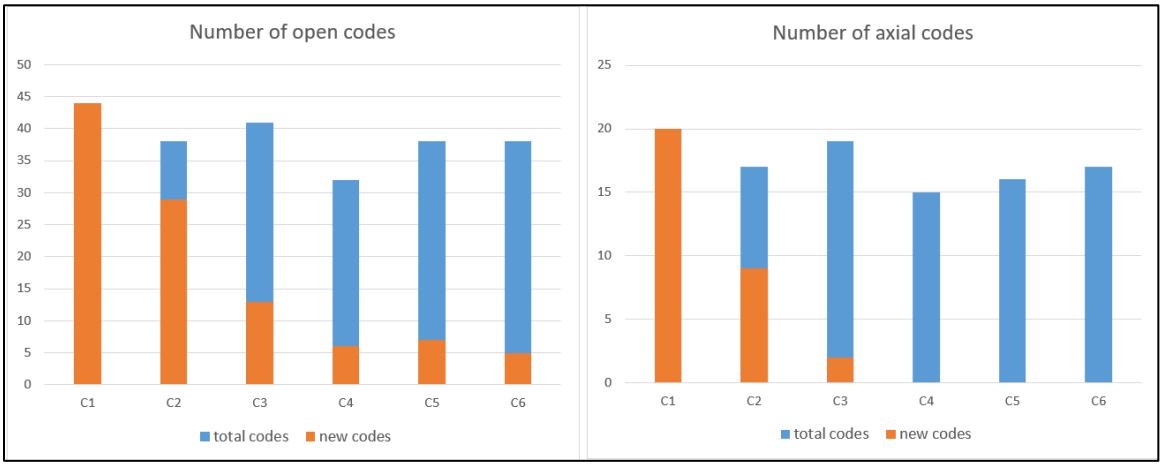
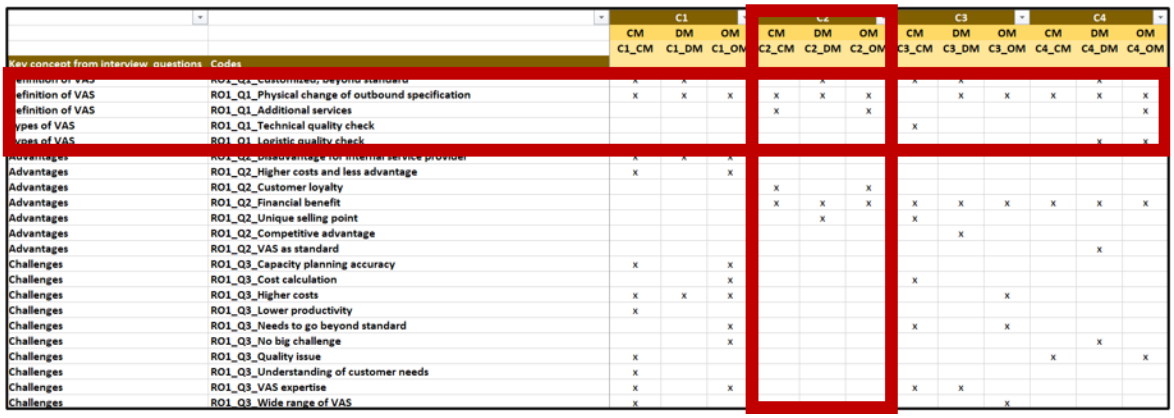


Figure 25. Data Saturation

4.3.3 Analysis of Attributes

In order to analyse the relationship between developed codes and the attributes of the research participants, a codes / attributes matrix was developed (see the entire matrix in the Annex IV). Based on this matrix, possible links between the codes and the companies that the managers work for, as well as between the codes and the roles of the managers in their organisations were further investigated (Figure 26).



Key concept from interview questions	Codes	C1 CM C1_CM	C1 DM C1_DM	C1 OM C1_OM	C2 CM C2_CM	C2 DM C2_DM	C2 OM C2_OM	C3 CM C3_CM	C3 DM C3_DM	C3 OM C3_OM	C4 CM C4_CM	C4 DM C4_DM	C4 OM C4_OM
efinition of VAS	RO1_Q1_Physical change of outbound specification	x	x	x	x	x	x		x	x	x	x	x
efinition of VAS	RO1_Q1_Additional services				x		x						x
ypes of VAS	RO1_Q1_Technical quality check							x					
ypes of VAS	RO1_Q1_Loristic quality check											x	x
Advantages	RO1_Q2_Higher costs and less advantage	x		x									
Advantages	RO1_Q2_Customer loyalty				x		x						
Advantages	RO1_Q2_Financial benefit				x	x	x	x	x	x	x	x	x
Advantages	RO1_Q2_Unique selling point					x		x					
Advantages	RO1_Q2_Competitive advantage								x				
Advantages	RO1_Q2_VAS as standard											x	
Challenges	RO1_Q3_Capacity planning accuracy	x		x									
Challenges	RO1_Q3_Cost calculation			x				x					
Challenges	RO1_Q3_Higher costs	x	x	x						x			
Challenges	RO1_Q3_Lower productivity	x											
Challenges	RO1_Q3_Needs to go beyond standard			x				x		x			
Challenges	RO1_Q3_No big challenge			x								x	
Challenges	RO1_Q3_Quality issue	x									x		x
Challenges	RO1_Q3_Understanding of customer needs	x											
Challenges	RO1_Q3_VAS expertise	x		x				x	x				
Challenges	RO1_Q3_Wide range of VAS	x								x			

Figure 26. Extract of Codes-Attributes Matrix

In the course of this analysis it was determined that in terms of attributes, all codes can be divided into four categories:

1. *General perspectives* – the codes linked to the data related to all or almost all transcripts
2. *Company-related perspectives* – the codes linked to the data that was provided by the interviews with the experts from the same companies
3. *Role-related perspectives* – the codes linked to the data that was provided by the interviews with the experts of different companies with the same role in their organisations
4. *Individual perspectives* – the codes cannot be placed into one of three previous categories as these codes are linked to the data provided by the interviews with one or only few experts (Table 33).

Categories	**Codes**
General perspectives	"Physical postponement activities"; "VAS bring financial benefit"; "Importance of costs"; "Triangle performance measures"; "Customer feedback as measurement of customer satisfaction"; "Lack of customer responsiveness measures"
Company related perspectives	"VAS as disadvantage for internal logistic service provider"; "VAS increase value for both service providers and their customers"; "VAS application has no difference with standard operations"; "VAS application is complex due to dynamics"; "Strive for high productivity and efficiency"; "Lean environment"; "Agile environment"; "Lean and agile environment"; ""Strive to improve flexibility in operation process"; "Strive to increase customer responsiveness in operation";

	"Strive to improve standard"; "Strive to improve both standard and flexibility"; "Dynamic VAS are calculated with higher margin"; "Financial performance measures are most significant"; "Focus on Group performance"; Repeating demand as measurement of success"
Role related perspectives	"Quality has special significance in context of VAS"; "Needs of closer customer relationship"
Individual perspectives	"Needs to go beyond standard as a challenge"; "Wide range of VAS as a challenge"; "Process determination as challenge"; "Importance of tracking customers' performance measures"; "Increasing demand as measurement of success"

Table 33. Axial Codes by Categories

4.4 Selective Coding

The aim of selective coding was to develop a final "story" of the empirical data based on the output of axial coding. For this purpose, the key concept was determined, and the other codes were connected to this concept as well as to each other.

4.4.1 Out of Selection Codes

Prior to beginning with the selective coding, it was important to identify the codes which do not represent the novel findings and therefore can be sorted out. In doing so, seven codes were taken away from the total portfolio codes that were created by the axial coding procedure.

The first four codes, namely "Triangle performance measures", "Customer feedback as measurement of customer satisfaction", "Needs of physical and IT resources" and "Increasing demand as measurement of success" were withdrawn from further consideration as these codes provided rather general concepts, which are usually relevant for many different kinds of businesses. Therefore, they do not highlight any new ideas that can contribute to the particular case of VAS in distribution centres.

The other three codes that were ruled out: "Needs to go beyond standard as a challenge"; "Wide range of VAS as a challenge"; "Process determination as challenge" were, in contrast, more focused on the particular context of VAS. However, these codes can be perceived as rather general concepts that are commonly associated with customised services in warehouse logistics. Moreover, these codes were previously classified as individual, which meant that these codes could not contribute to the context of attribute analysis.

4.4.2 Determination of the Main Concept

According to the selective coding procedure, in order to present the final findings, the main concept of coded data needs to be identified and the other codes need to be connected with this concept and compiled into one scheme. In the case of this particular data analysis, it was determined that the concept of lean and agile environments represented the key element of the coded data. Firstly, this concept strongly correlated with the context of the particular study, which focused on the topic of VAS in the context of leanness and agility. Secondly, the codes related to the concept of lean and agile were classified as the "company-related" codes that, in turn, represented the biggest category of attributes.

Thus, Company 1 and Company 4 can be seen as the organisations, where in the context of customer demand, the lean environment is the more relevant concept. By contrast, Company 2, Company 5 and Company 6 were classified as the companies with an agile nature of customer demands, while the data of Company 3 indicated the importance of both concepts (Figure 27).

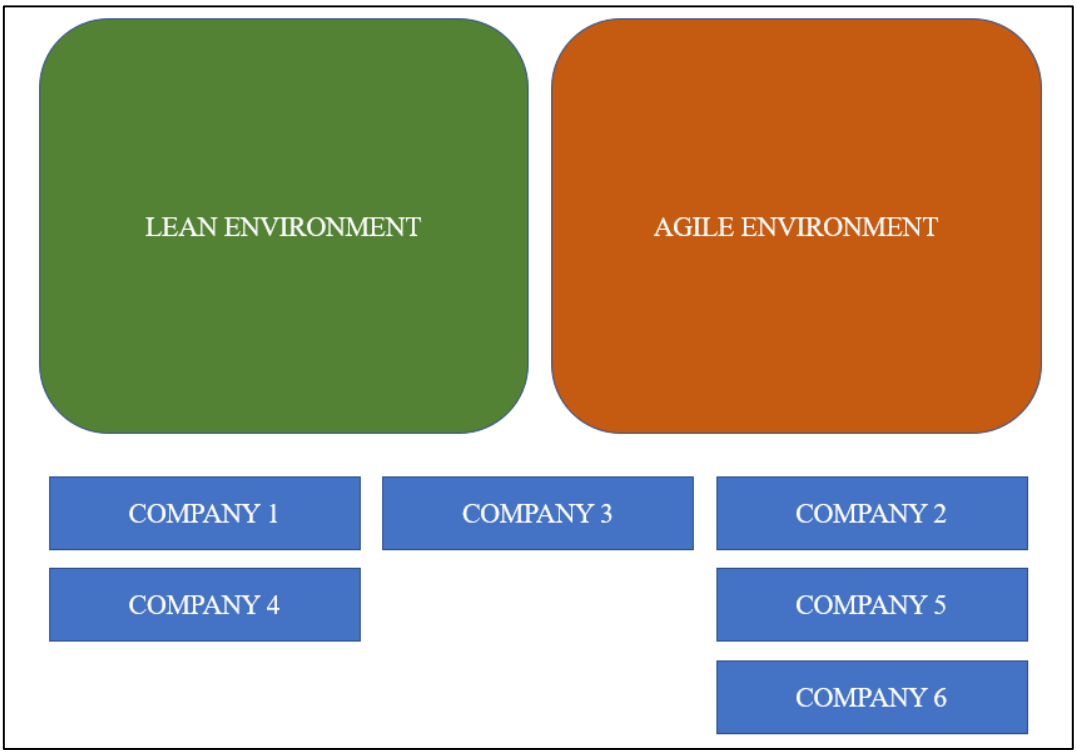


Figure 27. Main Concept of Selective Coding

4.4.3 Final Output of Selective Coding

Based on the concept of lean and agile environments, all other codes regarding the category of "company-related assumption" were integrated into the scheme of selective coding.

Additionally, the codes regarding “general assumption” and “role-related assumption” were also placed into this scheme. Moreover, in order to reflect these codes with the purposes of the particular study, the codes were structured according to the research objectives. Following this approach, a final scheme of selective coding procedure was developed (Figure 28). The interpretation and evaluation of this final scheme is presented in the next chapter “Discussion”.

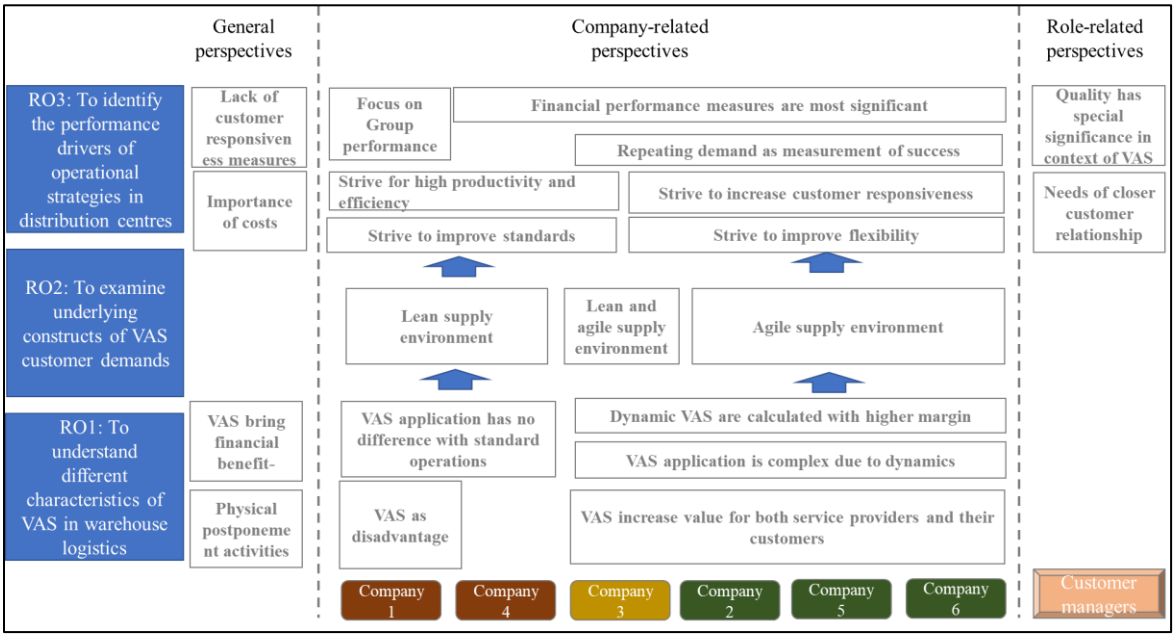


Figure 28. Results of Data Analysis - Final Scheme

4.5 Interpretation of Results

This part of the “Results” chapter presents the interpretation of the research findings represented in the Final Scheme that was developed through the reflection of the “final” codes of the data analysis. This now serves as a basis to understand the achieved results (Figure 29). The main aim of this interpretation procedure is to transform these results from the Final Scheme to a narrative discussion and to highlight the main points of the final “story”.

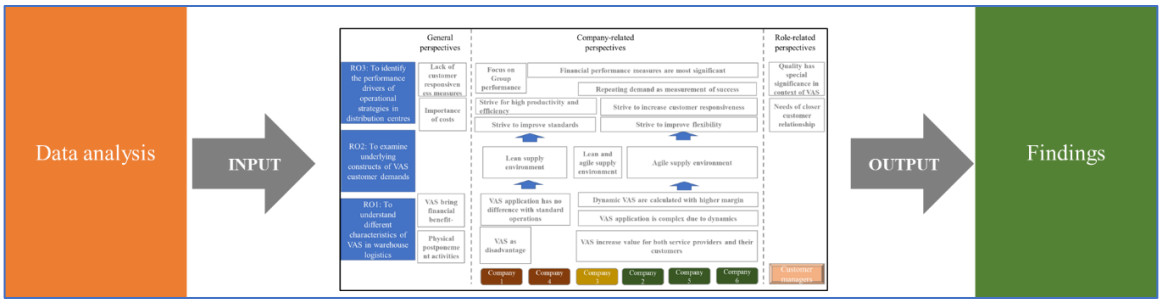


Figure 29. Input and Output of the "Final Scheme"

The interpretation of the results is based on the final scheme derived from the coding procedure. This final scheme presents the connection between research objectives and the codes on one hand, and, on the other hand, the relations of these codes to the categories of attributes ("general perspectives", "company-related perspectives", "role-related perspectives"). Such a strategy made it possible to reflect the research findings in their particular context. The discussion of this interpretation procedure, presented below, consists of three parts, which are structured according to the research objectives of this study.

4.5.1 Results Related to the First Research Objective

The final scheme revealed that the "general" and "company-related" perspectives categories of attributes were relevant for the coded concepts with regards to the first research objective (Figure 30). This means that in terms of the managers' perspective on VAS characteristics investigated in the context of the first research objective, they were either the same (general perspectives) or were dependent on the distribution centres that the particular managers represent (company-related perspectives).

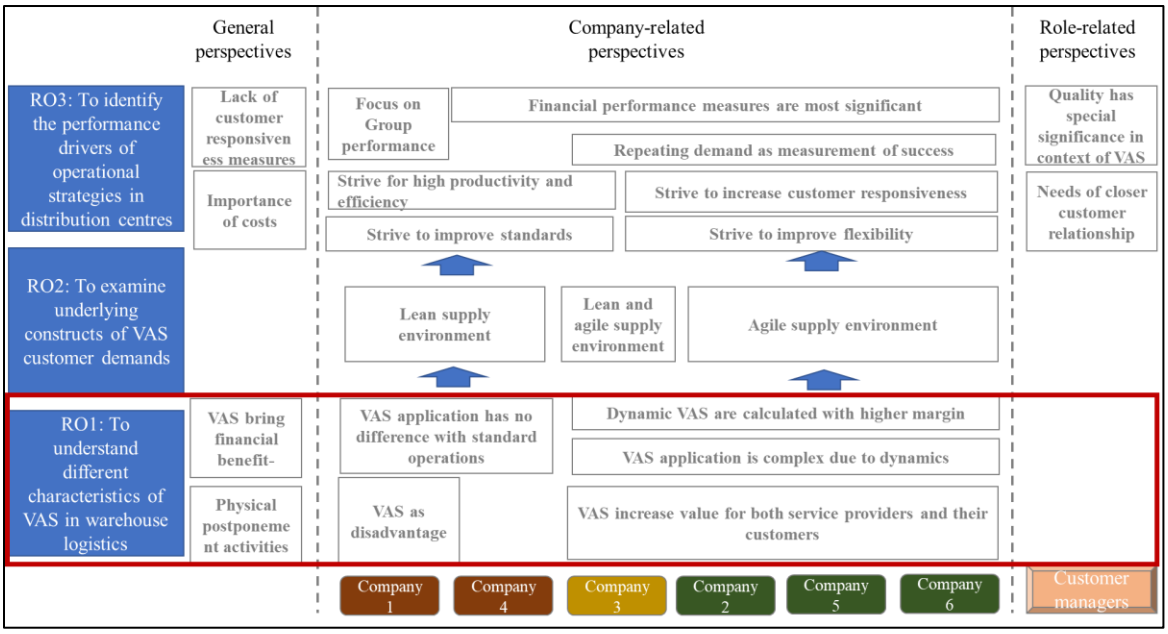


Figure 30. Codes Related to the First Research Objective

When discussing the "general perspectives" category in particular, the final scheme indicates that all company experts who participated in this study commonly associate VAS with supplementary customised activities. These are activities that are physically carried out in their distribution centres alongside the "traditional" warehouse operations. As highlighted by company experts, types of VAS tend to vary from the simple customised labeling to a more logistical and technical quality control of the goods. However, all of these services have a common nature and meaning as they reflect the concept of the postponement strategy. This is a strategy that the customer companies used in order to improve their supply chain performance by placing VAS in distribution centres of logistics service providers. The concept of postponement is not just limited to the TPLs companies represented in this study. This concept is also relevant for Company 1, where the decision about the application of VAS in the distribution centre is triggered by the central organisation of this company. In this case, the manufacturing sites of Company 1 are in fact the customers of this logistics unit and, following the postponement approach, push different customised activities to the last stage of their supply chain.

Since the company's experts perceive VAS as supplementary services that need to be performed on behalf of their clients, it only seems logical that managers across all surveyed distribution centres also stressed the necessity to charge for these services accordingly. Thus, on one hand, the company experts emphasised that a provision of VAS leads to the additional needs of physical resources, and consequently, to additional costs. On the other hand, they highlighted that they include these activities in their service portfolios expecting

a significant increase to the company's profit margins, which, in turn, should result from the price-cost margin acquired from providing different VAS. In this context, according to the findings of this study, the gained margin can be higher by the provision of those VAS, which have a more dynamic nature of customer demand.

Apart from perception of VAS as an opportunity to increase financial benefits, the company experts indicated a number of additional advantages to be gained by the application of these services in distribution centres. According to the results of this study, the managers of distribution centres also perceive VAS as an instrument to achieve different forms of "value-added" effects. For example, concepts such as "unique selling point", "higher competitive advantages", "customer loyalty" and "customer satisfaction" were regarded by different company experts as possible benefits that resulted from different VAS. These perspectives, however, could only be found in the codes derived from the data of the case companies where the agile nature of VAS customer demand has relevance (Company 2, Company 3, Company 5, Company 6). In contrast, the companies which are performing VAS associated with the lean nature of customer demand (Company 1 and Company 4), as shown in the Final Scheme, are not sharing such perspectives.

Moreover, in the context of the managers' reflections on the benefits of VAS, as shown in the Final Scheme, the application of VAS in distribution centres was considered as a disadvantageous approach. In particular, the Final Scheme indicates that the distribution centre managers of Company 1 perceive increasing demand for VAS in their distribution centre as a rather negative tendency. The interviewees of Company 1 articulated this position as a logical consequence of being a non-TPL distribution centre. This distribution centre is an internal logistic unit and has the function to reduce logistics costs of Company 1. Therefore, this distribution centre has no direct impact on sales and for that reason cannot take profitability as its own advantage into account. While the application of VAS in the distribution centre has a positive effect on the entire supply chain of the production group of Company 1, cost increases by additional customised services need to be performed on the operational level of the distribution centre. Hence, the warehouse logistics experts of Company 1 believe that the application of different VAS is beneficial for the company in general, but less advantageous for the distribution centre in particular.

The difference in how managers of different companies consider the VAS application meets not only the VAS advantages, but also the complexities that VAS bring to distribution centres. The "company-related assumption" category of the Final Scheme allows us to see

how the perception of VAS complexity varies depending on the nature of customer demand of the distribution centres. In particular, the managers of distribution centres with a more agile nature of customer orders point to a higher complexity of VAS if comparing these with the "standard" storage operations (put away – storage – pick). This way, in their interviews, the experts of these companies highlighted different aspects such as "dynamic workload" and "time pressure", which lead to the increasing complexity of operations in distribution centres. By contrast, the managers of distribution centres, where lean nature is the underlying construct of VAS customer demands reported that the application of VAS has the same level of difficulty as in the case of the standard activities. This means that the application of VAS, from these perspectives, does not represent any specific challenges for the operational process of distribution centres.

N	Perspectives	Findings
1	General perspectives	VAS in distribution centres is understood as customised services, physically performed on the operational level.
2	General perspectives	Independent of the particular business case, the company experts expect to gain a financial benefit by providing VAS.
3	Company-related perspectives	In the distribution centres where dynamic customer demand is relevant, the company experts expect to achieve non-financial added value effects, while the other company experts do not consider this opportunity.
4	Company-related perspectives	The company experts of the distribution centres with stable customer demand perceive no increase in the complexity of operational processes. The company experts of the distribution centres with dynamic customer demand, in contrast, claim higher operational complexity as a result of VAS application.
5	Company-related perspectives	The managers of distribution centre of Company 1, which is part of manufacturing, consider VAS as an advantageous approach for the supply chain performance of the group. However, regarding the distribution centre itself, they consider VAS application as an approach which leads to additional costs and no benefits.

Table 34. Findings Related to the First Research Objectives

4.5.2 Results Related to the Second Research Objective

The codes in the area of the second objective are key elements of the Final Scheme, as these codes provide an understanding of the underpinning construct of VAS customer demand. In doing so, this made it possible to reflect the explored topic of the leanness and agility concepts in the context of the VAS performance in distribution centres. In contrast to the area of the first research objective, where "general perspectives" and "company-related perspectives" categories had relevance, this area of the second research objective revealed that all codes were defined as "company-related" perspectives (Figure 31). This fact

indicates that the nature of customer demand varies between different distribution centres. According to the content of the Final Scheme, this variation was attributable to the fact that some distribution centres have a more lean nature of customer demand, while the other dealt with agile customer orders when performing VAS.

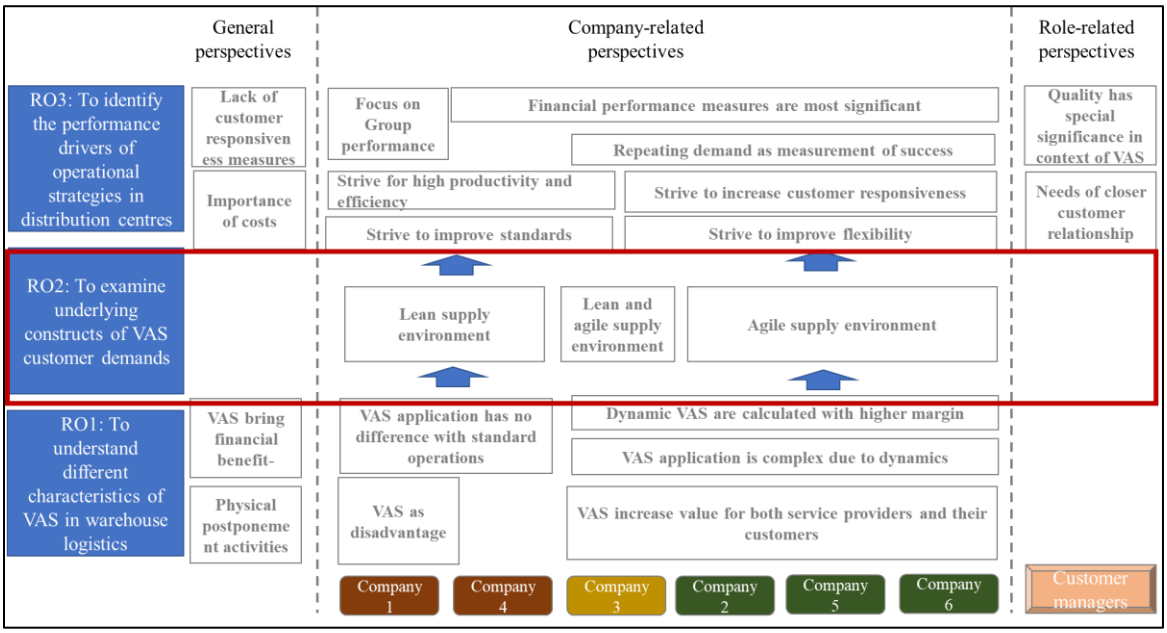


Figure 31. Codes Related to the Second Research Objective

In particular, when observing the Final Scheme, it can be noted that the nature of customer demand in the distribution centres of Company 1 and Company 4 was referred to as “lean”. Meaning the managers of these companies, who responded to the interview question regarding customer demands, suggested that VAS in their distribution centres are associated with rather stable and predictable demand and the lead time to produce different kinds of such services tend to be long. In contrast, the nature of customer demands in distribution centres of Company 2, Company 5 and Company 6 was determined as “agile”. This was determined based on how the managers of these companies claimed that the customer demand related to VAS tends to be unstable and unpredictable, and the customer orders commonly need to be produced in a short time. In turn, the nature of VAS customer demand in the distribution centres of Company 3 include both concepts, as the managers of this company pointed out that the nature of customer demand depends on the particular business strategy for their distribution centre.

N	Perspectives	Findings
1	Company-related perspectives	VAS customer orders in some distribution centres have stable and predictable demand and require a rather long lead time. In others, in contrast, they are associated with “instability”, “unpredictability” and “short lead time”. However, it is also the case that both of these contrasting aspects are strongly represented in one distribution centre (e.g. Company 3).
2	Company-related perspectives	The company experts expect a higher financial benefit of those VAS, which are characterised by the dynamic nature of customer orders.

Table 35. Findings Related to the Second Research Objectives

4.5.3 Results Related to the Third Research Objective

The codes linked with the third research objectives provided numerous concepts related to the performance drivers in the context of VAS in distribution centres. According to the Final Scheme, these concepts are represented in each of the three areas of categories of attributes (Figure 32).

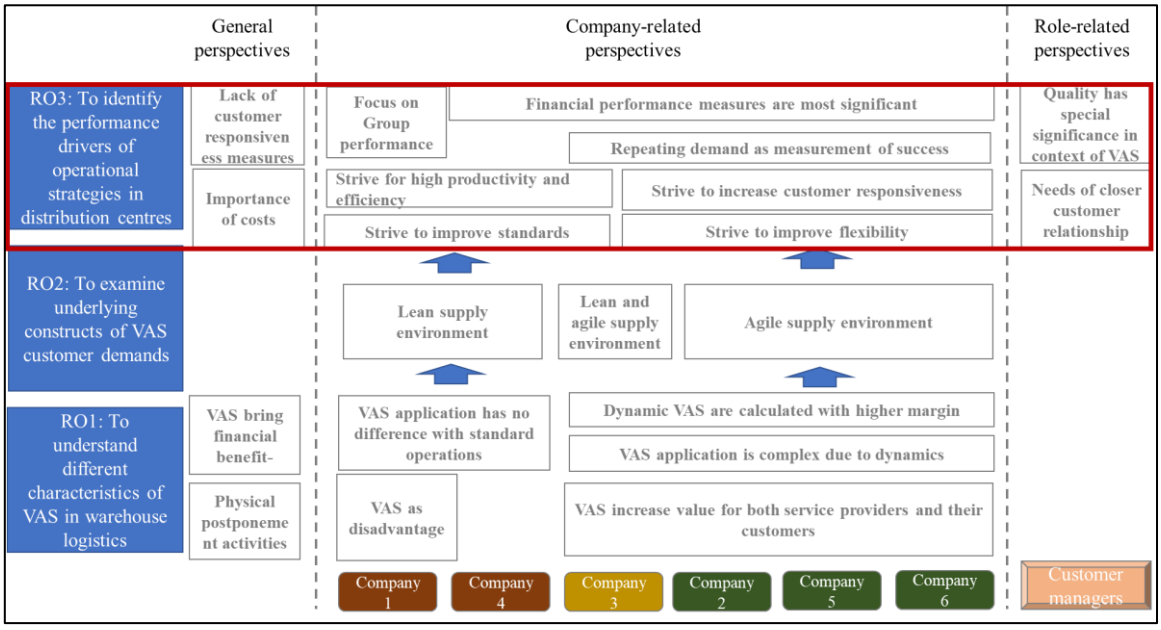


Figure 32. Codes Related to the Third Research Objective

In the category of general perspectives, for example, the concept of “importance of costs” was figured out in the final scheme. Meaning that all company experts who participated in the interviews emphasised the significance of costs to achieve a superior performance when applying VAS in distribution centres. Moreover, when taking this approach, the company experts provided the common position that the cost aspect is a fundamental component of the performance measurement systems in their operations. In this context, different measures related to the cost factors, such as “cost of sales”, “cost of staff” or “fixed costs”

were highlighted from the interviewees. Considering the fact that the company experts aim to gain financial benefit through incorporating different VAS, as discussed above, these perspectives of managers regarding cost aspect seem to be logical.

Hence, the logical conclusion from these perspectives can also be the fact that the company experts stressed the importance of the financial performance measures when responding to the question "Which performance measures show that the implementation of VAS is successful?". Thus, all interviewees called the measures related to the "financial" category as the key indicator that they monitor in order to understand the level of performance regarding applications of different VAS. Essentially, there was only one distinguishing point linked to the specification of the distribution centre of Company 1. While managers of the other five companies stressed the importance of the financial performance measures regarding their own returns, experts from Company 1 pointed out the importance of those performance measures, which are related to the entire company group. This difference, again, resulted from the position of this distribution centre in the supply chain structure as an internal logistic unit of a manufacturing company.

According to the category of "company-related perspectives" in the Final Scheme, however, the way in which managers strive to achieve a higher performance of the application VAS is different. Principally, the performance focus varies between different distribution centres depending on the nature of customer demand. Along these lines, a strive to improve the "productivity" of their operational processes in distribution centres is pointed out by the managers of those companies which tend to have a rather "lean" nature of customer demand. The distribution centre managers, who are dealing with more "agile" VAS did not provide such perspectives in their interviews. Contrarily, they suggested that in order to achieve higher performance by responding to VAS customer orders, it is crucial to focus on the "customer responsiveness". In turn, the managers of the distribution centre of Company 3, where aspects of both lean and agile nature of customer demands are relevant, indicated that both "productivity" and "customer responsiveness" can be seen as the two main drivers of VAS performance.

From this discussion, one comes to rationalise that regarding operational strategies required for the application of VAS, the managers also had differing positions. In this fashion, the data analysis results showed that managers of Company 1 and Company 4 perceive "standard" as the basic element that must be applied when dealing with VAS in their operations. On these grounds, the operational strategy stays the same, as in the case of

performing the “traditional” warehouse operations where, according to the managers of these companies, the concentration on standard is the underlying basis of superior performance. The managers of Company 2, Company 5, and Company 6 took a completely opposite position on this view. These overseers emphasized that, especially in the case of VAS application, not as standard, but “flexibility” as being necessary to perform VAS in distribution centres on the highest level. Furthermore, the managers of these companies highlighted that the customer demand of VAS needs to be responded to by different types of flexibility such as “place flexibility”, “flexibility in process” and “flexibility in manpower”. The managers of the distribution centre of Company 3, in contrast to the managers of other companies, highlighted the necessity of both standard and flexibility, which again reflects the specifics of VAS customer demands in their distribution centres that include the facets of leanness and agility.

Therefore, it is no surprise that the managers of distribution centres, who strive to achieve high productivity when incorporating VAS, highlighted on the one hand the importance of cost measurements, and, on the other hand, the lack of performance measures related to customer responsiveness category. This was especially evident in how the experts of Company 1 and Company 4 pointed out that there is no need to include the measures related to the “customer responsiveness” in their KPIs portfolio, as the demand of customer orders in their distribution centres is rather stable and predictable. The results presented in the final scheme, however, indicated that the lack of customer performance measures is not the company-related assumption, but rather the general assumptions. This means that the managers of distribution centres, who perceive flexibility as the main driver of their operations, also strongly focus on the cost measures, while customer responsiveness measures are lacking. This means that in terms of adopting different performance measures, the managers of the distribution centres who participated in this study act, more or less, in the same way independent of their operational strategies.

However, a distinction was identified in the context of how company experts measure customer satisfaction. While various managers from different distribution centres said that they use customer feedback for this purpose, only the managers of distribution centres with an agile nature of customer demand highlighted the “repeating demand” of VAS customer orders as an important indicator for measuring customer satisfaction. This finding, in fact, reflects the impact of the agile nature of VAS customer demand. While managers of Company 1 and Company 4 reported that they commonly have long-term contracts with

their customers, these managers faced more spontaneous customer orders in the context of VAS business.

Moreover, the Final Scheme indicates that the difference of managers' perceptions of VAS performance in distribution centres is not only related to the context of the lean and agile natures of customer demands. Essentially, the category of "role-related perspectives" reveals that the customer managers provided additional inputs into the discussion of VAS performance drivers. Particularly, these managers highlighted that they understand the importance of maintaining customer relationships as a crucial aspect of the successful application of VAS. To that end, the customer managers argued that due to the high diversity of such services, providing customers with the quality they expect is especially becoming much more challenging. Hence, they stressed that when it came to the VAS in distribution centres, the "quality" category holds a greater importance in measuring VAS performance. The "needs of closer customer relationships" and "quality importance", however, were only pointed out by the customer managers, whereas these topics were not equally emphasized by heads of distribution centres and operation managers when responding to the interview questions.

N	Perspectives	Findings
1	Company-related perspectives	Distribution centres facing a stable nature of customer demand strive to achieve higher cost efficiency when performing VAS, while dynamic customer orders require a focus on customer responsiveness.
2	Manager-related perspectives	Quality is a special aspect in the case of VAS in distribution centres and is therefore one of the main drivers of VAS performance.
3	Company-related perspectives	When performing VAS, the managers of distribution centres with a focus on cost efficiency strive to develop "standards", while managers of distribution centres driven by the concept of customer responsiveness aim to improve flexibility in different points of operational processes.
4	Company-related perspectives	Repeating demand is an indicator of customer satisfaction for the managers of distribution centres where the dynamic nature of customer demand is relevant.
5	General perspectives	Performance indicators related to costs are widely adopted in the performance measurement systems of distribution centres. Measures related to customer responsiveness, however, lack consideration of distribution centres.
6	Manager-related perspectives	The importance of focusing on close customer relationships, and in particular on the aspect of the quality of VAS in distribution centres, is mainly emphasised by the "customer managers".

Table 36. Findings Related to the Third Research Objectives

4.6 Summary of Results

The analysis of empirical data was underpinned by the open-, axial- and selective coding procedure. By open coding, 104 codes were developed with help of Nvivo software, and the evaluation of these concepts by the axial coding procedure led to 31 "axial" codes. The exploration of these codes by the companies clearly indicated data saturation meaning that the collection of data from further companies was not required.

The analysis of these 31 codes in the context of research participant attributes showed that these codes could be classified into general, company-related, role-related and individual perspectives. Further consideration of these codes outlined that seven of these codes represented no value for the particular research and can be therefore sorted out before the next step of analysis. The remaining 24 determined codes were used to create a final scheme of the data analysis based on the selective coding process.

This final scheme highlights the research findings in the context of this study. In particular, the final scheme indicated that VAS in distribution centres are physically performed customised activities. These services are offered in order to gain financial benefits. However, the advantages and disadvantages of these services can depend on the nature of customer demands. Thus, the adopted operational strategies of distribution centres vary accordingly. However, some misalignment of VAS performance with the customer demand was identified in the area of "VAS quality" and "performance measurement". The summary of the research findings is presented in Table 37. These findings are reflected and discussed in the following section of this thesis.

Research Objectives	Research Findings
RO 1: To understand different characteristics of VAS in warehouse logistics	VAS in distribution centres is understood as customised services, physically performed on the operational level.
	Independent of the particular business case, the company experts expect to gain a financial benefit by providing VAS.
	In the distribution centres where dynamic customer demand is relevant, the company experts expect to achieve non-financial added value effects, while the other company experts do not consider this opportunity.
	The company experts of the distribution centres with stable customer demand perceive no increase in the complexity of operational processes. The company experts of the distribution centres with dynamic customer demand, in contrast, claim higher operational complexity as a result of VAS application.
	The managers of distribution centre of Company 1, which is part of manufacturing, consider VAS as an advantageous approach for the supply chain performance of the group. However, regarding the

	distribution centre itself, they consider VAS application as an approach which leads to additional costs and no benefits.
RO 2: To examine underlying constructs of VAS customer demands	VAS customer orders in some distribution centres have stable and predictable demand and require a rather long lead time. In others, in contrast, they are associated with “instability”, “unpredictability” and “short lead time”. However, it is also the case that both of these contrasting aspects are strongly represented in one distribution centre (e.g. Company 3).
	The company experts expect a higher financial benefit of those VAS, which are characterised by the dynamic nature of customer orders.
RO3: To identify the performance drivers of operational strategies in distribution centres	Distribution centres facing a stable nature of customer demand strive to achieve higher cost efficiency when performing VAS, while dynamic customer orders require a focus on customer responsiveness.
	Quality is a special aspect in the case of VAS in distribution centres and is therefore one of the main drivers of VAS performance.
	When performing VAS, the managers of distribution centres with a focus on cost efficiency strive to develop “standards”, while managers of distribution centres driven by the concept of customer responsiveness aim to improve flexibility in different points of operational processes.
	Repeating demand is an indicator of customer satisfaction for the managers of distribution centres where the dynamic nature of customer demand is relevant.
	Performance indicators related to costs are widely adopted in the performance measurement systems of distribution centres. Measures related to customer responsiveness, however, lack consideration of distribution centres.
	The importance of focusing on close customer relationships, and in particular on the aspect of the quality of VAS in distribution centres, is mainly emphasised by the “customer managers”.

Table 37. Research findings

5. Discussion

5.1 Introduction to Discussion

While the previous chapter of this thesis presented the "raw" outputs of the data analysis procedure, the purpose of this chapter is to place the research findings in the context of the research purposes of this particular study, and consequently, to understand the theoretical contributions of these results. Thus, in order to discuss the acquired results of the study, the following two steps were conducted.

- *Reflection.* The interpreted findings were discussed in the setting of the research questions of this study. In doing so, the results were reflected in the context of the previous studies that made it possible to identify the originality of each finding within the scientific framework of the investigated topic.

- *Evaluation*. The conclusions derived from the interpretations and reflections of the research findings were evaluated based on their contribution to the context of the purposes of the particular study as well as on which unexpected results were achieved beside this context.

The outcomes of these two steps are presented in this chapter according to the sequences of these procedures. Thus, the next part of this chapter (5.2) shows the reflection of these findings, and the subsequent part (5.3) demonstrates the evaluation of the acquired conclusions. Similar to the previous chapter of this thesis (Literature Review, Methodology and Results) the overall outputs are summed up and presented in a "Summary", at the end of this chapter.

5.2 Reflection of Results

The main focus of this part of the "Discussion" chapter is to put the interpreted results in the setting of the existing knowledge and, by doing so, to reflect the contribution of these results to the purposes of the particular research. For this reason, the findings were reflected within the context of the three research questions of this study:

1. What is understood by the application of VAS in distribution centres?
2. What are the supply attributes necessary to respond to VAS customer demand in distribution centres?
3. How are the distribution centres operational strategies aligned with the performance of VAS?

5.2.1 Reflection of the First Research Question

The data empirically acquired in this study contributed to the novel outcomes in the context of how managers interpret the concept of VAS in distribution centres, as well as how managers perceive the advantages and complexities of these VAS.

In this respect, if one reflects the findings with the fundamental question: "what is actually understood by VAS in distribution centres?" the common assumption of VAS is that these services represent differently customised supplementary activities which are physically performed in distribution centres on top of the traditional warehouse operations such as "pick-pack-ship" (See section 4, table 34, number 1). In fact, all types of VAS mentioned by the research participants can be scoped into the "five performance areas" of logistics VAS suggested by Browersox and Closs (1996). For example, services such as "customised labeling", "building of display" and "quality control" can be categorised in the "customer-focused", "promotion focus" and "basic" VAS performance areas of Browersox and Closs (1996) accordingly. Consequently, these VAS reflect the nature of the supplementary services which are linked with the postponement strategies of the clients of logistics service providers and, in this manner, correspond with the definition of those VAS which Furmans and Deml (2014) referred to as "material-related VAS".

Accordingly, such conceptualisation of VAS in distribution centres on one hand includes all possible VAS performed in the operations of distribution centres. Whereas, on the other hand excludes the VAS which can be offered from logistics service providers besides the tangible area. The previous studies, however, showed that the logistics service providers can perform different services, which go beyond the physical activities in distribution centre operations. For example, Atkacuna and Furlan (2009), and later, Herrera and Yang (2017) considered the concept of VAS as a variety of services that can also derive from IT and administrative areas of logistics service providers. Furmans and Deml (2014) pointed out that the scope of VAS can go beyond "material-related" activities and referred to such services as "information-related" VAS.

Therefore, the way in which experts who participated in this particular study define VAS in their distribution centres is only partly matched with the conceptualization of VAS in the previous research. In this context however, it is important to consider how the interview questions in the particular study related to the definitions and types of VAS. They were not restricted to any predetermined concepts and the interviewees were not explicitly asked whether some services in the non-operational area have relevance to their distribution

centres. Having said that, the results of this study make it impossible to fully reject the possibility that such types of VAS could also take place in the distribution centres participating in this study. However, considering that all company experts had reflected on only material-related VAS, it can be concluded that the VAS in distribution centres in the form of physical customised activities are a dominant concept of modern warehouse logistics.

Although the perspective of VAS was limited to the material-related activities, an integration of such services in distribution centres, as identified in this study, can deliver different advantages for the logistics service providers. Principally, the research findings indicated that both financial and non-financial benefits can be gained by the application of VAS in distribution centres and therefore, different value-added effects can be achieved through this procedure. This fact itself is not new in the context of existing knowledge on VAS in the warehouse logistics field. Different VAS benefits highlighted from the research participants such as "increased revenue", "improved customer loyalty", "gained competitive advantage" and "created unique selling point" have already been widely introduced in the previous study on VAS in the logistics field (e.g., Okorie, et al, 2016, Herrera and Yang, 2017). The results of the particular study, however, showed that these benefits vary to a certain extent in distribution centres as there are particular conditions under which the managers of distribution centres expect to benefit from.

In the context of discussion of how the research participants reflected the financial aspects of VAS businesses, the research findings indicated that these types of benefits are one of the main reasons for the logistics service providers to offer VAS in their distribution centres. This conclusion can be derived from the fact that benefits connected with financial performances were commonly perceived from the research participants as the most significant aspect of VAS businesses (See section 4, table 32, number 2). Therefore, the concept of "value added" which implies the creation of value through the ratio of economic inputs and outputs is extremely relevant for the distribution centres in this particular context.

This conclusion contradicts the perspectives of the study by Furmans and Deml (2014), where the researchers, based on the outcomes of management survey by "Institute for Conveyor Technology and Logistics" in Germany, suggested that the main reasons to provide VAS are to "meet customer requirements", followed by "developing a unique selling point", while "higher return of investment" was the third most significant. The mismatch between the statistical data of Furmans and Deml (2014) and the research findings

of the particular study, however, can be linked to different contexts under which the data was acquired. This is especially true when reviewing the data in the publication from Furmans and Deml (2014) that was based on the questionnaires. This publication implied that company experts need to choose which is the most important among three determined categories of VAS benefits from their point of view. In turn, this would mean that for example, a company expert identified "unique selling point" as the most significant concept. That said, this does not mean that the "high return of investment" is unimportant. The methodology established in this study, in contrast, was underpinned by the more narrative approach, where the company experts had the possibility to point to different indicators of VAS benefits without measuring their significance. Moreover, it is important to consider the fact that the understanding of VAS concepts from the company experts who participated in the survey presented by Furmans and Deml (2014) might have included the different services which are performed beyond the operational level of distribution centres. The discussion of VAS benefits in this study, in contrast, followed the concept of "material-related" VAS, because the research participants, as previously mentioned, focused on these types of services when responding to the interview questions.

While the financial advantages were commonly perceived as the most crucial aspect of VAS application, the role of non-financial benefits, according to the research findings of this study, had a more contextual nature. Evidently, the research findings indicated the correlation between the construct of customer demand and the opportunity to gain the non-financial advantages such as "unique selling point", "customer loyalty" or "competitive advantages" were only highlighted from the managers of those distribution centres, which are dealing with more agile nature of VAS customer orders (See section 4, table 34, number 3). Based on these findings, it can be concluded that the concept of agility in the context of the construct of customer demand is a crucial factor, which enables logistic service providers to gain non-financial benefits by the provision of VAS. This conclusion is an original view on the question of what advantages can VAS bring for the logistics service providers. While previous studies considered the non-financial value-added advantages from the application of VAS as the natural effect, the results of this study contradict this position by emphasising the importance of a contextual perspective on this topic.

Moreover, according to the research findings, different contexts in which VAS in distribution centres are performed impact not only the way managers perceive VAS advantages, but also how they see the possible increased complexities of operational

processes. Most notably, it was identified that the level of complexity of VAS applications depends on the nature of customer demand. This conclusion derives from the fact that in responding to the interview questions, the increased complexity was only stressed by the managers of distribution centres, where the agile nature of customer demand has relevance (See section 4, table 34, number 4). For this reason, as in the case of "non-financial" benefits, the issue of increased complexity is a result of the agile context in the structure of customer demand. This perspective brings new contextual insight to the discussion of the possible negative effects that can be resulted from the application of VAS on warehouse operations. While previous researchers provided the knowledge of VAS complexity and considered the questions how and what can be impacted through application of VAS (eg. Karagiannaki et al, 2011, Lao at al, 2012, Faber et al. 2013, Jaaron and Backhouse, 2016), this study contributed to the question under which conditions this effect might occur instead. Table 38 demonstrates novel theoretical conclusions, which were obtained through the reflection of the research findings in the context of the first research question.

Research question 1	**Reflected conclusions / novel theoretical contributions**
What is understood by application of VAS	The concept of supplementary "material-related" services is the dominant concept of VAS in the warehouse logistics
	The financial benefit is the main reason for the distribution centres to offer different types of VAS
	VAS will also create non-financial benefits such as "customer loyalty", "unique selling point" and "competitive advantage", in the case the distribution centres provide "agile" VAS

Table 38. Main Conclusions Related to the First Research Question

5.2.2 Reflection of the Second Research Question

The second research question dealt with the topic of supply attributes in the particular context of the VAS in distribution centres. In this context, this particular study strived to understand which supply attributes are necessary in the current business of warehouse logistics to respond to VAS customer demand and under which circumstances those or other supply attributes hold their relevance. To reflect this aspect, it was important to understand how company experts, who participated in the data collection process, perceive the

performance drivers of VAS in their distribution centres and to identify the differences and the correlations within these perceptions.

The outcomes of the particular study regarding this topic showed that different managers focused on different supply attributes when performing VAS in their distribution centres. One of the factors that influenced this position, according to the findings, was specific to the VAS business of each particular distribution centre taking part in this study. In this case, the perspectives about the performance drivers of VAS varied between the company experts representing different distribution centres. In particular, the managers of some distribution centres stressed productivity as the most decisive aspect of the VAS performance. The others, in contrast, emphasised the necessity of the ability to react quickly on VAS customer orders. The third, again, suggested that it is crucial to focus on both aspects when supplying VAS customers (See section 4, table 35, number 1). Such different positions, in turn, correlated with different structures of customer demand that were identified by this study. In particular, the "productivity" was highlighted by the manager of those distribution centres which are dealing with the customer order having rather lean nature, while the aspect of "customer responsiveness" was pointed out by the managers of distribution centres which are faced with a more agile structure of customer demand (See section 4, table 36, number 1).

Therefore, the findings of this study clearly indicated that the fundamental principles of the Fisher's theory (1997) of the supply attributes alignment with the customer demand is a crucial component of the current business structure of warehouse logistics when talking about VAS. This fact, in turn, means that distribution centres are required to align their supply attributes with the particular VAS business case. With such a conclusion, the result of this particular study supports the outcomes of the study by Mokadem (2017), who indicates that the customer in each particular case can have different expectations on the logistics service providers in terms of lean and agile capabilities.

However, "productivity" and "customer responsiveness" are not the only supply attributes, which can be derived from the results of the particular study. The research findings indicated that the "quality" aspect also plays a significant role in the context of VAS performance in distribution centres. Such perspectives were expressly provided by the company experts who were referred to as "customer managers" in this study and represented different distribution centres. These managers stressed that the issue of quality needs always a special concern in the context of VAS as such services have a higher degree of diversity

and customization in contrast to the traditional warehouse operations driven from distribution centres such as “pick-pack-ship” (See section 4, table 36, number 2).When looking at the previous studies, it can be illustrated that different researchers also highlighted such specialty of the characteristics of logistics VAS (e.g., Bowercox, 2010, Jaaron and Backhouse, 2016). In this context, however, the previous studies mainly emphasised the issue of productivity, which can be affected by these characteristics. The research findings of this study, in contrast, indicated that the aspect of quality needs no less attention when providing customers with different VAS.

Therefore, from the analysis of research findings regarding the second research question, it can be concluded that “quality”, coupled with the “cost efficiency” and “customer responsiveness” is another key supply attribute of distribution centres that is necessary in the context of VAS performance. In this context, the “quality” may be seen as an element that needs to be generally considered when providing different types of VAS in distribution centres. The “productivity” and “customer responsiveness”, in turn, are rather two contradictory supply attributes, which are relevant depending on the structure of underlying constructs of customer demand.

Thus, the research findings identified two schemes of supply attributes, which are linked with the natures of customer demand. In this way, reflecting the concepts of lean and agile supply. Therefore, the research findings make it possible to consider the required supply attributes of VAS in distribution centres in the context of the concept of “market winners” suggested by Mason-Jones et al. (2000) in their supply chain model of “Market Qualifiers - Market Winners”. Thus, such supply attributes as “quality” and “productivity” belong to the “market-winner” in the context of “VAS lean supply”, while in the area of “VAS agile supply” these are “quality” and “customer responsiveness” (Figure 33).

Figure 33. Market-Winners in the Context of VAS in DCs

As there is no prior theory in terms of supply attributes in the particular context of VAS in distribution centres in existing research knowledge, such a conclusion provides an initial contribution to the understanding of this topic (Table 40).

Research question 2	**Reflected conclusions / novel theoretical contributions**
What are the supply attributes necessary to respond VAS demand?	The underlying construct of customer demand regarding VAS in distribution centres varies from one distribution centre to another and corresponds with the concept of leanness, agility or with both concepts.
	In the case of the lean nature of customer demand, quality and cost efficiency are the main supply attributes. Concerning customer orders connected with the concept of agility, quality and customer responsiveness are the most important aspects of VAS performance.

Table 39. Main Conclusions Related to the Second Research Question

5.2.3 Reflection of the Third Research Question

The purpose of the third research question was to understand how managers of distribution centres align their operational strategies with the performance of VAS in distribution centres. To gain such an understanding, this study explores which capabilities managers strive to adopt in their operations and on which performance measures they focus to achieve a superior performance by incorporating VAS in distribution centres. These results, in turn, needed to be reflected with the context of the performance drivers, which were identified

through discussion of the second research question, in order to ascertain the extent these strategies correlate with the VAS performance aims.

The research findings indicated that in terms of adopting capabilities there could very well be two fundamental concepts. Concepts that hold their relevance depending on the performance aims of each particular distribution centre. Decidedly, the interpretation of the data showed that the managers of distribution centres, which focus on productivity, highlighted the concept of standard as the most important element in their operations when performing VAS. By contrast, the managers of distribution centres which focus more heavily on the customer responsiveness performance identified different aspects of flexibility as the most significant (See section 4, table 36, number 3). Therefore, the capabilities of distribution centres in the operational area depend on the particular purpose of VAS performance. In this context, standard and flexibility are two contradictory approaches of choice. Such a conclusion is interesting in the context of existing knowledge of VAS in particular and of the warehouse logistics field in general. For example, some researchers highlighted the importance of standardisation of VAS in order to achieve high efficiency in the warehouse operations and stressed that the standardisation of these services can be a difficult task (e.g., Furmans and Deml, 2014). The result of this study, however, suggests that the standardisation is an inappropriate approach as some distribution centres strive to develop a more agile process. This way, the results of the studies on lean warehousing (e.g., Baby et al, 2018; Abushaikha et al., 2018; Freitas, et al., 2019; Abideen and Mohamad, 2020), which according to the literature review are more broadly introduced in the existing research in contrast to studies on the concept of agile warehousing, have only limited relevance in the context of VAS performance in distribution centres.

Considering such results, one would think that the distribution centres which followed different performance strategies in their operations need also different performance measurement systems, which can adequately support their strategies. The research findings, however, showed that the performance measures utilised to support the improvement of VAS performance are quite homogeneous in nature. This can be proposed as all company experts pointed out the importance of the cost efficiency measures in their distribution centres and, at the same time, indicated the lack of performance measures related to the customer responsiveness (See section 4, table 36, number 5). Thus, the research findings make it possible to identified that distribution centres, irrespective of their particular performance aims, are mainly cost driven in the context of VAS performance measures.

Such conclusion builds on existing evidence of Laosirihongthong et al. (2018), who, exploring the significance of different performance measures categories by different types of warehouses (manufacturing, TPLs, retailers), found that the categories related to the costs are the most dominant in the current performance measurement systems of warehouses. While the study by Laosirihongthong at al. (2018) considered the performance measures of warehouse operations in general, this study indicated that the dominance of the cost measures in the particular context of VAS in distribution centres is also the case.

These results, however, indicate that the performance measurement systems of some distribution centres are not fully aligned to the VAS performance targets. This point is particularly relevant to distribution centres, which focused on the flexibility in their operational process, as they are striving to achieve higher customer responsiveness and a lack of customer responsiveness measures can therefore be considered a point of weakness. Therefore, the research findings suggested that some distribution centres need to adjust their performance measures with their operational strategies.

Furthermore, only concentrating on the costs and customer responsiveness can be inappropriate in the context of VAS in distribution centres for, according to the result of this study discussed above, quality is another important aspect of VAS performance. Quality in this context refers to the concept which is a part of the "time-cost-quality" triangle used to measure performance. Thus, quality of VAS (in analogy to the concept of product quality) means conformity with customer requirements. Different key performance indicators related to the category of "customer compliance", in turn, are the commonly used measures to assess the level of VAS quality (e.g. RPPM).

When considering the aspect of quality in the context of the question how distribution centres aligned their operational strategies with VAS performance, it can be concluded that there is a gap between the customer expectations of this aspect and the perceptions of operational managers of customer expectations. This conclusion was revealed by the fact that the quality as an extremely important element of VAS performance was only highlighted by the "customer managers" (See section 4, table 34, number 6). In this respect, the research findings of this study reflect the perspectives from Huang and Hsu (2016), who indicated different gaps in expectations of customers and perception of distribution centres, with the original perspective of such gaps in the context of VAS. Table 40 shows the main theoretical conclusions regarding the third research question (see table below).

Research question 3	Reflected conclusions / novel theoretical contributions
How DC managers align operational strategy with VAS performance?	The distribution centres tend to align their operational processes with the particular purpose of VAS performance by adopting standards (in the case of stable nature of customer demand) or flexibility (in the case of dynamic customer orders).
	Regarding performance measures, the distribution centres are cost driven, while the category of customer responsiveness measures leaves room for improvement
	It is a mismatch by the perception of quality issue in terms of VAS performance between the customers (and customer managers) and the operations of distribution centres

Table 40. Main Conclusions Related to the Third Research Question

5.3 Synthesis and Evaluation of Results

The particular study provided a number of conclusions that contributed to the theoretical matter of the investigated topic. When looking at these conclusions, it can be seen that some of them are in line with the "lean-agile" framework proposed by this study, while the others represent unexpected outcomes, which go beyond the scope of this framework but still deliver valuable implications to the knowledge of VAS in distribution centres. This part of the "Discussion" section presents the synthesis of these results and evaluation of their contributions to the purposes of the particular research as well to the further aspects of VAS knowledge besides this context.

5.3.1 Results in the Context of Lean-Agile Conceptualisation

Different conclusions achieved through the interpretation and reflection of the research findings highlighted the correlation between the concepts of supply attributes and the VAS performance in distribution centres. Thereby, these results make it possible to replicate the conceptual framework created for the purpose of the collection of empirical data and reflect the previous conceptualisation of supply attributes in the field of supply chain research with the particular context of VAS performance in distribution centres.

When looking at these results in particular, it can be concluded that what was suggested by the Fisher (1997) model of the "functional" and "innovative" products in the context supply chain management is an adoptive idea for the particular case of the VAS in warehouse logistics. Such a conclusion is based on the fact that the explored VAS of the distribution centres participating in this study can be divided into two distinguishable categories, which in their characteristics reflect two types of products of Fisher's framework. Thus, the

functional VAS are characterized by predominantly stable and predictable customer demands. By contrast, innovative VAS relate to spontaneous customer orders and are therefore associated with a dynamic environment.

Thus, according to the conclusions of this study, some of these VAS are characterised by the “lower financial benefits", “lower complexity of operational process” and the more lean nature of customer demand, which includes the aspects of “stability”, “predictability” and “longer lead time”. The performance of such VAS pointed to the “productivity” that enables distribution centres to achieve higher competitive advantages through more affordable services. The others, in contrast, imply a range of contradictory and partly specific aspects that characterised these VAS. In particular, the key characteristics of such VAS belong to “higher financial benefits”, “non-financial benefits”, “higher complexity of operational process” and rather “agile” nature of customer demand. The key performance attribute of these VAS in this case is the “customer responsiveness” that made it possible to compete in the market where the quick reaction on the permanently changed customer demand has more significance than the price factor.

This conclusion is a fundamentally new view on the VAS in distribution centres. While Chen and Notteboum (2012) and Chen and Notteboum (2014), exploring the issue of selecting the most appropriate location for different VAS, highlighted the importance of Fisher’s theory when considering VAS in the context of the perspectives of supply chain performance, this study explicitly shows that the theory of Fisher is also important in line with the performance of VAS in distribution centres themselves.

However, if we consider how managers align their operations strategy with the VAS performance in distribution centres, the conclusions of this study show that these perspectives are only partly integrated in the operational strategy of the modern distribution centres. On one hand, such perspectives find application in the current structure of distribution centres on the operational level. This is where the distribution centres strive to utilise the elements of lean procedure in the form of standard implementation for the “functional VAS” and agility in form of operational flexibility for the “innovative VAS” when constructing their operational process. On the other hand, if one looks at the adoption of these perspectives in the context of performance measurement systems, the conclusions of this particular study indicate that the performance measures of distribution centres are cost-driven, while the concept of customer responsiveness in this case leaves an area of improvements.

Figure 34 presents the framework, which is based on the reflection of the conceptual framework (Figure 14) and the novel findings obtained in the process of this research. This framework demonstrates the understanding of VAS in distribution centres in the context of concepts of lean and agile supply attributes.

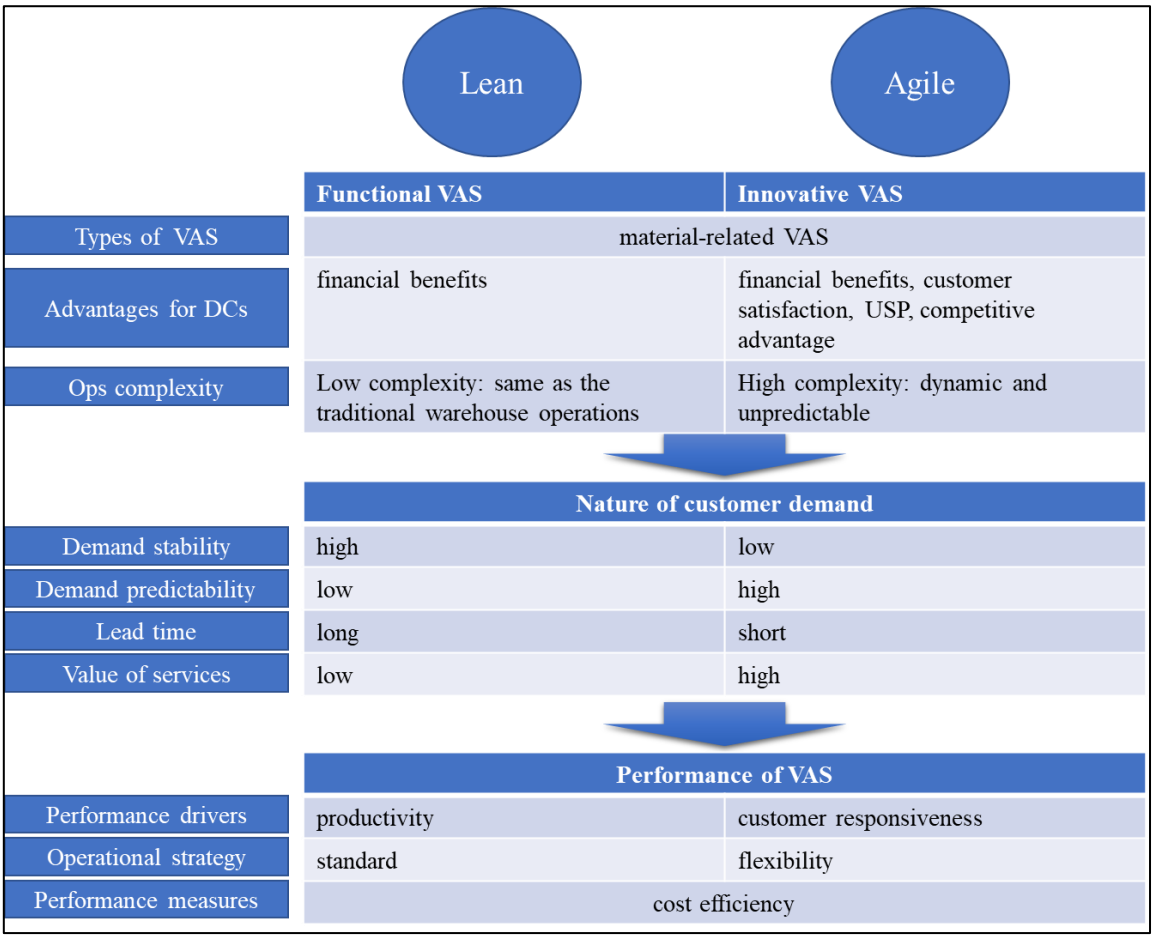


Figure 34. VAS in DCs in the Context of Lean and Agile Supply Attributes

5.3.2 Results Beside the Context of Lean-Agile Conceptualisation

Apart from those conclusions which reflect the nature of VAS in distribution centres in the context of the lean and agile concepts, the examination of the research findings led to a range of conclusions that are beside this setting. Particularly, it can be inferred that two aspects of VAS knowledge were impacted through the novel contributions derived from this study.

Firstly, the unexpected outcomes of this study touched the basic principles of the VAS concept in modern warehouse logistics. In particular, this study highlights the dominant understanding of the concept of VAS in distribution centres as the customised supplementary physical activities which are driven by financial purposes. This conclusion

indicates that the nature of performed VAS is quite rudimentary when compared with VAS concepts that were suggested in the previous scientific publications. This, in turn, means that the logistics service providers have the space for development of the more specific VAS that can make it possible to create value for them and their customers.

Secondly, a triangulation of sources in this particular study reflects the concept of quality in the context of VAS performance in distribution centres. Particularly, the concept of quality was recognised as one of the most crucial supply attributes necessary to respond to VAS customer demand. At the same time the outcomes of this study indicate limitations of these perspectives in the current operations of distribution centres. Thus, conclusions point to the misalignment, in this context, between the perceptions of logistics service providers on the operational level and the expectations of their customers.

5.4 Summary of Discussion

The findings of the particular study provided various implications to the knowledge of VAS performance in distribution centres. By doing so, each of the three research questions were affected by a number of novel theoretical contributions derived from the interpretation and discussion of these findings in the context of the existing research. As a result, the outcomes of this study not only reflected the concept of "leanness and agility", which was in line with the purpose of this research, but also acquire different conclusions which go beyond this conceptualisation. Table 41 shows a summary of the two parts of discussion presented in this section by highlighting the key aspects of the research outcomes (see table below).

Research questions	**Key Conclusions**	**Fields of research contributions**
RQ1: what is understood by application of VAS?	- "Customer loyalty", "unique selling point" and "competitive advantage" are relevant for "agile" VAS - More "agile" customer orders lead to higher level of operational complexity	The results in the frame of the lean-agile conceptualization
	- Dominant perception of VAS as "material-related" services. Financial benefits are the main driver for the provision of such VAS.	The results beside the frame of the lean-agile conceptualization
RQ2: What are the supply attributes necessary to respond VAS demand	- Customer demand can be extremely different from distribution centre to distribution centre - These demands can correspond with the leanness, agility or with both concepts.	The results in the frame of the lean-agile conceptualization

	- Quality and cost efficiency are main performance drivers of lean VAS; quality and customer responsiveness are the drivers of agile VAS	
RQ3: How DC managers align operational strategy with VAS performance	- Adoption of standards in the case of lean and flexibility in the case of agile - Regarding performance measures: mainly cost driven / the category of customer responsiveness measures have an area of improvement	The results in the frame of the lean-agile conceptualization
	- Probable mismatch by the perception of quality issue in terms of VAS performance between the customers and the operations of distribution centres	The results beside the frame of the lean-agile conceptualization

Table 41. Summary of the Results of Study in the Context of Research Questions

Reflection – Part IV

The interviews were carried out, the collected data was analysed and discussed, and the results are now in. Indeed, it has been a long journey. From my previous understanding of the topic in question - when finalising the creation of theoretical background - to the understanding which I have now: where, upon the completion of the empirical procedure, a broader light on different aspects of this topic has been shone. The interviews with different company experts as well as the examination of the acquired findings has provided me with an entirely new perspective on the ways in which managers of distribution centres perceive different aspects of VAS applications.

In particular, I've come to realise that these perceptions are formed depending on the constructs of customer demands that are relevant to the business environment of the distribution centres where a particular manager works. And because the structures of customer demand in different distribution centres are dissimilar or, in some cases, even contradictory, the characteristics of VAS given from different managers were heterogeneous in their natures. Thus, the perceptions on the same aspect of VAS application from two managers were sometimes as two opposite positions. A prime example of this can be found in the interviews with the operational manager of Company 1 and operational manager of Company 2, whereby the operational manager of Company 2 stressed that flexibility is the most crucial aspect of VAS performance, while the operational manager of Company 1 highlighted "no way" for flexibility.

This was a new learning point for me. In fact, it completely reconstructed my entire paradigmal understanding of this topic. Although the theoretical position of my study was underpinned by the notion that both lean and agile elements can be relevant in the context of VAS in distribution centres, it was quite unexpected for me to discover the extremities to which the structures of VAS customer demands in different companies can reach. Having a long years' worth of experience with the lean applications in warehouse logistics, among other things having to do with VAS, I could not imagine that the principles of lean could be of such insignificance in warehouse operations of some distribution centres. However, my interviews and post-interview discussions with the managers of distribution centres of Company 2, where the concept of agility has an especially high importance, forced me to rethink my paradigm. This made it possible to understand the various nature of customer demands in different distribution centres and the significance of the theoretical constructs suggested by Fisher (1997) in the context of currently provided VAS in logistics companies.

In the context of such reflection, my perspectives of the previous research on VAS in distribution centres were becoming even more critical. This was especially evident with my critique points of those studies where, in an analogy to my research, the data was obtained by the interviews with managers of distribution centres. In light of my research findings, it became more and more clear that a lack of consideration of the constructs of customer demands in these studies (where the perspectives of company managers are the basis for the research data) can be seen as a significant weak point. When the company experts who participated in these studies responded to the questions linked with the VAS business, their answers could be ascribed to one or another particular context of customer demand, which, in turn, were not incorporated into these studies. Thus, the data gained by the methodological procedures of these studies leave space for further explanation. Therefore, my research stresses that the concepts of leanness and agility in the context of the nature of customer demands must be considered priority and need to be fully understood when studying the topic of VAS in distribution centres.

On the other hand, my research also appeals directly to the distribution centres themselves, as it became clear that customers and their requirements have a huge impact on how managers of distribution centres must design their operational processes to achieve a superior VAS performance (the predictable nature of customer demand require lean supply attributes, while dynamic customer orders must be addressed by agile strategies). This point is especially important, in light of the fact that some aspects of the operational strategies

necessary to be aligned with the performance of different VAS seem to be not fully adopted in the current operations of distribution centres. This statement is indicated by my research findings, which emphasised a lack of performance measures related to the customer responsiveness category in the context of agile business environments. In my opinion, these weaknesses of the logistics service providers, may be a sign of a lack of proactiveness in the strategic concepts of managers of distribution centres. As the alignment of the operational process to the particular constructs of customer demand looks more like a logical consequence, which otherwise would not be able to satisfy customer needs, the performance measurement systems, in contrast, reflect a rather strategic basis of the company, which must be aligned proactively. This argument can be particularly reproduced by the reflection of my interview questions with the last company expert who suggested that "the interview questions are very simple and sensible in their nature, but we never think about these aspects proactively. Instead, we act rather reactively responding to the customer demands as it is given".

When reflecting the empirical procedure, it can be assumed that in the context of this discussion such reactive perspectives are not based solely on the particular case of this company, but rather are relevant for all distribution centres represented in my study. Moreover, such reactivity in the interactions of the logistics service providers with their customers seems to be a phenomenon, which covers different aspects of VAS business context. In particular, it can be seen that the lack of proactive actions touches not only the way distribution centres respond to VAS demand, but also what kind of services distribution centres develop for their clients. Thus, when reflecting on the interviews with the company experts, it is becoming clearer that the services performed in distribution centres are customer initiatives in their nature. This means that development of one or another value-added service is rather triggered by the customers than by distribution centres themselves. Even if these logistics companies have different portfolios of VAS which they officially offer to their existing and potential customers, at the end of the day, the implementation of a particular service is based on the order specification of the customer. This, in turn, can be one of the main reasons why the VAS concepts, which were named from the company experts in this study, are on a relatively simple level of complexity. The creation of VAS which are more specific and outstanding in their nature, as suggested by previous researchers, require direct initiatives from the logistics service providers. Looking at those VAS which are currently performed in the distribution centres, however, it can be concluded that such opportunities were not broadly recognised from the logistic service providers.

In its time, Herrera and Yang (2017) had arrived at a similar conclusion, who discussed the issue of VAS in the context of logistics service providers and their customers. They pointed out that: "…the customer usually takes the initiative for adding new services to the existing relationship". In the context of this issue, the researchers proposed that "Pro-actively proposing additional services to a larger extent could help providers increase their VAS volumes and scope towards different customers…" (p. 89). In consideration of my discourse, I am fully agreeing with this statement. Moreover, from the perspectives of my research findings, I will add that a proactivity in the frame of VAS business can help distribution centres recognise the advantages of dealing with VAS which have different underlying constructs of customer demands. With this argument, I am especially appealing to those managers, who are used to dealing in the lean business environment and have a rather negative perception of agility of customer demand. Based on my research results, I can definitely agree that such VAS are more challengeable for the operations of distribution centres, but on the other hand, they can have provide greater benefits, which make such services attractive especially for those logistics service providers, who strive to gain maxim "added value" effects from VAS applications.

However, in order to achieve higher proactivity of logistics service providers when dealing with VAS, I would stress that it can be necessary for the researchers and professionals to reconsider the current role of logistics in the modern supply chain in general. The reflection of theoretical publications as well as that of my practical experience are leading me to the conclusion that the role of logistics is going to remain behind the manufacturing industry. It looks like the performance of production companies goes into focus, whereas logistics is rather an additional element, which follows the production of a car or a train. Where do the concepts of lean and agility originate? The answer is clear: from production. For whom the different improvement techniques, like for instance Lean-Six-Sigma, first developed? The answer is again: for production. And why does the concept of Logistics 4.0 exist? It exists because there is the concept of Industry 4.0. And where are the innovative initiatives for logistics service providers themselves? Yes, one can conclude that today we are talking about such concepts for example as 4PLs and 5PLs, but it looks that these topics rather remain in the context of theoretical matter and do not find broader use in practice.

As we move forward into the future, I would say that one of the main contributions of my study is that this can draw more attention to logistics service providers and, in particular,

can trigger them to recognise more directions for innovatorial opportunities, especially in the context of the VAS, which in fact, represent a universal platform for such purposes.

6. Conclusion

This Conclusion chapter presents the last part of the DBA thesis. The aim of this chapter is to demonstrate the main achievements of this study; how these results contributed to the scientific as well as to the industrial contexts; where the limitations of this study reside, and consequently, which theoretical aspects ought to be covered in future research of this topic. Thus, this section begins with a reflection on the overall research outcomes (6.1), followed by the theoretical discussion of the research contributions, methodology and practice (6.2), proceeded by research limitations and the areas for further research (6.3). Lastly, it will end with the closing notes of the overall thesis (6.4).

6.1 Research Outcomes

This inductive study strived to gain a greater insight into the question of how modern distribution centres deal with the increasing demand for specific customer requirements. In particular, this explorative study investigated the topic of VAS in warehouse logistics in the context of lean and agile factors attributed to supply concepts. The main purpose of this study was to understand the contribution of these supply attributes in the performance of VAS in distribution centres.

Based on the case studies of six distribution centres, this study provided detail findings which are consistent with the lean and agile concept, as well as other findings which go beyond this context. The research findings from the empirical study cannot be generalised for the whole population, as is the case in quantitative research. The findings from this research, in contrast, make it possible to develop a deep understanding of context under investigation. The use of the concepts of triangulation and data saturation in this study insured the quality of the research and in particular potential prejudice and bias. As a result, the research findings addressed the aim of this study, which was conceptualised by three specific research questions.

RQ1: What is understood by the application of VAS in distribution centres?

This study showed that the concept of VAS application is generally dominated by the "postponement" of supplementary activities, which logistics service providers strive to implement in their distribution centres in order to gain financial benefit. Furthermore, the research findings indicated that different underlying constructs of customer demand, which reflect lean and agile natures, are fundamental aspects of VAS applications in distribution centres. In particular, this study suggests that the VAS in distribution centres, in analogue

to the Fisher's supply chain framework (1997), can be divided into two categories, which have either "functional" or "innovative" characteristics, depending on the nature of customer demands. The results of this study indicated that the application of "innovative VAS", in contrast to "functional VAS", leads to a higher complexity of the operational process. However, at the same time, such applications produce a higher level of profitability for the logistics service providers and can make it possible to gain non-financial benefits in form of "competitive advantages", "unique selling point" and "customer satisfaction".

RQ2: What are the supply attributes necessary to respond to VAS customer demand in distribution centres?

In order to respond to the wide variety of customer demands of VAS, distribution centres are required to focus on a variety of different attributes. The findings of this study suggest that the application of "functional VAS" needs to be underpinned by the lean supply, whereas "functional VAS" tends to focus more on agility. In particular, this study concluded that to be a market winner in the lean supply environment, distribution centres need to improve their cost efficiency, while success in an agile supply environment can be triggered through high customer responsiveness. In addition, this study also revealed that - independent of customer demand - the aspect of quality needs to be especially considered when providing non-traditional warehouse operations. Therefore, quality, according to the results of this study, is another important supply attribute that is essential to achieving superior performance by VAS applications.

RQ3: How are the distribution centres' operational strategies aligned with the performance of VAS?

As identified by exploration of the six distribution centres that participated in this study, distribution centres with lean supply tend to strive for standard, while distribution centres with agile supply focus on flexibility in the operational processes. However, the study indicated that the importance of the aspect of quality in the particular context of VAS businesses highlighted by the customer managers is not appropriately reflected on the operational level of distribution centres. Furthermore, it was identified that distribution centres are focused on the cost when measuring VAS performance, while performance measures related to customer responsiveness are inadequately considered in the performance measurement systems.

6.2 Research Contributions

This thesis represents original perspectives of theoretical, methodological and practical aspects, which were not addressed in the previous research of the topic in question. Therefore, this thesis delivers authentic, hands-on contributions to the knowledge, methodology and practice of this topic.

6.2.1 Contributions to Knowledge

The research findings provided a range of original implications to the body of the topic in question (See table 42). In doing so, the results of this study addressed the limitations of previous research and contributed to several research areas with peculiar theoretical content:

- *Contribution to the research on VAS in distribution centres*

The perspectives of lean and agile supply concepts in the context of VAS performance in distribution centres have not been addressed in the previous research on VAS in distribution centres. Thus, the position of this study provides a contemporary approach to the topic in question which resulted in different theoretical contributions to existing knowledge First, the new and novel findings of this study enhanced existing knowledge with the new theoretical aspects in terms of "What are VAS in distribution centres?" and "What are the effects of such VAS?" (See table 39). Essentially, one can argue that this study provides the findings, which, de facto, demonstrates the important role of the nature of customer demand in this context. Likewise, when considering the contributions of this study to the existing knowledge of supply attributes related to VAS as well as to the ways in which distribution centres particularly carry out VAS in their operations, the research findings (See figure 31 and table 40) can be seen as authentic and innovative due to the lack of previous research in this context.

- *Contribution to the research on warehouse logistics*

Upon reviewing the known literature of warehouse logistics, one comes to recognise that many previous research studies focused mainly on traditional warehouse operations when investigating the performance of warehouses and distribution centres from different scientific angles. On account of this, VAS were often considered as an integrated element of the services provided in warehouse logistics, for which any further distinct exploration is not needed. However, the research findings highlighted that there are different performance aspects, which do not reflect the traditional warehouse operations, but are strongly linked to the specific case of VAS applications in distribution centres. Thus, this

study specifically argues that VAS is an extraordinary part of modern warehouse logistics and therefore, more focus needs to be directed at the research on such performance in warehouse logistics.

- *Contribution to the research on supply attributes*

Since the publication of Fishers' papers (1997), the concepts of supply were broadly discussed by many researchers from several different perspectives. Thus, as shown in the comprehensive literature review by Sharma, et al. (2020) the concept of lean and agile supply attributes in the latest studies are considered in relation to supply chain performance, as well as to different paradigms which are currently relevant in modern society such as "resilient", "green", or "sustainability" paradigms. The research findings of this study, in turn, indicate that the concepts of lean and agile supply can also be considered as a key performance aspect of distribution centres when providing different VAS (See figure 31). Therefore, this study contributes to the research stream related to the concepts of supply attributes with a particular context of VAS in distribution centres.

6.2.2 Contributions to Methodology

The methodological contribution of this research is attributable to the novel concept, which was applied for the purpose of empirical data collection in this study. The claim for a methodological contribution resulted from the critical reflection of the previous qualitative studies in the research field of VAS in logistics. The application of triangulation strategies in the previous studies, in particular, were critically evaluated from the perspectives of this research. As result, a specific form of triangulation in the context of empirical research of the explored topic was developed.

Thus, when considering the previous studies on VAS in logistics dealing with phenomenological explorations, two types of methodological constructs can be found. The first type includes the studies, which are not based on triangulation strategies. These studies are focused on the investigation of different aspects of VAS either from the position of logistics service providers (e.g. Atkacuna and Furlan, 2009; Furmans and Deml, 2014) or from the position of their customers (e.g. Chen and Notteboom, 2012; Chen and Notteboom, 2014). The second type of methodological constructs, in turn, is based on triangulation approach. In particular, such a methodology considered the "voice of customers" by including both the logistics service providers and their customers in the empirical studies (e.g. Soinio et al., 2012; Okorie at al., 2016 and Herrera and Yang, 2017).

The empirical process of this study, in contrast, implied collecting data in such a way that each distribution centre is represented by three managers who are in the role of "distribution centre manager", "operational manager" and "customer manager". In this way, such a strategy made it possible at the same time to consider the perspectives of operation managers, who deal with VAS on a daily basis, and the customer perspectives by including customer managers, who have a broad understanding of different customer requirements.

Thus, the methodological process that underpinned this study was based on specific constructs of data collection which have no equivalent in the previous studies on VAS in distribution centres. Such a strategy proved its cogency in the methodological construct of this study and therefore represents a valuable approach that can be used in future qualitative studies on VAS.

6.2.3 Contributions to Practice

As highlighted from previous research studies and confirmed by the company experts who participated in this study, the trend of placing different VAS has been gaining momentum in recent years. Such trends are motivating logistics service providers to identify more effective strategies to increase performance by incorporating VAS in their distribution centres. In this respect, the outcomes of this study provide exclusive contributions to this practice that can support managers of warehouse logistics as they strive to innovate.

Firstly, this study developed a novel understanding of underlying constructs of VAS customer demand and the strategic challenges for distribution centres resulting from this issue. It recognised the importance of lean and agile supply attributes and particularly, their necessity to respond to different customer demands on VAS. In this way, the conceptual framework derived for the particular purposes of this study represents a theoretical model that can support logistics service providers to assess different VAS. In particular, this concept can help to evaluate the nature of VAS customer demands and consequently to identify those operational strategies, which can lead to superior performance levels by VAS provisions.

Secondly, the explored characteristics of VAS indicated the principles of functional and innovative natures of these services and the different effects that resulted from different characteristics. In particular, the study suggests that further creation of innovative VAS can help logistics service providers to gain higher added value effects. In this context, however, the improvement of flexibility of operational processes in distribution centres is a

fundamental aspect which needs to be considered by the logistics service providers when they pursue such strategic purposes.

Thirdly, the correlation of the existing literature with the research findings indicate that the logistics service providers can achieve further additional value when offering VAS beside those physical supplementary activities, which are currently forming the perception of the VAS concept in distribution centres. Considering the fact that the benefits of the non-physical VAS were proven by the theoretical contributions of previous studies, the examples of such services highlighted in this thesis represent advantageous opportunities for the practical usage.

Fourthly, this study agrees that a successful application of different VAS requires a closer relationship with customers in order to understand the specifications of each particular customer order that is placed in the distribution centre. This way, the concept of quality is key to successful performance in the peculiar context of VAS business. Therefore, the results of this study call for logistics service providers to give more attention to detail in the overall quality of their operations in distribution centres.

Finally, the research findings indicate that the performance measurement systems are not fully adopted in the concept of lean and agile paradigms pursued by the managers of distribution centres in their operational processes. This issue particularly affects the performance measures category related to the customer responsiveness measures, which might be crucial in the context of applications of innovative VAS. Such limitation is an important aspect of this study that addresses the industry of warehouse logistics with a possible area of improvement.

6.3 Research Limitations and Areas for Future Work

The finalisation of this study indicates several research limitations in the context of the suggested scientific procedure. These research limitations represent the detected weaknesses of this study, but at the same time, provide several opportunities for future research on the topic in question.

Some of these research limitations are resulting from the methodological scope of this study. This, on one hand, led to valuable outcomes reflecting the purposes of the particular study, where on the other hand, made it impossible to comprehensively explore some aspects related to the research findings. For example, there is a lack of explanation as to why the distribution centre managers strongly focused on the material-related concept and neglected

information-related concepts when describing the meaning of VAS in distribution centres. In this case, the reason for this limitation lies in the structure of the interview questions regarding VAS concepts in distribution centres. As these questions were not based on a predetermined concept, the methodological procedure did not imply the possibility to articulate to this specific point additionally during the interviews. For this reason, there is a need for a more comprehensive exploration of this issue in future research.

However, apart from the research limitations related to the methodological restrictions of this study, the reflection of the research findings also points to a need for deeper investigation of other aspects of the considered topic. Results regarding the importance of quality in the context of VAS and the lack of performance measures in the customer responsiveness field indicate the necessity of further research in these subject areas. In this way, the aspect of importance of quality in the context of VAS postulates a more profound level of detail in understanding this issue from the customer-supplier perspectives. The lack of performance measures in the context of the customer responsiveness category, in turn, requires a need for a novel framework of the performance management system for distribution centres providing VAS.

Furthermore, the empirical study confirmed that VAS performed in distribution centres in the form of material-related activities are generally considered as supplementary services which are offered from logistics service providers willing to go beyond traditional storage operations. This means that all decision, approaches and controls in respect of VAS, in the "real" business world, might be closely connected with the strategies regarding the "traditional" services of distribution centres. This research, however, dealt exclusively with the performance of distribution centres related to VAS. Therefore, the explored issues regarding operational strategies of distribution centres were considered in the autarkic context of VAS, which is the limitation of this particular study. Thus, to extend the knowledge of DC performance gained by this study, further research on the VAS in the context of the general business systems of distribution centres will be required.

These, as well as the other aspects discussed above count towards the limitations of this study that need to be addressed in future research. Table 42 presents several ideas for further investigation acknowledged through the reflection of the research findings of this study.

Subjects reflecting research limitations	**Possible questions need to be addressed**
Lack of focus on information-related VAS	• Why do the managers of distribution centres have a limited focus on the information-related VAS?

	• What are the factors that stimulate the development of non-physical VAS in distribution centres?
Importance of quality in the context of VAS in DCs	• Is the aspect of quality importance touching all types of VAS provided in VAS, or are there clusters? • How is this issue considered from the perspectives of the customers of logistics service providers?
Lack of performance measures related to the customer responsiveness category	• What are the performance measures that can assess customer responsiveness in the particular context of VAS demand in DCs? • How can an adequate model of a VAS performance measurement system look like?
VAS performance in the overall concept of DCs	• How different are the required supply attributes of VAS and traditional warehouse operations? • To which extent do the performance strategies of VAS performance depend on the strategies of traditional warehouse operations?

Table 42. Recommended Directions for Further Research

6.4 Closing Notes

This thesis represents an original contribution to the theoretical and practical field of the topic of VAS in distribution centres. The perspectives that underpinned this thesis have not been used in previous studies. Therefore, many arguments are initial in their nature. From this point of view, this thesis can be considered as a scientific piece of work which opens new research debates on the social contexts of VAS in the construct of modern warehouse logistics. The hope at this point is that this thesis will inspire a greater level of attention to this topic and will enthusiastically motivate further research into this field of study.

Reflection – Part V

The completion of the DBA dissertation has come to an end, and, with its genuine contributions, this research paper can be added to the existing fraternity of business research publications in the context of warehouse logistics. Now, as I approach the final lap of my DBA journey and come to reflect on the context of scientific matter, it becomes clear that the concept of originality of each scientific work is not only linked to their innovative contributions into different research streams, but can be also influenced by the personal researchers' paradigms, which exist regardless of the content of studied topics. In other words, the personal values and beliefs of the researchers can have a huge impact on the methodological constructs underpinning each concrete study, and consequently, make their results unique. Considering the final draft of my thesis from the perspectives of this discourse, I must stress that my scientific work was no exception in this context.

This thesis is a product of the up and down streamed interactions between me - as an individual with my own personal paradigms - and the studied scientific matter. Hence, the

procedure in which I carried out my research was in many ways influenced by my own personal values and beliefs, which were shaped based on different historical-social experiences from my life. And, as strange as it sounds, my individual ontological and epistemological perspectives were of a special significance in this context. Indeed, I was not wrong in saying that it sounds strange. In fact, I perceive the influence of my personal ontological and epistemological principles on the research procedure, to a certain extent, as a phenomenon as they stood in stark contrast to the philosophical perspectives which were applied in the study.

Essentially, I find that my individual paradigm relates more closely to the perspectives of positivist paradigm, as my perception of reality and the way in which I have acquired knowledge are based on the principles of objectivism. In saying so, I must admit that this self-reflection does not solely touch on the way I act in the scientific arena alone. I would claim that such ontological and epistemological concepts are relevant in all aspects of my life. This means that the paradigm principles of my individuum lay in the fact that the reality exists independently of human perceptions and interactions, and that this reality can be explained by both statistical data and facts. The purpose of this research, in contrast, required the use of a phenomenological paradigm for the methodological structure of my study. Such constellations forced me to use a more pragmatic approach, which implies the adoption of those research paradigms, strategies and methods, which were most adequately applied to the overall purpose of this particular study. Therefore, to achieve the goal of my study I was required to rethink the role of my individual paradigm and to understand the significance of phenomenological research directions. Ultimately, through this reflection it became clear to me that the principles of the interpretivist paradigm have a crucial significance for the purposes of my study.

Now, however, looking at the overall results of this thesis, it became evident that (notwithstanding that the research was designed following phenomenological principles) my personal paradigm had a huge impact on the results of my study. This is especially notable when reflecting on the limitations of my study. In view of the fact that if I were to ask why my study has these limitations, it would become clear that they are largely attributable to the fact that some aspects of the philosophical position of an positivist lead to the forming of the research design and consequently affected the results of the study. In particular, as was shown in the conclusion section of this dissertation, the limitations of my study were mainly due to determined methodology, which was based on the quota sampling

technique. And although all technique and methods used for the data obtainment and data analysis were strongly qualitative in their nature, at the end of the day I strived to have the same number of responses from each company, from the managers with the same functions, who were essentially asked the same interview questions without any deviations. Such a strategy is, in turn, rather close to the steps which are typical for a quantitative study, whereby the data need to be statistically examined between different research groups. Now, I would argue that such methodological structure was largely impacted by my personal ontological and epistemological views. And that methodological structure did not enable me to use the "waterfall" strategy for some aspects of my findings that required an additional deeper examination, which consequently led to the limitations of this study.

However, it goes without saying that if my research had not been influenced by my personal paradigm, it would still have the limitations, which might probably look different. Therefore, the impact of individual paradigm on the research procedure at this point cannot be considered as a critical point of my study, but rather as a determination of the facts. The fact which indicates that the originality of my thesis, besides other aspects, relates to my personal ontological and epistemological perspectives which influenced my research procedure and consequently the results of my study. In particular, now looking at my dissertation I can conclude that this scientific work was developed based on the principles of phenomenological interpretivist from a researcher with a positivist paradigm. And this is what makes my study peculiar…

References

Abideen, A., & Mohamad, F. (2020). Supply chain lead time reduction in a pharmaceutical production warehouse – a case study. *International Journal of Pharmaceutical and Healthcare, 14*(1), pp. 61-88.

Abushaikha, I., Salhieh, L., & Towers, N. (2018). Improving distribution and business performance through lean warehousing. *nternational Journal of Retail & Distribution Management, 46*(8), pp. 780-800.

Alderson, W. (1950). Marketing efficiency and the principle of postponement. *Cost and Profit Outlook, 3*, pp. 15-18.

Allen, P., & Varga, L. (2007). Complexity: The Co-evolution of epistemology, axiology and ontology. *Nonlinear Dynamics Psychology and Life Sciences, 11*(1), pp. 19-50.

Al-Saadi, H. (2014). Demystifying Ontology and Epistemology in research methods. *Research gate, 1*(1), pp. 1-10.

Ambe, I. (2012). Determining an optimal supply chain strategy. *Journal of Transport and Supply Chain Management, 6*(1), pp. 126-147.

Anderson, E., Coltman, T., Devinney, T., & Keating, B. (2011, April). What drives the choice of a third-party logistics provider? *Journal of Supply Chain Management, 47*(2), pp. 97-115.

Andersson, D., & Roso, V. (2016). Developing dry ports through the use of value-added services. *Commercial Transport*, 191-203.

Ardjmand, E., Shakeri, H., Singh, M., & Bajgiran, O. (2018, December). Minimizing order picking makespan with multiple pickers in a wave picking warehouse. *International Journal of Production Economics, 206*, pp. 169-183.

Arif, J., & Jawab, F. (2018). Outsourcing of Logistics' Activities: Impact Analysis on Logistics Service Performance. *11th International Colloquium of Logistics and Supply Chain Management LOGISTIQUA 2018*, (pp. 88-92). FST, Tangier, Morocco.

Atkacuna, I., & Furlan, K. (2009, June). Value-Added Services in Third-Party Logistics : A study from the TPL providers' perspective about value-added service development, driving forces and barriers. Jönköping International Business School. Retrieved from http://www.diva-portal.org/smash/get/diva2:233689/FULLTEXT01.pdf

Aziz, Z., Razak, R., Hussin, N., Yaacob, M., & Merican, R. (2017). *The Relationship of Logistics Flexibility and Value-added Capability on Logistics Performance in Logistics Services.* Kelantan: University of Malaysia Kelantan.

Baby, B., Prasanth, N., & Jebadurai, D. (2018). Implementation of lean principles to improve the operations of a sales warehouse in th manufacturing industry. *International Journal of Technology, 1*, pp. 46-54.

Baker , P. (2004). Aligning Distribution Centre Operations to Supply Chain Strategy. *International Journal of Logistics Management*, pp. 111-123.

Baker, P. (2008). *The role, design and operation of distribution centres in agile supply chain*. Retrieved from http://hdl.handle.net/1826/3022

Barney, J. (1991, March 1). Firm Resources and Sustained Competitive Advantage. *Journal of Management*(17 (1)), pp. 99-120.

Bartholdi, J., & Hackman, S. (2011). *Warehouse & Distribution Science* . Atlanta, GA 30332-0205 USA: Supply Chain and Logistics Institute, School of Industrial and Systems Engineering, Georgia Institute of Technology.

Baruffaldi G, Accorsi, R., & Manzini, R. (2019). Warehouse management system customization and information availability in 3pl companies: A decision-support tool. *Industrial Management & Data Systems*.

Berglund, M. (2000). *Strategic Positioning of the Emerging Third-Party Logistics Providers.* Linköping: Linköping University.

Bernard, H. (2000). *Social Research Methods: Qualitative and Quantitative Approaches.* Thousand Oaks, California, USA: Sage Publications, Inc.

Bhamra, R., Nand, A., Yang, L., Albregard, P., Azevedo, G., Corraini, D., & Emiliasiq, M. (2021). Is leagile still relevant? A review and research opportunities. *Total Quality Management & Business Excellence*, *32*(13-14), pp. 1569-1593. doi:doi:http://dx.doi.org/10.1080/14783363.2020.1750360

Bowen Jr, J. (2008). Moving places: the geography of warehousing in the US. *Journal of Transport Geography*, *16*, pp. 379-387.

Bowersox, D., & Closs, D. (1996). *Logistical Management: The Integrated Supply Chain Process.* New York: The McGraw-Hill Companies, Inc.

Bowersox, D., Closs, D., & Cooper, M. (2010). *Supply Chain Logistics Management* (Vol. 3). McGraw-Hill.

Boyland, J. (2019). A social constructivist approach to the gathering of empirical data. *Australian Counselling Research Journa*, pp. 30-34.

Brown, S., Stevens, R., Troiano, P., & Schneider, M. (2002). Exploring complex phenomena: Grounded theory in student affairs research. *Journal of college student development*, *43*(2), pp. 173-183.

Bruce, M., Daly, L., & Towers, N. (2004). Lean or agile: A solution for supply chain management in the textiles and clothing industry? *nternational Journal of Operations & Production Management*, *24*(2), pp. 151-170.

Bucklin, L. (1965). Postponement, speculation and the structure of distribution channels. *Journal of Marketing Research*, *2*(1).

Butler, A., Copnell, B., & Hall, H. (2018). The development of theoretical sampling in practice. *Collegian*, *25*(5), pp. 561-566.

Carson, D., Gilmore, A., Perry, C., & Gronhaug, K. (2001). *Qualitative marketing research.* London: Sage.

Castro, J., & Jaimes, W. (2017). Dynamic Impact of the Structure of the Supply Chain of Perishable Foods on Logistics Performance and Food Security. *Journal of Industrial Engineering and Management*, pp. 687-710.

Chakravarty, A. (2014). Logistics and Fulfillment Services. In *Supply Chain Transformation* (pp. 129-162). Northeastern University.

Chen, L., & Notteboom, T. (2012 (b)). Distribution and value added logistics in the cold chain product market with application to the role of seaports. *Asian Logistics Round Table 2012 Conference.* Vancouver: University of British Columbia (UBC),.

Chen, L., & Notteboom, T. (2012). Determinants For Assigning Value-added Logistics Services To Logistics Centers Within A Supply Chain Configuration. *OURNAL OF INTERNATIONAL LOGISTICS AND TRADE, 10*(1), pp. 3-41.

Chen, L., & Notteboom, T. (2014). A cost perspective on the location of value-added logistics services in supply chains. *International Journal of Logistics Systems and Management, 18*(1), 24-48.

Cheng, K., Harrison, D., & Pan, P. (1998). Implementation of agile manufacturing – an AI and internet based approach. *Journal of Materials Processing Technology, 76*(1-3), pp. 96-101.

Chopra, S., & Meindl, P. (2007). *Supply Chain Management: Strategy, Planning and Operation.* Upper Saddle River: Pearson Prentice Hall.

Christopher, M. (2005). *Logistics and supply chain management: creating value-adding networks.* London: Prentice Hall.

Christopher, M., & Towill, D. (2000). Supply chain migration from lean and functional to agile and customised. *Supply Chain Management, 5*(4).

Christopher, M., & Towill, D. (2001). An Integrated Model for the Design of Agile Supply Chains. *International Journal of Physical Distribution and Logistics Management, 31*(4), pp. 235-246.

Church, R. (2002). The effective use of secondary data. *Learning and motivation, 33*(1), pp. 32-45.

Ciesielska, M., Boström, K., & Öhlander, M. (2018). Observation Methods. In M. Ciesielska, & D. Jemielniak, *Qualitative Methodologies in Organization Studies. Voulme II: Methods and Possibilities* (pp. 33-52). United Kingdom: Palgrave Macmillan.

Clegg, S., & Kornberger, M. (2003, 12 31). Modernism, Postmodernism, Management and organization theory. *Research in the Sociology of Organizations, 21*, pp. 55-88.

Coghlan, D. (2011). Organization development and action research. In D. Boje, B. Bernard, & H. John, *The Routledge Companion to Organizational Change.* 46-58.

Corbin, J., & Strauss, A. (2008). *Strategies for qualitative data analysis. Basics of Qualitative Research. Techniques and procedures for developing grounded theory.* 3(10.4135): 9781452230153.

Cornwell, S. (1999). Interview with Anne Burns and Graham Crookes. *The Language Teacher, 23*(12), pp. 5-10.

Coyne, I. (1997). Sampling in qualitative research. Purposeful and theoretical sampling; merging or clear boundaries? *Journal of advanced nursing, 26*(3), pp. 623-630.

Creswell, J., Hanson, W., & Clark Plano, V. (2007). Qualitative research designs: Selection and implementation. *The counseling psychologist, 35*(2), pp. 236-264.

Crowe, S., Cresswell, K., Robertson, A., Huby, G., Avery, A., & Sheikh, A. (2011). The case study approach. *BMC medical research methodology, 11*(1), pp. 1-9.

Crowther, D., & Lancaster, G. (2008). *Research methods in education.*

David, R., & Felix, P. (2002). *Research methods in politics. Research project.* University of liverpool department of social and environmental studies.

Davila, T., & Wouters, M. (2007, May 15). An empirical test of inventory, service and cost benefits from a postponement strategy. *International Journal of Production Research, 45*(10), pp. 2245–2267.

Dawe, R. (1995). *Reengineer Warehousing, Transportation and Distribution* (Vols. 36, No. 1, p. 98-102).

Denzin, N., & Lincoln, Y. (2005). *The Sagen Handbook of Qualitative Research.* London: Sage.

Don-Solomon, A., & Eke, G. (2018). Ontological & epistemological philosophies underlying theory building: A scholarly dilemma or axiomatic illumination-The business research perspective. *European Journal of Business and Innovation Research, 6*(2), pp. 1-7.

Dubey, R., & Gunasekaran, A. (2015). Agile manufacturing: framework and its empirical validation. *International Journal of Advanced Manufacturing Technology, 76*(9-12), pp. 2147-2157.

Easterby-Smith, M., Thorpe, R., & Jackson, P. (2012). *Management research.* Sage.

Easterby-Smith, M., Thorpe, R., & Lowe, A. (1991). *Management Research: An Introduction.* London: Sage.

Easwaramoorthy, M., & Zarinpoush, F. (2006). Interviewing for research. *Canada volunteerism initiative, 6*, pp. 1-2.

Edmunds, H. (1999). *The focus group research handbook.* The Bottom Line.

Eilifsen, A., & Messier Jr, W. (2000). A review and integration of archival research. *Journal of Accounting Literature, 19*, pp. 1-43.

El Hussein, M., Hirst, S., Salyers, V., & Osuji, J. (2014). Using grounded theory as a method of inquiry: Advantages and disadvantages. *Qualitative Report, 19*(27).

Elaati, A. (2016, June). Postmodernism Theory. pp. 1-6. doi:10.13140/RG.2.1.4515.0327

Etikan, I., Musa, S., & Alkassim, R. (2016). Comparison of convenience sampling and purposive sampling. *American journal of theoretical and applied statistics, 5*(1), pp. 1-4.

Faber, N., De Koster, R., & Smidts, A. (2013, August). Organizing warehouse management. *International Journal of Operations & Production Management, 33*(9), pp. 1230-1256.

Faber, N., De Koster, R., & Smidts, A. (2018). Survival of the fittest: the impact of fit between warehouse management structure and warehouse context on warehouse performance. *International Journal of Production Research, 56*(1-2), pp. 120-139.

Fetters, M., Curry, L., & Creswell, J. (2013). Achieving integration in mixed methods designs—principles and practices. *Health services research, 48*(6pt2), pp. 2134-2156.

Fisher, M. (1997, March/April). What is the right supply chain for your product? *Harvard Business Review, 75*, pp. 105-116.

Fletcher, A. (2020). *The Reality of Gender (Ideology): Using Abduction and Retroduction in Applied Critical Realist Research.* Abingdon and New York: Routledge.

Fletcher, D., & Hardill, I. (1995). Value- adding competitive strategies: A comparison of clothing SMEs case studies in France and Great Britain. *International Small Business Journal*(14 (1)), pp. 33-52.

Foulds, L., & Luo, Y. (2006, April 21). Value-added services for sustainable third-party warehousing. *International Journal of Logistics Systems and Management* , pp. 194-216.

Frazelle, E. (2002a). *World-Class Warehousing and Material Handlichng.* New York: McGraw-Hill.

Freitas, A., Silva, F., Ferreira, L., Sa, J., Pereira, M., & Pereira, J. (2019). Improving efficiency in a hybrid warehouse: a case study. *Procedia Manufacturing, 38*, pp. 1074–1084.

Frohmann, B. (1994). Discourse analysis as a research method in library and information science. *Library & Information Science Research, 16*, pp. 119-138.

Furmans , K., & Deml, B. (2014). *Systematische Bewertung von Value-Added-Services in Distributionszentren.* Karlsruhe.

Giannikas, V., Lu, W., Robertson, B., & McFarlane, D. (2017, July). An interventionist strategy for warehouse order picking: Evidence from two case studies. *International Journal of Production Economics, 189*, pp. 63-76.

Gillham, B. (2008). *Observation techniques: structured to unstructured.* Education Review.

Glaser, B., & Strauss, A. (1967). *The Discovery of Grounded Theory. Strategies for Qualitative Research.* Mill Valley: The Sociology Press.

Glaser, B., & Strauss, A. (2017). Theoretical sampling. *Sociological methods*, pp. 105-114.

Griffis, S., Cooper, M., Goldsby, T., & Closs, D. (2004). PERFORMANCE MEASUREMENT: MEASURE SELECTION BASED UPON FIRM GOALS AND INFORMATION REPORTING NEEDS. *Journal of Business Logistics, 25*(2), pp. 95-118.

Grimshaw, A. (1973). Comparative Sociology: In What Ways Different from Other Sociologies? In M. Armer, & A. Grimshaw, *Comparative Social Research:Methodological Problems and Strategies* (pp. 3-48). New York: Wiley.

Guba, E., & Lincoln, Y. (1994). Competing paradigms in qualitative research. In N. Denzin, & Y. Lincoln, *Handbook of Qualitative Research* (pp. 105-117). Thousand Oaks: Sage.

Guimarães, L., & Alves, J. (2021, March). Improving picking performance at a large retailer warehouse by combining probabilistic simulation, optimization, and discrete-event simulation. *International Transactions in Operational Research, 28*(2), pp. 687-715.

Gunasekaran, A. (. (1998). Agile manufacturing: A framework for research and development. *International Journal of Production Economic*(62), pp. 87-105.

Gunaserakan, A. (1998). Agile manufacturing: enablers and an implementation framework. *International Journal of Production Research, 36*(5), pp. 1223-1247.

Guo, Z. (2017). A Study on the Core Competence of the Third Party Logistics Enterprises -- Taking Rongqing Logistics as an Example. *International Journal of Academic Research in Business and Social Sciences, 7*(5), pp. 222-232.

Hafiz, K. (2008). *Case study ecmple* (Vol. 13). The qualitative report.

Hamdy, W., Mostafa, N., & Elawady, H. (2018). Towards a smart warehouse management system. *Proceedings of the International Conference on Industrial Engineering and Operations Management*, pp. 2555-2563.

Harris, G., Componation, P., & Farrington, P. (2010, December). An Exploration of Fisher's Framework for the Alignment of Supply Chain Strategy With Product Characteristics. *Engineering Management Journal*, pp. 30-44.

Hatch, M. (2018). *Organization theory: Modern, symbolic, and postmodern perspectives* (Vol. 4). Oxford: Oxford University Press.

Hatton, G. (1990). *Designing a warehouse or distribution center In: The Gower Handbook of Logistics and Distribution.* 4th ed., edited by Gattorna, J.L., Gower, Aldershot.

Hennink, M., & Kaiser, B. (2021). Sample sizes for saturation in qualitative research: A systematic review of empirical tests. *Social Science & Medicine*, p. 114523.

Herrera, A., & Yang, L. (2017, May). Understanding value-added service offering by 3PL providers: VAS as a source of competitive advantage for the provider and the customer. Jönköping University. doi:10.13140/RG.2.2.30386.71369

Higginson, J., & Bookbinder, J. (2005). Distribution centres in supply chain operations. *Logistics Systems: Design and Optimization*, pp. 67-91.

Hill, T. (1993). *Manufacturing Strategy: Text and Cases* (2 ed.). London: MacMillan Press.

Ho, L.-H., & Chang, P.-Y. (2015). Innovation Capabilities, Service Capabilities and Corporate Performance in Logistics Service. *International Journal of Organizational Innovation, 7*(3), pp. 24-33.

Hox, J., & Boeije, H. (2005). Data collection, primary vs. secondary. *Encyclopedia of social measurement, 1*(1), pp. 593-599.

Huang, S.-H., & Hsu, W.-K. (2016). A knowledge gap model for improving service quality of international distribution centers. *Maritime Economics & Logistics, 18*, pp. 476-495.

Hudson, L., & Ozanne, J. (1988). Alternative ways of seeking knowledge in consumer research. *Journal of consumer research, 14*(4), pp. 508-521.

Hultman, J., Hertz, S., Johnsen, R., & Johnsen, T. (2009). *Global sourcing development at IKEA – a case study.*

Hussey, J., & Hussey, R. (1997). *Business Research: A Practical Guide for Undergraduate and Postgraduate Students.* London: Macmillan.

Ikechukwu, A. (2019). Assessment of organizational performance of private manufacturing companies: the impact of supply chain management responsiveness. *Journal of System and Management Sciences, 9*(3), pp. 26-44.

Jaaron, A., & Backhouse, C. (2016, November 14). A systems approach for forward and reverse logistics design: Maximising value from customer involvement. *The International Journal of Logistics Management, 27*(3), pp. 947-971.

Jafari, H., Eslami, M., & Paulraj, A. (2022). Postponement and logistics flexibility in retailing: The moderating role of logistics integration and demand uncertainty. *International Journal of Production Economics*. doi:https://doi.org/10.1016/j.ijpe.2021.108319

Jafari, H., Nuberg, A., & Hillethofth, P. (2016). Postponement and logistics flexibility in retailing: a multiple case study from Sweden. *Industrial Management & Data Systems, 116*(3), pp. 445-465.

Jaller, M., & Pineda, L. (2017). *Warehousing and Distribution Center Facilities in Southern California: The Use of the Commodity Flow Survey Data to Identify Logistics Sprawl and Freight Generation Patterns.* University of California: Leticia Pineda,. doi:https://escholarship.org/content/qt5dz0j1gg/qt5dz0j1gg_noSplash_b7d8a66052d159206f57581d2cf1f8df.pdf

Jamshed, S. (2014). Qualitative research method-interviewing and observation. *Journal of basic and clinical pharmacy, 5*(4), p. 87.

Jelen, I., & Kolinska, K. (2016). *Logistics Management - modern development trends.* Poznan: Poznan School of Logistics Press.

Jermsittiparsert, K., Sutduean, J., & Sriyakul, T. (2019). Role of warehouse attributes in supply chain warehouse efficiency in Indonesia. *International Journal of Innovation, Creativity and Change, 5*(2), pp. 786-802.

Johansson, H., McHugh, P., Pendlebury, A., & Wheeler, W. (1993). *Business Process Re-engineering: Breakpoint Strategies for Market Dominance.* Chichester, UK: Wiley.

Johnson, A., & McGinnis, L. (2011). Performance measurement in the warehousing industry. *IIE Transactions*, pp. 220-230.

Kahraman, A. (2015). Relationship of modernism, postmodernism and reflections of it on education. *Procedia - Social and Behavioral Sciences, 174*, pp. 3991-3996. doi:10.1016/j.sbspro.2015.01.1146

Karagiannaki, A., Papakiriakopoulos, D., & Bardaki, C. (2011, May 24). Warehouse contextual factors affecting the impact of RFID. *Industrial Management & Data Systems, 111*(5), pp. 714-734.

Kawulich, B. (2004). *Qualitative Data Analysis Techniques.* Amsterdam, The Netherlands: Conference: RC33 (ISA).

Khan, R., Iftikhar, A., & Khan, M. (2015). Impact of Third Party Logistics (3PL) on Customer Satisfaction in Pharmaceutical Industry of Pakistan. *Global Management Journal for Academic & Corporate Studies, 5*(2), pp. 75-84.

Killam, L. (2013). *Research terminology simplified: Paradigms, axiology, ontology, epistemology and methodology.* Laura Killam.

Kisperska-Moron, D., & De Haan, J. (2011). Improving supply chain performance to satisfy final customers: 'Leagile'' experiences of a polish distributor. *International Journal of Production Economics, 133*(1), p. 127.134.

Kovács, G., & Spens, K. (2005). Abductive reasoning in logistics research. *International journal of physical distribution & logistics management*.

Krafcik, J. (1988). Triumph Of The Lean Production System. *Sloan Management Review, 30*(1), pp. 41-52.

Kumar, M., Garg, D., & Agarwal, A. (2019). An Analysis of Inventory Attributes in Leagile Supply Chain: Cause and Effect Analysis. *nternational Journal of Mathematical, Engineering and Management Sciences, 4*(4), pp. 870-881.

Kursini, E., Novendri, F., & Helia, V. (2018). Determining key performance indicators for warehouse performance measurement–a case study in construction materials warehouse. *MATEC Web of Conferences (Vol. 154, p. 01058). EDP Sciences*.

Lai, K. (2004, September). Service capability and performance of logistics service provider. *Transportation Research Part E: Logistics and Transportation Review*, pp. 385-399.

Lam, H., Choy, K., Ho, G., Cheng, S., & Lee, C. (2015, December). A knowledge-based logistics operations planning system for mitigating risk in warehouse order fulfillment. *International Journal of Production Economics, 170*, pp. 763-779.

Langley , C., Allen, G., & Tyndall, G. (2004). *Third-Party Logistics Study. Results and Findings of the 2004 Ninth Annual Study.* Capgemini, Georgia Institute of Technology, FedEx.

Langley, C. (2007). *The State of Logistics Outsourcing 2007 third-party logistics. Results and Findings of the 12th Annual Study.* Capgemini, Georgia Institute of Technology.

Langley, C. (2019). *The State of Logistics Outsourcing. 2019 Third-Party Logistics Study. Results and Findings of the 23th Annual Study.*

Lao, S., Choy, K., Ho, G., & Yam, R. (2012). An RFRS that combines RFID and CBR technologies. *Industrial Management & Data Systems, 112*(3), pp. 385-404.

Laosirihongthong, T., Adebanjo, D., Samaranayake, P., Subramanian, N., & Boon-itt, S. (2018). Prioritizing warehouse performance measures in contemporary supply chains. *International Journal of Productivity and Performance, 67*(9), pp. 1703-1726.

Lee, H. (2002). Aligning Supply Chain Strategies with Product Uncertainty. *California Management Review Reprint Series, 44*(3), pp. 104-119.

Levitt, H., Motulsky, S., Wertz, F., Morrow, S., & Ponterotto, J. (2017). Recommendations for designing and reviewing qualitative research in psychology: Promoting methodological integrity. *Qualitative psychology, 4.1*(2).

Liu, J., & Liu, S. (1997). Modernism, postmodernism, and Neo-Confucian thinking: A critical history of paradigm shifts and values in academic psychology. *New ideas in psychology, 15*(2), pp. 159-178.

Llewellyn, G., Sullivan, G., & Minichiello, V. (2004). Sampling in qualitative research. In *Handbook of research methods for nursing and health science*. Pearson Education Australia.

Lopez, V., & Whitehead, D. (2013). Sampling data and data collection in qualitative research. *Nursing & midwifery research: Methods and appraisal for evidence-based practice*, pp. 123-140.

Lotfi, M., & Saghiri, S. (2018). Disentangling resilience, agility and leanness: Conceptual development and empirical analysis. *Journal of Manufacturing Technology Management, 29*(1), pp. 168-197.

Lu, C.-S., & Yang, C.-C. (2010). Logistics service capabilities and firm performance of international distribution centre operators. *The Sevice Industries Journal*, pp. 281-298.

Lv, C., & Chen, X. (2013). The Extension of Third-Party Logistics Value-Added Services in the Financial Field. *LISS 2012*, 203-207.

Mackey, A., & Gass, S. (2005). *Second language research: Methodology and design.* New Jersey: Lawrence Erlbaum Associates, Inc.

Magaldi, D., & Berler, M. (2020). Semi-structured interviews. *Encyclopedia of personality and individual differences*, pp. 4825-4830.

Maia, J., & Cerra, A. (2009). Interrelation between supply chain management and logistics: a case study in the Brazilian plant of a multinational automoive company. *Revista Gestao Industrial, v. 05, n. 01*, pp. 59-73.

Majeed, I. (2019, November 11). Understanding Positivism in Social Research: A Research Paradigm of Inductive Logic of Inquiry. *International Journal of Research in Social Sciences, 9*(11), pp. 118-125.

Marshall, M. (1996). Sampling for qualitative research. *Family practice, 13*(6), pp. 522-526.

Mason, J. (2002). *Qualitative researching* (Vol. 2). London: Sage.

Mason-Jones, R., Naylor, B., & Towill, D. (2000 (b)). Engineering the leagile supply chain. *International Journal of Agile Management Systems, 2*(1), pp. 54-61.

Mason-Jones, R., Naylor, B., & Towill, D. (2000). Lean, agile or leagile? Matching your supply chain to the marketplace. *International Journal of Production Research, 38*(17), pp. 4061-4070.

Mayer, S., Thirty, E., & Frank, C. (2009). *6. Europäische A.T. Kearney-/ ELALogistik Studie 2008/2009: Supply-Chain Excellence in der globalen Wirtschaftskrise.* A.T. Kearney, European Logistics Association.

Meier, T., & Andersson, D. (2003). *The Swedish TPL Industry – An Overview from the End of the 1990s to 2000.* Turku, Finland: Turku School of Economics and Business .

Mendibil, K., & MacBryde, J. (2005). Designing effective team-based performance measurement systems: an integrated approach. *Production Planning & Control, 16*(2), pp. 208-225.

Menegaki, A., & Alexopoulos, A. (2017). Evolution of logistics centers and value-added services offered in port areas and the importance of marketing. *Strategic Innovative Marketing*, 291-297.

Mertens, D. (2005). *Research and Evaluation in Education and Psychology: Integrating Diversity with Quantitative, Qualitative, and Mixed Methods* (Vol. 2). Thousand Oaks: Sage.

Michel, R. (2017, November 1). 2017 Warehouse / Distribution Center Survey: In the thick of e-commerce adjustments. *Supply Chain Management Review*. doi:https://www.scmr.com/article/2017_warehouse_distribution_center_survey_in_the_thick_of_e_commerce_adjust

Michel, R. (2020, November 11). 2020 Warehouse/DC Operations Survey: COVID-19 pandemic hits, operations respond. *Logistcis Management*. doi:https://www.logisticsmgmt.com/article/2020_warehouse_dc_operations_survey

Mills, A., & Helms Mills, J. (2018). *Archival research. The Sage handbook of qualitative research methods in business and management.* London: Sage.

Mills, A., Durepos, G., & Wiebe, E. (2009). *Encyclopedia of case study research.* (Eds, Ed.) Sage Publications.

Mohammadzadeh, M., Sobhanallahi, M., & Khamseh, A. (2020). Closed loop supply chain mathematical modeling considering lean agile resilient and green strategies. *Croatian Operational Research Review, 11*(2), pp. 177-197. doi:doi:http://dx.doi.org/10.17535/crorr.2020.0015

Mohr, J., & Ventresca, M. (2002, January). *Archival Research Methods.* Retrieved from 10.1002/9781405164061.ch35

Mokadem, M. (2017). The classification of supplier selection criteria with respect to lean or agile manufacturing strategies. *Journal of Manufacturing Technology Management, 28*(2), pp. 232-249.

Moon, J. (2004). *A Handbook of Reflective and Experiential Learning: Theory and Practice.* London and New York: Routledge .

Morash, E. (2001). Supply Chain Strategies, Capabilities, and Performance. *Transportation Journal, 41*(1), pp. 37-54.

Morse, J. (2015). Data were saturated... *Qualitative health research, 25*(5), pp. 587-588.

Mukherjee, K. (2016). *Production, 26*(2), pp. 249-260.

Muralidar, M. (2015). Agile Manufacturing -An Overview. *International Journal of Science and Engineering Applications, 4*(3), pp. 156-159.

Murchison, J. (2010). *Ethnography essentials: Designing, conducting, and presenting your research* (Vol. 25). John Wiley & Sons.

Myers, M. (2019). *Qualitative research in business and management.* Sage.

Nagel, R. (1991). *21ST Century Manufacturing Enterprise Strategy Report.* Lehigh University.

Narasimhan, R., Swink M, & Kim, S. (2006). Disentangling leanness and agility: an empirical investigation. *Journal of Operations Management, 24*(5), pp. 440-457.

Naylor, J., Naim, M., & Berry, D. (1999). Leagility: Integrating the lean and agile manufacturing paradigms in the total supply chain. *International Journal of Production Economics, 62*, pp. 107-118.

Nel, J., & Badenhorst-Weiss, J. (2010, November). SUPPLY CHAIN DESIGN: SOME CRITICAL QUESTIONS. *Journal of Transport and Supply Chain Management*, pp. 198-223.

Ohno, T. (1988). *Toyota Production Systems: Beyond Large Scale Production.* Cambridge, MA: Productivity Press.

Okorie, C., Tipi, N., & Hubbard, N. (2016). Analysis of the potential contribution of value-adding services to the competitive logistics strategy of ports. *Maritime Economics & Logistics, 18*(2), pp. 158-173.

Oktay, J. (2012). *Grounded theory.* Oxford University Press.

Oliver, K. (1998, January). A Journey into Narrative Analysis: A Methodology for Discovering Meanings. *Journal of Teaching in Physical Education, 17*(2), pp. 244-259.

Onstein, S. (2015). Distribution structure and distribution centre location decision-making-a review. *Vervoerslogistiek Werkdagen.*

Parasuraman, A., Zeithaml, V., & Berry, L. (1985). A conceptual model of SQ and its implications for future research. *Journal of Marketing, 49*(3), pp. 41-50.

Park, Y., Artino, A., & Konge , L. (2020, May 5). The Positivism Paradigm of Research. *Academic Medicine, 95*, pp. 689-694.

Pasian, B. (2015). *Designs, Methods and Practices for Research of Project Management.* Gower Publishing. Retrieved from 978-1-4094-4880-8

Paul, G. (1993). Approaches to abductive reasoning: an overview. *Artificial intelligence review, 7*(2), pp. 109-152.

Phyllis, C. (2021). Determination of Performance Indicators for Warehouse Evaluation: A Case of Medium Sized Warehouses in Nakuru Town. *Journal of Procurement & Supply Chain, 5*(2), pp. 32-38.

Platton, M. (1999). Enhancing the Quality and Credibility of Qualitative Analysis. *HSR: Health Services Research, 34:5 Part II*, pp. 1189-1208.

Porter, M. (1985). *Competitive Advantage.* New York: The Free Press.

Protic, S., Fikar, C., Voegl, J., & Gronalt, M. (2020). Analysing the impact of value added services at intermodal inland terminals. *International Journal of Logistics Research and Applications, 23*(2), pp. 159-177.

Purvis, L., Gosling, J., & Naim, M. (2014). The development of a lean, agile and leagile supply network taxonomy based on differing types of flexibility. *International Journal of Production Economics, 151*, pp. 100-111.

Putnik, G., & Putnik, Z. (2012). Lean vs agile in the context of complexity management in organizations. *The Learning Organization, 19*(3), pp. 248-266.

Qi, M., Li, X., Yan, X., & Zhang, C. (2018). On the evaluation of AGVS-based warehouse operation performance. *Simulation Modelling Practice and Theory, 87*, pp. 379-394.

Qu, S., & Dumay, J. (2011). The qualitative research interview. *Qualitative research in accounting & management*.

Rajamony, R., Ganesh, K., & Pugazhendhi, S. (2013). Drivers for logistics outsourcing and factor analysis for selection of 3PL provider. *International Journal of Business, 6*(1), pp. 37-58.

Ramaa, A., Subramanya, K., & Rangaswamy, T. (2012). Impact of warehouse management system in a supply chain. *International Journal of Computer Applications, 54*(1).

Reeves, S., Kuper, A., & Hodges, B. (2008). *Qualitative research methodologies: ethnography.* Bmj, 337.

Ribino, P., Cossentino, M., Lodato , C., & Lopes , S. (2018). Agent-based simulation study for improving logistic warehouse performance. *Journal of Simulation, 12*(1), pp. 23-41.

Rivera, L., Sheffi, Y., & Knoppen, D. (2016, September). Logistics clusters: The impact of further agglomeration, training and firm size on collaboration and value added services. *International Journal of Production Economics, Volume 179*, pp. 285-294.

Robson, C. (2002). *Real World Research. A Resource for Social Scientists and Practitioner-Researchers* (Vol. 2). Malden: Blackwell. Retrieved from ISBN 978-0-631-21305-5.

Rother, M. (1999). *Learning to See: Value Stream Mapping to Create Value and Eliminate Muda*. University of Michigan: Lean Enterprise InstituteEditor: Jim WomackISBN: 978-0966784305.

Rushton, A., Croucher, P., & Baker, P. (2014). *The Handbook of Logistics & Distribution Management* (Vol. 5). Kogan Page.

Russo, S., & Gronalt, M. (2021). Value added services at intermodal inland terminals and the importance of choosing a moderate innovation path. *Research in Transportation Business & Management, 41*.

Sabet, E., Stephans , S., & Yatdani, B. (2014). Supply chain strategies for the fast moving industries. *21st Annual EUROMA conference*, (pp. 1-10). Palermo, Italy.

Salhieh, L., & Alswaer, W. (2021). A proposed maturity model to improve warehouse performance. *International Journal of Productivity and Performance Management*.

Samuel, D., Found, P., & Williams, S. (2015). How did the publication of the book The Machine That Changed The World change management thinking? Exploring 25 years of lean literature. *International Journal of Operations & Production Management, 35*(10), pp. 1386-1407.

Sandelowski, M. (1995). Sample size in qualitative research. *Research in nursing & health, 18*(2), pp. 179-183.

Saunders, M., & Lewis, P. (2017). *Doing research in business and management.* Pearson.

Saunders, M., Lewis, P., & Thornhill, A. (2012). *Research methods for business students* (Vol. 6). Harlow: Pearson.

Sekaran, U. (1992). *Research Methods for Business: A Skill-Building Approach.* New York: John Wiley & Sons, Inc.

Seth, D., & Panigrahi, A. (2015, January 5). Application and evaluation of packaging postponement strategy to boost supply chain responsiveness: a case study. *Production Planning & Control: The Management of Operations*, pp. 1068-1089. doi:https://www.tandfonline.com/doi/full/10.1080/09537287.2015.1010626

Sharma, G. (2017). Pros and cons of different sampling techniques. *International journal of applied research, 3*(7), pp. 749-752.

Sharma, H., & Sarkar, C. (2019, June). Ethnography research: an overview. *International Journal of Advance and Innovative Research, 6*(2 (VIII)), pp. 1-5.

Sharma, V., Raut, R., Mangla , S., Narkhede, B., Luthra, S., & Gokhale, R. (2020, July 8). A systematic literature review to integrate lean, agile, resilient, green and sustainable paradigms in the supply chain management. *Business Strategy and the Environment, 30*, pp. 1191-1212.

Shi, Y., Arthanari, T., & Wood, L. (2017). Developing third-party purchase (3PP) services: New Zealand third-party logistics providers' perspectives. *Supply Chain Management, 22*(1), pp. 40-57.

Shi, Y., Zang, A., Arthanari, T., Liu, Y., & Cheng, T. (2016). Third-party purchase: an empirical study of third-party logistics providers in china. *International Journal of Production Economics, 171*, pp. 189–200. doi:https://doi.org/10.1016/j.ijpe.2015.08.028

Shoaf, L., & Shoaf, M. (2006). The hidden advantages of focus group interviews in educational research. *Journal of School Public Relations, 27*(3), pp. 342-354.

Short, S. (2006). Focus groups: Focus group interviews. *A handbook for social science field research: Essays & bibliographic sources on research design and methods*, pp. 104-117.

Slack, N., & Lewis, M. (2002). *Operations strategy.* Edinburgh: Prentice-Hall.

Smith, J. (1983). Quantitative versus qualitative research: an attempt to clarify the issue. *Educational Researcher, 12*(3), pp. 6-13.

Soinio, J., Tanskanen, K., & Finne, M. (2012, May). How logistics-service providers can develop value-added services for SMEs: A dyadic perspective. *International Journal of Logistics Management, 23*(1), pp. 31-49.

Somekh, B. (2005). *Action research.* UK: McGraw-Hill Education.

Srivastava, P., Khanduja, D., Agrawal, V., & Grover, N. (2011). Agile Manufacturing: Concepts and Evolution. *International Journal of Science and Advanced Technology, 1*(9), pp. 224-229.

Stewart, D., Shamdasani, P., & Rook, D. (2009). Group depth interviews: Focus group research. *The SAGE handbook of applied social research methods, 2*, pp. 589-616.

Storey, J., Emberson, C., & Reade, D. (2005). The barriers to customer responsive supply chain management. *International Journal of Operations & Production Management, 25*(3), pp. 242-260.

Straube , F. (2005). *Trends und Strategien in der Logistik: ein Blick auf die Agenda des Logistik-Managements 2010.* Hamburg: Deutscher Verkehrs-Verl.

Suddaby, R. (2006). From the editors: What grounded theory is not. *Academy of management journal, 49*(4), pp. 633-642.

Taherdoost, H. (2016, April 10). Sampling methods in research methodology; how to choose a sampling technique for research. *How to Choose a Sampling Technique for Research*.

Tang, K., Qian, M., & Wang, B. (2018). Analysis on the Development of Value-added Services of Logistics Enterprises in Yunnan. *3rd International Conference on Politics, Economics and Law (ICPEL 2018)* (pp. 390-392). Atlantis Press.

Tian, Y., Elinger, A., & Chen, H. (2010). Third-party logistics provider customer orientation and customer firm logistics improvement in China. *nternational Journal of Physical Distribution & Logistics Management, Bd. 40, Ausg. 5*, pp. 356-376.

Towers, N., Abushaikha, I., Ritchie, J., & Holter, A. (2020, March 30). The impact of phenomenological methodology development in supply chain management research. *Supply Chain Management: An International Journal, 25*(4), pp. 443-456.

Towill, D., & McCullen, P. (1999). The impact of an agile manufacturing programme on supply chain dynamics. *International Journal of Logistics in Manufacturing, 10*(1), pp. 83-96.

Trebilcock, B. (2011, December 21). Five tips for efficient value added services. *Modern Material Handling*. doi:https://www.mmh.com/article/five_tips_for_efficient_value_added_services

Trivedi, C. (2020, November 20). *Postmodern paradigm explained.* Retrieved from ConceptsHacked: https://conceptshacked.com/postmodern-paradigm/

Upton , D. (1995). Flexibility as process mobility: the management of plant capabilities for quick response manufacturing. *Journal of Operations Management, 12*(3/4), pp. 205-224.

Urquhart, C. (2012). *Grounded theory for qualitative research: A practical guide.* Sage.

Vacar, A. (2019). Logistics and supply chain management: an overview. *Studies in Business and Economics*(14 (2)), pp. 209-215.

Van Den Berg, J. (2007). *Integral warehouse management: the next generation in transparency, collaboration and warehouse management system.* Netherlands: Management Outlook Utrecht.

Van Hoek, R. (1998). Reconfiguring the supply chain to implement postponed manufacturing. *International Journal of Logistics Management, 9*(1), pp. 95-110.

Van Hoek, R. (2000). The role of third-party logistics providers in mass customization. *International Journal of Logistics Management, 11*(1), pp. 37-46.

Van Hoek, R. (2001). The rediscovery of postponement a literature review and directions for research. *Journal of Operations Management, 19*(2), pp. 161-184.

Vinodh, S., Balagi, T., & Patil, A. (2016). A hybrid MCDM approach for agile concept selection using fuzzy DEMATEL, fuzzy ANP and fuzzy TOPSIS. *The International Journal of Advanced Manufacturing Technology, 83*(9-12), pp. 1979-1987.

Vokurka, R., & Fliedner, G. (1998). The journey toward agility. *Industrial Management, 4*, pp. 165-171.

Wilson, B. (1979). Creating and sharing wealth: The added value approach. *Employee Relations, 1*(1), p. 7.

Womack, J., Jones, D., & Roos, D. (1990). *The Machine that changed the World: The Story of Lean Production.* New York: Harper Collins.

Wormack, J., & Jones, D. (1996). *Lean Thinking.*

Yang, B., Yang, Y., & Wijngaard, J. (2007, February 15). Postponement: an inter-organizational perspective. *International Journal of Production Research, 45*(4), pp. 971-988.

Yeung, J., & Zhang, M. (2007). Postponement strategy from a supply chain perspective: Cases from China. *International Journal of Physical, 37*(4), pp. 331-356. doi:10.1108/09600030710752532

Yin, R. (1984). *Case Study Research: Design and Methods.* Beverly Hills, Calif: Sage Publishing.

Yin, R. (2009). *Case study research: Design and methods* (Vol. 5). Sage.

Yu, Y., Wang, X., Zhong, R., & Huang, G. (2017). E-commerce logistics in supply chain management: Implementations and future perspective in furniture industry. *Industrial Management & Data Systems, 117*(10), pp. 2263-2286.

Yusuf, Y., Sarhadi, M., & Gunaserakan, A. (1999). Agile manufacturing: The drivers, concepts and attributes. *International Journal of Production Economics, 62*, pp. 33-43.

Zainal, Z. (2007). Case study as a research method. *Jurnal kemanusiaan, 9*, pp. 1-6.

Zhang, Y., & Wildemuth, B. (2009). Unstructured interviews. *Applications of social research methods to questions in information and library science*, pp. 222-231.

Zinn, W., & Bowersox, D. (1988). Planning Physical Distribution with the Principle of Postponement. *Journal of Business Logistics, 9*(2), pp. 117-136.

Appendix

Appendix I – Classification of Reviewed Publications

Categories	**Publications**
Highly cited sources - Books	Ohno (1988); Womack and Jones (1996); Porter (1985); Bowersox, Closs and Cooper (2010); Womack, Jones, and Roos (1990); Nagel (1991);
Highly cited sources - Journal reports	Fisher (1997); Bowersox and Closs (1996); Alderson (1950); Bucklin (1965); Van Hoek (2000); Van Hoek (1998) and Van Hoek (2001); Krafcik (1988); Yusuf, Sarhadi and Gunaserakan, (1999); Mason-Jones, Naylor and Towill (2000); Morash (2001); Griffis, Cooper, Goldsby and Closs (2004); Lee (2002); Bruce, Daly and Towers (2004);
Main sources - Journal articles	Atkacuna and Furlan (2009); Deml and Furmans (2013); Herrera and Yang (2017); Soinio, Tanskanen, and Finne (2012); Shi, Arthanari and Wood (2017); Shi, Zang, Arthanari, Liu and Cheng (2016); Soinio, Tanskanen and Finne (2012); Ho and Chang (2015); Aziz, et al (2017); Tian, Elinger and Chen (2010); Okorie, Tipi and Hubbard (2016); Karagiannaki, Papakiriakopoulos and Bardaki (2011); Faber, De Koster and Smidts (2013); Lao, Choy, Ho, and Yam (2012); Jaaron and Backhouse (2016); Huang and Hsu (2016); Mokadem (2017); Guo (2017); Putnik and Putnik (2012); Purvis, Gosling and Naim, (2014); Sabet, Stephans and Yatdani (2014); Nel and Badenhorst-Weiss (2010); Castro and Jaimes (2017); Sharma, et al. (2020); Baby, Prasanth and Jebadurai (2018); Freitas, et al. (2019); Abideen and Mohamad, (2020); Abushaikha, Salhieh and Towers (2018); Ikechukwu (2019); Jermsittiparsert, Sutduean and Sriyakul, (2019); Baker (2004); Baker (2008); Laosirihongthong et al (2018); Russo and Gronalt (2021); Chen and Notteboum (2012); Chen and Notteboum (2014);
Additional sources - Journal articles & Books	Bucklin (1965); Foulds and Luo (2006); Berglund (2000); Meier and Andersson (2003); Yeung & Zhang (2007); Yang, Yang and Wijngaard (2007) ; Davila and Wouters (2007) ; Mukherjee (2016) ; Seth and

	Panigrahi (2015) ; Jafari, Nyberg and Hilletofth (2015) ; Chakravarty (2014) ; Yu, Wang, Zhong and Huang (2017) ; Hultman, Hertz, Johnsen and Johnsen (2009) ; Rajamony, Ganesh and Pugazhendhi (2013) ; Arif and Jawab (2018) ; Khan, Iftikhar and Khan (2015) ; Langley (2007) ; Ribino, Cossentino, Lodato and Lopes (2018) ; Qi, Li, Yan and Zhang (2018) ; Laosirihongthong, Adebanjo, Samaranayake, Subramanian and Boon-itt (2018) ; Kursini, Novendri and Helia (2018) ; Phyllis (2021) ; Hamdy, Mostafa and Elawady (2018) ; Baruffaldi, Accorsi and Manzini (2019) ; Samuel; Found and Williams (2015) ; Dubey and Gunasekaran (2015) ; Vinodh, Balagi and Patil (2016) ; Cheng, Harrison and Pan (1998) ; Muralidar (2015) ; Gunaserakan (1998) and Gunaserakan (b) (1998) ; Srivastava, Khanduja, Agrawal and Grover (2011) ; Towill and McCullen (1999) ; Johansson, McHugh, Pendlebury and Wheeler (1993) ; Naylor, Naim and Berry (1999) ; Harris, Componation and Farrington (2010) ; Kumar, Garg and Agarwal (2019) ; Kisperska-Moron and De Haan (2011) ; Lotfi and Saghiri (2018) ; Mohammadzadeh, Sobhanallahi and Khamseh (2020) ; Bhamra, et al (2021) ; Johnson and McGinnis (2011); Ramaa, Subramanya and Rangaswamy (2012); Kursini, Novendri and Helia (2018); Salhieh and Alswaer (2021) ;
Bibliography - Journal articles	Barney, J. (1991) Firm Resources and Sustained Competitive Advantage. Journal of Management, 17, 99-120. A. Agarwal, R. Shankar, M.K. Tiwari, Modeling agility of supply chain, Industrial marketing management. 36(2007) 443-457 M. Christopher, D. Towill, An integrated model for the design of agile supply chains. International Journal of Physical Distribution & Logistics Management. 31(2001) 235-24

Appendix II – Interview Transcripts

Transcript I Company 1- Customer Manager

How do you define VAS in your DC and what types of VAS does your DC provide?

VAS is something that is very customer-specific, namely, customer-specific requirements that are not included into standard logistic processes. Such as, for example, the use of a special type of packaging, of a customized label, additional documentation, improvements in terms of kitting activities, and I would also name special ways how to pick and procure the goods during the shipment, meaning - if you have a combined shipment, I would say, this is not a VAS yet, but if we say the packages must be sorted in a particular order so that it can be perceived by the customers as a Value Added, then yes, I would say that this is already a VAS.

Q: Which criteria are you using to define whether an operation is a VAS or not?

First of all, we define our standard logistic processes as pick, pack, ship. Then, within a Distribution Centre, the main goal is the consolidation and everything that goes beyond it, i.e. whenever I deviate from the standards, for example, I provide a different packaging, a different logistic process, a different way of packing the goods, all of that I would define as VAS.

What advantages do VAS provide your DC?

We as EDC are service providers in-house, which means that there are actually very few advantages for us. Because VAS usually implies that we have to do something that is somehow beyond our standards, as a result higher costs are generated, and we actually don't create any more business operations, or something that an external service provider could generate. An external provider could say, 'ok I can do that and that and that, can settle it with my contractor', and can I qualify for the job by being able to do it all. We are rather at the end of the food chain, and we say, 'ok on that we have agreed with the customer, you have to implement that'. Now, of course, I can stand up and 'say, ok, although I am an in-house service provider, in the end, I act just like an external service provider', so that then I basically try to grow within the company. We do this by replacing a solution with an in-house solution, i.e. replacing a third party that acts from the outside or making other warehouse operators obsolete within our organization. And then, VAS are just a drop in the ocean. I would even say rather a small drop. This is always being used as a huge argument, but in the end, the price of the complete service is what always counts.

What challenges does the implementation of VAS imply?

The range of VAS is very broad, because every customer has his own requirements. At the moment, I am speaking about the EDC specifically, because EDC is focused on productivity and is best compared to others. But while running VAS we need to implement something that deviates from the standard processes or implement other activities that, first of all, delay the whole process of picking, packing and shipping. And, in general, this means for us higher process complexity.

Q: What do you understand under complexity?

Basically, up to a particular point, I have to demand a certain process from my employees, a process that always deviates from the normal processes, which means that the employees have to be able to recognize and realize that they have to do something new. That is a challenge within the day-to-day operations, because how much capacity do I really need? And at what point do I need the capacity? The accurate assessment of this is thus one of the difficulties for the warehouse manager and the team leader. It makes our operations more expensive because we tend to need more people, or more resources to implement something. It's a challenge at the administrative level as a whole because I have to follow particular guidelines, because we have to plan out our IT, because people don't understand why something is mapped in the system one way or another. And the more VAS we offer, the more exceptions we make from our standard processes, the more complex it becomes, the more difficult it is to keep track, and the more difficult it becomes to recognize error-situations

correctly. And then we still have to be able to ensure that we can provide the quality service customers expect from us.

Is the customer demand for VAS in your DC more stable or fluctuating?

Generally, the demand on such customer orders is quite stable. We have some exceptions, for example, in the case of the OEM customers, when the customers are on holiday from August to the middle of September. We don't have any orders in this period of time.

Is the demand on VAS orders more predictable or more unpredictable?

A VAS that you offer to a customer is actually something that repeats itself. I don't offer a service only once, but I usually do it every week, every month, or every day. Thus, in most of the cases we can predict the demand of VAS customer orders in advance.

Does the customer expect a short completion of VAS orders or is the lead time of the customer orders adequately long?

We have a deal with our customers in terms of lead time and this allows us to complete orders on time. For example, we have four days to complete our VAS in the "work order" area. This means I have all components on stock four days before the ship date and I can complete the order with no stress.

Is the value of VAS customer orders in your DC high or low?

We are the cost centre in the "Company 1" Group. We are not able to generate the turnover and we are not creating any profit from VAS. So, for us VAS mean higher costs, but no monetary value.

Which capabilities does the DC require to successfully implement VAS?

We need good process thinkers who thoroughly think things through. On the one hand, we must understand what the customers really want. And on the other hand, how these services could be implemented in distribution centres – implemented in a way that the quality and productivity of these orders are on the high level.

Encompassing all of this, we need a process to support it – a database where all the requirements are stored and we need systems that meet the requirements, for example, systems that make sure the packaging of the item is running through correct operations. For example, as a customer in terms of a VAS I would like to have a 3D barcode, but this 3D barcode has to come from the same printer as my 2D barcode because I cannot adjust and change the whole process just because of one label. So, this system has to support the whole process. In my opinion, this is the most important factor.

Do VAS require more standardization or flexibility in the processes?

If I now speculate on the classic KLT for "OEM-Company A", whereby, in terms of VAS, we pack the items into the container of "OEM-Company A", bring them up to a certain level where the transport is booked – these operations are being repeated on a daily scale. That means that for these VAS we must focus on standardisation as much as possible. Where do I need flexibility? I do need it if I have to perform something completely different from the standard very quickly. This is the Exception Management. This can be, the customer orders something very fast and urgently and needs a helicopter to transport it somewhere, but that can also be that we as "Company 1" have a delay somewhere and the delay has to be cut down or shortened. Then I have to do something special here in the logistics. But this is rarely the case.

Which performance measures show that the implementation of VAS is successful?

One of the metrics is the Returned Parts Per Million (RPPM). It gives the information about my returns (mistakes that I have made) something that does not match the specification of the customer. And that is, so to say, the quality metric and on the other hand we still have time metrics, for example the time performance, that can accordingly be measured with the LISC. So, we, as EDC have to benchmark ourselves with the help of the SHOT (Shipping on time), but within "Company 1" as a

supply chain, of course we should use LISC to see how capable we are. Finally, you always have to take the costs into account. That is something we do not have today. We do not have a target cost rate for a particular service we provide – at least I haven't heard of any. That would be something we lack, although if you think about the KPI system, I think it is logical to have it on board. And this will enable "Company 1" to recognize whether VAS bring in profit by considering all supply chain costs and the incomes we have from our customers.

Q: Do you have to strive for productivity, or do you first of all have to think about quality?

I believe we should put quality first because the customer decides whether he is willing to pay for these requirements or not.

Q: So, you said that quality is more important than productivity in terms of VAS. Does this only concern VAS, or the traditional warehouse operations as well? Are there any differences in this sense between the VAS and the standards?

Definitely. I think in terms of the standard business the emphasis shifts more towards the productivity.

How important is the cost efficiency and which measurements are you using to track it?

Cost efficiency is definitely important. Before I introduce something like a VAS, I have to evaluate whether it at all lies within the margin I have from one customer. Because, from my perspective, this is a cost of sales ratio that needs to be redistributed and split, and this cost key figure will be higher than that of the standard process.

How important is customer responsiveness and how do you measure performance of such VAS which are extremely dynamic and require particular customer responsiveness?

I will take the quality first as well. But also here, I will take the costs into consideration. Because we are the service providers, costs always play an important role for us. We cannot work with assumptions. We can't just act on the market and say, 'dear customer you want something extraordinary from me, then I'll charge you an extraordinary price.' And the customer says, 'actually, I don't care, because I can't solve it any other way, I am solving it with you. I realize it will cost me about double that price, but I accept it.' We do not have this luxury. We always have to measure our Cost-to-Sales Ratio. We can't influence the sales, that means we can only work with the costs. With respect to that, for every single service we provide, we have to realize that, basically, we can't say how much it will cost. Then, we have to establish a target measurement and compare ourselves to that cost estimation in order to understand whether we are successful or not.

How do you know that the customer is satisfied, and which performance measures indicate customer satisfaction?

You could speculate on the LISC or the RPPM ratios again, which would provide a quantitative assessment for the time being. However, you could also include the qualitative measurements, such as the Likelihood to Recommend (RTTR), which is also a metric where the customer evaluates the quality with the help of a questionnaire. And the question is, how does the customer measure delivery performance? Today, the OEM customers often measure using pure data. "Company XY" does not count when we have delivered to them effectively, but they track when we have sent them the commodity exit message. If I miss that point, but I pack the product as nicely as he wants, he won't be satisfied because he has to freeze all the systems, as his planning process isn't going right. He does get the commodities at the point when he wants them, but he does not get the notification. Then all the alarms within his systems are showing red and they are saying: "Company 1" is not delivering, do something.

Transcript II Company 1- Distribution Centre Manager

How do you define VAS in your DC and what types of VAS does your DC provide?

VAS are all processes that are more or less not part of a standard process, that cannot be handled within the normal material flow and that add value for customers beyond the standard. For example, when we talk about the food industry, for example, coffee industry, for me coffee to be a standard product, but when I talk about coffee displays - that is, when I produce a collection of different types of coffee for a supermarket - this is VAS for me. That means I provide my customers with an extra added value, or an extra service that promises my customers better service.

Q: Then what are the VAS exactly in the DC?

VAS appear for example because we act as a logistics service provider within the concern, thus we have products from different manufacturing fields lying around in our DC. If a customer wants to have a kit made from different manufacturing fields, and I build a kit for him with the help of a fitting, a seal and a rubber ring, then I offer our customer added value beyond standard distribution logistics. That is one point. The other point is, for example, when I have customized load carriers. For example, because I supply directly to the production line, just-in-time, I can add special requirements to certain customers for my logistics concepts through the VAS division and improve service or productivity at my customer's site. This clearly means I have to get away from my own requirements and standard processes, go to my customers and try to add value for them with a special area I have here through the VAS.

What advantages do VAS provide your DC?

First, VAS have a big advantage of selling additional products to a customer simply because I can offer the customer everything from one source. Now, if I am talking about mass logistics, then I am offering customers a reason to buy additional products from us, again, simply because I can provide everything from one source. That means I have a certain flexibility in my processes. The market often changes, customer requirements come in and out and if I am using only one instrument and only have one standard process, I become inflexible in the long run because I cannot react to changes on the market. For example, in the future there will be other load carriers but from my experience I can incorporate things into a standard process in the finishing sector.

Q: You tell me now about advantages of VAS for the "Company1" Corporation at all. But what are the advantages of providing VAS special for your DC?

This is a very interesting discussion. As part of our overall strategy, we have said that we want to separate our core business from additional activities. The pure focus at DC Bielefeld lies on costs. And if we only talk about our focus, then we see that we absolutely must separate these areas from each other. Also, in terms of managing costs and services, because our focus is our core business. Our core business is not VAS implementation. VAS is taken more as an additional product in our DC to simply ensure flexibility within the market. But the trend is still to reduce this area. We're currently in the process of simplifying the Kanban processes, there is an internal method called POP, "Company 1" Operational Process. It's implanted to identify what processes I have, the buying behaviour of the customers, what can I cut down, etc. In the current case of the Kanban process, we are looking for a service provider who can take over VAS tasks for us. Because we don't want to lose focus of our core business, which is pick, pack, warehouse and shipping - pure distribution logistics.

Q: That means for "Company 1", VAS are part of a core strategy, whereas for DC Bielefeld, VAS are something what we actually want to outsource?

From a purely logistical perspective, I see VAS as an area that we will not expand on a large scale in the future nor grow beyond the current dimension, but rather one that will be less managed. Of course, if VAS are broadly positioned, this is also seen as a competitive advantage. But it is not our core competence and never will be. The trend is to identify which special requests I can integrate into my standard process, and for that to be communicated with the customers.

Q: That means, VAS don't bring any advantages for your DC?

For us, the main aspect is to manage our costs. We are the cost centre and therefore, from the DC perspective, VAS bring us no advantages. In turn, from a corporate perspective, this is an important element for increasing turnover.

What challenges does the implementation of VAS imply?

First of all, VAS basically mean increased costs - everything has its price - and I generate additional expenses in my logistics centre, whether I am talking about space, resources, technology, or infrastructure - everywhere I have increased costs.

Is the customer demand for VAS in your DC more stable or fluctuating?

I would describe the customer demand for VAS in our DC as stable. Of course, we have some deviation, but by most customers the demand implies similar workload every month. It could vary on a daily basis, because I supply different industries in a large distribution centre and offer different service packages, which can lead to major fluctuations within a day or a week. However, we know when and what the customers want to have and can level out this very well.

Is the demand on VAS orders more predictable or more unpredictable?

Because we work with highly professional customers in the VAS, we always have very well-structured forecast figures. This means that our automotive customers plan their production weeks and months ahead, and always give us good forecast figures. This means that I can prepare myself really well for future business in terms of forecast figures.

Does the customer expect a short completion of VAS orders or is the lead time of the customer orders adequately long?

In the VAS area, we have longer lead time in comparison to the orders, which need to be picked and packed without additional services. We have dealt these rules with our customers and they know our rules.

Is the value of VAS customer orders in your DC high or low?

The value of VAS is higher when compared to standard warehouse operations, because VAS essentially means standard warehouse operations like put away, picking and packing plus some additional activities we have to do around the product. This means VAS implies higher effort and therefore, should have higher value.

Which capabilities does the DC require to successfully implement VAS?

We need to be very close to the customer, which means we really need to understand why the customer wants this service from us, and we need to understand the requirements clearly – in a way that we can read the packaging-and-delivery instructions of the customer, and we need great know-how of what is industry specific - from my point of view. For example, if I supply a "Company ZZ", then I also need to have someone who brings knowledge from the automotive sector to the DC to simply to speak the industry language.

Do VAS require more standardization or flexibility in the processes?

When I talk about kitting exclusively, then I can speak of a high standardization of these processes, and when I have a small variety of products that I need to kit, I can then speak of a low standardisation level. Then perhaps I'm not even on the VAS level anymore, but in some special assembly process. That always depends on what my definition says, but I basically believe that this process can be highly standardized. We have a challenge of delivering to many industries, so we have extremely different processes. For the automotive industry, for example, we have fixed labels,

and nothing else. But there are other restrictions in the mechanical engineering industry, for example. The fact that we can now divide our processes according to work waves and certain shipping days means that we can more or less talk about fixed standards, and we don't have to bring a certain flexibility, so that we have to change our processes a lot within a working day.

Q: Does it mean, in your opinion, that the process should be designed according to the standards?

Absolutely yes. We have introduced a kind of product portfolio. That means we have a service catalogue for our DC in the area that we have standardized. It is from this product catalogue, the customer can choose which services he wants. But of course, we have also made use of services within one industry sector when creating this catalogue. This means we make sure that our product catalogues cover the automotive industry completely, that we cover the mechanical engineering industry completely, as well as the area we supply with VAS like kits.

Which performance measures show that the implementation of VAS is successful?

In the "Company 1" Group, we have determined categories of performance measures, which we must track for all kind of businesses we are performing. This includes quality, services and costs. So, we measure quality by RPPM (return part per million), services by SHOT (shipping on time). And of course, as we are a cost centre we have extremely high focus on costs. I am responsible for this DC as well as for the other one in Belgium. Therefore, I know how many sales we have done in the month. Therefore, I measure cost of sales ratio. This is the most important measure I have to report every month to the corporate leader in Etoy.

How important is the cost efficiency and which measurements are you using to track it?

First, we look at the resources we need, for example human resources, but also infrastructure like technical equipment, buildings, forklifts, etc. We measure the whole thing by having productivity metrics that indicate what output I have generated in a day and what staff I need to do it. Naturally, we can't measure it on a daily level because every day is different, due to my service portfolio and process categories. If I have only labelling on one day and repackaging activities on another day, I tend to have less effort with the repackaging activities than with labelling or other activities. However, at the end of the month I have very firm expectations of how I will manage the VAS area, including the personnel costs, because those also represent the highest effort – about 60% of the total costs.

How important is customer responsiveness and how do you measure performance of such VAS which are extremely dynamic and require particular customer responsiveness?

In terms of our business, I am not required to react quickly. When talking about Priority or Emergency orders, I may see 2-3 orders a week that come in and have to be sent out on the same day. Apart from that, all other services and activities are scheduled well.

How do you know that the customer is satisfied, and which performance measures indicate customer satisfaction?

Basically, I can tell customer satisfaction, if there is additional, repeating business with the customers. So, this is my feedback from the customers in the VAS area. That means that if my customer is happy, I know that I have done a good job. I can make such key figures measurable with the help of the Shipment on Time Survey. However, I can also measure how many queries there were from customers (what we do every 2-3 years) by conducting an international customer survey. For this we use a list of questions, including packaging, compliance with the standard, paper work, to reflect whether or not we are on the right track with the customers. Such surveys serve to ensure that we are working on continuous improvement processes to improve customer satisfaction. This is our largest sensor in the VAS area for now. Of course, there are also internal key figures, and

there, I measure the quality key figures besides costs. But from the management's point of view, these are more decisive whether I am good or bad.

Transcript III Company 1- Operational Manager

How do you define VAS in your DC and what types of VAS does your DC provide?

In my opinion, a VAS could be creating a completely new product from a number of other products. So, every additional thing that we do with the product is VAS for me. We also have VAS where we don't create any added value within a product, but pack three individual components into one set. This is just an improvement of customer service, whereas three different components are merged into a single one so that instead of three different goods, a customer gets one package, and all the components are inside. And in my opinion, the term VAS is more suitable if we create additional value of the product. For example, assembling two filters to send them as a complete filter system. And therefore, I can ask for more money for this product, because I have created a refinement or a completely new product, and not only changed the number of products in the packaging.

Q: And what types of VAS does your DC provide?

What are we offering here in EDC? We are offering both, that is, we put the already packaged goods in a larger outer packaging, for example, we make a kitting out of different products, or we also create a set. We then tell the customer that we do not just sell three individual parts, but we sell three items in one package. This package then becomes a set, which consists of three individual components.

What advantages do VAS provide your DC?

I think there are only a few advantages for us – if any at all – as we are only investing money in a service that we offer to customers, when talking about implementing an “unreal” VAS - which means kitting and not installing anything. If we only put some products together, it just means we are providing a simple service of not receiving three packages, but compiling all of them into one. However, we naturally generate additional costs, because we are not selling the products at a higher price.

What challenges does the implementation of VAS imply?

There are no challenges within such services, but as I already mentioned, they are simply associated with higher costs. When creating a set, we provide it with a new item number, and the customer has an opportunity to buy both an individual component – which, again, is an individual product itself – and he gets an opportunity to buy a set as well – which, again, has a different item number. That means I have more stock of the same product, but (when talking about sets) in different sizes. Otherwise there are many stored commodities of the same product, as we have both different products in one package and also individual items stored. That means I need more storage space for a certain amount of time and I have to bring out the single components, kit them, and return the kit back to the store. That means I have at least three touch points more than in the situation where I would send the components directly to customers.

And during the integration phase you first have to understand what exactly it is that the customer wants. That is point one: The customer wants something else, so we have got to understand, what does he want? Have we had such requirements from other customers yet? In other words, do we already have such a process running? Or is this process completely new? And if the process is completely new, it has to be evaluated – what do I need for a tool, or maybe even a machine? For example, if something needs to be forged, I would need a welding machine, that means that must be evaluated beforehand. Another aspect needed is a quick costs calculation, meaning, how much would the whole thing mean in terms of effort? Such a calculation should be carried out in order to

determine how complex this process is, and at which point of the commodity movement one has to adjust this process. Or maybe is it even possible to carry out this process immediately after receiving the product? So that you don't even take the commodities in at all? We don't have that yet. But these are, let's say, estimations. So, when you talk about Value Stream, you say what you're doing, and where you're doing it. And I think that's why every requirement has to be reassessed constantly.

Furthermore, you have to be aware of what we already have within the standard process. For example, we know that we are able to do relabelling (putting on a new label) and that we already implement it within the standard processes. But if we say, ok, something has to be packed again, it means that I am leaving the standard process, because within a normal process I do not necessarily carry out the packaging and my employees do not possess any of the necessary additional information which I do not want to bother them with. That means, as soon as I get something like that, such as an order, I then have to go a different way than that of the mass production.

Is the customer demand for VAS in your DC more stable or fluctuating?

Such customers whose demand is always fluctuating exist, but they are not being represented here. To be honest, I do not know whether we want to have them here, because handling with these quantities just does not work, as we want to deliver quality like we have discussed before. And in order to ensure quality, I have to have people on board, who are familiar with the standards and know what they are doing. If I am to react permanently to such huge fluctuations, it continuously puts stress on my staff and there is a risk that their knowledge is not up-to-date, because the staff also needs to be trained in advance.

Is the demand on VAS orders more predictable or more unpredictable?

The demand is predictable for us, as we are working with the customers on long term relationship bases. We know the demand in advance, and this enables us to plan out our capacity. And if we are developing new VAS we communicate with the customers and request their future outlooks. We can predict the customer demand for a year based on their historical data, but we definitely know what we have to produce in the following days.

Does the customer expect a short completion of VAS orders or is the lead time of the customer orders adequately long?

Well, each customer places an order of a prepared item that consists of several components and the customer wants to have this item at a certain point of time. This is of course requires a certain expectation of time, whereas we can confirm that one part of the component comes from the point A, the next one comes from China, and then it is being calculated to find out which value stream will be the longest, and how much time we need to assemble and build the product. Within the DC, this usually it takes us about four days. Or not necessarily four days, but four days in advance we can see what we have to produce and what the lead time will be. As this was the question, I think this is extremely important for the orders to run smoothly. The workload of a single person, as well as the customer, and the customers' ability to manage the commodity stream are affected here. If I do not stick to my lead time, the processes of the customer stop again and then a truck does not arrive because we did not send anything.

Or what do you exactly mean by short lead time?

Q: For example, the customer orders big quantity and expects to get these in the short time.

We sometimes have customers who order a lot, but we don't have any customers who expect us to deliver this quantity immediately. The customers are already satisfied when I build up and send out 10 items out of a 1.000 item order, because that indicates that we are willing to do something. But I believe it is clear to every person and every customer, because they also have similar methods of production and the planning is necessary just because you have to organize both the machines and

the staff. And if you have the machine equipped to work with another order, then you cannot break off and adjust everything from the beginning, because you lose far too much time and money.

Is the value of VAS customer orders in your DC high or low?

As I mentioned before, we don't charge our customers with the additional price. Not as EDC. So, for us the VAS is just cost increase, which we need to manage every day.

Which capabilities does the DC require to successfully implement VAS?

To begin with, there is a need of stable systems and the capacity planning of the individual products. For example, we have to make sure that we do have the required individual components in stock at the time needed in order to finally carry out a kit or an assembly. The planning – and that is our strength – to purchase individual products and to have them here at the right time, as I said, and for that we need the systems that we have here to be in place. Then we have to manage the space, as I said earlier, both for the individual components and for the components that are needed afterwards for the kitting. We must also bring into account the handling speed. Meaning when the order comes in, we can carry out this order quickly – namely within two-three hours we can take the commodities, assemble them, store them back and sell them. That is our strength as a logistical unit. I think what we also need to some degree is the product knowledge. Namely, when we have 1,500 products in stock, and possess some product knowledge when we kit. In a situation where we use similar product groups, but then a completely wrong product group part is delivered (or the wrong quantity is delivered), we can notice this when the set is being assembled. This means that for the customers that need assembly we have a special kind of output quality control.

Do VAS require more standardization or flexibility in the processes?

I think you need standards everywhere. Flexibility also has its own standards – namely a standard for how to react, at what time, when does a particular good arrive, etc. In my opinion, nothing works without standards, because if there are no standards, the employees make decisions individually and the result does not always look the same, because different people prioritize different things, according to their own measurements. And where exactly do we need flexibility? Flexibility in terms of the time – maybe yes, flexibility in terms of the processes - no.

Which performance measures show that the implementation of VAS is successful?

What we strive for in terms of the key figures is, first of all, the number of complaints, the number of unsubscribed Work Orders, and the number of orders that are being cancelled. If you only measure the number of orders, that's wrong, because the order can only contain a part, but it can also contain 100 parts. And of course, you also have to take note of and evaluate the difficulty of the order, but it's not quite so easy. Producing a phone that has 100 components is more difficult than one that consists of 50, although I still produce a phone. The same applies to VAS – it is not just the end product we are measuring today, but the raw materials as well. Currently, we are not focusing on this. For example, to create a kit for the "Company XY", I only make one product, but I have to pack 5 different components in it. Meaning, I actually worked with 6 items, but in the end, I say I produced a single product. Therefore, it is very difficult to analyse the productivity of singular parts of a VAS. I work with up to 4 components, such as type, number of parts per hour, number of Work Orders per hour, and profit, that is, how much money I have made out of this whole thing. If I've only made 3 Work Orders, but I've earned 7,000€, then that's fine. But if I've made 100 Works Orders and only earned 3,000€, that's bad.

Q: Does this mean that the success of the VAS implementation in your DC is measured by monetary indicators?

As I said, success is a bit difficult to define. I, as a person who focuses on the benefit, would define success only through the profits made. We work a lot to generate more revenue. But this is usually

not the case, because as I said, we sell things at almost the same price. And if we don't define success over money, I'd define success as an increasing demand on VAS. This is success for me, because the fact that the customers are appreciative of the additional service we offer here and want even more, speaks for itself. And they even may be willing to pay more in the future.

How important is the cost efficiency and which measurements are you using to track it?

I mean, during a normal operations flow, costs are always important. I offer an additional service and that's an extra effort for me. Maybe I envision a great service, so I don't want to control every little detail of the costs, because I hope to reach the high costs-to-sales ratio with the help of the other products. But if I am just a pure value unit, then the only way to justify the effort is to decrease costs. Otherwise, I will go bankrupt after one year.

How important is customer responsiveness and how do you measure performance of such VAS which are extremely dynamic and require particular customer responsiveness?

I think, there is no difference at all. The cost measurement is always important, because at some point the situation can change so drastically that implementing VAS in contrast to normal operations will not be sustainable anymore. But, generally it is just important to reach the costs, so I wouldn't put a lot of emphasis on them, because by offering extra dynamic services I expect to gain new customers. And VAS are, after all, extra services. In doing so, this perhaps not only provides new customers to "Company 1", but also to connect new products with certain customers if they are satisfied with the services. But I think from the business point of view, it is important not to ignore the costs altogether.

Q: But you don't think such orders can be placed in your DC?

There are always such situations in logistics but also in production, that the planning has failed before for some reason. Either that happened directly because of us or because of the customers (as they have not ordered on time), and therefore, need our help in order to deal with the product outside the normal standard processes in the system. And for this we also have the so-called Prio-Orders – (AKA) Priorities, i.e. building of those goods, and they are being prepared in advance before others are. However, this should not be praised a 100%. As again and again, where the planning no longer works out, and the customer says, I can always order whenever I want, and I still get the products one way or the other. So, what happens more often, is that, because the stock is being held on, we do not only have to build up quickly, but we also have to send the product out with a special transport agent, and then there are not only the production costs, but the transport agent also will cost, say 500€. Then the customer says, ok, no, we don't need it so quickly after all. This indicates to me that this service offered by us is often being exploited. We are concerned about the service, but our customers, or the sales companies, which are our customers as well, take advantage of it because they want to supply their customers even faster than is necessary.

How do you know that the customer is satisfied, and which performance measures indicate customer satisfaction?

Firstly, figures related to quality. Secondly, the planner examines the LISC, (i.e. the products that we have discussed at a certain period of time and calculated beforehand), agreed upon and has actually put them together on-time and has sent out these products. These numbers are then being ultimately examined by the planner.

Transcript IV Company 2- Customer Manager

How do you define VAS in your DC and what types of VAS does your DC provide?

These are the services, which include all customer specific requirements and provide more value to the customer. So, if the customer wants to have some additional services apart from the storage of

their goods in our warehouse, we determine this as VAS. In “Company 2” we implement and offer the reworks, as well as orders, which include the repackaging for the customer or enclosure of the warranty cards. An example would be the AP printers: media products are purchased from the AP, but are sold by Aldi, as medium-purpose commodities. For that purpose, the goods have to be supplemented by the media guarantee card and the EN-sticker so that the items can be scanned. Or we add cartridges – so VAS would be orders like that. But we also have simple orders, for example the packaging unit simply does not correspond to what the end customer requires, so we have to unpack the products. And then we have situations, for example, when the current software in laptops is no longer up-to-date in terms of the technology, and then we have to replace and update the software.

What advantages do VAS provide your DC with?

I think the advantage is definitely that providing VAS increases our profit. Furthermore, these additional services generate revenue, because, in any case, apart from getting the goods in and out and storing them, I have a further profit generator. Also, customer loyalty is increased through providing such services, because otherwise the product would probably run through the other service provider, and not through our distribution centre.

What challenges does the implementation of VAS imply?

On the one hand, time pressure arises in particular areas which results in the hectic processes and cost increase. Of course, the customer is there as well and tries not to let such processes down, and make sure that commodities arrive on time. All of these problems also create costs for the customers. But, of course, if you've had these orders for years, you are making yourself a bit dependent, because you're probably assuming that it's going to continue like this. However, the customer himself is also always improving these things or even tries to avoid these problems with the help of process control measures.

Another challenge is to provide the quality expected by the customer. What the customer also definitely expects is, for example, when he places the order, it has to be implemented accordingly. But it is not feasible. For example, the stickers that have been ordered do not fit the size. And then everything has to be fixed. Or something has to be repackaged in the carton, and as a service provider you just have to think about all this and you have to inform the customer what is and what’s not doable. Perhaps even give an alternative solution, for example, to order an alternative replacement cardboard.

Is the customer demand for VAS in your DC more stable or fluctuating?

In the case of VAS, the demand is very unstable. And we have to be able to react on this demand very quickly.

Is the demand on VAS orders more predictable or more unpredictable?

We cannot really forecast the demand. We have historical data of the customer orders, but we can’t really rely on it. As I said, the customer demand varies and therefore making a forecast for VAS is quite difficult. For example, twice a year we have to enclose the warranty card for the media printers which we send to Belgium, but we never know the quantity.

Does the customer expect a short completion of VAS orders or is the lead time of the customer orders adequately long?

This tends to be short. The customers expect to have the order in the short time, so they don’t give us more time, but they expect that we will be able to adopt our capacity in the way that we can provide this order in the defined time scope. Just like “Retailer XY”, they have a delivery dates

brochure, and the goods must be there appropriately on time. But sometimes if the commodities arrive there in containers too late, then we do not have enough time to handle the order.

Is the value of VAS customer orders in your DC high or low?

VAS is the main part of our profit. We offer VAS and charge our customers, which stimulates our revenue. Therefore, VAS customer orders tend to have higher value.

Which capabilities does the DC require to successfully implement VAS?

First of all, capacity.

Q: What does capacity mean in this case?

You have to provide the employees, so the manpower, that you need for handling this order. Then also the manpower for all the processes. Because if, for example, 40 containers have to be taken in, you need a particular storage area for it; or for example, you have to put away 16,000 printers. This means that we have to be flexible enough to find manpower as well as storage place in time. And what plays the central role in reaching success is our understanding of customer requirements. VAS are complex and to avoid quality problems and make sure we ship products on time, we have to work with the customers on the very intensive basis.

Q: That means you are able to communicate with the customer to find a solution if too much is expected?

If we cannot stick to the delivery dates promised, first of all, I meet up with my customers, we have a special day for this, and then we are able to find a solution with the help of the storage space or with the staff, that is one of the advantages we have here. Or just in case of the software if we have laptops and the software has to be transferred – we immediately start communicating with the customers. Whether I try to extend the delivery appointment with the customer or as we sometimes do, that one day extension is enough, we do not deliver through the normal delivery process, but with the help of the express, because such shipping method is faster than the standard one.

Do VAS require more standardization or flexibility in the processes?

Of course, flexibility. As I said, we are facing dynamic demand, so the standardization of processes is not possible for us and it does not really make sense. So, flexibility is what we need in order to be more competitive as a small logistic company in contrast to the big players.

Which performance measures show that the implementation of VAS is successful?

On the one hand, we are successful if the customer continues to pass on further orders to us, and we see it afterwards when the prices that we have calculated cover the costs and also bring in a profit. That means we run the internal measurement and look at the costs. That means we already have a particular cost estimation for the customers, and, if you have stayed within the scope of these costs, then everything is in order. Of course, we also measure the deliver-on-time and quality rate.

Q: But which KPI do you think is most important in terms of VAS?

It is difficult to say, as all the KPIs have to be tracked. You cannot avoid tracking profit, but tracking quality is extremely important in the case of VAS.

How important is the cost efficiency and which measurements are you using to track it?

As I said measuring costs are very important. We split the total costs into different categories, such as labour cost, space costs, etc. But the most important aspect as I said is that the price of VAS covers the costs so that we generate higher profit.

How important is customer responsiveness and how do you measure performance of such VAS which are extremely dynamic and require particular customer responsiveness?

There is no difference whether I provide dynamic services or not. At the end of the day I expect to generate the turnover and create the profit by providing VAS.

Q: But do you use some measurement for the customer responsiveness?

No, we don't implement such measurement in our DC.

How do you know that the customer is satisfied and which performance measures indicate customer satisfaction?

On the one hand, as I said, we know that customer is satisfied if we get new orders. But also, if the orders come beforehand, we make a price offer and the customer still pays the surcharge for such orders. We use the yearly customer survey for that. So, the survey always takes place at the end of the year and it is published at the beginning of the year. Sometimes the survey can reveal that there was something that has somehow upset the customer during this period. Moreover, it can turn out that, for example, the customer can't anymore remember what happened in March. Still you have to improve all those problems upon. It is all about the information flow, the reaction time etc. That is how you counteract performance challenges. And, certainly, we measure quality which also indicates that the customer is satisfied. We track the complaint rate to see whether our customers are happy.

Transcript V Company 2- Distribution Centre Manager

How do you define VAS in your DC and what types of VAS does your DC provide?

We are offering various VAS at this point. For us, a VAS is every service and every employee activity that goes beyond the standard processes of product delivery and shipment. For example, for particular trade companies, we are running product revisions in terms of the guarantees. This means giving the manufacturer a two-year warranty. However, if the trade company that is selling the product to the end customer generally has a guarantee period of three years, then it means that all components of the product related to the guarantee have to be replaced. Furthermore, sometimes even during the goods' delivery (it so happens), that the products are not labelled properly or are not labelled sufficiently enough. In this case, we implement the labelling of these products. This may be, for example, in case if the codes are missing or are incorrect, or if certain product descriptions (that are required in Germany) are not in place (so we add them later); or the packaging in general is not available to the consumer who in turn wants to buy the product in Germany; or the packaging does not correspond the guidelines of trade in Germany. All of these are roughly our additional activities, which we take over for our customers. So, this is a rough record of the activities, which in turn is being divided into a number of smaller orders.

What advantages do VAS provide your DC?

VAS are very important for us. We are a medium-sized company, and unlike our big competitors we have a unique selling point by providing VAS immediately and very quickly. Our company is very dynamic, and we don't have a rigid framework or basement, but we can deliver these VAS quickly and that is our advantage. As, otherwise, if the customers and the clients that we have here, for whom we are working, i.e. our contractors, would not need any VAS to add to their products,

they would certainly resort to cheaper and larger contract service providers that have large volumes and a large turnover of goods in the warehouse and can offer much better prices than we do. Therefore, the majority of our profits are generated from providing VAS.

What challenges does the implementation of VAS imply?

We are facing the difficulties when we need to implement VAS because we rarely have the sufficient number of employees to carry out the order. This means that we have a very dynamic workload, while having to do a lot of work with external employees if necessary and have to resort to temporary workforces. This is a serious administrative burden for us. We have to work a lot within the working hours of our employees and a lot is asked of our employees in terms of flexibility. And it has to be clear that every VAS that is being delivered always interrupts the process chain in the house which results in increased costs. But this is, then accordingly, taken into account in terms of the price calculation. For these reasons, we are, naturally, offering a higher price than other companies for the traditional warehouse operations.

Is the customer demand for VAS in your DC more stable or fluctuating?

The demand is very dynamic. Some days we have no VAS on the products at all, meaning there are no orders nor requirement of such products, and then some days within 48 hours we may work up to 400-500 hours more to perform the VAS ordered in this one day.

Is the demand on VAS orders more predictable or more unpredictable?

We do very little forecasting, if any at all. As the customers are getting better and better in implementing VAS themselves, our VAS are actually becoming less predictable and therefore even more dynamic. In this case, we are already aware of what we need to do next year, we've got a forecast for that, there's also a meeting with our contractor, and up to a week in advance we usually know what we're going to do the next week. However, there are deviations, the so-called Priority Orders, whereas quantities flow in that have not been planned beforehand, but of course we take them as well.

Does the customer expect a short completion of VAS orders or is the lead time of the customer orders adequately long?

The customers know that we can react on very short-term VAS orders, so they expect us to provide VAS quickly.

Q: Does it mean that the lead time of the VAS customer orders tends to be short?

Yes, I think so.

Is the value of VAS customer orders in your DC high or low?

I would say the value is high. We are making a profit from providing VAS.

Which capabilities does the DC require to successfully implement VAS?

We need to be very flexible. What do I mean by that? I mean the flexibility in the workforce, place, processes. This is very specific to our company, I think it might be different in other companies.

Do VAS require more standardization or flexibility in the processes?

Flexibility is the most important. For example, by the delivery of the product the employees must understand how these are to be handled during the flow of the goods. We often work with those orders that cannot be planned. That means, for example, I know I have a week to implement VAS within these products. Then, of course, I try to work out the correct number of the staff required.

Then, in the following days I build up the personnel needed for production of the items. Afterwards, of course, I dissolve this group of the employees. And this all requires highly flexible processes.

Which performance measures show that the implementation of VAS is successful?

We compare how many hours we have sold because while offering VAS we sell the employee hours, also how many sales we have conducted, and what comes out in the end. Then, of course, there is cost accounting, which goes deeper into details of how much space or how much costs for this space has been needed for the whole thing, how much administration and so on. But when talking about the operative department, for me it is important how much turnover we have made, how many hours we have spent for it, and, most importantly, how many hours have we sold. That is the most important performance measure.

How important is cost efficiency and which measurements are you using to track it?

Tracking cost efficiency makes sense for us. And how do me measure that? So, we cannot measure productivity per hour, as we have no comparison. We don't know if we're better or worse. As VAS are all so different, we have to make an extra calculation of 30-40% for each service and have to make a price offer. And therefore, the most important metric and the final result for the employee group, for the department, and for the whole operating department - is Euro per hour: so, what this order has brought in at the end of the day. Do we really need so much staff? Are there other factors? Maybe it took up too much space? Of course, we also access historical data, see if we have already carried out similar orders to find the price matching. However, there are orders that we have to recalculate completely. And then we actually simulate this order. We pretend to carry it out with some other products, stop the time, evaluate the additional expenses that we will have with it in terms of the supply space - and then announce the price. And for all of this we have to know the costs of personnel, space and all additional process costs.

How important is customer responsiveness and how do you measure performance of such VAS which are extremely dynamic and require particular customer responsiveness?

For me, the most important KPI is the hours sold of those services that go beyond the standard.

How do you know that the customer is satisfied, and which performance measures indicate customer satisfaction?

There are two aspects of the customer satisfaction – one is, of course, the delivery reliability, meaning we are ready with the service exactly at the desired delivery date, and the second is that we deliver the product at the level of quality that the customer expects. The adherence to the deadlines is measurable by itself, and we measure the quality with the help of our quality management system. We have a record- and evaluation system in which all complaints are stored. For us, a complaint means the product does not meet the quality standards that the end customer expects. Either it has been delivered in such a state, or we have not brought it into the condition in which it should be.

Q: Do you use a formal customer survey for that?

Yes, we implement customer surveys once a year. We run them, this is being implemented via the sales department, and there are predetermined questions that one has to answer with a help of a certain scale - very satisfied/ less satisfied/ not satisfied at all - and there are also open questions, like: what can we do different for you, what can we do better for you?

Transcript VI Company 2- Operational Manager

How do you define VAS in your DC and what types of VAS does your DC provide?

VAS are all additional services that we offer to our customers. This includes the reworks of the commodities, meaning, we get many articles that we have to change. For example, we often add the printer cartridges for the printer manufacturers, so this is a typical additional service that we are offering. Furthermore, we have various customers who have B2B and B2C shipping carried out within our company. Typically, these are companies that have an online shop and store their products here. The products are then being both picked and packaged, as well as the delivery notes are being added. We process this via a particular postal route, and these services are offered in each type and form.

What advantages do VAS provide your DC?

The profit we create through providing such services. Plus, offering VAS leads to increased customer loyalty. Moreover, of course, we have a large number of customers that are not only interested in storing their commodities, but the whole range of services divided into small things happening with the product. And these whole additional services have to be offered so that we can meet all the customer demands. This means VAS play an essential role in retaining customers and maintaining customer relationships.

Q: If you say profit, does it means that you are charging the customers additionally?

Definitely. The customers order some VAS and have to pay more for them. Otherwise, we will not be able to generate profit and will work in the negative.

What challenges does the implementation of VAS imply?

A very big aspect in the whole thing is always the staff. The difficulties lie in recruitment, and in the right selection of staff. The staff first and foremost performs the physical work, and that is also a certain burden that must be met by any employee here. This is a very big factor, which also plays a decisive role in the cost calculation. I would also say the processes themselves. We enjoy a great amount of experience in the subject, but still, there are always new processes and we have to refresh ourselves again and again in what we do and make ourselves up-to-date. This process of improvement that we have is continuous, it will never end. We always try to optimize. Then, of course, there is the division of work, and that is the second major issue in the matter. I would say the process itself and the staff. These are the two difficulties in the subject. And, therefore, getting back to your previous question, we should expect additional costs, which result from these services and thus it is important to charge the customers with higher prices for these orders.

Q: But is this challenge in providing VAS different from the challenges of providing standard warehouse operations?

So, the implementation of VAS is different from the standard operations implementation. The standard process – and now we again can analyse the picking – implies that the employee drives the forklifts or a scanner, scoops to the storage bin, picks a lot, e.g. picks five boxes of slippers and then puts them down ready for the processing. The process in rework, for example, does not differ in the difficulty level, but the process of our additional services or our VAS has to be combined with many further processes. It also becomes very specific in terms of the division of the work steps. Picking is one thing. The picker just takes the products off of the shelf and prepares them. Or he runs the check-up of the storage area. Now I can go back to my example of the rework. Earlier we have packed the mirror consoles for a big discounter – the amount was about 50,000 and we managed it with three production lines. The working steps were divided into preparing the mirror console, folding the cardboard, adding the control sheet, attaching the warranty card. The processes and the

time pressure are much more complex within VAS, which is not the case with such standard processes as picking.

Is the customer demand for VAS in your DC more stable or fluctuating?

VAS are absolutely dynamic, so more fluctuating.

Is the demand on VAS orders more predictable or more unpredictable?

It is difficult to make any forecast for VAS. Above all, we actually always plan such actions beforehand - we calculate everything: the time, we also have to work with many fictitious figures and adjust them – here we also enjoy the previous experience. But you always have to change a lot in the process after the first day of production, such as the number of employees, and manage the process again. Thus, there is always planning, but there is also the first working day and only after this comes the truth.

Does the customer expect a short completion of VAS orders or is the lead time of the customer orders adequately long?

We normally have to react quickly. This is the customer's expectation, but it is what makes our company different.

Is the value of VAS customer orders in your DC high or low?

We are very strong in VAS area, because we hardly have any customers who just store the items here. Most customers buy additional services from us. And therefore, VAS is very highly valued for us.

Which capabilities does the DC require to successfully implement VAS?

The most important capability is quick reaction. In most cases, the customer gives us the components. Component A is a device, for example, a printer. Component B is a warranty card, component C is the sticker to be applied to the carton. And if the sticker is wrong, the customer notices that he has provided "Company X" with a wrong sticker. In this case, we have to produce the first batch again. The stickers must be removed if necessary, and the new ones must be put in place. All of this has to be very precise; no cardboard should be broken. These are the factors that can always come around unpredictably.

Moreover, there is always a position that is in such an unpacking rework, for example, the winding machine. Hereby, the technical prerequisites play an extremely important role. We have one winding machine in half of the production, several winding machines in another half and, naturally, up from a certain number of pallets, not all of them can be run via the automatic winding machine. In this case, we instruct our employees to wrap the pallets using a hand wrap foil, in order to be able to manage this whole quantity. Then you have to rethink again – is it worth driving this pallet from the Hall A into the Hall B? In most cases, it is not worth it and that is why the wrapping foil is useful. For this obstacle, one that often arises in a series of processes, we always need an intelligent solution. In the example I have just given, the solution is a wrapping foil.

Another important issue is place. Now, we don't have any problems with that – this issue is also a bit seasonal - but in fact space can often become a problem. Thus, I would extend my answer to the three points – staff, processes and space.

Moreover, space and staff as well as the capacity of the team management are required. We can't carry out such dynamic orders, so, of course, we go to the customer and say, dear customer, we can perform the rework, but we will only have time for it in 6 weeks. This usually leads to the customer choosing another service provider because the trade works so fast, as we mainly do electronics

reworks, that our customer has to look for another service operator, otherwise he will not be able to put off his equipment in the warehouse.

Do VAS require more standardization or flexibility in the processes?

Flexibility is the key element of our success. We don't have the chance to standardize these services, as the customer demand is dynamic, and we have to keep our flexibility.

Which performance measures show that the implementation of VAS is successful?

There are always key figures, and of course we constantly control ours, as well as our results. We work at an hourly rate. Each employee should generate 30€ per hour for the company. And, of course, we keep statistics on that. Our team leaders, who lead the packing teams, daily update the documentation table for the activities they have done. And thus, we can understand whether we are doing a good job. We measure this with a key figure and that is - generated revenue per hour per employee. That means if we do something with 10 employees and on average reach 25€, then I know we should get better. However, you cannot always be around 30€, there are particularly good orders, which are profitable for us, but there are also particularly bad orders. These are often the ones with small items which we pay per piece, whereas we have very little revenue per piece. However, it should always be about in balance of around 30€ generated turnover per hour.

How important is the cost efficiency and which measurements are you using to track it?

From the point I have just discussed, cost efficiency is very important for us. We are measuring the costs of employees and all additional costs, that result from providing VAS. And here, again, I can argue that the most important measure is euro-per-hour that workers should generate in order to cover all the costs.

How important is customer responsiveness and how do you measure performance of such VAS which are extremely dynamic and require particular customer responsiveness?

Our company is not measuring customer responsiveness, but I personally would determine it as accepting the orders of our customers when they come and very rarely having to reject the orders. That tells me we are flexible enough. I have been on board in this company since March 2019 and I have only seen one rejection of an order due to the capacity limits. It can be due to storage issue, the overload of our rework department or there is simply not enough manpower like a team leader or a group leader. And so, we had to say, dear customer, unfortunately, we have no capacity and we cannot carry out the rework. However, I would say we stand almost at a 100% fulfilment rate, so that we accept the orders of our customers, but are also ready within the prescribed deadline.

How do you know that the customer is satisfied, and which performance measures indicate customer satisfaction?

We always carry out the certified questionnaires. Ok, that might be a step too far. First of all, I know that the customer is satisfied when he is not complaining, but actually we often have feedback from our customers that we have done something particularly fast or particularly well. This means that we often don't even have to enquire about any further information, because we are already in constant contact with the customer. There are particular contact partners in the order processing department, so that there is always a possibility of getting in contact at the processing level, and this is very important for us because this department can give us feedback whether we are good or bad. On the contrary, if there are problems in the process then we get in touch with our customers. From the point of view of the staff, if an error occurs, we communicate about it to the customers. Actually, we are often praised for this, for providing direct, quick and regular feedback without having to ask. And that's good for us.

Transcript VII Company 3 - Customer Manager

How do you define VAS in your DC and what types of VAS does your DC provide?

VAS in our distribution centre represent all kinds of services that go beyond the actual standard. Sometimes VAS are implemented as an individual and autonomous service process, which falls beyond the actual scope of the so-called "normal" process. These could be, for example, the special quality check we provide in our quality department for the pharmaceutics industry.

What advantages do VAS provide your DC?

VAS provide us with the possibility of increasing the turnover by charging our customers for providing additional services. The general rule is that VAS cost more, whereas they provide the customers with benefits, which on the other hand, add value. And VAS provide a distribution centre with the Unique Selling Proposition. I believe that increased agility brings more flexibility. The requirement of customers lies in their supply chain, which implies the necessity of having VAS in the product portfolio of the service provider to ensure that the flexibility requirements are met. VAS go beyond the standard process and always go the extra mile, meaning providing something on top of the standard to ensure flexibility.

What challenges does the implementation of VAS imply?

Providing customers with the quality they expect by ordering VAS is becoming more difficult. On the one hand, a serious number of different departments is involved in VAS implementation. The goal of implementing the VAS has to be clear, because ultimately this is an internal sales process. Thus, it has to be internally aligned (in my case with the key account manager) and reconciled that the customer has a special requirement and our Distribution Centre would like to implement this special requirement as VAS. Finally, we need the personnel which realises that providing VAS is definitely something that is has market demand. So, combining departments and bringing necessary people on board is the first difficulty when setting the regulation for the VAS that we want to implement. The second difficulty is the calculation, meaning how high the costs will be, how high are the raw material costs, which of the costs are internal, and what price can we now calculate for the customer on the market.

Q: Are these challenges different to the standard warehouse operations?

Yes. VAS fall beyond the standard, so customer requirements and expectations are different. It is not only about running the standard process, but also about making sure it is operating smoothly. In turn, VAS are always something above the standard and therefore highlight the different focus of the customer.

Is the customer demand for VAS in your DC more stable or fluctuating?

VAS are very dynamic. We do also have VAS, where the customer demand is more stable, it’s just that the dynamic VAS came to my mind so immediately because they have created more difficulties for us in the past.

Is the demand on VAS orders more predictable or more unpredictable?

Orders that are well established – such VAS we are supposed to implement for several customers – tend to be more predictable. I am sure such VAS are already inscribed in the standard. On the other hand, we also have unpredictability, which is commonly associated with ad hoc customer orders.

Does the customer expect a short completion of VAS orders or is the lead time of the customer orders adequately long?

The lead times tend to differ from order to order. It's better to say this depends on the business case. We have here two different kinds of VAS. We provide quality control check by specially educated workers in the pharmaceuticals area. Here, the checks need to be done very carefully and we therefore, have rather longer lead times. In the case of easier VAS like labelling for example, the lead time can be quite short depending on the parameters of our contract with the customers.

Is the value of VAS customer orders in your DC high or low?

To this question as well you cannot give general answers. Some VAS mean for us really high investments, high cost increase, and the value of these services is then higher than of those VAS we can simply integrate in our standard.

Which capabilities does the DC require to successfully implement VAS?

As I am working in the customer department, I see the main aspect of success in the communication with the customer. We really need to understand what customers want to have. And we have to be able to provide these services both on time and by meeting the quality expectations. And this again requires flexibility in the process.

Do VAS require more standardization or flexibility in the processes?

This is a very difficult question. I would say both. Let me speak again about the pharmaceutical industry where we provide quality checks. By the quality check we definitely need a standard. We have to be sure that this check will be provided at high quality and the staff is right educated and the process flow is standardized. But we also need flexibility in terms of space. And we will also need flexibility if the customers have ad rock orders or if we need to implement new VAS, which we can not put in our standard. From this point of view, I think both are important for us.

Which performance measures show that the implementation of VAS is successful?

Mostly it is the timing. So, how quickly are we ready to implement the VAS and the calculation of the profit we are getting from these VAS when the implementation is completed. In the end, it is the time, quality, and cost value ratio – the so-called magic triangle - which is ultimately relevant for the customer satisfaction.

How important is the cost efficiency and which measurements are you using to track it?

The costs are very important. And here the cost-value ratio is the most important measurement of VAS. Depending on how large the scope is for a VAS, we just provide the calculation department with every cost and let them calculate what the internal costs are. After this, we take a look at what the price level of the customer looks like and calculate the corresponding price to introduce it to the customer. The Key Account Manager confirms whether the price is ok or not. But if it is a smaller unpredictable project and price is not extremely relevant, we orient to the VAS which we already have in the portfolio, and where the price is already calculated according to the contract. If the process is not different or new, we implement VAS at the same price.

How important is customer responsiveness and how do you measure performance of such VAS which are extremely dynamic and require particular customer responsiveness?

I think that is industry dependent. Our business is in the healthcare, I am responsible for the pharmaceutical customers. First of all, the quality has to be perfect. Moreover, there has to be a balance between time and costs. So, depending on how urgent the VAS actually is, it may cost more. If the VAS is forecastable, then it is always about the price. It is always going in one direction or the other, but the quality is basically the most important metric. Sometimes it is possible that we are only able to implement 50% of the service and no more. Quality is the metric number one, and

surely depending on the requirement it is probably more important that the time and the cost ratio. So, I believe it is different depending on the industry.

How do you know that the customer is satisfied, and which performance measures indicate customer satisfaction?

We either ask him at the end when we are through with the VAS implementation. If everything suits the customer or if he has a complaint; if we have to discuss the price; whether the customer is eager to pay the full price or has a complaint; is dissatisfied and does not want to pay. With such a service we take a look at how the project was completed and can derive important insights, for example, what do we have to do differently next time, what have we learned from this project on both sides, etc.

Q: Is there a standard questionnaire for customers?

We have the customer satisfaction survey once a quarter, but that does not include VAS. I think most of the time it is not scolded. If it went well in the end, then it is all right. In the best-case scenario the customer asks us to implement the service again, which means for us we have done everything well.

Transcript VIII Company 3- Distribution Centre Manager

How do you define VAS in your DC and what types of VAS does your DC provide?

Well, Distribution Centre is pick, pack and ship, so the normal processes such as storing, picking and making ready for dispatch represent the most important standard business. And then we have every process that goes beyond that, meaning it is implemented outside the standard business – and that is a VAS. For example, VAS can be marketing logistics, whereby we equip the information materials according to the projects of our customers. However, VAS can also be putting labels or stickers or sending leaflets. In some particular cases VAS can also be the storage of certain goods, whereas most time it is a relatively standard service. But as soon as I have the product changing activities that increase the value of the product sold and shipped – this is a VAS for me.

What advantages do VAS provide your DC?

By providing VAS you can calculate higher profit margins and generate higher benefit from sales. And if you only offer standard storage and outsource, then you have more competition. Whereas by offering additional services, you have competitive advantage as well as potential for increasing sales and, in turn, income.

What challenges does the implementation of VAS imply?

The VAS must first and foremost be discussed with the customers. For this, we need performance increasing processes and performance potential. VAS must be planned and agreed upon. The processes have to be so productive that the product is really changed and not just being stored and "exhausted". We need performance potential, as VAS lead to additional costs we have to consider. For example, assembling products is something that is relatively easy to implement as you just put a lot of parts together. So even considering the complexity of the VAS, it still isn't a challenge. However, when sending the leaflets for the pharmaceutical sector or, for example, in relabelling, we need people who understand what they are doing. That means the employees have to be trained, we need technology to do something like this and there is also management, as it means we need to turn several materials into a new product. For example, in terms of the pharmaceutical industry, we must have an upper part of the packaging and the packaging contents created. A single mistake can jeopardize the whole process.

Is the customer demand for VAS in your DC more stable or fluctuating?

You can't say VAS are always dynamic or always stable. It depends on the industry and the customers, because some of them are completely unstable.

Is the demand on VAS orders more predictable or more unpredictable?

It is also differently. There are, for example, the customers which come to us and want to exchange the packaging supplement. In this case, I can pretty much imagine that we won't do it. We would say we have had a breakdown in the system. In addition to that, we implement marketing logistics, where we had planned so many things at the beginning of the year! We have received a poster which states how many VAS, and when we have to deliver. For example, we could assume from this timetable that from the mid-August there will be a particular number of additional branches in Germany. So, the process was super predictable. That means we just had to plan and make sure that we have enough people there on the specific date. I want to say, there are different cases. That means on the one hand there are customers with whom I know that I have a contract with for the next three or four years. Then VAS can be planned. Therefore, I would say that the predictability really depends on the company we provide VAS for.

Does the customer expect a short completion of VAS orders or is the lead time of the customer orders adequately long?

The majority of customer orders we handle in DC have a long lead time, or better to say we have enough time to plan our capacity as well as complete and ship these orders on time. In an unpredictable case, where orders come in randomly, the customers expect to get these in the short time, and we have to calculate whether we can accept such orders.

Q: And how do you calculate that?

First, we must understand whether we can zero-in on this in the short time. Then we must see if the customers has to pay more for such orders and we calculate the cost to understand if we gain profit for this action. This is not possible for many last-minute customers who expect a VAS from us at say 4 p.m. tomorrow because our structure is too expensive.

Is the value of VAS customer orders in your DC high or low?

Normally, the provision of VAS bring us higher margin. But if we develop some VAS like simply putting some parts together, this can be seen as VAS with low value in contrast. Here we just consider additional costs, but the process is quite simple, and we charge customers at a lower rate when compared to other cases.

Which capabilities does the DC require to successfully implement VAS?

We need trained people and the flexible processes that enable us to integrate such VAS. Finally, we need to be able to manage a complicated IT-system to be able to run the processes correctly.

Do VAS require more standardization or flexibility in the processes?

This is a big advantage of our logistics structure. We can provide both. And I think the VAS require both. You will never be successful if you are not driving the standard. We implement our process based on the lean principles. For us, keeping standard means for us better productivity and quality. But we are flexible in the case of space and highly educated staff. So, we are able react on the specific customer requirements.

Which performance measures show that the implementation of VAS is successful?

As distribution centre manager, I would firstly consider which customers we are serving. Then I look into how the pick-pack-ship performance required looked like and when did we implement the

services. I would also analyse the costs and sales. I have the commission prices and storage prices, I have shipping prices, which means I can estimate how much the pick-pack-ship performance costs, where I generated sales, and again, how expensive they were. And we have a service warehouse, where I can see billings, reminders, import-export ratio.

Moreover, customers may issue complaints by phone. We also make different account assignment objects. For example, we estimate the costs of conditioning and these has to be equal to our sales. We pay attention to all services – storage, picking, marketing. Then we observe individual costs, for example, for marketing office. Then we cover the other costs and run through profit. I record revenue in reporting and analysing and that's how I see if I'm profitable or not. That is the most important performance measure to say whether we are successful.

We also measure the quality. In marketing we control whether our staff reaches the appropriate contact person, but also how much marketing we create. Those would be the measurements for labelling, for example. Sometimes the leaflets are wrong. Then you have to look at how much money was paid for it. Then, while staying stable, we must again ensure that quality is as close as possible to the one promised and correct the failure to make sure there is no error. We run the quality check, at least to know how we perform the lowest level of quality control and estimate the end costs. We also want to make sure the staff did a good job. Thus, we measure quality and productivity, and all of that can be divided into financial or commercial performance, operational performance and quality performance. With VAS you also have to be careful and state how exactly you are going to measure all of these attributes, because VAS don't run as standard, as for example, conditioning.

How important is the cost efficiency and which measurements are you using to track it?

As I said, the cost efficiency is the basis for us. So, the most important measurement for me is whether we are productive.

How important is customer responsiveness and how do you measure performance of such VAS which are extremely dynamic and require particular customer responsiveness?

The cost and quality again. At the end, the price doesn't matter for the customers. Additional labelling might cost 1,2,3 Euro more but the customer never rejects, as otherwise he has a process problem. As you can imagine, there are packages which need new labelling. Such packages usually already cost 4,000 to 5,000 euros or even more and as labelling will be 2 or 3 euros more per item, the difference doesn’t really matter to the customer. The most important thing is that VAS are implemented and implemented fast.

How do you know that the customer is satisfied, and which performance measures indicate customer satisfaction?

We regularly gather feedback. If we perform a VAS and the customer does not complain, that’s a good sign. However, in addition, we are also conducting sustainability-graduation surveys whereas the customer has to reply whether he is satisfied or not.

Transcript IX Company 3- Operational Manager

How do you define VAS in your DC and what types of VAS does your DC provide?

VAS are all value-increasing activities which are performed on the products of our customers, be it that we put extra labels, or extra packaging. It is also possible that the product of the customer's channels is required to be customized or that the product has to be manufactured the way the customer wants it. In other words, we get a raw product here and something is changed in such a way that it creates added value for the end customer.

Q: But how do you recognize VAS? I mean storage of the product also brings value, but it isn't a VAS?

Storing the product is not a VAS. This is a classic standard service that we offer. The customer delivers the goods here, we store them for the customer and send them out. If we implement nothing else on the goods except for store, pick, ship, this is considered as the normal standard process. However, if the customer wants us to put an extra label on a product, then there are different processes that must be taken into account for different countries. In these cases, the health insurance companies (for example) would reimburse the costs for the medicines. For example, we have business in Belgium and we must have a special label on these products. It is not financially feasible for our customer to order this label from the manufacturer, as he sends this product not only to Belgium, but also to other countries. These country-specific labels are VAS.

What advantages do VAS provide your DC?

VAS generate additional business. And this, in turn, increased sales and brings more revenue.

What challenges does the implementation of VAS imply?

The challenge we are facing is managing the costs which are increased by implementing VAS, and the dynamics that come in with implementing VAS. We are serving almost 30 customers here. And usually not each customer demands an individual process, but we have to make sure that at least somewhere we have standard processes. However, almost every customer has certain expectations as to what VAS processes should look like when they require them from us. And that is where the challenge for us lies, to integrate customer requirements into standard processes.

Q: Does this mean that you are integrating VAS directly into the picking process?

This is different depending on what customer we are dealing with. First, we distinguish between classic pharmaceuticals, so medicine and the medical machines. In the case of medicines, there are strict legal requirements. That is, if you change these products, which we implement in a so-called "tech room", it does not fall under our operational, but our quality assurance department. While providing these VAS, we are obliged to operate according the documentation. This means after a service is implemented, the product is being checked from an approved specialist. He checks whether the VAS has been fulfilled correctly and whether the goods can be traded with these VAS. In terms of medicine machines, the requirements are not so strict. The reason for this is, of course, because the medicine on which we perform VAS are vital medicines, for example, for curing serious illnesses, etc. And the machinery is just something that the doctor was trained for and knows how to use. So, as I said, the regulations are not as strong. For these products we often run VAS together with picking, so within the context of normal operational business.

Is the customer demand for VAS in your DC more stable or fluctuating?

It depends. We have customers who we know that we will always have to make VAS for them. But it is always different how the services must look like. This is largely related to the main objective we have. When looking at the Belgium label example, this business is a very stable one, we can always plan it, and we always know which labels we need to put on which products. But when I think about medical machinery, there are manufacturers who send their goods to Asia, for example, but putting labels on products every single time is not profitable for him. So, then we have to label the products every time, making sure labels are in the correct language. Furthermore, in these countries we have different business partners that require different amounts of goods. That means we only know there is shipping to China every week, but we do not know whether we are going to ship 10,000 pieces, 3,000 pieces or 50,000 pieces.

Is the demand on VAS orders more predictable or more unpredictable?

In the case of the labelling for Belgium, the VAS are quite stable and thus the demand is quite predictable. In case of Asia goods, the demand is very unpredictable.

Does the customer expect a short completion of VAS orders or is the lead time of the customer orders adequately long?

This again depends on the business segment. As the China orders are dynamic, we have to develop closer customer relationships, so that we get our numbers as quickly as possible and plan the staff accordingly. However, in case of labelling for the Belgian market, this is very stable. It isn't required every day, so that more often we make VAS in waves, but it is recurring. We have stable sales in country, so our customers also have stable sales, and therefore we have longer lead time to implement the VAS activities.

Is the value of VAS customer orders in your DC high or low?

Of course, if we are not charging as much for the VAS to the Belgium customers as we would to the Chinese customers when discussing the two previously mentioned situations. Obviously, for the China labelling we have more effort, need to react quicker, take on more costs, and thus, charge the customers more.

Which capabilities does the DC require to successfully implement VAS?

Again, we differentiate between pharmaceuticals and medicine machines. In terms of pharmaceuticals, we definitely need the expertise of the quality assurance department. We need pharmacists, so they can judge afterwards whether everything has been done correctly and give the products the "go-ahead" so that they can circulate in the supply chain. In the medical machinery field, a lot more pressure is put on the personnel. Staff has to be trained very well – which again highlights a challenge for the business managers or project managers – to estimate how to implement the processes correctly. And then we need people who are familiar with the processes and can define the standards of VAS while integrating the processes that our customers request into the standards.

Do VAS require more standardization or flexibility in the processes?

We actually have been discussing this topic for a long time. Nowadays, we follow the path of standardization in all the processes we have for our customers, but we are also very flexible in the time frame within which we apply the services. It has to be especially flexible in terms of pharmaceutical business. All VAS have to be planned in advance; special rooms must be made available. In this respect, we have both standard processes and very flexible processes. I think that's what makes us very profitable. The standard processes ensure the cost reduction so that we have a space for flexibility. In our DC we have three rooms that we provide specifically for VAS. And, VAS for the medical products never come ad hoc but are always planned with the customer. Then, essentially, we can act very flexibly within these rooms and our staff.

Which performance measures show that the implementation of VAS is successful?

We have two metrics which we use to measure the success of VAS. The first is the "accordance to the timeline", which means we have to get a certain delivery done by a certain delivery day. Of course, it is easier if I have more time until the end date, compared to having a day or two. The second KPI is the time constraints behind each process, as well as the quantities that are produced within this time. Meaning I can measure exactly that I have produced 5,000 pieces and needed a certain amount of time for this process, as well as the maximum time I would have needed for this service. With the help of employees who also adjust themselves for particular tasks we can measure the average time needed. So, if I have hit or exceeded my deadline, I am in a good position, thus, the measurement of time percentage is 100%. And if I performed poorly than I had planned before, that percentage is lower.

Q: Does it mean you measure financial benefit of VAS?

Clearly, by the end of the day we have to be sure that the VAS we are providing in our DC bring us the financial benefit.

How important is the cost efficiency and which measurements are you using to track it?

Cost efficiency is very important. We have to look at how long this process takes to calculate prices for customers because they also have their own margins. We can then cover the costs and carry out the processes profitably and monitor our key figures accordingly.

How important is customer responsiveness and how do you measure performance of such VAS which are extremely dynamic and require particular customer responsiveness?

It doesn't matter whether we provide stable or dynamic VAS. The cost tracking is equally important for these services as well. We have certain customers for whom we have to set certain requirements, as well as requirements which we also have to meet internally, in order to remain cost-effective. And it doesn't really matter what VAS we are in, we must always be efficient. We measure and analyse our reviews constantly to see if we were unproductive and if so, what was the reason.

How do you know that the customer is satisfied, and which performance measures indicate customer satisfaction?

We understand that customers are satisfied when there are no claims and we also have a very close relationship with customers. In this respect, we receive feedback very quickly, whether positive or negative. We often get feedback from the customer that, precisely because we are so flexible, we delivered very quickly although the product quantity was large.

Q: Do you also run standardized surveys?

Yes, we have them in the Customer Service area. There is a customer survey every 3 months, including a standardized questionnaire to fill out and so we get feedback that is measurable for all customers because we have a barometer from which we extract key figures. However, I always find close feedback to be better because it gives us the opportunity to work on problems together. Personally, I prefer this over a standardized questionnaire because they are evaluated only once a quarter.

Transcript X Company 4- Customer Manager

How do you define VAS in your DC and what types of VAS does your DC provide?

Value Added Services in terms of our business (or how we understand it) is the transformation of goods, meaning we change the goods that our customer has stored with us, or for example, present them in a way prior to sale. Let me give you two examples. We have a Distribution Centre where we produce the so-called displays or sales pitches for our customers. This means that we create a display set out of different goods, which is usually distributed to branches as part of a promotional activity – so promotional displays – which the customer has on his sales agenda. Another example of VAS could also be that we put together goods and make a completely new unit out of them. For example, for one of the customers we have a spin with 12 different glasses – which normally, are completely divided - but we put together 4 items, which means there are still 12 glasses, but in the form of 4 different sets which are then sold as part of a promotion activity.

Another form of VAS would be if we process the goods ourselves, which we are currently doing for a customer manufacturing batteries. So, this customer is manufacturing batteries that are first just being delivered to us and then, depending on which customer orders these batteries, the battery gets

a label. That may be a manufacturer label, whereas for Company X you need the same battery, as, for example for Opel, but in this case the battery still gets a sticker from Ford. Another example would be a car parts manufacturer, whereas each car part has its own label. In this case we perform that practical change of the goods that are then being processed accordingly. These are VAS how we understand them.

What can also be a VAS is the repackaging. Imagine the goods coming from a customer's production in a specific packing scheme in a pallet. There are customers who say they need to process the goods again, but for that they need a different packing scheme for the production. For example, another customer of our company needs a cardboard box that is rotated to 90 degrees, so that he can more conveniently take the goods from the pallet. This is sometimes done manually or sometimes by machine, depending on what is available and what goals we are pursuing. These are the typical examples of VAS that we provide as a Distribution Centre.

What advantages do VAS provide your DC?

Money from the customers. At the end of the day, we provide a service for the goods with the help of technical equipment or our personnel, which of course costs money as we have to pay our employees. The main question is, why do such processes take place at all? It's because the customer is usually not so flexible in his production process that they could integrate them there. This is especially the case in the finished goods sector or in the sector of car batteries. We are talking about mass-production with the high number of raw materials. Parts of the product come from the production line, and often the customers themselves have neither the space nor the capacity, as the customer has made so many individual agreements with his customers in turn, that it's not possible in terms of system capacity, personnel or operations. And in this case, we are practically the extended workbench of the manufacturer that brings the goods in a special form, so that the customer can in turn process or sell these goods.

What challenges does the implementation of VAS imply?

There are several challenges which DCs face by providing VAS. VAS imply supporting customers with individual solutions. As different customers have different requirements, it means we must be flexible enough to implement all of these in our DCs. We have to create closer relationship with our customers to understand the specifications. Otherwise we cannot provide VAS in the quality they expect from us. Furthermore, the calculation of productivity is becoming more complex. If the services are repeatable and we can look at the time we have already evaluated for the similar services, then it is easy for us to assess productivity. However, if we have to implement new services, which are completely different from these which we have already integrated in our process, then we definitely need to be very precise. Otherwise, we cannot control the costs and will not generate the return we expect from this service.

Is the customer demand for VAS in your DC more stable or fluctuating?

The situation whereby we have fluctuating demand is relatively rare. I would say in 99 % of the customer demand on VAS is stable.

Is the demand on VAS orders more predictable or more unpredictable?

More predictable. Especially by our loyal customers we have a certain experience and also, we coordinate the actions together, in advance. In the consumer goods sector, for example, display and promotional activities and constructions are an integral part of normal business. Thus, we know, especially with long-term customers, the time of year or season in which their displays are built – in this case VAS actually almost become a predictable business. Thinking about the last 2-3 months, when the Corona crisis arose, nothing was predictable. The entire display construction was partially cancelled. Now business is moving on again, with quantities that we did not know before. This

means that we also have to change our processes accordingly. Indeed, this is the case on both sides of the agreement. Therefore, both we and our customers, are interested in making the business possible and successful. As a rule, we are in a very close communication with our customers when such problems arise. There are lots of promotional activities in the consumer goods sector, which we can plan in the long term. An example of this would be the manufacturer of food sector products that has planned promotional activities with customers in advance – this allows us to plan our production process a few weeks in advance.

Does the customer expect a short completion of VAS orders or is the lead time of the customer orders adequately long?

We have actually never had a customer say that they would like us to get the products ready by tomorrow. Instead they inform us of an agreement with for example, Company xx, that has a week of promotional activities. Our customer is selling XY products there and needs a certain amount of promotional goods for the pop-up displays or flyers. The customer thus communicates that that is what he wants to receive, and we just have to make sure that we produce and deliver on time. The unplanned processes are relatively rare, but of course we are very transparent about whether we are able to perform the order or not. Promising to perform every order is illogical as our personnel is not a resource that is infinitely available. This is especially the case when it comes to highly qualified staff because there are certain areas which require special expertise. That is why we tell our customers in advance whether we are able to meet their requirements and on which scope. Otherwise, it would be an incompatible economic risk.

Is the value of VAS customer orders in your DC high or low?

Each VAS order we send to our customers costs them more than the orders which don't need to be specified. We strive to provide VAS in most efficient way in order to create a higher competitive advantage for our DC. Higher prices one hand and higher productivity on the other hand enable us to create higher margins from VAS.

Which capabilities does the DC require to successfully implement VAS?

This in fact reflects my previous answers. We have to be on a very good communication level with the customers and we always have to look at the productivity level. At some parts of VAS, we need special expertise. This means staff, that should be qualified accordingly. And of course, it is essential to have all the necessities whether that's' in the form of staff, available place and equipment. These obstacles are common and are not only specific to VAS, but to all the businesses.

Do VAS require more standardization or flexibility in the processes?

Our goal at providing VAS is to put these into our standard as much as possible. This is our general logic of how we develop our process to handle customer orders in operation. VAS are services which we plan in advance. They happen again and again, which of course gives us an opportunity to introduce them into our normal processes.

Which performance measures show that the implementation of VAS is successful?

Measuring that is relatively simple. We usually perform calculations for our customers based on the individual services we offer them. The quantities that we get from our customers are the foundation for the price offers. Based on that we make a calculation, that is measuring how much time one unit takes for its production. For example, we can measure how long it takes to make a new product set. In a case where 5 packages of 5 different items are put into a new set, packed, labelled, all of these processes are being time recorded and the certain fixed calculation values are being counted. This creates the basis for a variable billing calculation, including the prices, the costs due to of personnel expenses, coordination expenses and technical equipment.

Q: Does it mean, the return on investment is your indicator of success?

Not only. In the VAS area, and I would say especially in the VAS area, the measuring of quality is the other aspect that needs to be tracked very well. We are using the claims rate in the customer department to monitor customer compliance. This means the ratio of claimed customer orders in the VAS segment. This indicator is very important for us, as we must provide customers with the services of a high quality. Otherwise, the customers will be not willing to pay for these services and that will in turn negatively influence return on investment.

How important is the cost efficiency and which measurements are you using to track it?

Absolutely important. We have extremely detailed productivity measurements, that is, whether it is a normal storage process (such as pick-pack), or a VAS where we have measurements that are calculated and finally compared against the "real" values. Meaning if we have calculated that we need a spin in 10 seconds, we want to measure whether we do really need 10 seconds for this process. First and foremost, this is beneficial for our internal control - so that we know if we are calculating everything correctly.

How important is customer responsiveness and how do you measure performance of such VAS which are extremely dynamic and require particular customer responsiveness?

Like you have said before, this is not really a relevant case for us. It could be relevant if the customer did not have all the information in advance and could not provide us with his calculations. In this case we use our previous experience to plan and calculate. After a certain amount of orders, we know what effort they take, how long they take, how is the productivity, etc. This gives us the ability to calculate and adjust the prices at the end. However, I can imagine such a situation if the customer does not have sufficient information in advance.

How do you know that the customer is satisfied, and which performance measures indicate customer satisfaction?

The customer reaction is usually very clear. To begin with, the customer is dissatisfied if the goods are not shipped at all, that is clear. We get this as well, if we do not deliver on the initial delivery date, then we know that there will be a complaint. This can be managed by telling the customer in advance that the quantity is too large and will only be shipped to a later date. Often the customer appreciates us telling him about the challenge in advance so that he can inform his customer. However, we also receive complaints if the goods are damaged or if there has been a transport damage. However, this is quite normal in day-to-day transport management when it comes to handling damage (for example, glasses are damaged, and we have not noticed that). For us, this is a normal complaint – and – claims management process.

Q: That means the customer satisfaction measurements are the same for both standard warehouse operations and VAS?

There is no difference for us. We monitor the complaint statistics, which are collected regularly, and for us it is an identical process in terms of settlement. The customer does not differentiate these statistics either.

Q: Do you also have a customer satisfaction questionnaire?

It is not structured. We regularly conduct conversations with customers, with some customers even daily. So, there is a daily feedback, whereas we discuss what has not gone well, look at the internal complaint rate to see how well we performed. We also track how long it takes us to process a complaint, but this is also a standard process for our Distribution Centre. So, to monitor our performance, we have a whole bunch of customers with whom we record at the end of a period or a year/month, how high was the delivery performance, what went wrong, how many complaints there

were, has there been damage to the goods, were there goods that were gone missing or delivered too late, etc. We monitor all these measurements in great detail and discuss them with the customer at the end of each period. But this is also a standard process for us in this area.

Transcript XI Company 4- Distribution Centre Manager

How do you define VAS in your DC and what types of VAS does your DC provide?

We have different Warehouse Centres at "Company 4". Each centre has different functions. On the one side, we have a classic Distribution Centre, where the production goods are stored in a classic way and are then shipped to the customers of our customer. Moreover, we also have locations where the goods are simply handled, i.e. the customer delivers us goods in a certain form, we then partially repackage them and send them along. An example of this is our Distribution Centre in Vienna where we serve a large hardware store operator; the goods come from a German location, are pre-picked, commissioned and then assigned to individual markets throughout the Southern/Eastern Europe and Austria. It means that the pallets are just moved further in the same form as they arrive – essentially only moved from left to right. On the other hand, are Distribution Centres where we partially complete the pallets when promotional shops are running, for example add an additional item to a pallet or whatever. This is purely VAS business. In addition, there are packaging activities and other services.

Q: And how you define what is a VAS in your DC and what is not?

VAS is a special process above the standard. In the distribution centre here, which I am responsible for, we have VAS in term of the quality checks and weighing of goods which we do before they are going into stock. Or we also pack the products in special packages according to the requirements of our clients.

What advantages do VAS provide your DC?

Higher sales and return on investment. This is our advantage and de facto reason why we are ready to implement additional requirements.

Q: Does it mean the company has to pay more for VAS?

Clearly. This is the basis for the implementation of VAS. If the customer wants to have more specific services, the customer must pay for that. I think this is the rule of all normal business dealings. Nobody will do something extra without it bringing them benefit in some way.

What challenges does the implementation of VAS imply?

VAS are not challenging for us at all. They require more cost spending by providing additional staff, but this is precalculated and considered by the pricing. Otherwise, we implement VAS in the same way as standard operations. The difference is only that the goods are, for example, specially packed in trays - i.e. are more sale representative.

Is the customer demand for VAS in your DC more stable or fluctuating?

For us VAS orders are static, we always know beforehand what we have to do. We have very few customers whose demand is dynamic, but we are used to monitoring our customers. And also look at what they do and how they react to it. If the customer has something that he hasn't planned yet, i.e. we haven't got the numbers yet - it will be billed additionally.

Is the demand on VAS orders more predictable or more unpredictable?

We are working with very predictable demand. Our customers have previews of processes for two to three months ahead. Therefore, we are always able to plan the capacity in advance.

Does the customer expect a short completion of VAS orders or is the lead time of the customer orders adequately long?

The lead time is always discussed in the contracts with customers. The time to produce each order is calculated and if we need more time we will have it.

Q: Does this mean, it doesn't occur that the customer wants a big order to be implemented immediately, on a short term?

This is very seldom. The majority of the orders are planned in advance, and even if such an order is placed at our DC, we will expect to get enough time to complete this order.

Is the value of VAS customer orders in your DC high or low?

It is difficult to give a general answer. For us, VAS are part of a standard process. VAS are taken into account and have their own value, which is higher than the one of the standard warehouse operations. So, if we create additional services, for example, in the goods receiving department, this process is then more expensive than the normal process and the price for this process is then made higher accordingly.

Which capabilities does the DC require to successfully implement VAS?

Same as by standard warehouse processes. We need qualified staff, we need a structured process and a team leader who is able to manage the efficiency of all these activities taking place at the DC. Be it standard goods receiving, picking, packing process or be it some customer specific services. The same competences are required.

Do VAS require more standardization or flexibility in the processes?

Standardization. We, as quite a big player in the warehouse logistics in Germany, strive to create and adopt the standards in the all DCs. That means the processes need to be implemented according to our standards independent at every location. The goal of this is to achieve high efficiency in all administrative and operative processes. This helps us to develop a competitive advantage and to gain our contracts by tender. And, in most cases, the lower price makes the strongest argument for that. And in our DC, there is no speciality. We strive for standardization and for high productivity.

Q: Does it means that in other DCs of Rudolf Logistics you will need flexibility if customer demand is more dynamic?

At those locations where customer demand is more dynamic, the flexibility may be important as well. But this is not the case when it comes to us.

Which performance measures show that the implementation of VAS is successful?

Return on investment ratio is the key performance measure for us. We have special KPIs for VAS. An example of this would be how we measure productivity in addition to return on investment. We measure productivity on the personal level. Meaning, how productive was the worker when performing a VAS customer order. So, we compare the time we calculated in advance with the real time he spent for this order. Furthermore, we measure all other KPIs in the VAS area, like shipping on time and quality rating. But this is, like I just said, measured in the same way as other activities in our DC.

How important is the cost efficiency and which measurements are you using to track it?

Very important. If we want the customers to work with us and not switch to the competitor, we have to make sure to create an attractive price for the customers on one hand and still have a higher return on investment on the other hand. That is why productivity is so important for us. We test the assembly once and then we have a value of what has been done in an hour of labour. We always add 10% to this calculated measurement and that is what the employee has to achieve. Afterwards we measure the return on investment.

How important is customer responsiveness and how do you measure performance of such VAS which are extremely dynamic and require particular customer responsiveness?

We have some orders like that, but they are relatively rare. And if we do have such orders, the way we measure them is the same.

Q: Does this mean that even if more flexibility is required you will still measure VAS by cost and return on investment?

We measure flexibility by an ultimate ratio between input/output and the completed implementation as well as the timeline of the delivery to the customer. However, this is always the same procedure. For these orders – like for all others – we will measure return on investment. For such orders, we will of course calculate higher price.

How do you know that the customer is satisfied, and which performance measures indicate customer satisfaction?

We measure customer satisfaction with the help of complaint rates.

Q: Do you have any questionnaires for the customer survey?

No, we don't.

Transcript XII Company 4- Operational Manager

How do you define VAS in your DC and what types of VAS does your DC provide?

We have basic logistics services for our customers, namely dispatch of the goods and everything else that represents a special service, such as repacking goods or other services that the customer wants and can book, are VAS in my opinion. For the most part, I believe, what the customer books additionally can be interpreted as VAS.

Q: And what do you exactly implement in the in terms of VAS?

An example of how we implement VAS would be when we get the goods from overseas and repackage them as well as parcel them and the customer only wants to store the goods in advance, but wants us to take over other activities for him such as putting products on pallets and storing them. Some customers want to distribute the goods in Germany, and in these cases, and we pick the goods, provide all possible materials, and ship them. At the same time, we also take over logistics within Germany, i.e. the distribution of goods in the country.

Q: What is VAS then? Storage of goods is a standard process, isn't it?

Exactly. We provide storage to our customers, but some customers want us – as a logistics service provider – to accept goods that, for example, come directly from China. In this case, we prove the quality and book product into the system; later, complains are handed in if something gets damaged. Moreover, when the new goods arrive, we also book this as a special expense. The customer wants to know what efforts in receiving the products, weighing them, and sending them to the customer

represents. Finally, we sometimes provide not only new cartons, but possibly also new content to the packaging.

What advantages do VAS provide your DC?

To us, VAS brings profit. Secondly, we can meet the requirements of our customers. By offering such services, we make sure that the customer wants to continue cooperating with us. The reason behind this is the fact that the customer wants to advertise himself using VAS as the main argument.

What challenges does the implementation of VAS imply?

We face some difficulties by implementing VAS from time to time if some customer wants his products to be weighed and inspected, for example. That is, we have to check the entire range all at once and we also have to be very precise in making sure we do not make a mistake. In addition, we have no deviation at all for some customers, but a lot for other customers.

Q: But does it mean you have to calculate more cost for such VAS?

Of course. Implementing VAS implies higher costs in operation. But at the end of the day, we generate more profit, so we can adequately cover all the cost very well. Thus, it is very important to assess very well the time needed for these additional VAS.

Is the customer demand for VAS in your DC more stable or fluctuating?

The demand is stable. We work with some customers over a long period of time and we know exactly when the customer orders will come and in which quantity. These orders normally come in the same quantity, so we do not have a big deviation. In case of the new customers, it's always important to discuss the demand in advance so there are no management issues in my operative department.

Is the demand on VAS orders more predictable or more unpredictable?

VAS is something that we organize with the customer in advance. During the process a customer may be able to express an additional wish. In general, it is something that is not spontaneous, and is clearly discussed. VAS can be planned for us.

Does the customer expect a short completion of VAS orders or is the lead time of the customer orders adequately long?

Some customers, for example, want all of their items to be weighed and this is a special expense for us. In this case, an employee may have to spend a week completely implementing this task. We plan this in advance and the customer must also understand that it takes some time.

Is the value of VAS customer orders in your DC high or low?

We definitely generate higher incomes from implementing VAS and we also have benefits for the employees.

Which capabilities does the DC require to successfully implement VAS?

We need to have enough space and personnel to do that. For us, VAS for us is normally more time consuming, so we have to plan our capacity in advance in order to provide VAS on time. Sometimes, this depends on whether I have quite a low workload in the week of the picking and shipping process. In that case, I can arrange some staff from this area to do VAS activities. This means if the customer wants a special service, we can use the employees who do not have much to do at that moment in time. If the workload for the week is high, I have to organize some additional people for that.

Do VAS require more standardization or flexibility in the processes?

We are striving to implement standard processes in our DC. This, I would say, is our overall goal on how to deal with our daily workload.

Q: Is it different to the standard warehouse operations?

No. We have the same rules and the same standard for standard operations as well as for the VAS. For us, it doesn't matter what we do. Standardization is always the priority.

Which performance measures show that the implementation of VAS is successful?

We discuss all orders with the customer. After the VAS is implemented, we measure whether we have reached the planned speed effort. We also assess the financial results - did our costs match with what was calculated beforehand and what did we achieve in the end. In a normal case, if nothing was wrong, we created high profit. Additionally, we take notice of all metrics by all products that we ship from our Distribution Centre and we set this value in a ratio with the inventory as well as margin value to see if we were good enough.

How important is the cost efficiency and which measurements are you using to track it?

I would say, cost efficiency is the most important point for our DC. We, as the operative part, need to work on cost efficiency daily. And how we do that? We strive to increase our productivity. For example, we know how many pieces need to be checked, and we have a predetermined time frame, which is evaluated before integrating such VAS. Therefore, we measure pieces per hour and know whether we are efficient enough or not.

How important is customer responsiveness and how do you measure performance of such VAS which are extremely dynamic and require particular customer responsiveness?

We don't have any such orders at all. If we were to handle such things in the future, we still have to carry out the same measures we are using for all other activities. I don't think we need some special measurements. I think cost and quality always play the most important role.

How do you know that the customer is satisfied, and which performance measures indicate customer satisfaction?

He tells us that. We call customers every day and all deviations are being reported. If we cannot achieve anything, we'll let the customer know that.

Q: Do you do this only for VAS or for standard warehouse operations as well?

This applies to all services in our DC, so it doesn't really matter whether it's a VAS or a standard warehouse operation. I'm on the phone talking to the customers every morning and this gives them every opportunity to say what they doesn't like or what might be not going right.

Q: Do you have any questionnaires for the customer survey?

No, we do not have anything like that.

Transcript XIII Company 5- Customer Manager

How do you define VAS in your DC and what types of VAS does your DC provide?

For me, VAS are services that go beyond the standard processes, like warehousing: storage and retrieval. For me, this would be something like display construction, incoming goods inspection, or something similar. So, in principle its everything that exists outside of storage, which is in and out operations. For me, these would be services that bring added value.

What advantages do VAS provide your DC?

First and foremost, the price advantage we get from the customer is huge because VAS has a different cost structure. Partly this is personnel costs, but we have the advantage of having all the goods are stored in one DC, so no additional transport is necessary. A customer could also say that he would like to store or now still stores with us and is currently trying to optimise his technical processes. The advantage in this case is that he does not have to move his products to other locations generating even more transport costs, but instead making all services available from one source. Cost advantages also imply benefits in speed as far as availability is concerned. Partly, you don't have to use one person to his or her full capacity, but structure things so that their work is evenly distributed. If I hand over a service to an external service provider, he has the risk of capacity utilisation. But the contract service provider does not have one customer at one location but several, so it is a multi-user centre. He then optimises the capacity utilisation so that it makes sense for him too. Therefore, it's also added value for the customer.

Q: So, you are saying costs, speed, and availability. But these all are advantages for the customer, aren't they? And what are the advantages for a DC?

Increase of turnover and return first of all. But also, customer loyalty. We have customers in the transport sector who demand such services, and VAS enables us to retain them very strongly. This should not be underestimated. Of course, it is an expansion of business but mostly it is about customer loyalty. Simply storing a thousand of pallets is one thing. But as soon as the processes become more complex, it is of course, from the service provider's point of view, about customer loyalty on one hand and, on the other hand, about decreasing the probability that the customer is going to switch the service provider. That is of course also an important point.

What challenges does the implementation of VAS imply?

I think VAS are difficult if they are not known and the effort involved cannot be estimated. Cost calculation is a huge and challenging issue. All interfaces have to be considered. So, the biggest obstacle I find is the calculation. Theoretically, if I (as a logistics service provider), were to go a little further and promise too much to the customer, I may be able to properly manage my standard operations, but the VAS are too difficult for me. A situation such as this could harm the reputation of my standard business. Whether I can provide the service, whether I have a good feeling about how expensive this service is going to be and how my processes will work has to be clearly communicated to the customer. For example, sometimes VAS is a seasonal business, so I always have to see if I have enough staff at the moment for this business. We supply the Advent calendar industry around Christmas every year, which is naturally very seasonal. This is our biggest advantage as we can handle it and give advice to our customers. Then we always think: Can I implement this service? Can I manage it in terms of resources? How do I get them implemented sensibly? What is the flow of information? Is there a clean definition phase? Is the quality management sufficient? And the quality management becoming complex by providing wider range of different VAS.

Is the customer demand for VAS in your DC more stable or fluctuating?

I would say that demand is more dynamic than the standard business. If I compare VAS with the classic warehouse activities, VAS are ad rock when it comes to customer demand as well as seasonality.

Is the demand on VAS orders more predictable or more unpredictable?

Forecasting and planning demand is complicated. The business of VAS is very difficult to predict. But what does forecast mean? For example, we get an order and can either accept it or not. The customer might say he has a certain problem and needs our help, for example he needs relabelling, testing and display construction. Then you can roughly estimate the effort and you can use that when forecasting cost. Other than this I can't really say, that now is September and I'm planning a 20-30%

increase in turnover with the next VAS implementations. That is difficult. It is much easier for us to plan for individual projects. But the annual general planning is much more difficult, because VAS come unpredictably. And indeed, it is often the case that they arrive at very short notice. For example, if the customer has problems with the quality and we have to replace something. This VAS is purely ad rock. That's why VAS are much more difficult to plan and prepare for.

Does the customer expect a short completion of VAS orders or is the lead time of the customer orders adequately long?

VAS are often associated with short lead time in our company. The customer often orders something and expects it to be implemented quickly. It may well happen every week. It could also be that the customer has extended processes and then he says that he has capacity problems that must be solved by the following week. These are typical test processes. In that case, the customer had a certain volume and then passed on his overflow to us but did not communicate it. Then it has to be implemented at a very short term.

Is the value of VAS customer orders in your DC high or low?

Basically, we expect to create higher value from VAS. However, it doesn't always work out this way. Now I am back to the topic where I said that you have to be able to evaluate your processes well. Sometimes it happens that we underestimate or miscalculate things. In any case you have a certain learning curve.

Which capabilities does the DC require to successfully implement VAS?

First of all, you need to be competent in controlling your projects so that you can reasonably estimate effort. It is also important to have an operational competence. What kind of work steps are required? Take, for example Displays, which I consider a VAS. You get a few photos by the customers, what the displays should look like, and then you have to calculate. That means we need the operational know-how to say that we need 10 hours for a display. You also have to evaluate the hours commercially. This VAS must be calculated and evaluated following individual steps. I also think you need a special ability in building and improving relationships with customer relations. In my experience, we have much more communication with the customers at VAS department than within standard operations. As I said, we must first have certain competences that help present these processes, to calculate prices and to communicate them. We also need to be able to assess our team. That means, do I have the know-how? For example I'm working as a logistician for industrial customers and I get a customer request to pack certain products. It's quite complicated for someone who usually just packs other products and doesn't have the necessary expertise. That means I always have to consider whether I have enough resources. We need to be very quick and flexible. And I have to work very closely with the customers. For example, I do the first test and I have to communicate to the customer if I can't implement a particular service and that I need time for employee training. Then the customers join in to perform the service as a team.

Do VAS require more standardization or flexibility in the processes?

We are absolutely talking about flexibility in the VAS area. It's like if I want to use something outside the standard, flexibility makes the most sense because if we say now that we have to define SOPs for every request, the customer would say that's too complicated for him. Then I have a problem.

Which performance measures show that the implementation of VAS is successful?

So financially you can evaluate the cost centres when you make the price allocation. We also do that to see if the costs are covered. And often, in the VAS area, the customer quality indicators are also agreed upon. Depending on which VAS that is, we measure the complaint indicators. The monetary value of the service is also very individual. Or, when it comes to testing processes, we

measure the deviation rates or how often errors occurred. Whether it is packaging, display construction or similar VAS, we have internal financial key figures and external quality measurements with the customers.

How important is the cost efficiency and which measurements are you using to track it?

Well, it is already a task of the logistics service provider to work on cost efficiency. We do this because it is unfortunately not the case that if you increase a price, the same increase will take place for all services. The wages are rising every year, as well as energy costs and of this leaves me with less and less of a profit margin. This means that I am forced to work efficiently due to these fixed costs increases. However, we always run the possibility of taking one process, optimising it, and in turn, the demand will balance the costs out.

How important is customer responsiveness and how do you measure performance of such VAS which are extremely dynamic and require particular customer responsiveness?

Unfortunately, we don't have performance measures which indicate customer responsiveness or better to say our flexibility to act quickly. In principle, we always looked on flexibility in such a way that when we receive a request, we have the resources to perform it. However, we don't measure how quickly we have implemented an order, but rather we analyse the customer and look how much extra work we have to do.

How do you know that the customer is satisfied, and which performance measures indicate customer satisfaction?

On the one hand, we do a structured analysis, so we have at least annual meetings with the customers. The intensity of the business is also an indicator. That means it is not only the volume but also whether the customer is giving me more business. So that is the topic of how deep our relationship is. It is also possible that we get new customers from time to time, who say they got a recommendation from X and Y. But basically, measuring customer satisfaction is having an exchange in the operative area. In my case, it is a quarterly or annual exchange whereas I evaluate the management and see if the customer still wants to keep doing business with us.

Transcript XIV Company 5- Distribution Centre Manager

How do you define VAS in your DC and what types of VAS does your DC provide?

That is a great question. It always depends on what the customer wants from us. The bottom line is that we don't offer a fixed scheme where we say, "we can really do all that", but we have found that different industries and different customers have different needs. And together with our customers we try to work out what we can do for them. Often the cooperation becomes more and more intensive. If the customer notices that one of our services worked out well, we ask him if that's what he would like the next time. We used to have a little storage here in the logistics department at Company xx. Now we have, for example, 50 warehouses with huge material flows, but also a customs warehouse, which is also a kind of VAS. We take care of such services as well. We also have the filter warehouse and of course we do various activities there as well. We started doing storage with one of the special customers of our company, but now we go into such VAS like display construction, labelling, etc. We also repack and provide quality control. Essentially, we do a lot of different things.

Q: According to which criteria do you understand whether it is a VAS or a standard operation?

We ourselves do not need to separate these concepts. Ultimately, the client should say that if that is the VAS we provide. In the end, I'm just a service provider and I say come on, you can use me for

things you don't want to do or things that are too costly for you. Because the quantities are too small, because controlling is too complex, because they want to outsource. Customers are driven by different motives when they give processes out to the service providers. And, I think VAS are services that take place outside of the classic warehousing. These are services that we build up together with our customers within the framework of our cooperation.

What advantages do VAS provide your DC?

First of all, I have a great opportunity to develop my turnover by offering value added services. I manage to bring a higher workload to my space. That also depends on how you are positioned as a service provider. There are warehousing service providers who have no additional space to offer VAS. Here in Bielefeld, we have around 25,000 square metres of space that we offer our customers to make VAS. So, we have already taken over complete warehouses, and customers sometimes define this as VAS. Then the customer can concentrate on what he is particularly good at, i.e. purchasing and sales, and then we take care of the logistics. We have also done all kinds of things for customers when they think we can do a better job or if we can get it done at a lower price than the customer himself. Thus, this is a win-win strategy as the customers save costs and we generate higher profit.

What challenges does the implementation of VAS imply?

There are often difficulties when the customer releases such services from their processes and hands them over to us as VAS. It is often the case that the employees of our customers have a different understanding of the "Doings" than what was actually communicated to us. This is why it often crunches especially in the initial phase because the customers do not always know the specifics that are involved in such a business. Of course, everyone says their business is standardised and everything runs in very clear processes. More often than not, however, VAS orders in particular bring several special features for individual customers with them. These are often points that are not taken into account in the tender or handover situation, but ones you only really come to notice during the process. Then it takes 4 to 6 weeks until you have everything you need so that there are no problems in transmission.

Is the customer demand for VAS in your DC more stable or fluctuating?

It depends. For example, we've adopted standard storage for some hazardous materials. These are of course services that run every day and are stable. But special services like packing the displays or quality control are quite unstable. That always comes up on demand and must then be implemented quickly. I am currently packing 36,000 gift sets for our customer for Christmas. Of course, he has planned those services in advance, but he suddenly had a quality problem and now I am checking 500 units at the same time to see if any liquids have leaked. In other words, these are services that come quite spontaneously, and we have to process them spontaneously within the bounds of our possibilities.

Is the demand on VAS orders more predictable or more unpredictable?

Unpredictable. That is a big part of our business. We do not know today what we will – or will not – do for our customers in the coming weeks.

Does the customer expect a short completion of VAS orders or is the lead time of the customer orders adequately long?

The leads time is often short. Customers expect from us quick reaction and our structure enables us to react accordingly.

Is the value of VAS customer orders in your DC high or low?

Well, we started with VAS only a few years ago. With that said, things can definitely be implemented so spontaneously, which brings more benefit than standardised processes, that everyone can follow. In order to do that, I just need 3 people and a forklift. Such processes still do exist. But if somebody says he needs 50 000 bottles checked as fast as possible because of a delivery stop, then these are different conditions. I have to quickly assign more personnel and this service has to be implemented. Those are other costs. Always outside the standard.

Which capabilities does the DC require to successfully implement VAS?

What we definitely need is a high level of IT competence and experience from the employees in both the IT department and the management team. For us, the specialisation is the takeover of customers' IT systems. We don't tell our customers that they have to work with our IT management, but it is imperative that they work in their systems. At “Company XY” we work in JDE-Networks, or SAP, or any other warehouse software of our customers. Of course, this always requires training of our employees to have the basic knowledge of the programs, although it is often the case that we work on the basic level and do not immerse ourselves in any depth of systems. So such IT systems are very similar on this basic application level, so our employees can adapt relatively quickly.

Do VAS require more standardization or flexibility in the processes?

The classic processes are already standardised. For example, if I'm a customer who has been licensing his products here for 20 years, we'll have more than 50,000 product storage spaces, which are of course standard processes. They are precisely described and must be proven according to the quality regulations. Every step is described exactly. But there are always these special processes where the customer suddenly has a request and we have to complete a task as quickly and flexibly as possible. This cannot be integrated into standard processes, so we have to sit down and write down the sequence of these processes.

Q: How do you ensure that you have flexibility?

That is my job. I can only do it through having good relationships with many clients. Of course, we can't track it all by ourselves, I don't have 20 people I could employ for that. I use the support of other service providers where I can ask for help and get people to do the things I need at the level of quality that I need them. We are very hands on as we use almost no or very few machines. We are not a classic production company as everything is done by hand. I often cannot share people, I have to comply with the legal requirements regarding working hours, deadlines, holidays, illness, etc. The standard process is of course easier to plan. Sometimes you have to evaluate the holidays of the employees and in order to know how many staff you have. The customer behaviour is also periodic. I know that after Christmas the customer has a lull in business, then it goes up again, but in the summer, it goes down again. You can plan all this better than the spontaneous VAS. They also have to be carried out spontaneously.

Which performance measures show that the implementation of VAS is successful?

Well, from the financial point of view, it is relatively easy. Revenue minus costs is my success. That is also easy to describe. Especially when I pay for external personnel. Machine hours are also recorded and then I can read out very well whether I was successful or not. Of course, you know about your weak points from the projects you have done several times and you can measure them in your calculations. You are also successful if the customer comes back again and again and places the orders even if we are not the cheapest option. We have many competitions on the market in Bielefeld and we are probably the most expensive of all. But we are also renowned for representing the highest of quality.

Q: Does that mean you focus more on quality and not on costs?

No. Quality is of course very important, but we also have to consider quantity. So if I have to take quality measures on products then it should take no more than 2 seconds. On the other hand, if for example, I have to make sure that we stick the label on the right way or something like that, then I have to look things through very carefully. You can do this quickly, but it will not be accurately done because it is exhausting for the people.

How important is the cost efficiency and which measurements are you using to track it?

Of course, the costs are very important. We have some measurements within the "implemented processes" department saying how much packaging we have to do in one hour, the number of forklift hours needed, etc., all of which is measured. It's all in the tables, we can evaluate it.

How important is customer responsiveness and how do you measure performance of such VAS which are extremely dynamic and require particular customer responsiveness?

It is often more difficult to measure the spontaneous services that come along. Basically, my customer calls me and says what he wants. That's often how the relationship with our customers is. I can't plan anything because I don't know what he wants from me.

Q: How do you then measure success at the end of the day, after implementing a VAS?

At the end of the day, when I have written a bill and see that I have profit, then I have been successful.

Q: Does it mean you always prove to have revenue?

Exactly. We must have profit, otherwise I don't need to do all this. Of course, the standard processes are always cheaper because you get used to each other and you know what the others have to do. At VAS, such things as technology and personnel deployment are more important to track. For example, if I work with 3 people but 2 are too slow, I have to find out what the picking performance looks like. I have to know if I will be regularly supplied with goods by my customers or something similar. I have to measure this, and we measure it too. These differences will always remain between standard and exceptional VAS.

How do you know that the customer is satisfied, and which performance measures indicate customer satisfaction?

We actually have the customer survey once a year in the freight business. We send it out and hope that the sheet comes back. One must always consider how fair or how biased these surveys are. You can find this out by asking correct questions and by choosing the customers to whom you send the survey to. Here in logistics, I measure the direct feedback of my customers and whether they give me more orders. At the end of the day, this feedback is what really matters. This is how I measure whether I am successful. Personally, I have been the logistics manager here for 14 years now, I took over the team with 10 people and 10,000 pallet spaces. Now, I have 30,000 pallet spaces, the turnover has increased sixfold, and now I also have 30-40 employees. This is my subjective measurement of success. In addition to this, every month we also sit down with the management team and look at the BWA, check the individual points, where are the deviations, why are there deviations, why are we spending more or less money at some points, etc. Therefore, there are controls in place whereby the technical costs, damage costs, operating hour costs are measured. This all is clearly measured and is the basis of all our measurements.

Transcript XV Company 5- Operational Manager

How do you define VAS in your DC and what types of VAS does your DC provide?

VAS in our DC is everything we provide to the customers according to their specific needs in addition to warehouse services. For example, this year we implemented the confectioning. Meaning we put a number of small, different pieces in special bags, packed them for the customer and sent them out. Moreover, we implement the controlling of bottles. For example, the controller says that there are 50 thousand bottles, but in reality, it's not true. In this case, that probably means we have the wrong label, or a bent label, or a wrong patch on it - all of which has to be checked. If the label is actually incorrect, it must be torn off and the product must be prepared for labelling again. So we have such services as well, but only for logistics working exclusively for the XZ company.

What advantages do VAS provide your DC?

For a DC, VAS naturally mean additional tasks, additional work, securing additional jobs, additional income and the utilization of space, etc.

Q: Does it mean that the customer has to pay more for these services?

Well, what does pay mean. Of course, the client has to pay for the services we provide. Otherwise, we wouldn't consider these to be advantages.

What challenges does the implementation of VAS imply?

For some customers, accuracy is especially important. In any case that we offer VAS, we need to know what we are talking about, which means we need to be able to do them at all.

Is the customer demand for VAS in your DC more stable or fluctuating?

Actually, the requirements are fluctuating. Even the customers we work with have their own customers who in turn demand something from them. And every order is not the same for them. So, every order we get is not the same because there is another customer requirement linked to it. Be it a product portfolio that changes or the delivery has to be done within a shorter time, there are certain regulations. Now, for example, because of COVID-19, new regulations must be considered. So, it is never a standstill. Thus, flexibility is a very big issue there.

Is the demand on VAS orders more predictable or more unpredictable?

We can predict that there is going to be an order, but we can never predict how big it will be, because again it depends on the customer because it is he, who in turn, has demands from his customers. We can plan the time required, for example, as we are doing now with the action with hairdressers. You can plan the time, but neither the quantity nor what needs to be done. Last year we put the products in small bags, this time there are cardboard containers. There is again a new request because the cardboard has to be folded in advance, so it must be ready for sale. Therefore, I would say the orders change again and again. You can plan the time, but the contents are very difficult to predict.

Does the customer expect a short completion of VAS orders or is the lead time of the customer orders adequately long?

Most of the customers require short lead time. First of all, our customer has to decide what to do, what it should look like, and how it should be delivered. Then the customer begins to communicate with us: what should we do, what should we take over, where must material be procured, or production be steered, organized, etc. Again, for such special services we need production areas, storage areas, buffer areas. When all the planning is done, sometimes it is already too late to meet the planned deadline. So we have to act relatively quickly. However, we are dealing with personnel service providers, who can act flexibly. And I believe that especially when we are talking about VAS, it is not about a special qualification but about accuracy. It is important that you get good personnel even at short notice.

Is the value of VAS customer orders in your DC high or low?

If we provide VAS, it always translates to higher value we create on the service we provide. So, we need flexible spaces for storage and flexible storage areas are naturally more expensive than the permanently occupied storage areas. From what I've experienced this is also clear to every customer. Space is hard to get, and sometimes the logistician has to work upwards, the width is no longer available because there is too much of the product. Of course, we have flexible space that we can always offer, but it is more expensive. It is also quite normal, because you have to wait for the space to be available for orders that occupy this space. If you always have follow-up orders, then you can plan them well and certainly offer them at a lower price. Usually, you only have one customer who does that. He has maybe two or three orders a year and the for rest – if you can plan it – you can offer it at a different price, but it is very difficult. Essentially, area is the most important factor, not only in the short term but also in the long term. A recent example of this would be when we provided 500 shelves for a customer (for two years) but now he says that we are so good that he wants to outsource more space and for longer. This puts us at a disadvantage because we can't afford such a large space. In any case, the greatest benefit is flexibility.

Which capabilities does the DC require to successfully implement VAS?

As a service provider, we have to fulfil two points: be flexible, i.e. have to be able to react quickly, and to offer the services at reasonable prices - for if it is so expensive that I can do it myself, I will do it myself. Often these two things are the most important points. Speed means you have to be able to meet the deadline. And you have to be able to set up the organization at short notice. And in terms of price you have to make an offer that is attractive for the customer.

Moreover, we need professional competencies such as the personnel that performs VAS (the professional competencies must be even on a problem recognition level). There must be enough space for VAS. Depending on what you offer, you need operational space, storage space, stand space, buffer zones, and a good communication network.

Do VAS require more standardization or flexibility in the processes?

Flexibility is essential to providing VAS because that is exactly what the customer expects from us. Otherwise, if all processes are standard, if everything could be planned well – especially in terms of costs – many people would plan for 5 years. If this was possible and the customer tells me that that's all we'll be doing for the next 10 years, then that will of course further reduce the costs. But if I don't know that beforehand, and that is usually the case, then flexibility is the most important thing and then you have to negotiate the price.

Which performance measures show that the implementation of VAS is successful?

The key figure is for example if the customer is satisfied and gives us orders again and again. Sometimes we also do a check-up at the customer's site should there be some quality problem. This is something I cannot plan for. It suddenly appears and the customer has to have the whole batch checked to see if everything is in order. However, the price again has to be so good that the customer can rather throw the damaged products away and make new ones. That must be cheaper. And if the customer continues to work with us and we can generate the profit, then we know we are successful.

How important is the cost efficiency and which measurements are you using to track it?

The costs play a large role. We measure the personal costs and the cost of space. And finally, we have to be able to stay within the cost calculation in order to achieve the margin we calculated before.

How important is customer responsiveness and how do you measure performance of such VAS which are extremely dynamic and require particular customer responsiveness?

We measure the costs, but we don't use any performance measures that indicates customer responsiveness. It is rather a gut feeling. If we are on time with the order, we know we did good job.

How do you know that the customer is satisfied, and which performance measures indicate customer satisfaction?

The customer is satisfied if the plan is kept. He makes an order and is only satisfied if the time that was promised is kept. But it is also a risk for the customer if the work is not done properly and the customer only notices it later because he gets complaints about something that is bothering him. Furthermore, he has to agree on the price. The customer is still satisfied if the costs are within the limits, even if the quality is not right, which happens from time to time. Sometimes the background is wrong, or the barcode is wrong, or the language on the label is wrong. This is clear. If it's only one batch that has a problem, you can remove it and replace it with another order. For quality assurance purposes, we tested a number of products. For example, we have tested 100 pieces to see how long they take to be inspected, unpackaged, cleaned, and put into other containers. We have tested all of these processes. And if the customer never complains, we know we have good quality. That is our proof. If customers don't like something that we've done, they no longer stay with us.

Q: Do you have specific questionnaires for the customers?

There aren't any questionnaires, but we have order enclosures. There are several instructions and a confirmation from us of what we did during the inspection. These are A4 sheets, 506 of them, with photos of what it should and should not look like. Instructions what to do with what. At the end there is a small questionnaire to make sure we have checked everything and if we have done everything as it should be. We sign it and it goes to the customer as a quality check.

Q: Have you received any feedback from the customers that way?

We have never had any customers expressing themselves to the quality check. So, as long as we continue to get orders from the customers, it proves to me that everything was done right.

Transcript XVI Company 6- Customer Manager

How do you define VAS in your DC and what types of VAS does your DC provide?

I'll just say what I understand by VAS, so they are additional or value-adding services, that is to evaluate a product in some way and make it more interesting for the end user. So away from the standard, to make special, additional services.

Q: Is that your own definition or a definition of this DC? By which criteria would you recognise whether it is a VAS?

Well, VAS can be recognised by the processes that do not comply with the standard.

Q: So, what types of VAS do you offer here?

We have the co-packing, the confectioning, also such additional processes like panel quality control. For example, at a customer's site we check if there is a defect in the product. Each carton is opened and checked.

Q: What exactly is checked?

Whether there is a defected batch. These are the products for animal feed, and they are partly vacuumed. Then every can is checked to see if something is wrong with it. So, we have such additional services. Then we have something like land carrier consolidation, so if there are residual pallets, I would also include this under additional services. It is not classical palette in - palette out.

What advantages do VAS provide your DC?

So, the aim of our company, as well as the aim of all companies, is to have high return on investment. In this case VAS is an especially beneficial business, as in terms of VAS the margin is higher in contrast to all standard warehouse operations. However, this is not the only advantage. From my point of view, if you can offer VAS, you can win customers. We are supposed to have the classic transport or storage business, but if we have an additional service, then our business will be more attractive. For me, VAS provide an opportunity of saying we are versatile, flexible, can face new challenges every day. VAS are not standard - the pallets come in one day and tomorrow they're taken out. Various labels are put on such orders. So, there are many processes that need to be implemented quickly and promptly. So, it's cool to prove yourself and say we can provide standard but also additional services. And we can even do that within a certain time.

What challenges does the implementation of VAS imply?

The main challenge is that every day can be different. That there is no standard. Personnel but also space are required, because there is not only one process that we have to learn. The processes are new every day, which has something to do with deviation, because it is all about customer demand. This is already a certain challenge. Perhaps, when it comes to automation, you have to look in the VAS area to see whether you invest in some machine or not. In the area of long-term investment, you also have to look carefully if the VAS business is short-term. Especially when it comes to automation, it is often the case that you have to see to what extent you can automate, because automation is standard, and standard and VAS are not the same.

Is the customer demand for VAS in your DC more stable or fluctuating?

I think it is a bit sporadic. There can be a lot today, but not much tomorrow. So, it is rather fluctuating, you cannot say that there is a continuous demand.

Q: So, it can be that the customer wants to have a product in a certain quantity every day?

Well, some customers already have a forecast, which is basically balanced for half a year. But we think on a weekly basis, so we have a contract for 10 years, and we know a week in advance what we have to do, but the tasks can still change every day, so it's all very unstable.

Is the demand on VAS orders more predictable or more unpredictable?

Well, actually there is no forecast in the field of VAS, it's all just a tendency. You can imagine that we have a food customer here who has a season, which means that we can expect that if we are in the middle of the season, we know that we need 40 - 50 employees, and in the next season we have 10 - 15 employees to represent the management. This means that you can see the trend quite well from the forecast. But in itself the actual production planning can only be seen in the weekly forecast.

Q: VAS orders are thus unpredictable? Or independent?

That depends on the customer in any case. I would say low predictability. You can see a tendency, but you can't rely on it one hundred percent, so it's not really predictable.

Does the customer expect a short completion of VAS orders or is the lead time of the customer orders adequately long?

Unfortunately, the customer doesn’t give us in advance in which week we have to manufacture the products. If there is an article with the Prio-order behind it and a production on day X, but it can also be that this morning the customer has a very urgent order and asks us to plan the production today - so this can also happen.

Is the value of VAS customer orders in your DC high or low?

I think VAS have high value. I mean, there are a lot of processes behind them, thus, the product becomes automatically more expensive and has to become more expensive, otherwise the service provider is doing something wrong. But now when I think about the end consumer and I think nowadays the end consumer wants this added value service. Well, there are such classic articles as flour and sugar, where I don't need an added value service. Although I'm sure there are VAS for them, too, so if you think there are backing displays or something like that, there are a lot of different possibilities. I think that nowadays the customer wants to have a choice of such small showcases. I think that they are also willing to pay more for it.

Which capabilities does the DC require to successfully implement VAS?

Definitely a process and project manager, who implement VAS and pay attention to sustainability, who are in contact with customers quickly, and who represent an interface to the people in the field and the customers, because customers are the ones who usually make the requests. That is why VAS require especially close relationships with the customer.

Do VAS require more standardization or flexibility in the processes?

Well, because VAS are in my opinion very flexible, it is more about flexibility. So, by default there are processes when I'm doing the picking and putting into storage or something like that, but when it comes to the articles themselves, you need flexibility. You also need to be willing to put all of the effort in it, to train people again and again. Because there are so many articles and the customer's marketing department is always thinking up new things, which means that flexibility is the way to go. There are basic processes that are standard when it comes to the normal processes. But a practical structure alone is always different, so depending on what you have of a product, you need a display, boxes, surface, mixed box of 3-4 types, packing table on which you can produce – all that is clearly specified in the standard processes, so there you have a certain standard. But every product is individual when it comes to VAS.

Which performance measures show that the implementation of VAS is successful?

Well, I can see that we have process times for each article, so I know from previous recordings how long my processes can take, and I can tell from this KPI how my line has to be timed, where do I have bottlenecks, where do I have no bottlenecks, how many employees do I need. And as soon as I change anything, I know that I don't earn anything or have to pay more. This means that our items are already calculated in such a way that you can make a profit or even control production. This is a challenge, especially when you have to go into great detail, so you have to pay special attention to every single article.

Q: So, what are these KPIs of success?

Production times. So, these are calculable values for each order. And then they are always calculated and updated daily by our system, which tells us how much has already been stored and scanned in again, and then you can see what the production status is.

How important is the cost efficiency and which measurements are you using to track it?

This topic is actually quite important. We have to see how much we get. As a matter of fact, we only do VAS if we get paid well. So, this calculation we make for the articles includes on the one hand reasonable times, on the other hand fix and variable costs. These have to be covered otherwise you can't offer VAS. Unless there are any subsidies, so that you have any other business e.g. transport business besides the VAS warehouse, so that it balances itself out, but that is also possible to calculate in such a way that you can work cost-covering. At least in theory. In practice you just have to look. Sometimes it's just hard to calculate the orders in detail from the start because you don't know the construction, you don't know the material and so on and so forth, which means you make premises at the beginning and then you go back and look at the order again: okay, where are

my adjustments, where did I miscalculate or did I do something wrong with my personnel planning, the structure of the production lines and so on and so forth.

How important is customer responsiveness and how do you measure performance of such VAS which are extremely dynamic and require particular customer responsiveness?

Actually, we act more like this: some of our employees are performance-oriented and keep an eye on it the whole day: how is production progressing, are we making progress or not, and they are then also in contact with the customer. They are the first to try to extinguish the problems, so look, what went wrong or why it doesn't work as it should, and then they exchange their views with the customer.

How do you know that the customer is satisfied, and which performance measures indicate customer satisfaction?

From the feedback. We are in a very close exchange with the customer. When it comes to VAS, we have a short meeting session every day at 10:00 a.m.; it's all about going through everything; if we are well, what's up, what needs to be done, what are the priorities, where we don't get ahead. This is actually at an Excel basis where the hours are exactly put, and we can see where we are, what the status is, what we are experiencing at the moment, are we on time or not. If we are not on time then it goes to the studying the reasons; e.g. the customer reacts because goods have not arrived on time, or we react because there is perhaps a lack of personnel. So, this is being exchanged on a daily basis.

Q: Do you also have other KPIs? Maybe customer surveys?

Interviewee: We don't have anything like that, it's just rather a daily exchange. We also communicate from other positions like branch managers, which I think we do, but I don't have any common points with them myself, so I'm sure we discuss once a month what is good and what is not good.

Transcript XVII Company 6- Distribution Centre Manager

How do you define VAS in your DC and what types of VAS does your DC provide?

I would say we are very diverse when it comes to VAS. As you have seen, I think. So, what do we offer... Well, we actually have any kind of activity that can be done in the warehouse with the help of the space or conditions on site. This starts with the classical assortment construction. So, I take a box and create an assortment. Thus, from mono cartons I create a mixed set. That would be a classic VAS that we do here. Another example is the subscription box models in the field of e-commerce where different products are repacked according to different packing patterns. Or the classic display for the supermarket has to be loaded and assembled. But also gifts that are wrapped with wrapping paper, stickers and so on have to be taken into account and represent VAS.

What advantages do VAS provide your DC?

For a DC, VAS bring added value. Well, I am the service provider, and that way, through these services, we generate our salary. Thus, if we can provide an additional service, we can of course increase our turnover. If we just drive the pallet in and out, this business is only done with three employees. But within the VAS I might have to change the business a little bit and carry it out with 30 employees, therefore the service value increases as well.

What challenges does the implementation of VAS imply?

Clearly, the staff. The personnel in VAS is what you need most. As a logistician, I unfortunately cannot atomise everything. Because I cannot focus only on my own products, because certain contracts have to be behind them. In order for such a machine to bring return on investment, it must

be applied in a long-term perspective for when customers suddenly want a completely new packaging than before. Then comes the seasonality which influences personnel… Seasonality means that we have almost double the number of staff here during the Christmas season. But in January it really goes down, whereas Easter goes up again. So, seasonality and staff variation. Staff variability is the biggest problem. In addition, quality of the staff is another issue.

Is the customer demand for VAS in your DC more stable or fluctuating?

Mostly fluctuating. We do have some VAS orders that are stable every year. So, we can always plan when this business is going through. But of course, there is also the classic action business that runs in between. For example, there are big campaigns at Aldi, where we are very active. Or our customers are planning a huge campaign. You might only know this a month in advance. Sometimes you can plan very well but you have to live with a little fluctuation as well. But mostly VAS customer demand is really unstable.

Is the demand on VAS orders more predictable or more unpredictable?

It really depends on the customer. However, we have a lot of customers where we only know the demand when we are already in the business process. So, it can be that we only know the evening before what the customer wants or only in the morning what is really coming up. Then more or less working hours have to be booked. These processes also have a very complex controlling. So, we have to have a lot of experience. If you look at the e-commerce sector, it is possible that a YouTube blogger carries out a promotion on one evening and we don't even know about this order. So, the demand is less predictable.

Does the customer expect a short completion of VAS orders or is the lead time of the customer orders adequately long?

Of course, even if the customer orders unplanned quantities he expects us to carry them out quickly. In any case, this wish is always there. But we can say that there is no other way to carry it out sooner and that it is too much. We always try to do everything as fast as possible, because our goal is to satisfy the customer and to say we did it even though we might not have had to, which of course makes us successful in customer retention. But there is of course an upper limit. I always have to see if we have an advantage of saying that there is an order that only has to go out in 6 weeks, then I can use my staff for the other project. So, we always try to make it possible if we can.

Is the value of VAS customer orders in your DC high or low?

VAS is nothing else than a standard process plus further additional services which cost money. Therefore, customers pay more for orders like that. Naturally, if the client orders high quantity and expects us to perform the order in a short period of time, the margin of such VAS is in turn higher.

Which capabilities does the DC require to successfully implement VAS?

I would say IT-system is always very important. So how do I process everything. Especially in the food sector with its excessive batch requirements. But also, in e-commerce there are a lot of manual processes behind it. So, a certain amount of know-how is required. We have to understand the needs of the end customer, not only our customer but the whole food sector. Personnel management, so we need team leaders who are trained. How the product has to be packed and what it has to look like. Thus, as I said before, personnel and space are always variating.

Do VAS require more standardization or flexibility in the processes?

Flexibility is more important. Surely it depends on which area of VAS we are in, but especially in the area of display construction - the displays change very quickly, the expectations of our customers are partly determined by the constantly changing marketing concepts. We have to plan our space

and be very flexible to be able to implement these orders. Of course, standardisation and flexibility are priced differently. And if the customer always wants standard processes from us then he will clearly get a lower price. So, the customer must know what he needs more.

Which performance measures show that the implementation of VAS is successful?

Of course, we have the working-hours that we calculate. The turnover and the space needed for the project are included in the calculation as well. So, it is best to control all key figures very carefully. Of course, we are using contracting in some areas. Tracking is easy in that case, because we have to meet certain criteria with our services.

Q: Does it mean that you are measuring financial performance?

Of course. At the end of the day we want to see whether we have reached the planned return on investment. However, when we talk about KPIs, we are now in the process of implementing a special tool, meaning we are introducing a click-send function and build up interfaces with all our IT systems, as we have many of them in use. Our goal is to be able to measure all KPIs precisely by the end of the next quarter of the year. Currently we cannot do this. Currently we have to track all KPIs using Excel. As I said, it is more a follow-up analysis and the contract analysis.

How important is the cost efficiency and which measurements are you using to track it?

Of course. We look at how much the reminder hours for the specific project cost us, how many we need. So, overtime is also a key figure.

How important is customer responsiveness and how do you measure performance of such VAS which are extremely dynamic and require particular customer responsiveness?

In the field of e-commerce, we have a specific agreement, so even with our large customers we have a weekly schedule. So, we are tracking whether we have any deviations, and actually we don't, pretty much all of the orders work out very well. And by all the orders there is a delivery deadline and it is always met, so we don't have delays. Of course, as I said, costs play an important role as well.

Q: Does it mean that you are measuring the costs of spontaneous VAS orders?

Q: This is project-related. Our employees do the stamping in order to track costs as well. So, the employees scan exactly which project they are working on, so later on I know how many hours have been spent on a project, how much we had in costs etc. Then I also know whether we were effective in the project or not.

How do you know that the customer is satisfied, and which performance measures indicate customer satisfaction?

We discuss this with the customer. I wish I could say we have a quality manager in house, but it is mostly about an annual interviews with the customer. We are in very close contact with large customers as well. We ask them if they are satisfied, how the process is going on, etc.

Q: Do you have any key figures for the customer satisfaction or any customer surveys?

We do have customer questionnaires, exactly. Especially in the e-commerce sector it is very important. We do not do that for spontaneous projects but for the long-term projects in our DC. In e-commerce sector we ask for the deadline for receiving the package, so the deadline for when it has to be sent out. You have seen the food boxes in our DC. They all have to be out by 2 pm. We can't be late, everything has to be sent out. But then we also have orders which have to be sent out by 3 p.m., 10 am, etc. Thus, we also measure these agreements.

Transcript XVIII Company 6- Operational Manager

How do you define VAS in your DC and what types of VAS does your DC provide?

Everything that goes beyond standard activities we provide to our customers. But added value is created if the products are not just pushed through our warehouse. So all such operations that fall beyond the standard we call VAS. In our logistics centre VAS mainly are display construction and special packaging for shipping the goods - which the local manufacturer cannot provide.

What advantages do VAS provide your DC?

One advantage for customers is certainly that we both are involved in the handling of, for example, display construction including the organisation, construction, delivery to the place. So he doesn't have to go back to the factory, but is saving freight costs etc., and that's certainly a big advantage we can offer the customer. This way we have a bigger action range, which the customer could not do because of the personnel effort, because their attention is certainly production and not necessarily all the work that we do here afterwards. Therefore we have certainly bigger advantages on the market, because not every carrier is able to offer these services and I can see us quite far ahead from the competition.

Q: Are these advantages from the customer's point of view?

For many years we have been doing more contract logistics, so that we can sell more of these goods. I will say now that most of the products come from Asia or somewhere else, they are then distributed in the area markets such as XX, XZ and co - it is all about mass processing. There I see that we have changed a little bit, more in the direction of VAS which are more complex. Where there is more work for us here on the spot, which of course generates our turnover, and enables us to earn more money than through basic storage of products. But it is no longer just a mere pushing through the masses of goods 1 to 1 but making something out of these goods, e.g. display construction, kitting or all other actions we do for manufacturers, so there is a lot of work. Otherwise I would not be here.

What challenges does the implementation of VAS imply?

Sometimes a challenge for me is what I am feeling in one area right now which is a strongly fluctuating seasonal business. This is typically on Easter/Christmas and in between the demand is relatively little. But we can mix that up well because we have a broad customer spectrum, so demand is compensated a little bit. Of course we have a challenge now in the section of the e-commerce business with new companies and many Start-ups. For me it is the big challenge that there are often many companies that simply have no experience themselves, of course, this is sometimes a bit difficult. It is also fun if you can pass the experience on to people and you get back that it is accepted accordingly, that is of course also a nice thing. We have been doing it this way, as we can communicate out experience accordingly, because we do not want any shipments to come back. The reason could be that there is a wrong number on a label or because the code has been generated wrongly or similar problems. These are the things that are often not so well known to the people in the start-up sector - so what is behind all VAS. There we had our learning processes and I often see that the big customers are the pioneers and the witnesses, so they are the ones who set the standards in the form of norms concerning labelling and so on. Of course, you have to keep up to date if there are any changes, because you can easily have problems. If large receivers like Company XX have any changes in their processes and you are not up to date - then there is a problem. So you have to be open and eager to find out what is going on and be up to date.

Is the customer demand for VAS in your DC more stable or fluctuating?

The demand is extremely dynamic. As I said, it fluctuates seasonally. That can depend on the weather, that can be determined by the calendar. So, logically, Christmas business is a lot. In the summer months we have promo campaigns with the drinks we produce. If there are any events outside, which this year is not very much the case - though they also try to compensate this in some other way - so it is extremely dynamic. And you have to react very quickly to this and also be flexible, extremely flexible. It may be that we have to carry out an order in 3 weeks, and then we don't have anything to do a week after. So you have to be smart, so that you can cleverly use the staff or release them when you have nothing or not so much to do. There are of course some customers who have been bringing similar campaigns to us for years, which we can plan to some point, but there are also a lot of spontaneous deals.

Is the demand on VAS orders more predictable or more unpredictable?

Personally, I find it very difficult to forecast in advance. I don't know the customer activities on the market, but I do have personal contacts with the customer, so we are already talking about what is planned. For example, next year we have a big promotion with a special order of vodka or whisky. Then of course I can already estimate the scale of the actions that will be coming up if we get them. And then the things that are coming again and again - you can plan them. If you have done the work clearly and tidily, then you have already made the experience. Sometimes the customers leave, but then they come in 1-2 years again because they have noticed that the price is not everything, the performance must also be right. And if we deliver the performance appropriately, the price is really no longer so important because the reliability, adherence to delivery dates and such things are of course much more important for the manufacturer than a price difference of 0.05 €. Because only with on-time delivery, especially for the retail chains, it is can happen that if a big manufacturer launches a new campaign next year, and the on-time delivery of his logistics provider doesn't work, he is removed from the list. It is very important to look at everything carefully and to be very strict about adherence to delivery dates.

Does the customer expect a short completion of VAS orders or is the lead time of the customer orders adequately long?

The thing is not all customers are the same. I would say that the majority of the customers I personally deal with now call us and ask whether we can handle double the amount until a deadline. Then we can talk about it. Often, I have the experience that in the end it is all about the delivery. I do regulate this internally, we already have the advantage that we can say "okay, send 20 people over here today to help my colleagues, but next week we will send another 20 people over to you if you need them, so we are very flexible internally". So far, we have always managed all orders, whether by shifting personnel or because products didn't arrive as fast as they should have. Then of course it is important to be very flexible within the company, I know other companies which are not so flexible. And then they try to postpone longer periods of time and then there are problems.

Is the value of VAS customer orders in your DC high or low?

Of course, it costs more money for the customer. Our service and our work must also be paid for. The extent to which this affects the customer's product prices – is the question. I think it is a difference if it's more a marketing thing, so that you just want to push something in the market, then you will probably not look so much at the processes but rather want to push the market first in order to be established on the market in the long run. The question is, is the background that VAS are being done because there is overproduction, and it has to go to the market before it gets bad? I have never had such a problem. So yes, VAS is in principle something that costs more money.

Which capabilities does the DC require to successfully implement VAS?

Competencies... You need the ability to work in a team - that's a big thing, and I personally always say that even the ones working on the ground are just as important as our boss pulling the strings.

This can work together or only works together, a functioning team must be involved, and it must be clear to everyone what VAS are all about. Otherwise you have too many internal difficulties, but that's a normal working atmosphere as it should be optimal. Yes, you also need logistical and commercial skills, but you also need a lot of hard-working bees, as I call them - the people who simply pack, carry, stick and so on – they are all important. And of course you need reliable personnel.

Q: Are there any skills specifically needed for VAS?

I think it is always different in different areas. When I think about the eCommerce sector, you need a lot of IT people because of course it is all very IT-demanding. If the systems don't always run smoothly, and if someone is not good in the IT department, you have a problem. I am more IT independent. Of course we also have to record everything in the system and so on, but you can learn this quite normally, these are normal booking systems, roughly speaking Excel lists. So you don't need any special skills - you can acquire them if you want. Let me say now that you have to be able to communicate with the customer - that is competence that you have to possess. But I don't need a university professor for that, so to say. Of course, you need specialists who take care of sales. The girls who take care of our marketing. But I think that in every company it is like that. Of course, IT is hard. But it is increasingly important. If I look in the morning and my computer doesn't work, then I can't work. Then we also have specialists who take care of the disposition, who take care of the trucks - that's also clear. I am the interface between the various departments with my hard-working team that processes the orders and then brings the freight to the warehouse or talks to the sales department when a new project is due. How can you calculate, what is needed, what experience is there, what has to be repacked and how much time do we really need for each order.

Do VAS require more standardization or flexibility in the processes?

We need extreme flexibility, as the customer requirements permanently change and we win more and more customers, that have individual requirements. And, as I said, we have strong seasonal fluctuation, so we have to be able to adjust the number of workers in a different time of year.

Which performance measures show that the implementation of VAS is successful?

There are unbelievably many KPIs. Let's just say I've been in this company for the last10 years and recently the field of value-added services has become very well established. I get the feedback from the customer or I see customers coming back again - that tells me that the customer is satisfied. So, when the customer is satisfied we are successful. Success in the form of money earned is a task ruled by the other department. They look at whether we have made profit etc., on the other hand there is a restructuring at the moment to get all the data: exactly where which sales are generated, which customers, where is it going better or worse etc. - we always get the feedback of course. Basically, I would say we are successful and whether I have 30% or 50% product margin with certain customers - I am not the person to speak about it.

How important is cost efficiency and which measurements are you using to track it?

That's what I just said, we are currently setting up a tool and around this point there is a lot of restructuring going on. I see that the company has grown very fast in the last years and the whole controlling is a bit behind. But now it is very strong and more and more data has to be processed and we have to make sure that the data is available - that's a very important point clearly, so that we can see in detail which customer we have, with which process are we currently in, where we have advantages or do we stop a partnership, what is not going so well from the cost factor. Of course you have to have good controlling - it has been a bit neglected due to the fast growth, but we are very hard at “cleaning it up” lately.

How important is customer responsiveness and how do you measure performance of such VAS which are extremely dynamic and require particular customer responsiveness?

We have always managed to get fast actions and still managed within the time limit. I can't unload it in advance because I always have the problem when we talk about such an action. The customer often calls and says, “I need my order very quickly by then and then”. But afterwards the container is still stuck somewhere, or a ship comes 3 days too late from the customs. Therefore I can only say that only if I have the goods, I will finish the job in 10 days. I can make an extrapolation, but it always has to do with the fact that everything is there. Most of the problems then come because of the delay of the goods delivery, and then, for example, and I have to interrupt my processes twice. We always have this problem, but we have always managed to make up for it. If we have to work overtime, however, it costs more money. Then these are additional costs, and the customer does not mind paying them as a rule, because he himself has a due date. Let me give you an example. For example, a customer has ordered VAS for vodka for a festival. If we deliver too late then everything does not make sense. Then the customer can't get rid of the goods or can't distribute them as planned. In addition, other companies in between also are involved. There is for example a printing company in between. If it can't print, then I have problems, or problems with the refill company, for example a bottle has run out. The production has to be stopped. Everything has to be checked. Everything is delayed for 2-3 days - I have that again and again. If I try to compensate for this or that action, it is no problem, we can postpone the delivery date a bit because of these issues. Mostly it is however so that the dates remain firm to any actions.

How do you know that the customer is satisfied, and which performance measures indicate customer satisfaction?

Well, we get this feedback. On a personal level. Personally, I would say it is not only important to get something done, but I think it is quite okay to get feedback afterwards and talk about whether the action went well. I pass this on to our people. It's also a question of motivation that they are aware of this. Then you don't just get a typical Christmas card for Christmas, but rather a more personal email or something like that. We always have feedback from customers.

Q: But do you have any key figures with the help of which you can recognize customer satisfaction?

Not that I know. There is customer satisfaction KPIs, which are recorded by the sales department, but I don’t have anything to do with that. I have much more personal contact here. For example, I find out that the customer is here, everything is in order - so we can give this task over, can start and then he is just happy that the action is completed. Then I can tell him that the order will be ready on Friday. Then the customer says that everything is fine and that it suits him. Then I know that the next orders will come.

Q: Do you have any quality indicators?

I don't need quality indicators at the moment because I know I have no rejects, no returns. For example, if I get 5 returns of every order, then something is wrong, and I have to mark this. However, I have not had a mistake in the last 2-3 years. Therefore, I can give a 100% delivery assurance.

Appendix III – Extract “Word Cloud” and “Word Tree”

Appendix IV – "Codes / Interviewees" Matrix

Part 1

		C1			C2			C3			C4			C5			C6		
		CM	DM	OM	CM	DM	OM	CM	DM	OM	CM	DM	OM	CM	DM	OM	CM	DM	OM
		C1_CM	C1_DM	C1_OM	C2_CM	C2_DM	C2_OM	C3_CM	C3_DM	C3_OM	C4_CM	C4_DM	C4_OM	C5_CM	C5_DM	C5_OM	C6_CM	C6_DM	C6_OM
Key concept from interview questions	Codes																		
Definition of VAS	RO1_Q1_Customized, beyond standard	x	x			x		x	x			x		x			x		x
Definition of VAS	RO1_Q1_Physical change of outbound specification	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x
Definition of VAS	RO1_Q1_Additional services				x		x						x			x	x		
Types of VAS	RO1_Q1_Technical quality check							x							x			x	
Types of VAS	RO1_Q1_Logistic quality check											x	x	x		x			
Advantages	RO1_Q2_Disadvantage for internal service provider	x	x	x															
Advantages	RO1_Q2_Higher costs and less advantage	x		x															
Advantages	RO1_Q2_Customer loyalty				x		x							x			x		
Advantages	RO1_Q2_Financial benefit				x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

Part 2

		C1			C2			C3			C4			C5			C6		
		CM	DM	OM	CM	DM	OM	CM	DM	OM	CM	DM	OM	CM	DM	OM	CM	DM	OM
		C1_CM	C1_DM	C1_OM	C2_CM	C2_DM	C2_OM	C3_CM	C3_DM	C3_OM	C4_CM	C4_DM	C4_OM	C5_CM	C5_DM	C5_OM	C6_CM	C6_DM	C6_OM
Key concept from interview questions	Codes																		
Advantages	RO1_Q2_Unique selling point					x		x									x		
Advantages	RO1_Q2_Competitive advantage								x										
Advantages	RO1_Q2_VAS as standard											x							
Challenges	RO1_Q3_Capacity planning accuracy	x		x															
Challenges	RO1_Q3_Cost calculation			x				x						x					
Challenges	RO1_Q3_Higher costs	x	x	x						x									
Challenges	RO1_Q3_Lower productivity	x																	
Challenges	RO1_Q3_Needs to go beyond standard			x				x		x									
Challenges	RO1_Q3_No big challenge			x								x							

Part 3

		C1			C2			C3			C4			C5			C6		
		CM	DM	OM	CM	DM	OM	CM	DM	OM	CM	DM	OM	CM	DM	OM	CM	DM	OM
		C1_CM	C1_DM	C1_OM	C2_CM	C2_DM	C2_OM	C3_CM	C3_DM	C3_OM	C4_CM	C4_DM	C4_OM	C5_CM	C5_DM	C5_OM	C6_CM	C6_DM	C6_OM
Key concept from interview questions	Codes																		
Challenges	RO1_Q3_Quality issue	x									x		x	x					
Challenges	RO1_Q3_Understanding of customer needs	x																	
Challenges	RO1_Q3_VAS expertise	x		x				x	x										
Challenges	RO1_Q3_Wide range of VAS	x								x									
Challenges	RO1_Q3_Dynamic workload					x								x					
Challenges	RO1_Q3_Higher costs are covered by price calculation					x	x												
Challenges	RO1_Q3_Manpower						x											x	
Challenges	RO1_Q3_Process determination						x												
Challenges	RO1_Q3_Quality issues through short lead time				x														

Part 4

Key concept from interview questions	Codes	C1			C2			C3			C4			C5			C6		
		CM	DM	OM	CM	DM	OM	CM	DM	OM	CM	DM	OM	CM	DM	OM	CM	DM	OM
		C1_CM	C1_DM	C1_OM	C2_CM	C2_DM	C2_OM	C3_CM	C3_DM	C3_OM	C4_CM	C4_DM	C4_OM	C5_CM	C5_DM	C5_OM	C6_CM	C6_DM	C6_OM
Challenges	RO1_Q3_Time pressure				x		x												
Challenges	RO1_Q3_Productivity of new VAS										x								
Challenges	RO1_Q3_Seasonality													x				x	x
Challenges	RO1_Q3_Heterogeneous, dynamic VAS																x		
Customer demand stability	RO2_Q4_Rather stable demand	x	x	x							x	x	x						
Customer demand stability	RO2_Q4_Rather unstable demand				x	x	x							x	x	x	x	x	x
Customer demand stability	RO2_Q4_Stable and unstable depending on customer							x	x	x									
Customer demand predictability	RO2_Q5_Rather predictable demand	x	x	x							x	x	x						
Customer demand predictability	RO2_Q5_Acceptance of ad hoc customer orders					x													

Part 5

Key concept from interview questions	Codes	C1			C2			C3			C4			C5			C6		
		CM	DM	OM	CM	DM	OM	CM	DM	OM	CM	DM	OM	CM	DM	OM	CM	DM	OM
		C1_CM	C1_DM	C1_OM	C2_CM	C2_DM	C2_OM	C3_CM	C3_DM	C3_OM	C4_CM	C4_DM	C4_OM	C5_CM	C5_DM	C5_OM	C6_CM	C6_DM	C6_OM
Customer demand predictability	RO2_Q5_Rather less predictable demand				x	x	x							x	x	x	x	x	x
Customer demand predictability	RO2_Q5_Predictability depend on the customer							x	x	x									
Customer demand predictability	RO2_Q5_Reliability and on time delivery are more important than price																		x
Customer demand predictability	RO2_Q5_Unstable demand due to e-commerce																	x	
Orders lead time	RO2_Q6_Rather long lead time	x	x	x					x		x	x	x						
Orders lead time	RO2_Q6_Ability of high customer responsiveness				x		x								x	x			x
Orders lead time	RO2_Q6_Rather short lead time				x	x	x							x	x	x	x	x	x
Orders lead time	RO2_Q6_ Long and short depending on the customer							x		x									
Service value	RO2_Q7_Disadvantage for internal service provider	x		x															

Part 6

Key concept from interview questions	Codes	C1			C2			C3			C4			C5			C6		
		CM	DM	OM	CM	DM	OM	CM	DM	OM	CM	DM	OM	CM	DM	OM	CM	DM	OM
		C1_CM	C1_DM	C1_OM	C2_CM	C2_DM	C2_OM	C3_CM	C3_DM	C3_OM	C4_CM	C4_DM	C4_OM	C5_CM	C5_DM	C5_OM	C6_CM	C6_DM	C6_OM
Service value	RO2_Q7_High value		x		x	x	x		x		x	x					x	x	x
Service value	RO2_Q7_Higher profit derived from VAS				x	x							x	x		x			
Service value	RO2_Q7_Dynamic VAS have higher value							x	x	x					x	x		x	
Service value	RO2_Q7_High productivity is necessary										x								
Capabilities needed	RO1_Q8_Adoptable IT systems	x							x									x	
Capabilities needed	RO1_Q8_Closer customer relationship		x		x			x			x			x			x		
Capabilities needed	RO1_Q8_Experts and expertise	x		x					x	x						x	x		
Capabilities needed	RO1_Q8_Knowledge of product			x															
Capabilities needed	RO1_Q8_Place			x															

Part 7

Key concept from interview questions	Codes	C1			C2			C3			C4			C5			C6		
		CM	DM	OM	CM	DM	OM	CM	DM	OM	CM	DM	OM	CM	DM	OM	CM	DM	OM
		C1_CM	C1_DM	C1_OM	C2_CM	C2_DM	C2_OM	C3_CM	C3_DM	C3_OM	C4_CM	C4_DM	C4_OM	C5_CM	C5_DM	C5_OM	C6_CM	C6_DM	C6_OM
Capabilities needed	RO1_Q8_Supply chain planning accuracy			x															
Capabilities needed	RO1_Q8_Flexibility in manpower				x	x								x				x	
Capabilities needed	RO1_Q8_Flexibility in process					x		x	x										
Capabilities needed	RO1_Q8_Management team						x			x		x						x	
Capabilities needed	RO1_Q8_Physical resources						x				x		x						
Capabilities needed	RO1_Q8_Place flexibility				x	x											x		
Capabilities needed	RO1_Q8_Quick reaction						x							x					
Capabilities needed	RO1_Q8_Productivity										x								
Capabilities needed	RO1_Q8_Ability to estimate effort													x					x

Part 8

Key concept from interview questions	Codes	C1			C2			C3			C4			C5			C6		
		CM	DM	OM	CM	DM	OM	CM	DM	OM	CM	DM	OM	CM	DM	OM	CM	DM	OM
		C1_CM	C1_DM	C1_OM	C2_CM	C2_DM	C2_OM	C3_CM	C3_DM	C3_OM	C4_CM	C4_DM	C4_OM	C5_CM	C5_DM	C5_OM	C6_CM	C6_DM	C6_OM
Capabilities needed	RO1_Q8_Quick reaction and attractive price at the same time														x				
Standard vs flexibility	RO2_Q9_Standard importance	x	x	x							x	x	x						
Standard vs flexibility	RO2_Q9_Flexibility importance				x	x	x						x	x	x		x	x	x
Standard vs flexibility	RO2_Q9_Both standard and flexibility are necessary							x	x	x									
Standard vs flexibility	RO2_Q9_Lean - productivity & quality vs flexibility & quick reaction								x										
Standard vs flexibility	RO2_Q9_Productivity is the main driver of competitive advantage											x							
Standard vs flexibility	RO2_Q9_Order spontaneously														x				
Performance measures	RO3_Q10_Cost measures	x	x		x	x			x										
Performance measures	RO3_Q10_Increasing demand of VAS			x															

Part 9

Key concept from interview questions	Codes	C1			C2			C3			C4			C5			C6		
		CM	DM	OM	CM	DM	OM	CM	DM	OM	CM	DM	OM	CM	DM	OM	CM	DM	OM
		C1_CM	C1_DM	C1_OM	C2_CM	C2_DM	C2_OM	C3_CM	C3_DM	C3_OM	C4_CM	C4_DM	C4_OM	C5_CM	C5_DM	C5_OM	C6_CM	C6_DM	C6_OM
Performance measures	RO3_Q10_On time delivery measures	x	x							x		x							
Performance measures	RO3_Q10_Performance categories determined by Group		x																
Performance measures	RO3_Q10_Complexity of productivity evaluation			x															
Performance measures	RO3_Q10_Quality emphasis	x			x						x								
Performance measures	RO3_Q10_Quality measures	x	x	x					x		x			x					
Performance measures	RO3_Q10_Supply chain financial performance	x	x																
Performance measures	RO3_Q10_Financial performance				x	x	x	x	x	x	x	x	x	x	x	x		x	
Performance measures	RO3_Q10_Quality, on time delivery, costs							x											
Performance measures	RO3_Q10_Productivity								x			x							

Part 10

		C1			C2			C3			C4			C5			C6		
		CM	DM	OM	CM	DM	OM	CM	DM	OM	CM	DM	OM	CM	DM	OM	CM	DM	OM
		C1_CM	C1_DM	C1_OM	C2_CM	C2_DM	C2_OM	C3_CM	C3_DM	C3_OM	C4_CM	C4_DM	C4_OM	C5_CM	C5_DM	C5_OM	C6_CM	C6_DM	C6_OM
Key concept from interview questions	Codes																		
Performance measures	RO3_Q10_Quick implementation of VAS							x											
Performance measures	RO3_Q10_Repeating business														x	x			x
Performance measures	RO3_Q10_Production time																x		
Cost efficiency	RO3_Q11_Impact on financial performance	x			x	x	x	x		x		x	x	x		x	x		
Cost efficiency	RO3_Q11_Productivity		x						x		x								
Cost efficiency	RO3_Q11_Strive to decrease costs			x															
Cost efficiency	RO3_Q11_No productivity per hours					x													
Cost efficiency	RO3_Q11_Order simulation and time calculation					x		x							x		x		
Cost efficiency	RO3_Q11_Yearly increase of fix costs													x					

Part 11

		C1			C2			C3			C4			C5			C6		
		CM	DM	OM	CM	DM	OM	CM	DM	OM	CM	DM	OM	CM	DM	OM	CM	DM	OM
		C1_CM	C1_DM	C1_OM	C2_CM	C2_DM	C2_OM	C3_CM	C3_DM	C3_OM	C4_CM	C4_DM	C4_OM	C5_CM	C5_DM	C5_OM	C6_CM	C6_DM	C6_OM
Key concept from interview questions	Codes																		
Customer responsiveness	RO3_Q12_Cost measures	x		x															
Customer responsiveness	RO3_Q12_No need to react quickly		x								x	x	x						
Customer responsiveness	RO3_Q12_No performance alignment		x							x									
Customer responsiveness	RO3_Q12_Financial performance measures				x	x									x				
Customer responsiveness	RO3_Q12_No customer responsiveness measures					x	x							x		x	x		
Customer responsiveness	RO3_Q12_Quality, on-time delivery, costs							x										x	
Customer responsiveness	RO3_Q12_Quick implementation (price not important)								x										x
Customer responsiveness	RO3_Q12_Monitoring daily production progressing																x		
Customer satisfaction indicators	RO3_Q13_Customers' performance measures	x																	

Part 12

		C1			C2			C3			C4			C5			C6		
		CM	DM	OM	CM	DM	OM	CM	DM	OM	CM	DM	OM	CM	DM	OM	CM	DM	OM
		C1_CM	C1_DM	C1_OM	C2_CM	C2_DM	C2_OM	C3_CM	C3_DM	C3_OM	C4_CM	C4_DM	C4_OM	C5_CM	C5_DM	C5_OM	C6_CM	C6_DM	C6_OM
Key concept from interview questions	Codes																		
Customer satisfaction indicators	RO3_Q13_Service quality	x		x	x	x				x	x	x				x			
Customer satisfaction indicators	RO3_Q13_Questionnaires (Surveys)	x	x		x	x	x		x	x					x			x	
Customer satisfaction indicators	RO3_Q13_Repeating business		x		x			x						x	x				
Customer satisfaction indicators	RO3_Q13_Customer feedback						x	x	x	x	x	x	x	x	x		x	x	x