MASTER

Service orientation and the impact for information quality
case study at Athlon Car Lease

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Service Orientation
and the impact for
Information Quality
Case Study at Athlon Car Lease

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“If I had asked people what they wanted, they would have said faster horses.”

— Henry Ford

“It is not the strongest of the species that survives, nor the most intelligent that survives. It is the one that is most adaptable.”

— Charles Darwin
EXECUTIVE SUMMARY

Introduction

This research presents a qualitative analysis about the effect service orientation can have on an organization, especially regarding information quality. Examples of service oriented thinking are a rethinking of the value of an asset; ‘value does not lie in owning the asset but in using it’ and a rethinking of obtaining value; ‘co-creation with customers rather than pushing products into the market’ and a rethinking of value delivery; ‘open innovation with your suppliers and dynamic partnering’.

This rethinking of the value delivery systems and value obtainment systems in a business environment requires a rethinking of the partnerships an organization has with their suppliers and customers. Moreover, you want to control these partnerships in a way it enhances the relationships with your customer (more based on real customer needs) and you suppliers (more based on innovation, than efficiency).

The hypothesis of this thesis is that this transformation of the value obtainment and delivery systems, of the partnerships and of the governance mechanisms (control), will lead to new information quality issues and requirements. The organization Athlon Car Lease is used for exploring this hypothesis. The main research question is:

“What is the impact of Service Orientation on both the business environment of Athlon as the Information Quality and what implications does this have for Athlon?”

Context

Since business environments are operating in a dynamic market - where customers are more empowered, short life cycles occur and the customer value lays in functionality not in ownership - the ability to enable service oriented solutions is an increasingly important competitive advantage. Athlon Car Lease is acknowledging these trends to be relevant for their future industry. Athlon generally sees car-leasing to evolve incrementally, but predicts more radical developments in the area of broader mobility solutions. Today, Athlon is operating in a very stable and traditional market where lease cars are seen as a commodity by many customers. The current situation and the expected future scenario for mobility are completely different worlds, which require investments in understanding these implications and investments in the development of these services, products, business models and the organization.

Literature recognizes the service dominance as a trend impacting future businesses, supply chains, marketing, sales as well as the relationship with customer. This thesis made use of a framework that structures the service dominant logic trend in three aspects: the service oriented value aspect, the partnership aspect and the control aspect.

The aim of this research project is to apply this framework in Athlon, in order to see how a highly dynamic Service Dominant business environment in reality looks like and which Information quality issues can occur.
Method

This research used a case study approach. As a data collection strategy, two rounds of in-depth interview questions were held. In total seven respondents were interviewed, who all are placed in the higher management of Athlon. To make the data analysis step reliable, valid and structured, the interview questions were developed beforehand. In order to do so, literature about Information Quality and the Service Dominant Logic were studied. In the end, this research made use of two theoretical framework; about Service Dominancy in supply and demand chains and about information quality. Both of the frameworks are recently developed and the scope of this research was also to enrich and clarify both frameworks. Two dynamic networked business processes were developed to ease the discussion during the interviews about information quality.

In addition to the interviews, this researcher participated in four workshops of one day each. These workshops were held with the higher management of Athlon International and the topic was Future Mobility Scenario. Moreover at Athlon, the researcher had access to a variety of documents and process models and to a variety of employees for ‘small talks’. The researcher also had close contact with the developer of the two frameworks, who is working for the TU/e.

Contribution to literature

This research enriched the Information Systems research field with ideas about information quality issues that organizations face when transforming their business model to a more innovative and service-dominant one. This is an addition to current literature about information quality that has been done in the context of a Goods Dominant Logic business environment with conventional supply chains. This master thesis initiated the first steps towards identification and characterization of emerging IQ issues in the context of a framework about the Service Dominant theory. This thesis is relevant for future research on the development of an information governance model as an organizational solution for these IQ issues.

Conclusion

Based on this method, indeed some information quality issues occurred. This is because Athlon wants to transform towards a more Service Dominant business environment that focuses on mobility solutions, rather than car lease solutions only. This business environment will have more dynamic inter-organizational processes and this leads to information quality issues, like information semantic inconsistency between parties and ownership of customer behaviour data issues.
This master thesis is the result of a graduation project fulfilled in order to obtain the degree of Master of Science in Operations Management and Logistics at the Eindhoven University of Technology. This graduation project is done in cooperation with Athlon Car Lease (part of DLL) in Eindhoven and Almere.

First of all I would like to thank my company supervisors; Caren Weisleder and Harald Kroon for their dedication in the project. You had me involved in strategic workshops and connected me with inspiring managers and visionaries of Athlon. Moreover you showed me that you cared about the project. Both in (re)thinking of the master thesis approach as in the time you put into the project (even on Friday afternoons and Sunday mornings!).

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Above all, I want to express my gratitude to my family for their support. My sincere appreciation goes to my parents, my brothers and my girlfriend for helping wherever they can.

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# Table of Contents

Executive Summary .................................................................................................................. i
Preface .................................................................................................................................. iii
List of Figures ......................................................................................................................... vii
List of Tables .......................................................................................................................... viii
List of Abbreviations ............................................................................................................ ix

1 Introduction .......................................................................................................................... 1
   1.1 Problem Context ........................................................................................................... 1
   1.2 Problem statement ........................................................................................................ 2
      1.2.1 Problem Statement from a Theoretical Perspective ............................................. 2
      1.2.2 Problem Statement from a Practical Perspective ................................................. 3
   1.3 Research Objectives and Research Questions .............................................................. 4
   1.4 The contribution to service-dominant logic and information quality studies ................ 6
   1.5 Thesis structure ........................................................................................................... 7

2 Service Dominance Paradigm and information quality ....................................................... 9
   2.1 The Service Dominant Paradigm ................................................................................ 9
      2.1.1 What do companies exchange? Value in use or Manufactured output? .............. 9
      2.1.2 The drivers for the Service Dominant Paradigm ................................................. 10
   2.2 The SODSC Framework .............................................................................................. 10
   2.3 Information Quality ..................................................................................................... 11
      2.3.1 Information Quality issues .................................................................................. 11
      2.3.2 Service orientation and the influence on Information Quality ......................... 12

3 Methodology ...................................................................................................................... 13
   3.1 Possible Research Activities and Research Outputs in Information Systems research ...... 13
   3.2 General Research Approach: Case Study .................................................................... 13
   3.3 Data collection ............................................................................................................. 15
      3.3.1 Selecting Evidence collecting approach for case studies ..................................... 15
      3.3.2 Semi-structured interview .................................................................................. 15
   3.4 Data Analysis ................................................................................................................ 16
   3.5 Limitations ..................................................................................................................... 16
      3.5.1 Validity .................................................................................................................. 17
      3.5.2 Reliability ............................................................................................................. 18
3.6 Specific Research Approach for RQ 1 and RQ2

3.6.1 Positioning Athlon in SODSC Framework – Step 1 and 2

3.6.2 Positioning Athlon in SODSC Framework – Step 3

3.6.3 Positioning Athlon in SODSC Framework – next steps

3.7 Research Approach for RQ3

3.7.1 Selecting a networked business process – Step 1, 2 and 3

3.7.2 Explore Information Quality issues – Step 1, 2, 3

4 Findings

4.1 Introduction in Athlon’s current situation and future situation

4.1.1 Athlon’s current situation

4.1.2 Future State of Athlon

4.2 Service Oriented Value

4.2.1 Current Situation of Athlon

4.2.2 Future Situation Athlon

4.3 Partnership

4.3.1 Current Situation of Athlon’s partnership dimension

4.3.2 Future Situation of Athlon’s partnership dimension

4.4 Control

4.4.1 Current Situation of Athlon’s business environment from the control perspective

4.4.2 Future Situation of Athlon’s business environment from the control perspective

4.5 Service Orientation and the impact on Information Quality

4.5.1 The two processes as a result from the transition of Athlon in Service Orientation

4.5.2 Deductively Explored Information Quality issues

5 Conclusions

5.1 Answers to the research question

5.1.1 What service orientation is there at the moment in Athlon’s business environments?

5.1.2 What characteristics will Athlon’s future business environment in 2020 have and what implications will it have on the Demand- and Supply chain of Athlon?

5.1.3 Which IQ challenges are relevant in Athlon’s 2020 SD-business environment and which IG requirements are necessary?

5.1.4 Summary

5.2 Implications for and Limitations of the SODSC framework

5.3 Implications for and Limitations to the IQ framework

References
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 1</td>
<td>Theoretical Problem Statement</td>
<td>3</td>
</tr>
<tr>
<td>Figure 2</td>
<td>Practical Problem Statement</td>
<td>4</td>
</tr>
<tr>
<td>Figure 3</td>
<td>Main Hypothesis</td>
<td>5</td>
</tr>
<tr>
<td>Figure 4</td>
<td>Research Questions Overview</td>
<td>8</td>
</tr>
<tr>
<td>Figure 5</td>
<td>An ontological representation of S-D Logic (Fragidis &amp; Tarabanis, 2011)</td>
<td>9</td>
</tr>
<tr>
<td>Figure 6</td>
<td>System Approach for Structuring and Explaining SODSC</td>
<td>9</td>
</tr>
<tr>
<td>Figure 7</td>
<td>Research Framework (Hevner et al., 2004, p.80).</td>
<td>14</td>
</tr>
<tr>
<td>Figure 8</td>
<td>Steps to position Athlon in SODSC frameworks (Research approach for RQ 1 and RQ 2)</td>
<td>18</td>
</tr>
<tr>
<td>Figure 9</td>
<td>Steps to select a networked business process that is going to be changed regarding the transition of Athlon</td>
<td>25</td>
</tr>
<tr>
<td>Figure 10</td>
<td>Steps to Explore Information Quality issues</td>
<td>26</td>
</tr>
<tr>
<td>Figure 11</td>
<td>Positioning Athlon’s value obtainment and value delivery activities (orange current, green future situation)</td>
<td>34</td>
</tr>
<tr>
<td>Figure 12</td>
<td>Partnership position of Athlon’s business environments (orange current situation, green future situation)</td>
<td>38</td>
</tr>
<tr>
<td>Figure 13</td>
<td>Athlon’s business environments from the control perspective (orange current situation, green future situation)</td>
<td>41</td>
</tr>
<tr>
<td>Figure 14</td>
<td>Domain Structure BeWyse Process Models Athlon</td>
<td>62</td>
</tr>
<tr>
<td>Figure 15</td>
<td>The Service oriented value framework</td>
<td>82</td>
</tr>
<tr>
<td>Figure 16</td>
<td>The Partnership framework</td>
<td>82</td>
</tr>
<tr>
<td>Figure 17</td>
<td>The control framework</td>
<td>82</td>
</tr>
</tbody>
</table>
LIST OF TABLES

Table 1 The academics’ view of IQ............................................................................................................. 11
Table 2 The practitioners’ view of IQ........................................................................................................... 11
Table 3 Some IQ Definitions (Falge, Otto, & Osterle, 2012, p. 4317) ...................................................... 11
Table 4 Research Framework Classification (March & Smith, 1995)......................................................... 13
Table 5 Service orientation in the Demand Chain perspective................................................................. 20
Table 6 Service oriented value in the supply chain perspective.............................................................. 21
Table 7 Service Orientation in the partnership dimensions using the customer perspective (Demand
Chain) .................................................................................................................................................. 21
Table 8 Service Orientation in the partnership dimension using the supplier perspective (Supply Chain) 22
Table 9 Service orientation in the control dimension (Demand Chain Perspective)............................... 23
Table 10 Service Orientation in the control dimension (Supply Chain perspective).............................. 24
Table 11 Characteristics of the 4 quadrants of the SO value framework................................................ 29
Table 12 Characteristics of the 4 quadrants of the Partnership framework ........................................... 34
Table 13 Characteristics of the 4 quadrants of the Control framework .................................................. 39
Table 14 Important IQ aspect from practice as a result of SO ................................................................. 48
Table 15 The explored IQ requirements ................................................................................................. 72
Table 16 Relevant situations for different research methods (Yin, 2014) (COSMOS corporation, 1983) .... 79
Table 17 Six sources of evidence: strengths and weaknesses (Yin, 2014)................................................ 79
Table 18 Structured and Unstructured interviews (Blumberg, Cooper, & Schindler, 2008, p. 386) ........ 80
Table 19 Five Case Study Analysis Strategies (Yin, 2014) .................................................................... 80
Table 20 Motivation and challenges of paradigm shift from leadership in technology to leadership in use
(Manufacturer perspective) (Meier, Volker, & Funke, 2011) ............................................................... 81
LIST OF ABBREVIATIONS

SODSC = Service Oriented Demand Chains and Supply Chains
SO = Service Orientation
IQ = Information Quality
4P’s = Price Product Promotion and Place
DLL = De Lage Landen
TU/e = Eindhoven University of Technology
RQ = Research Question
KPI = Key Performance Indicators
Ch. = Chapter
SD = Service Dominant
GD = Goods Dominant
IG = Information Governance
IS = Information Systems
Req. = Requirement
IT = Information Technology
PhD = Doctorate Candidate
1 INTRODUCTION

This document is the result of a master thesis project. The master thesis project is part of the graduation program of Eindhoven University of Technology (TU/e) and is done in collaboration with Athlon Car Lease (an organization that is part of De Lage Landen: DLL). This research focused on service oriented business environments and how DLL’s mobility business unit, Athlon Car Lease, can benefit from such environments and which Information Quality requirements it has to take into consideration. See Appendix A: Organization Chart Athlon for more information on the relations with DLL and Athlon.

This chapter starts with the problem context in paragraph 1.1. In paragraph 1.2, the problem statement as a trigger for this project is described. Paragraph 1.3 describes the research objectives and thereby states the scope of this project. The third paragraph (1.4) motivates the relevancy of this project. The structure of the report is elaborated in paragraph 1.5.

1.1 PROBLEM CONTEXT

These days hardly any company is an isolated instance. Companies are a part of a network of other businesses. In a network each company is delivering a specialized unique value proposition towards the whole network (Luftenegger, Comuzzi, Grefen, & Weisleder, 2013). There are researchers that found evidence from literature and practice that these networks of cooperating businesses will be changing (Rasouli, Kusters, Trienekens, & Grefen, 2014). Firstly, a shift from traditional stable supply chains towards supply chains with integrated operations and development processes is predicted (Rasouli et al., 2014) (Gebauer, Paiola, & Saccani, 2013). Secondly, the marketing strategy of the network as a whole will shift from a transactional one (the ‘4P’s’ approach; see e.g. Jobber and Fahy (2009)) to a more relational one where co-creation with the customer plays a central role (Rasouli et al., 2014) (Vargo & Lusch, 2004).

As a result stable networked businesses with steady inter-organizational interactions will shift to an adaptive collaboration between parties. This collaboration needs to be supported by dynamic networked business processes. This master thesis project looked at the information quality challenges this dynamic collaboration will imply. This research project discovered issues like information inconstancy, information leakage and information semantic misalignment as a result of more dynamic collaborations between parties within a business environment.

This research project has been done in the context of the mobility industry. Athlon Car Lease collaborated in this project as the main stakeholder. Athlon already has a service oriented business model; by offering all kinds of services and solutions around a car. This asset based service orientation can be improved according to Athlon, by adopting a customer based service orientation business. This is needed since consumers these days recognize that value lies not in owning an asset, but in using the services offered by assets (Traganos, 2014, p. 1) (DLL, 2013). This implies that Athlon’s customers just want to go from A to B, without having a preference for a mobility solution. As long it is fast, cost effective and convenient.
1.2 PROBLEM STATEMENT

The two stakeholders of this project, Athlon (as a part of DLL) and the Information Systems Department have two problem statements, implying that this master thesis project is based on both a theoretical problem (paragraph 1.2.1) as a practical problem (paragraph 1.2.2).

1.2.1 Problem Statement from a Theoretical Perspective

The research group Information Systems has developed a framework – the SODSC framework – that can serve as a basis for future research on business environments where customers are more empowered and suppliers are globally networked (Rasouli, Kusters, Trienekens, & Grefen, 2014). Two main changes in the future business environments are a motivation for the research done at the Information Systems group.

Firstly, these new business environments have to change their conventional marketing strategy from a transactional marketing nature to a new paradigm where customer-centric value creation plays a central role (Rasouli et al., 2014) (Vargo & Lusch, 2004). Secondly, these new business environments will not necessary consist of only traditional stable supply chains. More and more supply chains require an approach where the development and operations are more and more integrated between all the partners, suppliers, manufactures/assemblers and product developers involved (Rasouli et al., 2014)(Gebauer et. al., 2013). This new paradigm is described in literature as the Service Dominant Logic (Vargo & Lusch, 2004), implying:

Do not think in terms of exchanging products or goods, but think in terms of facilitating your customer’s own value process by enabling the usage of your goods and services (e.g. Vargo & Lusch, 2004; Gronroos, 2011).

Business enviroments that are adopting the Service Dominant Logic will need to enrich their enviroment with new partners and interact more dynamically, due to the trend that service lifecycles are short since customer needs are changing constantly. Moreover, the potential information source that organizations can use, has dramatically increased in size and scope due to the fact that information systems have been migrating from a hierarchical to a network-based structure (Batini, Cappiello, Francalanci, & Maurino, 2009). An important question will be:

“How can we provide high quality information for so many different stakeholders?”

The effect of poor Information Quality on the business performance has been investigated in previous research (Sheng & Mykytyn, 2002), (Lee & Strong, 2003). Moreover IQ issues have also be investigated in the context of supply chains, however only for conventional supply chains (Falge, Otto, & Osterle, 2012), (Xu, Nord, Brown, & Nord, 2013). The new dynamics (more partners, short term customer demands) require a rethinking of the supply chain and IQ issues. The link between dynamic (Service Dominant) business environments and information quality aspects is missing in literature. The Information Systems research group state that one of the most important requirements that need to be considered in the context of a service dominant business environment are related to Information quality. This research will solve this problem by making a first step towards linking the two paradigms together (Service dominant logic and Information Quality).

The problem statement from the Information Systems Department, as a stakeholder in this project is:
**Theoretical problem statement:** What terminology about service orientation is there at Athlon and how does it relate to the SODSC framework and which links towards Information Quality issues can be identified when talking about service orientation?

The relation between information quality and service orientation through dynamic interactions is shown in Figure 1. This is more elaborated in chapter 2, paragraph 2.3.2. Also the theoretical problem statements are shown in Figure 1, in the form of Research Questions. Note that the real RQ’s are stated in paragraph 1.3.

### 1.2.2 Problem Statement from a Practical Perspective

Athlon is the second main stakeholder of this project, as already described in the beginning of this paragraph. **Athlon** is a leading European car lease company. They are active in ten European countries and headquartered in the Netherlands, servicing both local and multi-national customers and managing more than 250,000 contracts. Currently, **Athlon Car Lease Netherlands** owns around 100,000 cars.

Operational car lease means offering a car and offering services around the car during the predefined contract period. The contract consists of fixed costs and variable costs that is dependent on what has been agreed upon. **Athlon**'s customers are both large and small enterprises that want to offer their employees a ‘company’ car. The customers ask **Athlon** to take care of activities like maintenance, sales, procurement, tier replacement, repair handling, fuel handling, fine reporting and insurances (depends on the contract). Customers can enjoy the hassle free usage of a car and focus on their core business.

Athlon acknowledges that the trends from literature, as mentioned at the beginning of section 1.2.1, are relevant for Athlon’s future. However, the thoughts about shaping a new service dominant business environment requires both structure and enrichment. A structured analysis of Athlon’s current business environment and future scenario is needed including multiple perspectives.

Service Dominant thinking as an organization, requires a Service Dominant thinking in the Demand Chain of Athlon’s business environment. Athlon is interested in an academical reflection of their current
demand chain and if necessary recommendations for improvements. The demand chain consists of activities like sales, marketing and customer relationship management that aim to elicit customer needs and customer satisfaction.

The Service Dominant thinking is also useful in the supply chain. Athlon is a service company. Athlon is not a car manufacturer, nor a petrol station, nor a repair shop, nor a tier manufacture, nor a car dealer. Athlon is part of a business environment with the previously mentioned actors; their suppliers. Athlon is interested in an academic reflection on their current supply chain and whether it is ready to offer new services that are in line with the Service Dominant Logic theory.

Therefore Athlon’s problem statement is:

**Practical problem statements:** What is a service dominant business environment and where is Athlon’s business environment now? How can we go from our current business environment to a service dominant business environment?

In addition to this problem statement and research context from the Athlon perspective, an organization chart is provided in Appendix A: Organization Chart Athlon. This organization chart gives a clear overview of the main stakeholders of Athlon: DLL and the Rabobank. Moreover the chart summarizes the countries Athlon is operating in and shows the different departments within the organization.

Figure 2 summarizes the problem statement that Athlon presented as an input for this project.

![Figure 2 Practical Problem Statement](image)

**1.3 RESEARCH OBJECTIVES AND RESEARCH QUESTIONS**

The research objective will be elaborated in this section. The main research questions are given together with the research objective.

Based on the problem statements described in the previous section (1.2) the two high level research directions can be identified:

1. Characterize the current and future environment of Athlon using SODSC terminology
2. Explore IQ aspects related to a service dominant business environment

In addition to that a research focus is established by Athlon and the TU/e:

**Context:**
Athlon is moving from a service oriented into a service dominant business by extending their value proposition from operational car leasing to mobility services.

**Hypothesis:**
In a Service Dominant business environment the positioning, engagement and role for the customer changes (the customer becomes an active actor and contributor). Moreover the Service Dominant business environment will be highly dynamic; Athlon cannot insource all activities and value propositions, but has to look for enriching partners. Such a highly service oriented business environment need to be highly supported by Information Systems (Sambamurthy, Bharadwaj, & Grover, 2003) and the effectiveness of those systems is depends on the Information Quality (Sheng & Mykytyn, 2002) (Illari & Floridi, 2014). This can be summarized as follows:

![Figure 3 Main Hypothesis](image)

Figure 3 Describes that the more service orientation there is within an organization, the more dynamic the demand and supply chains will be, the more IQ challenges the business environments will face.

**Main research question:**
“What is the impact of Service Orientation on both the business environment of Athlon as the Information Quality and what implications does this have for Athlon?” (see sub questions next page)

**Implication:**
Athlon, as the governor/facilitator of the mobility business environment needs to balance between the value obtained from dynamic networked interactions and the risk evolving from the dynamic inter-organizational information exchange.

**Objectives:**
Theoretical Research Objective 1: “Using Athlon’s terminology of Service Orientation to enrich the SODSC framework from a practical point of view”
Theoretical/Practical Research Objective 2: “Developing a set of Information Quality requirements that are relevant for Athlon’s future Service dominant Business environment.
Practical Research Objective 3: “Applying the enriched SODSC framework to the current and future business environment of Athlon to structure ideas about new mobility markets and to grasps the differences of the two business environments”
In order to reach the objectives and to answer the main research question, this research project is broken down in three research stages with corresponding research questions and deliverables. The three research questions are based on Figure 1 and Figure 2 and the paragraphs 1.2.1 and 1.2.2. The overview of research questions is shown in Figure 4. The phases, steps and methods are described in chapter 3.

The main outcome of this research will be an answer on the main research question by providing a link between service orientation and information quality from a business environment perspective. This link will be a new and relevant contribution to the literature of Operations Management and Information Management.

1.4 THE CONTRIBUTION TO SERVICE-DOMINANT LOGIC AND INFORMATION QUALITY STUDIES

This paragraph will motivate this research project in the context of the Service Dominant (SD) logic field and information systems field.

Firstly, this research enriches the general perception of the Service Dominant-logic and the SODSC framework, by doing a case study at a business environment. This research will work with a new construct, named the SODSC construct, which is developed in order to integrate and add new perspectives to the service-dominant logic (Rasouli et al., 2014). This research will enhance the understanding of this framework, by showing what the different characteristics are in a Service Dominant Demand and Supply Chain and a Good Dominant Demand and Supply Chain and relate this to examples from practice.

Moreover this research enriched the Information Systems research field with ideas about information quality issues that organizations face when transforming their business model to a more innovative and service-dominant one. This is an addition to current literature about information quality that has been done in the context of a Goods Dominant business environment with conventional supply chains (e.g. Falge et al., 2012; Xu et al., 2013). This master thesis initiated the first step towards identification and characterization of emerging IQ issues in the context of the SODSC construct. This thesis is relevant for future research on the development of an information governance model as an organizational solution for these IQ issues.

Previous work on the topic of service orientation, information quality and research projects at Athlon were consulted for determining a suitable research direction. Kostas Traganos mentioned that “future research should be conducted on how organizations can expose business services to be used by other business partners of the same business network” (Traganos, 2014, p. 85). His master thesis research was also conducted at Athlon, but he used the Base-X framework (Luftenegger E., 2014) as a theoretical framework. The Base-X framework is also based on the Service Dominant Logic, the difference is that this research is more explicitly looking at the network of Athlon with its suppliers and customers as partners. For Athlon this research is therefore a useful extension of previous academic research about service dominant paradigm. The Service Dominant business environment perspective, including suppliers and customers, is a perspective that has been missing in previous research at Athlon.

Two bachelor students already worked with the SODSC framework. Their recommendation for future directions were that the characteristics of the SODSC framework should be elaborated more in order to
distinct between the Good Dominant characteristics and the Service Dominant characteristics (Weerdenburg, 2014) (Hulscher, 2015). It is difficult to position a network in the framework now. This research made a step forward in making the SODSC more usable and more applicable in practice by making the positioning of networks in the construct clearer.

The research direction of this master thesis is also based on future research recommendations by academic papers. In their paper, Otto et al. analysed the state of research with regard to information quality in business networks (Otto, Lee, & Caballero, 2011). Both information quality and business networks are mature fields, but “comprehensive frameworks for information and data quality management in business networking are missing” (Otto et al., 2011, p.94). This research project will contribute to this new field of information quality and dynamic network integration.

1.5  THESIS STRUCTURE
This thesis follows a business research structure as described in Business Research Methods (Blumberg, Cooper, & Schindler, 2008, p. 558).

This chapter described the problem statement, research objectives and research questions. Chapter 2 describes the theoretical background of the problem statements and provides a theoretical foundation for (partly) answering the research questions.

Chapter 3 gives an elaborate overview of the research methodology and research design used to answer the research questions stated in this chapter. The next chapter (4), presents the findings of the execution of the research approach. The last chapter, chapter 5, provides the Operations Management and Logistics research field conclusions of this master thesis project. These conclusions include recommendations for Athlon what to do with the findings described in chapter 4.
Research Question:
“What is the impact of Service Orientation on both the business environment of Athlon as the Information Quality and what implications does this have for Athlon?”

Sub question 1:
What service orientation is there at the moment in Athlon’s business environments?

Phase 1:
Understanding Athlon’s current business environment by conducting exploratory interviews (based on SODSC)
Understanding what Information Quality Aspects are (literature review and exploratory interview)

Deliverable:
Positioning Athlon’s current situation in SODSC Framework
Limitations SODSC framework

Sub question 2:
What characteristics will Athlon’s future business environment in 2020 have and what implications will it have on the Demand- and Supply chain of Athlon?

Phase 2:
Additional literature review about SODSC
Setting up a Data Gathering Plan for evidence that supports Athlon’s future positions in the SODSC framework
Define Scope of the relation between SO and IQ

Deliverable:
Positioning Athlon’s current situation in SODSC Framework
Discussing potential for adding scales to the SODSC framework

Sub question 3:
Which IQ challenges are relevant in Athlon’s 2020 SD- business environment and which IG requirements are necessary?

Phase 3:
Understanding what IQ issues and IG requirements play a role in a SD business environment based on literature
Data gathering plan to explore how these IQ issues can be relevant in Athlon’s Service Dominant Business Environment

Deliverable:
Case Study at Athlon on the most important IQ issues in a Service Oriented Dynamic Network
List of most important IG requirements for Athlon

Link between service orientation and information quality from a business environment perspective

Figure 4 Research Questions Overview
2 Service Dominance Paradigm and Information Quality

This chapter of this master thesis consists of a theoretical background on the service dominant logic and information quality, for the research outcomes must be placed in light of these particular theories. This research is guided by the SODSC construct developed by Rasouli et al. (2014). This construct is chosen because of its clear structure and relevancy for Athlon’s strategy transition. Moreover, the construct has been developed as part of a Ph.D. project (called: Information quality issues in service-oriented demand-supply chains) at the TU/e that was conducted in parallel with this master thesis project. The researchers of the two projects had several meetings together to improve each other’s research.

The structure of this chapter is as follows. The chapter starts with a discussion on the good dominant and service dominant paradigm shift and what the drivers are. This is described in paragraph 2.1. Then the SODSC framework is introduced in paragraph 2.2. Moreover the link between SO and Information Quality and central theories about Information Quality will be described in paragraph 2.3.

2.1 The Service Dominant Paradigm

This chapter starts with a brief background on academic perspectives on how companies are adding value. In paragraph 2.1.2 briefly the drivers of service orientation in companies are mentioned.

2.1.1 What do companies exchange? Value in use or Manufactured output?

As a start, firstly theories around the characteristics of a service dominant and a traditional good dominant business models were consulted. The main difference between a service-dominant versus a traditional goods dominant business model is the unit of economic exchange.

In the service-dominant business model, this unit is service provision while in the traditional goods dominant business model, manufactured output (tangible resources) was seen as the unit of economic exchange (Vargo & Lusch, 2004). Until now, most of our knowledge have been developed using the manufacturing mind-set. The second characteristic and difference between the two paradigms is who is creating the value. The Service Dominant Logic argues that co-creation of the value with customers is important. The relationships should be relational rather than transactional (Baines, Lightfoot, Benedetinni, & Kay, 2008). In the Goods Dominant Logic the relations between company and customer are transactional (Baines et al., 2008).
Summarizing, the Service-Dominant business model focuses on intangible resources and service provision as a unit of exchange. And the co-creation of the value with customers plays an important role. In the Goods Dominant business model the unit of exchange are tangible resources and the supplier-customer relations are transactional.

Paragraph 3.6.1.1 goes deeper in the value in use and value in exchange aspects.

2.1.2 The drivers for the Service Dominant Paradigm
There are financial, strategic and marketing drivers to follow a more service dominant business model (Baines et al., 2008). Service dominant services are difficult to imitate by competitors and service dominant services increase customer loyalty. Customer loyalty is derived by focusing on customer needs and customer experience. ‘Customer loyalty’ and ‘difficult to imitate’ are examples of strategic drivers. A marketing driver is that a company can sell more contracts, since result oriented services imply more integrated and comprehensive service offering. Financial drivers are relevant in the sense that there is an agreement with researchers that factors like customer loyalty leads to an increase in sales.

Besides financial, strategic and marketing driver there are researchers arguing that ‘learning’ can be seen as an additional driver for the Service Dominant Logic (Vargo & Lusch, 2004). This is because in the SD logic you understand the customer better.

Table 20 in Appendix G: Motivation and challenges for Service Dominancy shows an overview of the motivation and challenges resulting from the shift from leadership in technology to leadership in use.

2.2 The SODSC Framework
After the elaboration of the Service Dominant Logic, as a basis for the framework, the researcher studied the SODSC Framework.

The paper of Rasouli et al. (2014) is integrating the use of various notions in the marketing and supply chain domains, for several research communities have studied the integration of products and services and used different names for this integration (Barquet, de Oliveira, Amigo, Cunha, & Rozenfeld, 2013).

Moreover, by making a distinction between demand and supply chains, the paper of Rasouli et al. (2014) explains that there are different aims to be service oriented from a marketing and from a manufacturing point of view. Figure 6 shows the approach the authors of the paper is using to explain service orientation in demand and supply chains. Customer value, in the form of more customer service and therefore value, is the output of the SODSC system. To create this service value for the customer, supportive mechanisms are necessary and the main one is partnership. Control mechanisms also affect the degree of service-oriented value for the customer. For all three dimensions (service-oriented value, control and partnership) a framework is developed.

A summary of these three frameworks is given in Appendix H: Summary SODSC Framework. The frameworks are also more elaborated in paragraph 3.6.
2.3 INFORMATION QUALITY

Paragraph 2.3.1 gives a brief outline of what information quality is. This research project took those information quality issues as a starting point. Moreover a theoretical background on the relation of Service Orientation and IQ is shown in paragraph 2.3.2.

2.3.1 Information Quality issues

Both academia as practitioners have their view on IQ as is show in Table 1 and Table 2 respectively. The table of the academic view on information quality has been established through a literature review starting with the most fundamental paper about information quality: Beyond accuracy (Wang & Strong, 1996). The practitioner’s view on information quality was derived from exploratory interviews within IT management in Athlon and a review on the famous ISO standard for information quality (ISO9126).

In short, Information Quality dimensions have been investigated from different points of view in the literature. Definitions of some of the Information Quality dimension can be consulted in Table 3.

Table 1 The academics’ view of IQ

<table>
<thead>
<tr>
<th>Paper</th>
<th>Elements</th>
<th>Context</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lee et. al., 2002</td>
<td>Product Quality, Service Quality</td>
<td>Based on how to improve IQ</td>
</tr>
<tr>
<td>Khatri &amp; Brown, 2010</td>
<td>Accuracy, Timeliness, Completeness and Credibility</td>
<td>Based on end use of data</td>
</tr>
<tr>
<td>Kooper et. al., 2011</td>
<td>Reliability, relevance, usability, availability</td>
<td>Based on Information Governance theory</td>
</tr>
<tr>
<td>Batini et. al., 2009</td>
<td>Accuracy, Consistency, Completeness and Timeliness</td>
<td>Based on Wang and Strong</td>
</tr>
</tbody>
</table>

Table 2 The practitioners’ view of IQ

<table>
<thead>
<tr>
<th>Source</th>
<th>Elements</th>
<th>Context</th>
</tr>
</thead>
<tbody>
<tr>
<td>Athlon</td>
<td>Compliance issues, privacy, reliability, dependency on technology, traceability and ownership</td>
<td>Based on information sharing and IT integration issues</td>
</tr>
<tr>
<td>ISO9126</td>
<td>Functionality, reliability, usability, efficiency, maintainability, portability</td>
<td>Based on software quality</td>
</tr>
</tbody>
</table>

Table 3 Some IQ Definitions (Falge, Otto, & Osterle, 2012, p. 4317)

<table>
<thead>
<tr>
<th>IQ Dimension</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accuracy</td>
<td>The extent to which information correctly represents an action or a real world object</td>
</tr>
<tr>
<td>Completeness</td>
<td>The extent to which value are present in an information collection</td>
</tr>
<tr>
<td>Timeliness</td>
<td>The extent to which information represents the real world at a given point in time</td>
</tr>
<tr>
<td>Consistency</td>
<td>The extent to which data in one database corresponds to data in a redundant or distributed database</td>
</tr>
<tr>
<td>Relevancy</td>
<td>The extent to which data is applicable and helpful for the task at hand</td>
</tr>
<tr>
<td>Accessibility</td>
<td>The extent to which data is available at a given point in time</td>
</tr>
</tbody>
</table>
2.3.2 Service orientation and the influence on Information Quality

Paragraph 1.2.1 already described the academic story line that that service orientation might impact information quality. In addition to this, this paragraph motivates why the chosen methodology for RQ3 is grounded in theory (see paragraph 3.7).

As described in paragraph 2.2, the goal of the SODSC framework is to investigate service orientation in networked business environments. When a networked business environment is service dominant, it has dynamic interactions and dynamic networked processes (Rasouli et al., 2014 & 2015)

A dynamic business environment requires sensing customer needs and rapidly responding to these needs by their set of partners within a business environment (Sambamurthy et al, 2003). In this business environment the information-intensive inter organizational business processes are important (Grefen, Mehandjiev, Kouvas, Weichhart, & Eshuis, 2009). High quality Information sharing between parties is enable by the Internet of Things (IoT) technologies that facilitate the access to the globally distributed information (Lohr, 2012).

More information can be provided suppliers or by customers in a service oriented business environment. Supplier share for example information related to their newest service and customer can share their experience through social media.

There are however some issues to be expected about this information sharing and exchanging between the parties of a business environment, like unsecured information access (see Table 1) and low quality information products (Table 1) (Tallon, 2013) (Haug, Stentoft Albjorn, Zachariassen, & Schlichter, 2013) (Silvola, Jaaskelainen, Kropsu-Vehkapera, & Haapasalo, 2011). These issues can disrupt the performance of a business environment (Rasouli, 2015). These issues need to be recognized and responded by information quality requirements who are often called information governance mechanisms (Tallon, 2013).

Based on the literature study about IQ (see paragraph 2.3.1) information quality requirements to tackle those IQ issues were developed. Most of the effort in this part of the thesis was done by the PhD candidate researcher M.Rasouli. After a very extensive literature study, he identified information quality requirements, information security requirement and metadata requirements. These three categories of Information Quality requirements (also called Information Governance requirements) resulted in 28 requirements that a business environment need to take into account. More information is shown in Appendix E: Explored IQ requirements overview.
3 METHODOLOGY

Paragraph 1.3 explained what has been researched. In addition to the ‘what’, this chapter tells how the research has been done and why.

3.1 POSSIBLE RESEARCH ACTIVITIES AND RESEARCH OUTPUTS IN INFORMATION SYSTEMS RESEARCH

This paragraph describes briefly to which two common research approaches this thesis belongs. In this way, the reader of this thesis understands better which research activities are focused on.

According to literature, there are two types of research approaches that are suitable for research in the Information System fields (Hevner, March, Park, & Ram, 2004). These two approaches are the Design-Science approach and Behavioural Science approach. The Design-Science approach in the IS research context focuses on research activities as building and evaluating IS artefacts (March & Smith, 1995). An IS artefact can be a construct, a model, a method or an instantiation in the context of Information Systems (March & Smith, 1995). The behavioural science approach focuses on theorizing how or why an environment reacts to a certain IS artefact and in parallel justifies this theory.

Table 4 positions this master thesis research in the research framework of March and Smith (1995).

<table>
<thead>
<tr>
<th>Research Outputs</th>
<th>Design Science</th>
<th>Behavioural Science</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Build</td>
<td>Evaluate</td>
</tr>
<tr>
<td>Constructs</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Model</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Method</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instantiation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Justify</td>
</tr>
<tr>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

As can be concluded from the table, this research has both design science research activities as behavioural science research activities. This research focuses on evaluating the SODSC framework (model) and improving it. Moreover it focuses on theorizing the relation between service orientation and IQ (construct) and justifying this theory.

Figure 7 positions this master thesis research project in the framework of Hevner et al. (2004), another framework that is commonly used in Information Systems Research. For building and evaluating theory, one should take into account both the relevance and rigour of the research. Figure 7 explains why this research takes into account both, by showing the business environment that is investigated (Athlon) and the knowledge base that is used for this research.

3.2 GENERAL RESEARCH APPROACH: CASE STUDY

As can be seen in Figure 7, the case study approach is used to evaluate the theory (SODSC framework and SO → IQ relation). This section will briefly describe the possible research methods and why a case study approach suites this research the best.

Yin (2014) compares the case study with other research methods in social sciences. For example, you can do an experiment, survey or statistical modelling instead (Yin, 2014).
This thesis is evaluating the usefulness of a construct and explaining why and how it works or not. This research will focus on contemporary events happening at Athlon. However relevant behaviours cannot be manipulated (so an experiment research approach was not possible for this thesis); this academic research at Athlon takes Athlon as an organization and future ideas around mobility as-is.

The survey method would then also be usable. However case study research follow the replication logic, where survey research follows the sampling logic (Blumberg et al., 2008). “Case studies are therefore not generalizable to a population but to a theoretical proposition. The main advantages of the case study approach compared to other approaches is that it relies on multiple sources of evidence, such as interviews, observations and documents” (Blumberg et al., 2008).

So a case study relies on primary document, secondary documents and physical artefacts, but it adds direct observation of the events being studied and interviews the persons involved in the events (Yin, 2014). At Athlon the observation of events and conducting interviews were possible. It was also possible to consult both primary as secondary documents (see Appendix B).

Once it was decided to use the case study approach, the choice between single and multiple case studies had to be made. Where single case studies use only one case, multiple case studies use more. Multiple case studies investigate an issue using multiple contexts, which is usually better (Blumberg et al., 2008). But when the case study investigates unique cases, a single case is suitable. This is the case, since this research aligned the research with unique and specific needs of Athlon (see paragraph 1.2.2).
All in all, based on the availability of information and concerning the research objective, the single case study approach was chosen.

3.3 DATA COLLECTION
This chapter describes from which sources information was obtained and by what means.

Tables from Yin (2014) are used to support decisions made concerning data collection. These tables (Table 16, Table 17, Table 18 and Table 19) can be found in Appendix F: Tables from Yin, 2014.

3.3.1 Selecting Evidence collecting approach for case studies
The second element that needs to be considered is the evidence collecting approach for case studies. Yin (2014) describes six sources of evidence as is shown in Table 17. A good case study research uses multiple sources of evidence. This research used information from Athlon’s future scenario workshops. Most of the other information was collected by (exploratory) interviews with Athlon employees. A list of these evidence sources is shown in Appendix B: Sources of Evidence.

The most important data collection step was the conduction of semi-structured interviews. The goal of these interviews was to describe and explain the current situation and the future situation of Athlon in the context of the service orientation dimensions of the SODSC framework. Therefore a specified set of predefined questions was developed as a detailed interview guide.

Table 18 shows that there are the other type of interview is a structured interview. The objectives (also stated in paragraph 1.3) of this research are to explore new terminology regarding service orientation and to enrich the SODSC framework, to explore information quality issues and requirements in the context of a more dynamic business environment and to explain Athlon’s future vision in the context of service orientation. Regarding the nature of this objectives (more exploratory and explanatory) the semi-structured interview fits the best here. Moreover the SODSC framework does not describe measurement techniques to describe the theoretical concepts of SODSC. Also Athlon is still developing their future mobility scenario. It would be useful for this research field to learn from this development process and take into account the different viewpoints of stakeholders.

However, in order to explain the SODSC constructs, it is necessary to put structure in the interview. Without structured questions, Athlon’s business environment cannot be clearly positioned in the context of SODSC. A part of this research project focuses on developing this structured interview questions, based on literature. The result is shown in paragraph 3.6.1.

3.3.2 Semi-structured interview
This paragraph describes briefly what the nature of a semi-structured interview is, the main requirements for success and ethics that need to be taken into account.

Semi-structured interviews usually start with rather specific questions, but allow the interviewee to follow his or her own thoughts later on (Blumberg et al., 2008, p. 385).

Blumberg et al. describe three success factors for (semi-structured) interviews (2008, p.285): participants must understand and have to access to underlying background for the questions, participants must understand his or her role in the interview (as the provider of accurate information) and the participant must perceive adequate motivation to cooperate. In order to satisfy to these success
factors, an introduction to the research project was given in the email send to the respondents and at the beginning of the interview.

And last, but not least, some ethics should be taken into consideration. All respondents were asked permission for publishing the information and recordings during the interview. Also they had the opportunity to review their quotes in this thesis.

3.4 DATA ANALYSIS

In analysing case study evidence, several analytic strategies can be followed. There are five analytic techniques for case study research. Pattern matching, explanation building, time-series analysis, logic models, and cross case syntheses (Yin, 2014). See also Appendix F: Tables from Yin, 2014 and Blumberg et al., 2008, Table 19. For this case study research, the explanation building strategy was chosen.

The data analysis process started with transcribing the interviews (based on the recordings of the interview). The interviews were literally typed out and stored. Next, the transcripts were used to create a case study data base. This database was ordered along the different constructs in the SODSC framework (following the interview guideline).

The interviews transcripts consisted of facts. Facts were checked in documents or cross verified in other interviews. Perceptions in the interviews were dealt with as less interpretation from the researcher as possible. The different perceptions combined provided insight in a shared perception to what extent a certain construct was present in the current situation of Athlon or in the future situation.

Moreover, all the respondents had the possibility to change any content (provided by them) before the publishing of this master thesis. All the quotes in these thesis are double checked by the respondents!

3.5 LIMITATIONS

This paragraph will list some concerns and limitations that might bias the results of this thesis. Moreover, to ensure the quality of the research, the validity and reliability issues that can arise are discussed in paragraph 3.5.1 and 3.5.2.

As described in paragraph 3.2, the case study approach was found to be the most applicable research method for answering the research questions. There are however also concerns about case studies (Yin, 2014): “When a case study researcher has not followed systematic procedures and had influence on the direction of the findings and conclusions than the rigorosity of the method is in danger”. This risk is always present with any approach. However this risk is bigger in case study research, since “case study research is not well specified with procedures to be followed compared to the other methods” (Yin, 2014). To minimize this risk, this research project dedicated this methodology chapter to convince researchers that this research has been conducted in a systematic way. Paragraph 3.6 and 3.7 describes exactly the approach followed to answer the three research questions.

Another concern is the generalizability of case study findings. However Yin argues that this concern is also valid with the other approaches. “Case studies are generalizable to theoretical propositions and the goal should be to generalize theories, rather than do statistical generalizations where you can more easily extrapolate your findings to other situations” (Yin, 2014).
As described in paragraph 3.2, this research will do a single-case study research. However, multiple case studies are more appealing, since “their results are considered more robust” (Blumberg et al., 2008). Due to time limitations, only the Athlon case could be used. Future researchers at DLL can adapt the same methodology described in this chapter with the other business units of DLL (e.g. healthcare). It would be interesting to see the differences in result or it would support the results of this thesis even stronger.

Using interviews as the main data collection method has also some risks. The weakness is that interviews are more difficult to recall. However, in order to mitigate this risk, the interviews were recorded. Also some of the interviews need to be hold through video-conferencing. The technique was excellent and therefore no bias in the results are predicted.

As an analysis technique, explanation building was used. This technique has its challenges. “Much analytic insight and sensitivity are demand of the explanation builder” (Yin, 2014, p. 150). To reduce any biases in the explanation process, external colleagues from Athlon and a second supervisor (Rob Kusters) were consulted. These people can be seen as ‘critical friends’, to safeguarding the believability of the explanation building process.

3.5.1 Validity

The validity issues are divided in construct validity, internal validity and external validity. Each of these plays a role in different parts of this research, such as the data collection phase, the data analysis or the overall research design.

The construct validity is concerned with the identification of the correct operational measures for the concepts that are being studied (Yin, 2009). To make the data collection as objective as possible, there is chosen to use multiple sources of evidence in the data collection phase, making it possible to establish a chain of evidence. However for the last RQ (second in-depth interviews), this was more difficult, since there are not many sources for assumptions about Information Quality in future (assumed) business processes. Therefore readers should consider the second part (RQ3), as an experimental exploration of information quality, based on (only) the assumptions of the respondents. Of course these respondents have in-depth knowledge about information processes and strategic directions, so the outcome (see paragraph 4.5.2.1) can still be used to show that some of the Information Quality issues are standing out and are valid issues to consider in future research.

To increase the construct validity, the written text about the interviews (see chapter 4), are reviewed by the respondents. However, for the last in-depth interviews about IQ, this review was only done by the Sales Manager (H. Kroon), due to the limited time available.

The internal validity is of less importance in this research as the case study has a descriptive and more exploratory character. However the part where some knowledge activities are tested inside the organization, does deserve some attention, due to the causal relation (service orientation and IQ) that is tested in this research. Therefore the tactic to use the explanation building techniques (see paragraph 3.4) is used to increase the internal validity (Yin, 2009).

The external validity is concerned with defining the domain to which the study’s findings can be generalized (Yin, 2009). With the case study results, the researcher strived to generalise the results to some broader theory in order to make it useful for other companies. This is also shown in paragraph 3.1, in Figure 7. The discussion for future research is described in paragraphs 5.2 and 5.3.
3.5.2  Reliability  
The reliability is concerned with the question whether the research is replicable, so when another investigator would follow the same procedures, it would arrive at the same findings and conclusions (Yin, 2009). In order to be able to do so, this research will describe in paragraph 3.6 and 3.7 exactly, step by step, how this research has been conducted. One can question why some steps are done, but concerning the reliability issue, discussion about what has been done are minimized.

3.6  Specific Research Approach for RQ 1 and RQ2  
This paragraph explains the case study approach that was used to answer the following research questions:

**RQ1:** What service orientation is there at the moment in Athlon’s business environment?  
**RQ2:** What characteristics will Athlon’s future business environment in 2020 have and what implications will it have on the Demand- and Supply chain of Athlon?

This approach is reflected in Figure 8. As can been seen, there were three steps executed to get the findings as is shown in paragraph 4.2, 4.3 and 4.4. These steps will be outlined in the next paragraphs.

![Figure 8 Steps to position Athlon in SODSC frameworks (Research approach for RQ 1 and RQ 2)](image)

3.6.1  Positioning Athlon in SODSC Framework – Step 1 and 2  
Step 1 and 2 are explained in this paragraph together, however in reality first step 1 once executed, then based on this step 2 was derived. A general description of how to develop an interview guideline was given in paragraph 3.3.2. This paragraph will explain the theoretical foundation for these questions. The interview guideline is extensively reviewed with the Athlon and TU/e supervisors of this research project. The literature used in this interview development process is based on the literature study performed by the author of this thesis and it is based on the work of the PhD researcher M. Rasouli.

3.6.1.1  Service oriented value  
The investigation of service-orientation in networked businesses highly depends on a clear understanding of the network’s aimed value proposition.
3.6.1.1 Service oriented value in demand chain perspective

The demand chain dimension of a value chain consist of marketing-, sales- and customer relationship management activities. Due to empowering customers and more transparency, these activities need to understand, create and simulate customer demand better (Hilletofth, 2011). This change is reflected by the “value creation” notion in marketing context (Gronroos C., 2008) (Prahalad & Ramaswamy, 2004). To understand this rethinking of marketing, one has to understand a new paradigm that serves as a fundament of service orientation in the demand chain dimension. This paradigm is the S-D logic of marketing, as was described in paragraph 2.1.

Many service companies have tried to make their services more like goods in order to separate the production and consumption of the service and to standardize the services. In a service dominant environment however, the goals is not to standardize but to customize services. By doing this, one is recognizing the role of the consumer as a co-producer and to maximize consumer involvement (Vargo & Lusch, 2004). From this theory we can derive the following questions:

**Q.1:** I see you have several services as lease, mobility products, management services and advice services. What are the customizable characteristics of the service and are they managed before or during the contract?

**Q.2:** I will describe two extremes. One business focuses on mass-customized value propositions based on unique expectations of a customer. Another business offers standard value propositions based on general customer requirement analysis. Where is Athlon according to you and how will this change in future?

The traditional good dominant logic (G-D logic) of marketing sees value creating process as a process where the supplier creates value by creating an economy benefit by selling products or services.

However we do not see this economic benefit (also called value in exchange) as a service oriented value. A service oriented value is determined by a customer in the form of the value-in-use (Service dominant logic of marketing). Value is created by customers during the usage of a service or product. This role of a supplier is to facilitate the usage of a product or service by a customer (see the paper of Gronroos, 2008).

From this theory we derive the following questions:

**Q.3.** How do you improve the value for the customer during the usage of the service? Do you have several meetings for example with the customer about value improvement? What is your structure for doing this?

**Q.4.** I will describe two extremes. In one situation the production and consumption of services are separated. In the second situation the production and consumption are integrated; so a customer has an opportunity to define new value propositions during the usage of a product. Where is Athlon now and in the future?

Table 5 shows the differences between the two dimensions of this perspective. This table can help positioning Athlon’s future and current business.

3.6.1.1.2 Service-oriented value in supply chain perspective

The supply chain dimension, on the other hand, includes logistics, operations and outbound logistics activities (Hilletofth, 2011). Traditionally based manufacturers companies are moving their position in
the value chain from product manufactures to providing customers with integrated solutions that can include multi-vendor products (Baines et al., 2009). The service-orientation within supply chain dimension is in line with the concept of servitization (Baines et al., 2009) (Vandermerwe & Rada, 1988) and PSS (Tukker, 2004).

*Table 5 Service orientation in the Demand Chain perspective*

<table>
<thead>
<tr>
<th>Supplier centric value obtainment</th>
<th>Customer centric value obtainment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value created by:</td>
<td>Service oriented value created by:</td>
</tr>
<tr>
<td>Value in exchange: <em>economic benefit by selling service/product</em></td>
<td>Value in use; <em>value is created during the usage of a service/product</em></td>
</tr>
<tr>
<td>Athlon has a role of a supplier of service/products</td>
<td>Athlon has a facilitating role; helping to create the customer value by offering the usage of a service</td>
</tr>
<tr>
<td>Production of service and consumption of service are separated</td>
<td>There are several moments and opportunities for a customer to change its service and co-create a better service for him/her to obtain more value.</td>
</tr>
<tr>
<td>A customized solution is developed based on standard service offerings, the customer will consume it over a certain period of time</td>
<td>Constantly a unique customized solution is delivered</td>
</tr>
</tbody>
</table>

When offering only a single product or service, the suppliers’ responsibility of the service stops when it is sold to the customer and the customer starts to use it. Product lifecycle management theory emerged, also from a service orientation context, in order to extend this responsibility also after sales. A service oriented supply chain should deliver value also during the usage of the product (so also after sales) by for example providing support and maintenance during the usage of the product or service. From this theory the following question can be derived in order to get insight whether Athlon has extended his responsibility to the usage of the product:

**Q.5.** How do you position Athlon in the Asset Lifecycle Management theory? You already provide after sales services as maintenance and support. Are there other services? Which services are you developing in future?

Also Tukker describes service orientated value from a supply chain perspective. He sees this supply chain as a network that consists of tangible products and intangible services designed and combined so that they jointly are capable of fulfilling specific customer needs (Tukker, 2004).

The result oriented product service system is service oriented, the product oriented service system is value in exchange oriented. In order to determine where Athlon can be positioned in the output and result oriented category of a product service system the following question is asked:

**Q.6.** I will explain two extreme situations. In one situation a company offers services around an asset; the car. These services are optional and the customer pays per service. In another situation the company offers a result. The client describe the functionalities of the result and the company can decide how it can fulfil the result. The customer pays per result criteria; e.g. pay per distance. Where Athlon is now and why and where is Athlon in the future?

Table 6 shows the differences between the two dimensions of this perspective.
Table 6 Service oriented value in the supply chain perspective

<table>
<thead>
<tr>
<th>Single product/Service</th>
<th>Integrated Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product Service Delivery (Rasouli et al., 2014)</td>
<td>Product lifecycle management</td>
</tr>
<tr>
<td>Output Oriented (Tukker, 2004) (Rasouli et al. 2014)</td>
<td>Result Oriented</td>
</tr>
</tbody>
</table>

3.6.1.2 Partnership

The inputs of a networked business are the interacting organizations that follow a joint objective. This paragraph explains how you can classify partnerships in both the demand chains as the supply chains.

3.6.1.2.1 Partnership in demand chain perspective

Service orientation relies on the shift from the transactional interaction between suppliers and customers towards the relational interaction (Rasouli et al., 2015) (Ballantyne & Varey, 2006) (Harker & Egan, 2006). The transactional interaction from a customer perspective means; you are going to shop and choose a product that fits for you the best. Once you bought, no more interactions play a role. From a service producer company as Athlon it implies that you are attracting the customer to buy your products through for example 4 P’s mechanism (price, product, promotion and placement). Relational marketing is about an on-going process of supporting the creation of perceived value for a customer (Rasouli et al., 2015) (Ballantyne & Varey, 2006) (Gronroos, 1997).

Contrary to the transactional interaction that views customers as passive actors, the relational interactions originates from the activation of customers. (Gronroos, 1997, 2011). So, service-orientation within demand chain dimension, which concentrates on the value co-creation, is established upon the shift from passive customers to active customers.

From this theory the following questions are derived:

Q.7. Are there customers that you consider as partner for Athlon, in the sense that they are involved in the process of creating new services? How will this change in future?

Q.8. I will describe two extreme situations. A company has only transactional interactions, where the company is attracting his product and the customer decides to buy it or not. In the other situation the customers are active and are in dialog with their supplier how to create value for himself. Where is Athlon now and in future? Can you give examples?

Table 7 summarizes the differences between the two dimensions of this perspective.

Table 7 Service Orientation in the partnership dimensions using the customer perspective (Demand Chain)

<table>
<thead>
<tr>
<th>Customer as a passive partner</th>
<th>Customer as an active partner</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transactional interaction</td>
<td>Relational interaction</td>
</tr>
<tr>
<td>Customers are a passive audience; they decide to buy a product or not (only feedback)</td>
<td>Customer can engage in dialog with suppliers during each stage of product design and product delivery</td>
</tr>
<tr>
<td>Supplier is active: is trying to attract their services (e.g. with 4 P’s marketing strategies)</td>
<td>In the extreme form, customers are the most active actor as Co-innovator, co-designers, co-manufactures and co-marketer</td>
</tr>
</tbody>
</table>
3.6.1.2.2 Partnership in supply chain perspective

The provision of integrated products and services as well as the need for the full support of a product or service within its lifecycle necessitate enriching the networked business (Windahl & Lakemond, 2006), (Storbacka, Windahl, Nenonen, & Salonen, 2013) (Gebauer et al., 2013).

In order to enrich your business environment, you need diversified suppliers and capabilities in order to react on changing customer needs. This requires agility and adaptability for both the survival and growth of organizations that are part of the value network (Lusch, Vargo, & Tanniru, 2010). This is also in line with the core competency theory (Prahalad & Hamel, 1990). It is important that companies rely on their own areas of competences but that they enrich their network by looking for partners that can perform better in other areas of competences that are relevant for the business network. Such networks consists of business with specialized competences.

This implies that there are more dynamic interactions between suppliers. In order to have a service oriented network, suppliers should be linked and de-linked with each other based on changing customer needs (Rasouli et al., 2015). In line with (Lusch, 2011), (Wieland, Polese, Vargo, & Lusch, 2012) the value network can be described as modular suppliers that are loosely coupled.

In line with this theory the following questions are established:

**Q. 9:** You are working with partners in your supply chain, like the repair shops and fuel card providers. How are you enriching this network of suppliers? Do you have a team for example that is looking for new parties in the network that can offer new services?

**Q.10:** What do you consider as core capabilities of Athlon that are currently not being outsourced? How will this change in future?

**Q.11.** Do you have suppliers that you consider as partners? In other words, these suppliers are actively helping you to co-develop new services? Do you have meetings to improve the package of the service? How will this change in future?

Table 8 summarizes the differences between the two dimensions of this perspective.

<table>
<thead>
<tr>
<th>Table 8 Service Orientation in the partnership dimension using the supplier perspective (Supply Chain)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stable partnership</td>
</tr>
<tr>
<td>highly structured and rigid supply chains</td>
</tr>
<tr>
<td>Suppliers as a passive resource</td>
</tr>
</tbody>
</table>

3.6.1.3 Control

Network control involves formal and informal bindings to adapt a network to environmental changes and to coordinate and safeguard interactions between parties (Jones, Hesterly, & Borgatti, 1997).

3.6.1.3.1 Control in demand chain perspective

This perspective emphasises on the role of the customer results in more importance of the customer-centred adaption of a networked business rather than supplier-centred adaption (Rasouli et al., 2015). The customer centric adaption is the idea that the customer is adapting the network and the network is open for it. A good example is found in the article of Christopher (2000); Zara. Zara developed a supply
chain that is capable to respond a demand that turns out to be higher or lower than expected. Moreover, the real customer centric adaption element comes when Zara is collecting information and data from all the company stores and sites around the world to quickly adapt the dresses when the demand turns out to be lower. In this way the customers are adapting the network.

In line with this theory Athlon might have approaches as well to measure customer satisfaction. Therefore the following question is established:

**Q.12** How do you make sure you know the experience and satisfaction of a customer in future? How do you make sure you keep in dialog with the customer about customer needs?

**Q.13.** Are there customers actively leading you to take certain directions? Do they put pressure to adopt Athlon’s services to their need? Will this change in future?

**Q.14** I will explain two extreme situations; the network of Athlon is changed due to new technological innovation or it changes because of new customer requirements. Where is Athlon now? Can you give an example? How will this change in future?

**Q.15.** Are you willing to transfer the control (the control that the customer is satisfied) at the client. So you will be a responsive supplier and the customer will be more active?

Table 9 summarizes the differences between the two dimensions of this perspective.

**Table 9 Service orientation in the control dimension (Demand Chain Perspective)**

<table>
<thead>
<tr>
<th>Supplier adapts network</th>
<th>Customer adapts network</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer attraction (4P’s)</td>
<td>Customer experience (feedback surveys not only on 4P’s dimensions but also on usability, sustainability, maintainability of the products/services)</td>
</tr>
<tr>
<td>Supplier is active: develops technology and doing research on the applicability of new services</td>
<td>Customer is active with clear needs and ideas</td>
</tr>
<tr>
<td>Only feedback moment from customer is that a customer buys it or not</td>
<td>Customer explains why a product is good or not and is involved earlier in the process of product development</td>
</tr>
</tbody>
</table>

3.6.1.3.2 Control in supply chain perspective

Stable supply chains provide a single service or product and focus on the coordination of efficiency rather than innovativeness for the development of new products and services (Christopher, 2000) (Provan & Kenis, 2008). Based on Provan & Kenis (2008) due to the focus on efficiency rather than innovativeness, the centralized coordination by using of formal mechanisms can be more appropriate for this type of networked businesses. The *formal mechanisms* for the coordination can be based on the standardization of interactions between parties.

The provision of integrated services require the collaborating partners and dynamic interactions. This type of supply chain do not have to be governed by formal mechanisms (Macaulay, 1963). Instead, participation, communication and trust are key *informal mechanisms* that can be used more effectively in this type of networked businesses (Joshi & Stump, 1999). Moreover, it is difficult to govern such highly dynamic supply chains centrally, since they are demand driven (innovative) with different allocations of business processes and different modes of control and coordination (Verdouw, Beulens, Trienekens, & van der Vorst, 2011)
In line with this theory the following questions are derived:

**Q.16** I will explain two extreme cases. In one situation a supply chain network is governed centrally by a dominant player. The control focuses on efficiency of partners. You manage your partners based on formal contracts. In another situation, the supply chain networked is governed decentral; there is not a central authorian mechanism. The focus is on innovation and responding to customer needs rather than on efficiency. The network has less formal mechanism, like trust, participation and easy knowledge sharing.

*Where is Athlon now and how will this change in future? Why? Can you give examples?*

Table 10 summarizes the differences between the two dimensions of this perspective.

*Table 10 Service Orientation in the control dimension (Supply Chain perspective)*

<table>
<thead>
<tr>
<th>Central</th>
<th>Decentral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Authorian, highly structured</td>
<td>Collaborative and non-coercive governance (Lusch et al., 2010)</td>
</tr>
<tr>
<td>Focus on efficiency</td>
<td>Focus on customer satisfaction</td>
</tr>
<tr>
<td>Only performance information and output requirements are shared.</td>
<td>Information is easily shared between actors. Information like customer needs,</td>
</tr>
</tbody>
</table>

3.6.2 **Positioning Athlon in SODSC Framework – Step 3**

The third step (see Figure 8) is about selecting the right respondents to answer the questions developed in the previous paragraph (3.6.1). In total, six business experts were selected based on their availability, motivation (important requirement, see section 3.3.2), their expertise and the most important one is that they all participated in strategic workshops so they are reliable sources to ask questions to about the future situation of Athlon. For these in-depth interviews, the sales manager, innovation manager, procurement manager, marketing manager and enterprise architect were interviewed. More information about these respondents can be found in Appendix B: Sources of Evidence.

3.6.3 **Positioning Athlon in SODSC Framework – next steps**

After step 3, of course the interviews were held using the interview questions derived in step 1 and step 2. After the interviews, the interview data was analysed (see paragraph 3.4). The result is presented in paragraphs 4.2, 4.3 and 4.4. This chapter has been reviewed by all six respondents.

3.7 **Research Approach for RQ3**

Figure 9 and Figure 10 show the approach to answer the last research question:

**RQ3**: Which IQ challenges are relevant in Athlon’s 2020 Service Dominant business environment and which IG requirements are necessary

As can been seen, there were six steps executed to get the findings as shown in paragraph 4.5. These steps are outlined in the next paragraphs.

3.7.1 **Selecting a networked business process – Step 1, 2 and 3**

Regarding the identified research question, we need to select a business network that aims to handle dynamic networked business processes.
As described in paragraph 1.2.2, Athlon, as a car leasing organization, aims to develop and establish dynamic networked business processes in its business environment to provide integrated mobility solutions for customers. So, it is a relevant case to explore information exchange issues resulting from dynamic networked business processes.

The first three steps are about selecting a suitable dynamic inter-organizational business process in Athlon. In Appendix E: Service oriented Process Models with Dynamic interactions, the two chosen processes are shown. The first process is about developing a customized solution for the customer based on customer experience data. The second process is about integrating financial information from parties into a cost overview for the customer. Both processes are based on the evidence collected (see Appendix B) and passed all the three steps as are shown in Figure 9. Moreover it is based on the findings of the approach from Figure 8 Steps to position Athlon in SODSC frameworks (Research approach for RQ 1 and RQ 2. A detailed description why these processes are chosen, is given in Chapter 4.

3.7.2 Explore Information Quality issues – Step 1, 2, 3
The choreographic diagram is shown in Appendix D: Service oriented Process Models with Dynamic interactions. Choreographic diagrams is a perfect method to describe business collaborations between two or more parties on a high level (Dumas, La Rosa, Mendling, & Reijers, 2013, p. 125). The diagram described in the appendix describes the financial information integration process. A choreographic diagram about the service selection process is due to time limitations of the process not included anymore.

Figure 9 Steps to select a networked business process that is going to be changed regarding the transition of Athlon

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Next to the choreographic diagram, the two inter-organizational dynamic processes will be transformed to executable models including information objects. This is also shown in Appendix D: Service oriented Process Models with Dynamic interactions. The reason for doing this, is that executable process models are known as models that show which system passes information from one participant to another for action (Dumas et al., 2013, p. 298). This makes it easy to point towards information quality aspects.

After developing the orchestration and choreography diagrams of selected networked business processes the in-depth interviews are prepared. These in-depth interviews are based on pre-determined semi-structured questionnaires. The questions within these semi-structured questionnaires are developed in the base of deductively explored Information Quality issues in the processes. The questions can be better understood after reading the findings of RQ 1 and RQ2. Therefore the deductively explored IQ issues will be presented in Chapter 4.

Once the questions were made, suitable respondents were found. Three business experts that also participated in the first in-depth interviews were used as respondents. Due to the time not all six respondents were available anymore. It was anticipated that the three respondents could not discuss all the IQ issues that were explored. Therefore a fourth respondent was consulted; the IT manager, since it was assumed that the chance he couldn’t answer all the questions was lower compared to the other respondents.

The interviews took on average half an hour. The sales-manager also reviewed the two processes (see step 1 of Figure 10). After the information was collected the data was analyzed (see paragraph 3.4 for detailed approach). Some specific limitations to this steps are outlined in paragraph 4.5.2.3.
4 FINDINGS

This chapter presents the findings as a result from the methodology described in the previous chapter. Hereby paragraphs 4.2 - 4.4 answer the first two research questions and paragraph 4.5 the last research question.

As already described in paragraph 3.4, an evidence based research approach has been used for this thesis. Some quotes from the interviews are presented. All the information in this paragraph is also based on the information from the documents as is shown in and from the respondents who were introduced in paragraph 3.6.2.

4.1 INTRODUCTION IN ATHLON’S CURRENT SITUATION AND FUTURE SITUATION

This paragraph will describe first the current situation of Athlon using the Radar and Canvas model tools. Then in paragraph 4.1.2, the future state of Athlon is elaborated, which is based on the researcher’s insights from the strategic workshops that were held with the higher management of Athlon.

4.1.1 Athlon’s current situation

In the first part of the project, during the orientation phase, some exercises were done to elicit and understand Athlon’s current business using business model analysis techniques.

The two important techniques were the business model radar and the business model canvas. The business model radar tool is described in the dissertation Service Dominant Business-Design (Luftenegger E., 2014). This tool is useful to see the roles of different actors within a network using the value proposition perspective. In order to elicit quickly the core of an organization’s strategy, the business model canvas can be used. This model is described by Osterwalder (2004). Both the models are applied to the current situation of Athlon. These models are shown in Appendix C: Business model Canvas and Radar. These models are the result of an extensive workshop with Athlon international manager, Harald Kroon, who is also supervising this project. The appendix also shows a legend that can be used to interpret the figures.

The information of these two figures are used in the evidence building analysis in paragraph 4.2, 4.3 and 4.4.

4.1.2 Future State of Athlon

This paragraph summarizes the findings of all the workshops that the researcher has been participated in. See also Appendix B for further details. This paragraph is also reviewed by one of the workshop leaders, Caren Weisleder. This paragraph therefore enhances the conclusions of the in-depth interviews.

“The vision of Athlon is to be the leading European provider of car leasing and mobility services, delivering innovative, sustainable and cost effective solutions to customers, and to become the trusted consultant and coordinator for all mobility needs”

This vision is in today’s vastly changing mobility landscape not providing sufficient guidance to the operating countries to develop mobility propositions. Today, existing mobility services are merely
defined by value adding services to an existing car leasing contract like ‘Flex-drive’ that can provide the lessee with a more suitable car during a short period (e.g. holidays).

With increasing demand for more flexible and car-unrelated mobility services, Athlon is standing at a strategic cross-road to decide on the evolution of mobility solutions. The Future Scenario workshops (see Appendix B) are focusing on the following strategic direction:

“Athlon chooses to invest into the exploration and development of new mobility propositions, that potentially would become not only differentiating offerings in the market, but profitable revenue streams in the future. This would require the development of mobility related and customer centric business models, serving dynamic mobility needs”

These workshops explored the future demands, behaviors and implications for the European Mobility landscape in order to identify how this could potentially impact and guide Athlon's strategy for mobility. The project has been concluded with the recommendation to keep this direction (see box), where Athlon would explore the more radical innovation of business models as well as the impact on the organization, marketing and systems enabling future mobility solutions. Of course there are many other possible directions for Athlon, but this was not the scope of the workshops and this research.

The direction stated in the box on this page would transform Athlon from a service oriented car leasing company to a truly service dominant mobility provider and require a business architecture defined by collaborative Value Networks (Product Service Ecosystems) and Integrated Solutions with a high co-creation engagement of customers and end-users.

4.2 Service Oriented Value

The service oriented value framework has two axis with four quadrants. Whether an organization’s business environment belongs to one of them is not always black or white. However, Table 11 can help the discussion where Athlon’s environment fits the best. This table is based on the information provided in paragraph 2.2 and paragraph 3.6.1. This paragraph will use Table 11 to determine the current situation of Athlon’s business environment from the service orientation perspective (paragraph 4.2.1) and the future situation (paragraph 4.2.2).

4.2.1 Current Situation of Athlon

The analysis of the current service oriented value obtainment and value delivery of Athlon’s business environment is presented in the following sub paragraph. The first paragraph focuses on Athlon’s service offering. Paragraph 4.2.1.2 explains which services are provided during the contract (after sales services). The next paragraph (4.2.1.3) explains whether it is possible for a customer to customize a service and when. Paragraph 4.2.1.4 goes deeper in what kind of role Athlon has in the demand chain.

This paragraph concludes with positioning Athlon in the SODSC dimensions.

4.2.1.1 Athlon’s service offering (pricing and solutions)

Athlon is using modular pricing models. According to the Sales Manager, this means that Athlon’s customer should look at the total cost of ownership, which included fixed costs, but also variable costs.

A customer can decide to pay Athlon a monthly fee based on the fixed costs resulting from using a car. A customer pays the variable costs themselves. However, a customer can also pay a monthly fee including the variable costs. This fee is higher than in the fixed costs only situation.
Athlon takes the risk of predicting an average variable cost flow. The customer pays a higher fee, but also do not need to bother unexpected high variable costs.

Based on this pricing model, Athlon developed all kinds of solutions with different names. **Athlon essential** is a car lease solution, where the customer prefers to manage car related risk himself. For example in the insurance package of Athlon essential there is a higher own risk. You cannot choose your own dealer and you have to maintain your tires yourself.

On the other hand you have **Athlon Comfort** that offers full operational car lease. This can be called a result oriented solution. You pay a higher fee per month, but you can change your tires every year and you can make use of the road assistance and repair shops anytime. In this business model Athlon takes a lot of risks and the monthly fixed fee has to cover all the variable costs. This calculation is based on years of experience and analytical models. Athlon comfort also offers a solution to do fuel handling. All in all it can be concluded that Athlon offers a result to the customer. All imaginable services around a car are offered for a fixed price per month. In an output oriented service delivery, these services are charged separately as is done in some extend with Athlon essential. Between Athlon comfort and Athlon Essential there are multiple other solutions with a different ratio of fixed cost services and variable costs services.

So both the solution as the pricing are based on delivering a result to the customer. During the interviews, this was confirmed by the respondents. An example of the marketing manager:

**Marketing Manager:** “we have result oriented pay; we take the risk and charge a fixed amount of money every month. This depends per contract.”

If one compares the pricing models and products described in this paragraph, one can conclude that the term **result oriented service delivery** is the best term to describe Athlon’s current situation compared to other terms in Table 11.

### 4.2.1.2 Athlon’s services during the contract period

Over the years, Athlon has developed an extensive set of services around a car. When positioning Athlon in the product lifecycle management theory, Athlon is very far.
This was confirmed in the interviews, explicitly by the enterprise architect:

Enterprise Architect: “We do asset lifecycle management and offer and orchestrate all services to keep the car and contract running. From that perspective, we are more actively involved than other divisions of DLL for example”

Most services are maintenance and support services. But also after the contract ends, Athlon makes sure the car gets a new owner and resells it back to the market.

If you see the usage of a car in the context of mobility, more value adding services during the usage of a car can be imagined. The mobility manager explained in the interview that there is a dedicated team responsible for telematics solutions. These telematics solutions can increase the value for Athlon’s customers (for example navigation and real time traffic information).

This paragraph showed that Athlon offers a wide range of services during the whole lifecycle of the car. The previous sub paragraph showed that Athlon offers result oriented solutions. Both argumentations are used to motivate the position of Athlon’s value delivery chain as a chain that delivers an integrated solution. This is reflected in Figure 11.

4.2.1.3 Customer’s ability to customize a service

Athlon services are customized in the sales phase; prior signing the contract. A customer can choose from a set of predefined services. This can be classified as supplier-centric value obtainment. Moreover it implies that the production and consumption of the services are separated.

However there are some possibilities for the customer to change a part of their services, as the sales manager and mobility manager outlined:

Sales Manager and Mobility Manager: “Account managers have the responsibility for after Sales Contact.” Mobility Manager: “An example: a client decided in the beginning of the contract to have a specific invoice format. However, the customer wants to add information on the fuel consumption in the invoicing. The account manager can investigate the possibility to enrich the reporting and invoicing process of the customer”

This after sales contact is usually done with large accounts (over 500 cars). And to be able to distinguish Athlon’s current value obtainment structure, it is interesting to analyse the motivation for having account managers do the after sales contact. The reason is, that usually the large account contracts are done with companies having a multi-vendor contract. So they have multiple car lease companies (usually 2 or 3) to offer car lease solutions. Account managers make sure that Athlon outperforms the others.

Another reason for Athlon to change value propositions is described by the innovation manager:

Innovation Manager DLL: “Changing value propositions during the contract are triggered by negative experience of the customer”

All in all, to talk about customer centric value obtainment, Athlon’s goal of having after sales contact is to align Athlon’s services to changing customer needs. In this way constantly a unique solution is delivered and the customer can co-create services during the contract period.
From this paragraph we can conclude however, that Athlon’s value obtainment structure is still more supplier-centric. This means, as discussed before, that the production and consumptions of services is separated, which means that value is exchanged for money/contract.

### 4.2.1.4 Customer’s perception of Athlon’s value proposition

The customer’s perspective of Athlon’s value proposition can be described as follows:

| Marketing Manager and Mobility Manager: “Car Lease value propositions are seen as a commodity by many users” Mobility Manager: “This implies that they are interested more in the price of the solutions, rather than the add-ons” Marketing Manager: “as a result from this, we create value propositions based on the needs we withdraw from the market” |

This implies that Athlon is seen more as a supplier that exchanges services for a fixed price, rather than a facilitator that can help to increase the value of a customer’s organization by listing and advising the customer with customer specific solutions.

This paragraph and the previous paragraph 4.2.1.3 show that currently the value obtainment processes are more supplier centric. This is reflected in Figure 11.

This does not mean, that there is no co-creation with the customer with Athlon:

| Marketing Manager: “We create value propositions based on the needs we withdraw from the market. For example, now we see there are many self-employed entrepreneurs. They need more flexibility (for upscaling or downscaling the contract). Therefore we developed essential. When we think the product is ready to go live, then we present is with interactive client panels. In this way we co-create with the client.” |

This value obtainment process is a good example of how an organization can be service oriented by eliciting customer needs. However the literature argue that pure service co-creation activities or an integrated solution co-creation activities need to be structured and hold continuously during the usage of a service. Therefore the current situation of Athlon is still supplier-centric.

### 4.2.1.5 Summary

Based on the argumentations described in the previous sub-paragraphs (4.2.1.1, 4.2.1.2, 4.2.1.3 and 4.2.1.4), the orange block - that represents the positioning of Athlon’s current situation regarding service oriented value – is placed in the right-down corner (see Figure 11).

This type of service orientation in demand chains and supply chains implies that the value lies not in providing more and varied opportunities for consumers to co-create personalized experiences, but more in building features into products and services. Also, in the supply chain of Athlon, integrated products and services packages are delivered rather than pure products or services.

### 4.2.2 Future Situation Athlon

The analysis of the future service oriented value at Athlon’s business environment will be done in this paragraph. This paragraph consist of several sub-paragraphs. The first paragraph focuses on Athlon’s future service offering. The next paragraph explains whether it is possible for a customer to customize a service and when. Paragraph 4.2.2.3 goes deeper in what kind of role Athlon has in the demand chain and supply chain. This paragraph concludes with positioning Athlon’s future scenario in the SODSC dimensions.
4.2.2.1 Athlon’s service offering (pricing and solutions)
During the interviews a consistent view on Athlon’s future service offering was elicited:

Sales Manager: “in the future we will be the facilitator of mobility solutions. The solutions won’t be developed only around the car.” Mobility manager: “we will look into mobility solutions in a broader sense. Athlon can offer travel advice in 2020. If you can translate data into information, you can provide the customer with valuable information. A dedicated project team called: ‘telematics team’ is working on this future scenario.”

However, this does not mean that the current service offering will vanish:

Enterprise Architect: “Operational car lease will still exist, but it will evolve more towards pay per use. An example: in the future situation Athlon will sell bundles of 1.000.000 km. A customer can monitor their subscription and actual usage and they can upscale or downscale it (co-create it) during the contract lifecycle. We will have more services. Technology and telematics are important here”

Also the marketing manager believes in pay per use pricing. He mentioned that there is a dedicated team, led by Andreas de Leeuw (Athlon Netherlands) working on this. Also the procurement department is working on pay per use pricing:

Procurement Manager: “We have set up a project with a major International tire manufacturer provides tiers for our car. We are looking if we can charge the customer a fee for the amount of mm tier used.”

This analysis confirms that Athlon will also provide result oriented services and after sales services. That is why the value delivery process in Figure 11 can be classified as an integrated solution delivery.

Concerning the customization of services, Athlon will still standardize their value propositions:

Mobility Manager: “now and in the future, standardization of value propositions are necessary, in the sense that you should have a focus as an organization: you cannot be everything for everyone. Athlon should create a recognizable identity. In my point of view, in the future, Athlon should segment groups based on needs. If you have these groups with their needs, you can develop solutions and within this set of solutions you can start to standardize.”

The mobility manager shows the direction of Athlon to obtain value from customer needs, rather than cost related needs, which is now the case. In the future Athlon will look more on customer needs that result, when they are fulfilled, in more value for the customer.

Also more opportunities to create value is offered in the future to the customer:

Mobility Manager: “Athlon is working more towards self-servicing. Athlon should enable clients to change for example the reporting format. On short term (probably even before 2020) the new myAthlon website will enable this. Athlon should invest more in technology. E.g., clients want to download information with their smartphone. In this way they can create value for themselves (information) whenever they want”

This paragraph showed that Athlon will focus on what value a service brings for the customer (rather than focusing on what services can be exchanged to the customer).
4.2.2.2 Customer’s ability to customize a service
In the previous paragraph it was shown that Athlon will focus on constantly eliciting customer needs. This is not only an idea, but it is also based on current actions Athlon is taking.

Marketing Manager: “Athlon is working on a crowdsourcing platform, to post ideas and feedback. People can vote on those ideas. The best idea we will develop together with client panels.”

Also the role of Athlon’s sales force will change:

Sales Manager: “Our salesman will have a more consultative role” Mobility Manager: “We will give our customers advise (where do you want to go?), solutions (Mobility Card, Car sharing) and management tools (self-service tool so that the client is in control).

Athlon is doing this in a limited way with the large accounts already (advise, solution and management). However, the mobility managers said that this mind-set have to be rolled out in whole the organization by 2020.

This analysis implies that the value obtainment will be more customer focused. Athlon will have a facilitating role by offering consultative services to improve the mobility management of a customer and to listen more to customer’s requirements. This is also in line with the previous paragraph (4.2.2.1). Therefore Figure 11 positions Athlon in the customer-centric position of the y-axis.

4.2.2.3 Role of Athlon in from the customer perspective and supplier perspective
Athlon will strengthen its service orientation in the future. According to the sales manager, Athlon will focus even more on offering result oriented services:

Sales Manager: “Customers want to focus on their core activities. Athlon will provide the customer reporting tools and moreover, Athlon will also do activities around analysing reporting.”

This implies that the position of Athlon in Figure 11 will remain in the integrated solution value delivery process, since it still focuses on providing result oriented solutions.

4.2.2.4 Summary
Figure 11 shows Athlon’s future scenario (2020) positioned in the SODSC terminology. The green block, that represents the position of service orientation Athlon wants to have in future, is placed in the up-right corner. This positioning is based on the arguments given in the previous subparagraphs (4.2.2.1, 4.2.2.2 and 4.2.2.3).

If one compares both positions, the value in Athlon’s business environment won’t lie in building more features into products and services. Athlon’s business environment will rather provide more and varied opportunities to consumers for co-creating personalized experiences.

4.3 PARTNERSHIP
The partnership framework has two axis with four quadrants. Whether an organization’s business environment belongs to one of them cannot always explicitly determined. However, Table 12 can help the discussion where Athlon’s environment fits the best. This table is based on the information provided in paragraph 2.2 and paragraph 3.6.1.
Figure 11 Positioning Athlon’s value obtainment and value delivery activities (orange current, green future situation)

This paragraph will use Table 12 to determine the current situation of Athlon’s business environment from the service orientation perspective (paragraph 4.3.1) and the future situation (paragraph 4.3.2).

Table 12 Characteristics of the 4 quadrants of the Partnership framework

<table>
<thead>
<tr>
<th>Rigid Stable supply chain</th>
<th>Service ecosystem/value network</th>
<th>Adaptive/agile supply network</th>
<th>Collaborative value network</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transactional interaction</td>
<td>Relational interaction</td>
<td>Transactional interaction</td>
<td>Relational interaction</td>
</tr>
<tr>
<td>Customer is a passive audience</td>
<td>Customer is involved in product design and delivery stage</td>
<td>Customer is a passive audience</td>
<td>Customer is involved in product design and delivery stage</td>
</tr>
<tr>
<td>Supplier is active and attracting their products</td>
<td>Customer is co-creator</td>
<td>Supplier is active and attracting their products</td>
<td>Customer is co-creator</td>
</tr>
<tr>
<td>Highly structured supply chains</td>
<td>Highly structured supply chains</td>
<td>Enriching network with new partners</td>
<td>Enriching network with new partners</td>
</tr>
<tr>
<td>Resources are not integrated with other organizations</td>
<td>Resources are not integrated with other organizations</td>
<td>Suppliers as co-developers</td>
<td>Suppliers as co-developers</td>
</tr>
</tbody>
</table>

4.3.1 Current Situation of Athlon’s partnership dimension
The partnership characteristics from a service orientation perspective of Athlon’s current business environment is presented in this paragraph, which is divided in four sub-paragraphs. The first paragraph focuses on partnerships structures with the customer and the second paragraph focuses on the partnership structures with the suppliers. An additional paragraph (4.3.1.3) presents the findings in the perspective of enriching the network of Athlon.

This paragraph ends with positioning Athlon’s partnership structures in the SODSC dimensions.

4.3.1.1 Customer as a partner
Athlon has customers that can be considered as partners:

Enterprise Architect: “We cooperate with USG to design a pay per use concept. Moreover, with DLL we did a mobility budget pilot.”
The marketing manager explained the customer segments and with whom partnerships are derived:

Marketing Manager “We are segmenting customers based on volume: we have large accounts (500 and more), key accounts (200-500) and small accounts (less than 200). Within each of this segment we have clients we consider as partners were we develop new products and we have strategic customers. Often we have a multi-vendor relations with those ‘co-developers’. We want to have a single vendor relation (this means that Athlon is the only supplier of lease contracts). A way of doing this, is to take your client by the hand and tell them what they need in the future. You are more an advisor. Strategic clients are the big multinationals that we need, in order to be able to have a huge bargain power towards our car suppliers. Those strategic clients come to us proactively and ask us to develop for them new products”

This shows that in Athlon’s business environment often new products are pushed into the market, and with some clients products are pulled out of the market by the customer. The mobility manager does not see a lot of change in the future:

Mobility Manager: “We have and we will have both transactional as relational interactions with the client. Most of our customers are ok with transactional relations, for example the local bakery store. Transactional relations are cheaper and less time consuming. However if you have large accounts, you will see more multilevel contact within the organization. The account manager is then in discussion with important stakeholders in the company. The fleet manager want the best reporting, HR wants to be the best employer of the year, Finance wants the cheapest contract and Marketing wants a CO2 neutral fleet. In this case you have relational interactions, since you want to provide a solution that includes all those different needs. The account manager has a role of a consultant. Examples of companies were consultative sales was done: Weltengroup, Stork and PBI.”

So there are examples of partnerships with the customer. However most of the respondents argue that most of the customers are passive, for example the enterprise architect:

Enterprise Architect: “Most of our customers have quite a passive attitude. Car Leasing is seen as a commodity and selecting a car lease company or a car is very cost-driven. If there are tax triggers that impact the financial situation, then the client, both customers (companies) as drivers (employees), will become active and will demand us to change (e.g. CO2-related “eigen bijdrage” in The Netherlands). Procurement manager: “On the scale of 7 out of 10, we are pushing solutions to our customer. That is what they expect from us. There are examples like flex drive, where a company is proactive.”

Usually only powerful customers are expecting Athlon to come up with something new. However they usually take the passive, judging role; Athlon should come up with ideas, and they will argue whether they will be interested in it or not. This is not something bad. Athlon can take this consultative or advisory role and thereby provide more value for the customer. However concerning the Service dominant theory, Athlon’s customers can be classified as passive and for most of the customers, transactional relations occur. This is reflected in Figure 12.

4.3.1.2 Supplier as a partner
Athlon’s supply chain network is stable:

Procurement manager: “90% of our services are done by ‘traditional’ partners. This structure is very stable, just as the relationships. You have three relationships: someone who is responsible for the service, someone who creates the service (or manufacturer of the asset) and someone who takes the risk. The last party is Athlon.”
Also Athlon is a partner in the car lease business environment. The procurement manager argues that Athlon’s role is to give direction in the car market. If Athlon offers only Renault cars for example, more Renault cars will be sold. This is interesting for Renault and that is why Athlon can buy the Renault cars for a better price.

There are suppliers you can consider as partners. As already mentioned in paragraph 4.2.1.1, Athlon works with a major international tire manufacture. In this case Athlon came with an idea and asks the suppliers who wants to do a project with them. The major international tire manufacture is rather an exception. Most of the partners are not actively co-developing new services pro-actively.

This paragraph explained that Athlon’s current business environment consist of a highly structured supply chain.

4.3.1.3 Enriching Business Environment
Athlon’s business environment is sometimes enriched by new partners. However this is usually opportunity driven:

Sales manager: “we do not have a strategy to enrich our network. This is opportunity driven. Trial and error. The project with a Car-Sharing start-up was also opportunity driven. The Car-Sharing’s financial partner said: to get funding for your new enterprise, you should go to Athlon. Athlon provided the money, and was able to access car sharing mobility solutions. A win-win situation. Unfortunately the concept was not successful in our current car sharing market.”

Innovation manager: “the Car-Sharing example showed that there was probably too little co-creation. Both Athlon and the Car-Sharing company missed opportunities, because they did not sit together often enough to adapt the Car-Sharing company’s processes to the customers’ needs of Athlon.”

In an agile adaptive supply chain network this networked is enriched constantly in a structured way. Therefore this analysis shows that Athlon has stable partnerships. This is also in line with the previous paragraph (4.3.1.2). Figure 12 shows this stable partnership position in the partnership framework.

4.3.1.4 Summary
Figure 12 summarizes the discussion of the previous paragraphs... The orange block represents the current position of Athlon’s partnerships in the SODSC theory.

This positioning implies several conclusions. Firstly the customer-supplier relationships can be characterized as a traditional supplier-customer relation. The second conclusion implies that, in order to deliver result-oriented services, Athlon works with many suppliers. However this stable supply chain is not suitable to respond dynamically to emerging opportunities based on customer needs. This does not mean that Athlon cannot change its service offering with for example mobility solutions. However this change will go slow when having this current structure and Athlon will probably miss some opportunities resulting from new technologies and partners.

4.3.2 Future Situation of Athlon’s partnership dimension
This paragraph starts with a discussion about what Athlon’s future core capabilities will be and thereby explaining what new roles other suppliers will have (paragraph 4.3.2.1). Then the future partnerships with customers will be discussed. The last paragraph summarizes this paragraph by positioning the partnership dimension in the SODSC framework.
### 4.3.2.1 Athlon’s future core capabilities

Athlon’s core capability is described by the procurement manager during the interview and is not likely to change in the future:

**Procurement manager:** “The procurement’s core capabilities remain; we will have the steering function. We can negotiate for our customers with suppliers. The outsourcing and insourcing discussion is according to me quite simple: where we can have margins (because we take the risk our customers don’t want) we will keep those activities. No risk activities, or activities the customer does not care to take the risk for, we should outsource. I can image for example we will not do maintenance in 2020 for our cars. Maintenance are fixed costs for our customers, so not a lot of risk. Repair for example, we will keep (more unexpected/variable costs). The client does not want the risk of paying unpredicted repair costs. We take the risk, and we will make a margin on it.

*In the future we will focus on mobility solutions, but the decisions will be made in the same way. For example, we can bargain with bike suppliers. When customers don’t like the risk and hassle of flat tires, Athlon can play a role for maintenance and repair. For NS business cards the same discussion. If we can bargain with NS, Athlon and Athlon’s customers can benefit from it.*”

This section above explains well how the procurement manager is looking at the role of Athlon in the supply chain. Athlon will be relevant for other supplier partners (see also discussion in paragraph 4.3.1.2). Athlon can help steering the market of mobility and thereby help new entrepreneurs entering the car lease market. The procurement manager mentioned in the interview that Athlon will be the negotiator and will take the risk in the mobility solution offering, but can also help new suppliers enter the market.

For this, Athlon needs to have a more structured way of enriching the network. It is too early according to the respondents to talk about a commitment by the board of Athlon to set a dedicated group of people on this enrichment process. However, both the procurement manager, innovation manager and sales manager explicitly agreed that a structured way of enriching the network is useful (rather than the trial and error process, described in paragraph 4.3.1.3). Moreover during the future scenario workshops there was an agreement among the participants that in order to offer mobility solutions new partners need to be found to co-create new mobility services.

The discussion of this paragraph is reflected in the supplier-supplier relationships dimension, shown in Figure 12.

### 4.3.2.2 Customer as a partner

There are some challenges for Athlon concerning the relation with their customer. The procurement manager argues that customers won’t be so loyal in the future. The lifecycles are shorter and shorter (lease contracts of 4 years won’t exists probably).

However the mobility manager argued that the client-supplier relationships will weaken:

**Mobility Manager:** “the client-supplier relations will weaken. In the future clients and Athlon will see that the can learn from this relation. Everyone has its own capabilities. The aim is to share those capabilities”

Also the marketing manager has an explicit mind-set of seeing customers more as a partner:

**Marketing Manager:** “Marketing would like to develop everything with the clients. This enables a better relation with the client and the customer will be a partner (the supplier-client relations will
This paragraph shows that Athlon’s future attitude towards the client will go more towards seeing the customer as a partner. This is also reflected in Figure 12.

4.3.2.3 Summary

Figure 12 summarizes Athlon’s future position in the service oriented partnership theory (green box). Athlon will focus more on customer-supplier relationships were the customer is more involved in the value creation process. This is in line with the trend that customers will be more empowered (see also section 1.1). Moreover suppliers will work more together to offer mobility solutions. This can be classified as a collaborative value network. Small entrepreneurs developed smart technologies related to mobility solutions. However it is essential to enter a big market for them, to keep the funding going. Athlon will play a more active role in this.

4.4 CONTROL

The last dimension is the control dimension. Table 13 helps to classify a business environment in the four quadrants of the control framework (Figure 17). This table is based on the analysis done in paragraph 3.6.1.3. Paragraph 4.4.1 describes the current state of controlling a service oriented business environment. In paragraph 4.4.2 the same analysis is done, but then from a future perspective.

4.4.1 Current Situation of Athlon’s business environment from the control perspective

The current situation of Athlon’s business environment relating to control aspects is explained in the following three paragraphs.

4.4.1.1 Customer needs research

To say something about whether there is a supplier-centric adaption of the network or a customer-centric adaption it is good to understand Athlon’s customer’s needs or customer’s satisfaction research.

The following section is derived from the in-depth interview with the marketing manager:
Marketing Manager: “we are doing continuously research on service improvement opportunities with the help of an external partner: Fidex. They develop surveys. The questions on those surveys are usually closed questions, and we target about 1000 customers. Customers get these surveys when they made use of one of Athlon’s services or an Athlon’s partner’s service. Once a year we also send a separate survey, including open questions. We have two target groups and researches; one for the car uses (end user) and one for the fleet manager. We steer our supply chain on the net promotor score based on this research. This mechanism is quite reactive (we steer our supply chain based on negative results).

“We also have proactive research. We select 40 customers and we ask them what we can do better. This research is called: Customeyes.”

Regarding the characterization described in Table 13, one can conclude that Athlon is pro-active in eliciting customer requirements. There are not so many customers actively leading Athlon to take certain direction or to put pressure to adopt Athlon’s services. There are some initiatives to have a dialogue with the customer about their needs:

Marketing Manager: “We are training our sales force and account managers to ask the customer whole the time, how can we improve our services? You gave our service an 8 out of 10. What do we need to do to get a 10? These questions are asked by some of our people, but it is not yet in our sales force and account managers DNA.”

The procurement manager explained how this marketing way of controlling relates to new products:

Procurement Manager: “marketing looks at customer needs, procurement tells whether we can satisfy those needs or not and sales put it, based on our advice, in our service catalogue”

So it can be concluded that the supplier is pro-active in deriving customer needs. Moreover Athlon is attracting their products to the customer, using 4P’s terminology; transactional control. By asking during the survey whether the customer is satisfied with Price, Quality of the service, you do not yet know what the real customer satisfaction or customer experience is. Therefore the current way of adapting the business environment can be classified as supplier-centric, as is shown in Figure 13.

Table 13 Characteristics of the 4 quadrants of the Control framework

<table>
<thead>
<tr>
<th>Supplier-Centric adoption and centralized coordination</th>
<th>Customer-centred adoption and centralized coordination</th>
<th>Supplier-Centred adoption and distributed coordination</th>
<th>Customer-centric adoption and decentralized coordination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer attraction (4P’s)</td>
<td>Customer experience (satisfaction)</td>
<td>Customer attraction (4P’s)</td>
<td>Customer experience (satisfaction)</td>
</tr>
<tr>
<td>Supplier is pro-active</td>
<td>Customer is also pro-active</td>
<td>Supplier is pro-active</td>
<td>Customer is also pro-active</td>
</tr>
<tr>
<td>Feedback is based on sales figures</td>
<td>The why question is central in the feedback</td>
<td>Feedback is based on sales figures</td>
<td>The why question is central in the feedback</td>
</tr>
<tr>
<td>Authorian, highly structured supply chain</td>
<td>Authorian, highly structured supply chain</td>
<td>Collaborative and non-coercive governance</td>
<td>Collaborative and non-coercive governance</td>
</tr>
<tr>
<td>Focus on efficiency</td>
<td>Focus on efficiency</td>
<td>Focus on customer satisfaction</td>
<td>Focus on customer satisfaction</td>
</tr>
<tr>
<td>Main knowledge sharing between partners are KPI’s</td>
<td>Main knowledge sharing between partners are KPI’s</td>
<td>Knowledge sharing also includes customer needs</td>
<td>Knowledge sharing also includes customer needs</td>
</tr>
</tbody>
</table>
4.4.1.2 Network performance measuring
Athlon’s business environment has a highly structured and authorial way of controlling the supply chain:

Procurement manager: “We are explicitly controlling our network with service level agreements. We know now perfectly what we pay and why we pay it. There are of course also trust relations. If we tell our suppliers that we will predict a volume of 1000 cars, then they believe us. On strategic level there is trust, but on operational level everything is recorded and measured.”

According to the procurement manager it is necessary to focus on efficiency and talk in terms of KPI. To make sure those KPI’s and efficiency standards are market conform, Athlon is also doing some of the services themselves. They have for example an own service centre, where they compete with their partner’s service centres. This is to keep our partner’s competitive. Therefore it can be concluded that Athlon has a centralized coordination of value provision. This is also reflected in Figure 13.

4.4.1.3 Summary
Based on the two paragraphs, the orange block is positioned in the lower-left corner of Figure 13. The supplier centric network adaption implies that Athlon (and Athlon suppliers) encourages customers to have them stay in their business environment. Moreover Athlon focuses on efficiency of the network, rather than innovativeness and therefore prefers a centralized coordination for this kind of network.

4.4.2 Future Situation of Athlon’s business environment from the control perspective
This paragraph is divided in three sub-paragraphs; network adaption, network coordination and a summary.

4.4.2.1 Network adaption
During the interviews information about the future power of the customer was discussed:

Marketing Manager: “also in the future we will stay in the middle of proactive and reactive (just as the customer). Of course customers have influence and power to change some details. But for radical innovations we’ll have to do it together. Customers won’t force us to offer specific mobility solutions, just as Athlon won’t force the ‘market’ to deliver value propositions regarding mobility.”

The control of the demand chain will be more market driven, where it used to be sales driven; Athlon has products on the shelves and Athlon needs to sell them to our customers. In the future, Athlon will see what the market is asking from them; Athlon builds and provides. The power will be more in the market and Athlon will follow. Therefore it can be concluded that the network adaption will be more customer centric, or as the marketing manager wants to describe it, market centric. This is reflected in Figure 13.

Some more examples were derived from the interviews to argue that Athlon is using more customer-centric control:

Marketing Manager: “technology (telematics) will provide us with more and more data. This data we can translate into useful information. In this way we can inform our customer proactively with our new services and products. Example: if we see that a customer crosses every year the border to Austria during the same period in February, we can assume he is going on winter holiday. In this case, we can advise him next year, a month in advance, that we can offer him a ski box and winter chains. CRM will be more CDM; customer dialogue management, through the use of information technology. These dialogues will happen real-time (through a 4G network). If we see that a customer has problems
on the road, we can already start a process for sending him help. Another example: we are building a module on our website where clients can rate our services and suppliers based on a 5 star system. In this way, we force ourselves to listen to our clients.”

Also the enterprise architect mentioned future direction on having the customer being more active in expressing their needs and having more self-control on their own value creating process:

Enterprise Architect: “in myAhtlon it will be possible to make maintenance appointments with our partners (suppliers). This way you get more self-service. Moreover the customer gets more reporting and self-service opportunities. This increases customer’s experience and satisfaction. In the future customers can manage their mobility budget online.”

4.4.2.2 Network coordination
Regarding the supply chain, no concrete examples or directions were given in the interviews or workshops to have the coordination being more decentral. The respondents of the interviews explained that in order to stay competitive, Athlon should ensure it offers a service or solution against a competitive price. In the car lease market there is not enough trust that partners will ask an honest price for their service when Athlon is not centrally governing the network. It is difficult to imagine for Athlon, that this will change, even with new partners that offer mobility solutions. There is a consensus (derived from the future scenario workshops) that a part of the mobility solutions will be outsourced to parties that can develop it better, faster and cheaper. However the procurement manager argues that its department will always keep on looking for a party that can provide the same service better and cheaper:

Procurement Manager: “Athlon will keep its controlling function, because it enables us to steer the market and network of suppliers. This is what customers are and will expect from us. To offer the best product against the best price.”

Therefore Figure 13 positions the supply chain dimension of control again in the centralized network coordination dimension.

4.4.2.3 Summary
Based on the previous analysis, the green box is positioned in the upper-left corner in Figure 13.
Because of the shift from viewing the value from the supplier perspective (as value-in-exchange) towards viewing the value from customer perspective (as value-in-use), Athlon’s business environment will emphasis on the role of the customer in adapting the network. The coordination of interactions among suppliers is still mostly focused on decreasing the cost of the product or service provision by eliminating unnecessary costs.

4.5 SERVICE ORIENTATION AND THE IMPACT ON INFORMATION QUALITY
This paragraph will deductively explore information quality issues based on the findings of paragraph 2.3 and paragraph 4.2, 4.3 and 4.4.

4.5.1 The two processes as a result from the transition of Athlon in Service Orientation
Paragraph 2.3.2 and 3.7.1 described why it useful to first develop two inter-organizational processes that are likely to exist in Athlon’s future state (around 2020 or earlier). This paragraph will explain why the two processes, that are shown in Appendix D: Service oriented Process Models with Dynamic interactions are suitable for the exploration of IQ and that it is based on the findings of paragraphs 4.1, 4.2, 4.3 and 4.4. Paragraph 4.5.1.1 will describe how the SO value transition leads to a new service selection process. Paragraph 4.5.1.2 explains why the service selection process and cost overview process are a result of the changing relations with partners and customers. And paragraph 4.5.1.3 explains why the service selection process is a result of the transition of Athlon in its control function.

4.5.1.1 Transition from an integrated product-service value delivery system towards an integrated solution co-creation value obtainment process
As can be seen in Figure 11, Athlon will change its value obtainment process from a supplier-centric one to a customer centric one. Therefore the service selection process is developed to illustrate it. Moreover it is most likely that this process will be a real process in Athlon’s business in 2020. The service section process (see Appendix D: Service oriented Process Models with Dynamic interactions) shows how Athlon can make sure it is obtaining value in a more customer centric way. Athlon will be the facilitator of the mobility business environment and will be the link between the customers and other partners in the network. The service selection process describes how a system develops a personalized value proposition based on customer experience data.

4.5.1.2 Transition from Rigid Stable Supply chain to a Collaborative value network
As is shown in Figure 12, will change their customer-supplier relationships from a passive partnership towards an active partnership. This confirms again that service selection process is a future process that activates the customer, by analyzing customer experiences and by validating the value proposition with the customer before implementing it.

Also Figure 12, shows that Athlon will change the stable supplier-supplier relationships to more dynamic partnerships. This implies that the interactions between actors (especially partners), as shown in the choreographic diagram and the cost overview process model, will be dynamic. And this will have impact on IQ, as is explained in paragraph 4.5.2.2.

4.5.1.3 Transition from a supplier-centric adaption and centralized coordination towards a customer-centred adaption and centralized coordination.
Figure 13 shows that Athlon’s future business environment will be adapted by customers, rather than by supplier partners. This confirms that the service selection process, who controls and analyses the customer experiences, is a realistic future business process.

42
4.5.1.4 Summary
Paragraphs 4.5.1.1, 4.5.1.2 and 4.5.1.3 confirm that the two selected processes are inter-organization and have dynamic interactions with customers and partners because of the service dominant transition described in Figure 11, Figure 12 and Figure 13. This paragraph provided the findings of step 1 and step 2 of Figure 9.

4.5.2 Deductively Explored Information Quality issues
This paragraph will present the findings from step 3 of Figure 9 and of step 1,2 and 3 described in Figure 10.

This paragraph describes the information quality issues in the Service Selection process and the IQ issues in the Cost Overview process. Both process models are shown in Appendix D: Service oriented Process Models with Dynamic interactions.

The deductive reasoning is based on the information quality requirements as described in paragraph 2.3.2. Therefore this paragraph, at each question, refers to specific Information quality requirements from Table 15 shown in Appendix E: Explored IQ requirements overview.

4.5.2.1 Deductively Explored Information Quality issues in the Service Selection Process and answers
Based on the Service Selection process the following questions can be asked:

4.5.2.1.1 IQ issue 1 and IQ requirement

Q.1. If you look at the service selection process, parties may intend to produce and keep customer experience related information personally, due to the more independence of parties, they may intend to produce and keep. Therefore you need to **handle information product repetition (Req. 3 in Table 15)**. Is this relevant? How can this requirement be relevant for Athlon?

The answer to this question is:

Sales manager: Yes this is relevant, since you don’t want that the customer fills in multiple surveys. You have to make good guidelines with your partners to avoid this.

Procurement manager: you don’t want the customer fill in his personal details 500 times. We have to manage these information flows.

Mobility manager: it is true that there are other systems that have master data. And indeed, one system should be leading. Currently this is our Momas system, when a HR system is updated, the Momas system is updated automatically. We have the experience already.

4.5.2.1.2 IQ issue 2 and IQ requirement

Q.2. As can be seen in the service selection process, you want to integrate all customer experience information in one data warehouse. A requirement is therefore, that you have **to link relevant information products (Req. 4 and Req. 7 in Table 15)**. How do you think Athlon is going to respond this need in the future business model?

The answer to this question is:

Mobility manager: Yes very important. Business intelligence is the future.

Procurement manager: Knowledge about clients is key in our future business environment. It is the only way to offer good customized services to our clients.

Sales manager: We indeed need to collect our own customer experience data.
4.5.2.1.3 IQ issue 3 and IQ requirement

Q.3. Within the process for service offering for customers, **disused information need to be terminated**, since old products and services can repeatedly be replaced by new developed products and services (Req. 5 in Table 15). Is this requirement relevant according to you? If yes, why?

The answer to this question is:

**Procurement manager:** it is relevant, since based on privacy and compliancy rules Athlon should make sure valuable information is not left at departed partners. It is more an operational problem, than a Service Dominant transition problem.

**Sales manager:** it is relevant, due to privacy regulations. These privacy regulations are different in each country we operate. This requirement is therefore difficult to tackle. You want to have one European database with standardized privacy and data termination rules.

**Mobility manager:** we should follow a garbage in, garbage out system. I would focus more on the correctness of data, than on having irrelevant information.

4.5.2.1.4 IQ issue 4 and IQ requirement

Q.4. If you look at the value proposition activity, parties need to share information. **Athlon as a broker requires to share related information between all parties** (Req. 10 in Table 15). Is this relevant for Athlon? How this role is going to be realized?

The answer to this question is:

**Mobility manager:** This requirement is about what Athlon will be in 5 years. According to me we will have indeed this facilitator role. Clients are expecting from us that we manage the innovations in the mobility market.

**Procurement manager:** We want to keep the orchestrator role. So we do not want to organize public congresses to share information. We will approach partners and link partners together when we see there is a business case possible.

**Sales manager:** If you look at the process, you will see that information from parties are leading to Athlon, but in the future you will see that this arrow will also move the other way. We will not actively connect two parties together, this will only happen when we see a business case in this.

4.5.2.1.5 IQ issue 5 and IQ requirement

Q.5. A supplier in your business environment can have valuable information about customer’s experience data that can leave the network illegally. You need to **prevent information leakage** (Reg. 13 in Table 15), you have to **develop a dynamic trust management system** (Reg. 18 in Table 15) and you have to **align diversified security ontologies** (Reg. 19 in Table 15) Do you think this is extra relevant in the future SD context?

The answer to this question is:

**Mobility manager:** We will be in the lead of the business environment in 2020. Therefore all the information has to stay with us in a central database.

**Sales manager:** You cannot prevent this for 100%, neither in the current as future situation.

**Procurement manager:** We already have a policy, so this is relevant for us. For social media there is not a policy yet, so this could be indeed a good future issue. However I don’t predict this issue will happen, since we make good agreements on this with our suppliers.
4.5.2.1.6 IQ issue 6 and IQ Requirement

Q.6. There might be situations that you create valuable information collaboratively. For example, you conduct together a customer experience review in the service selection process. **Athlon should then manage information ownership issues (Req. 14 in Table 15).** How will Athlon manage information ownership issues in the future? Who can use it and has a license to use it? What do you do with information you do not own anymore? Do you delete it? Or do you pay for it?

The answer to this question is:

**Mobility manager:** it is not about owning the information but in having access to it. Big data is the future, so it is an important requirement to have access to data of for example the car. It is predicted that cars generate driver behavior as well.

**Procurement manager:** Very relevant, but difficult. And even when we own the data, we cannot always use it due to privacy regulations.

**Sales Manager:** This is a game that already plays, how this will end, I don’t know. Of course it is important that we will have access to this data.

4.5.2.1.7 IQ issue 7 and IQ Requirement

Q.7. In the service selection process, do you think it is relevant to make one key identifier of each actor (Req. 22 in Table 15), for example an Athlon identifier number? Is this possible?

The answer to this question is:

**Mobility manager:** Yes very relevant, this is the front office tool we are currently developing. In the future a customer can make use of 20 car rental suppliers. They do not want to identify themselves each time.

**Procurement manager:** Very relevant, one of our competitors is already working on this.

**Sales manager:** Yes, not only for customers, but also for suppliers. Athlon should connect a client and a user through a unique identifier. Preferable you want to identify everyone by name, but due privacy issues, this might be difficult.

4.5.2.2 Deductively Explored Information Quality issues in the Cost Overview Process

Based on the Cost Overview process the following questions can be asked:

4.5.2.2.1 IQ issue 8 and IQ Requirement

Q.8 As can be seen in the cost overview process, you will need to integrate financial information from different parties. These partners can use different information formats. Therefore Athlon should **align the syntactic of information products (Req. 1 in Table 15).** Do you already deal with this issue? How do you think this issue can emerge even more in future business model?

The answer to this question is:

**Mobility manager and Sales manager:** not a problem, we have our Momas System for that. We have experience with this, so probably the future process can be managed with our format integration capabilities.

**Procurement manager:** Very important, we work with a lot of dealers and this has to be integrated indeed. But we already have experience with this.

4.5.2.2.2 IQ issue 9 and IQ Requirement

Q.9. In your business environment information is produced (for example during cost overview process) by different actors (e.g. customers, car dealer, OEM’s). Your suppliers can use different
languages. You can think about French and Dutch, but also a car repairer uses the term ‘flat’ tire repair and the other use the term ‘broken’ tire. Explored IQ requirements are that Athlon should **modify these semantic inconsistency (Req. 2 in Table 15), and metadata inconsistency (Req. 25 and Req. 26 in Table 15).** How do you think Athlon will do this in an even more dynamic mobility environment?

The answer to this question is:

**IT Manager:** IT manager: yes this is relevant. If you exchange information, than the metadata definitions (or definitions in general) will become relevant. For example, two terms, voxel and Opel can be used for the same car model.

**Sales Manager:** it is very important to understand what each field in the invoice means. In one invoice variable costs might be integrated already in the fixed costs. Some amounts are including VAT, others not. This is critical, since you base your reporting (see the cost overview process) on this information.

Now you have multiple suppliers for a select group of services. In the future you get multiple suppliers for multiple services. The complexity of definitions will rise in the future.

**Procurement manager:** very relevant. We already experience problems when reselling our used cars. There are many definitions for the same car model.

**Mobility manager:** yes relevant. For example in our own international benchmark processes we measure in terms of conversion ratios. Each country interprets this conversions ration differently (included or excludes different factors in this ratio).

### 4.5.2.2.3 IQ issue 10 and IQ requirement

**Q.10.** For the provision of a cost overview (invoice) for customers Athlon needs to **synchronize** (and update) financial information from different partners who have contributed in the creation of an integrated mobility solution (**Req. 6** in Table 15). How is Athlon going to handle this requirement?

**Can you imagine a problem that a database is not up-to-date?**

The answer to this question is:

**Sales Manager:** Currently, if you look at the cost overview process, the only thing that can happen is that a supplier hands in its invoice too late. In the future, we would prefer 24/7 real time information if you operate in many countries in the world. However we are not that far yet, it is not one of our main priorities.

**Mobility Manager:** We have now a totally automated workflow. So your cost-overview process is quite correct, it automatically checks whether a price is too high or too low. We are already handling this requirement.

**Procurement manager:** Important, but we are already doing this.

### 4.5.2.2.4 IQ issue 11 and IQ requirement

**Q.11** An explored requirement is that in the cost overview process, **the information provided by each actor should be transparent (Req. 8 in Table 15)** and Athlon should **ensure the soundness of financial information products (Req. 9 in Table 15).** How Athlon aims to make processes (of partners) in the future more transparent?

The answer to this question is:

**IT Manager:** Currently not a problem. Can’t come up with an example related to this cost overview process.

**Mobility Manager:** One of the functionalities of Momas is control and invoice control. So the same as Q.10; we are doing this already.
Sales Manager: We have the transparency and reliability quite under control, since it is very important for our credibility towards customers.

Procurement manager: Important, but we have experience. We have systems that calculate when a maintenance service needs to occur for example. So when a customer does this too early, we will know this immediately.

4.5.2.2.5 IQ issue 12 and IQ requirement

Q.12 In the cost overview process, a customer might want an invoice of a service used 2 years ago. A requirement is that Athlon should ensure continuity of information service (Req. 12 in Table 15). How is this a relevant requirement for you?

The answer to this question is:

Mobility manager: this requirement is not very important, since we are storing all relevant information in our own database.
Sales manager: You think about these issues already, when a partner leaves the network. We won’t have a partner leaving the network without having this information.
Procurement manager: Question forgotten to ask during the interview.

4.5.2.2.6 IQ issue 13 and IQ requirement

Q.13 if you look at the cost overview request process, you get all information products of your partners and you want to integrate it for your customer. A requirement is that you should trace information provenance (Req. 17 and Req. 24 in Table 15) How will you make sure, in this new process, that information can be traced to the source?

The answer to this question is:

Sales manager: transparency and compliance is very important. You want your information to be reliable. If you are not able to trace your information, then you will lose credibility at your clients. We are already working on this in the current situation.
Mobility manager: This according to me the same as in question 11.
Procurement manager: See question 11.

4.5.2.2.7 IQ issue 14 and IQ requirement

Q.14 To integrate financial information provided by different parties, you need to be aware of the meaning of information. So you need metadata for each party that enhances interpretation of provided information (Req. 23 in Table 15). How is Athlon going to handle this metadata handling requirement?

The answer to this question is:

IT manager: important requirement. Not only between parties in this cost overview process. Also internally we have several metadata systems (e.g. between countries). In response to this, we have already definition tables (if someone says this, he means this).

4.5.2.2.8 IQ issue 15 and IQ requirement

Q.15 If Athlon develops metadata, other parties need to follow this metadata. So how do you balance between the robustness of the data, and the flexibility that you need; Is the collaborative metadata robustness a relevant requirement for you (Req. 27 in Table 15)?

The answer to this question is:
**IT manager**: depends on the metadata. Metadata for car models is developed by us currently. About the future metadata constructs, it will depend whether we are able to push our metadata format or our suppliers. This is dependent on who has the power in the network.

4.5.2.2.9 IQ issue 16 and IQ requirement

Q. 16. In the cost overview process, you need to be able to interpret information from multiple sources consistently. Is the **metadata context awareness** requirement relevant for this cost overview process (Req. 28 in Table 15)?

The answer to this question is:

**IT manager**: it is relevant, but it is all about controlling and updating these metadata definitions. It is definitely a lot of work, I don’t know whether it will be a big problem.

4.5.2.3 Conclusion

It is important to keep the limitations about the validity of this research question (see paragraph 3.5.1) in mind, when reading the conclusion. The available time was a big limitation; both the mobility manager, IT manager and procurement manager only half an hour was available and the list of questions was quite long. Moreover, with the procurement manager a video call was arranged and hence, the process models could not be clearly communicated.

The most important outcome of this step are the sixteen deductively explored IQ issues who were presented in this paragraph, together with their relating IQ requirement formulations. Some of them were more relevant for Athlon than others, as can be noticed from the answers of the respondents. A top 7 of the most important IQ issues and IQ requirements for Athlon’s Service dominant business environment is presented in Table 14. What was taken into consideration in this list of 7, was whether the respondents clearly explained that an issue or requirement will be relevant in future. This data analyses could have been improved by adding Likert scales to the questions, to make the classification less subjective. However due to the limited time and the level of abstraction of the constructs measured in the questions, it was decided to leave it out. It was not the aim to prove that these issues occur, but this research had the aim to explore whether more or new IQ issues occur because of a more service oriented strategy of an organization.

**Table 14 Important IQ aspect from practice as a result of SO**

<table>
<thead>
<tr>
<th>Par. Nr.</th>
<th>IQ issue</th>
<th>IQ requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.5.2.1.1</td>
<td>Suppliers intend to produce and keep relevant information</td>
<td>Handle Information product repetition</td>
</tr>
<tr>
<td>4.5.2.1.2</td>
<td>You need all customer experiences to develop a good value proposition</td>
<td>Link relevant information products</td>
</tr>
<tr>
<td>4.5.2.1.6</td>
<td>Different parties can develop relevant information</td>
<td>Manage information ownership issues</td>
</tr>
<tr>
<td>4.5.2.1.7</td>
<td>Identification of actors in the network has to be done at every interaction</td>
<td>You have to make one key identifier for each actor</td>
</tr>
<tr>
<td>4.5.2.2.2</td>
<td>Because of the dynamics in business processes new actors can use several information semantics</td>
<td>Modify semantic and metadata inconsistency</td>
</tr>
<tr>
<td>4.5.2.2.6</td>
<td>Information cannot always be traced to the source, since you work with a dynamic network of suppliers</td>
<td>Traceability of information provenance</td>
</tr>
<tr>
<td>4.5.2.2.7</td>
<td>When integrating (financial) information from partners you need to know the meaning of each field</td>
<td>Metadata collaborative repository</td>
</tr>
</tbody>
</table>
5 CONCLUSIONS

In this chapter the final conclusions of the thesis are presented. Firstly the answers to the research questions are given. Then three paragraphs are dedicated to explain the implications for Athlon, recommendations for the further development of the SODSC research and IQ research respectively. These paragraphs also describe the limitations of this thesis in each direction and advises about future directions are given.

5.1 ANSWERS TO THE RESEARCH QUESTION

The main hypothesis of this research was that there is an important interdependence between service orientation and information quality challenges in the context of business environments (networks). So the more a business environment transforms towards a truly Service Dominant business environment, the more Information Quality requirements it has to take into account.

This hypothesis was formulated in one main research question: “What is the impact of Service Orientation on both the business environment of Athlon as the Information Quality and what implications does this have for Athlon?”

This research question was broken down in three different sub-questions.

5.1.1 What service orientation is there at the moment in Athlon’s business environments?

Athlon’s current business environment can be classified as an environment that creates value by offering Integrated Products: an integrated product services delivery network. In order to do so, Athlon’s business environment has a rigid stable supply chain. This supply chain is coordinated by Athlon and this business environment would rather change due to new supplier requirements than customer requirements: supplier centric adaption and centralized coordination.

This type of service orientation in demand chains and supply chains implies that the value lies not in providing more and varied opportunities for consumers to co-create personalized experiences, but more in building features into products and services. These services and features are then bundled and offered to the client. Also, in the supply chain of Athlon, integrated products and services packages are delivered rather than pure products or services. From the SD logic perspective, the ability for the customer to be a part of the value proposition creation process is missing in Athlon’s current situation.

In order to offer result oriented products, Athlon organized their supply chain in a rigid way. According to the SD logic, such a supply chain is not suitable for responding dynamically to emerging opportunities based on customer needs. The relation of the customers with the business environment of Athlon can be seen as transactional. This means that Athlon’s business environment prefers to push products into the market and is not triggered by the customer for changing their product offering. According to the SD-Logic, this type of customer-supplier relations will not lead to long term partnerships where a customer and supplier support each other to create a better perceived value for the customer. Transactional relations make it hard for companies to differentiate themselves among competitors. Athlon can now only differentiate itself by Product, Price and Promotions of their standardized products.

Due to the offering of standardized integrated products based on formal and pre-defined contracts, customers do not have the possibility for the adaption of this business network. The adaption of the
network is more supplier centric, which means that Athlon (and Athlon’s suppliers) encourages customers to have them stay in their business environment, by doing commercials and lowering the prices. Moreover Athlon focuses on efficiency of the network, rather than innovativeness and therefore prefers a centralized coordination for this kind of network. Such a way of governing the business environment can lead to focusing too much on efficiency and formal contracts, rather than on innovation and trust.

5.1.2 What characteristics will Athlon’s future business environment in 2020 have and what implications will it have on the Demand- and Supply chain of Athlon?

Athlon’s future business environment can be classified as an environment that co-creates value with the customer by offering integrated solutions: an integrated solution co-creation network. In order to do so, Athlon’s business environment will change from a more supply chain oriented model to a service ecosystem. Athlon will then offer not only value adding service around the car within their life-cycle, but offer a range of mobility solutions catering for the specific mobility needs of customers. This business environment will be focused on consistent innovation evolution by service provision and development: customer centric adoption and centralized coordination. This strategy is in line with the SD-Logic.

In order to do so, Athlon needs to change their customer relationships. These relationships should be more relational, meaning that both Athlon as the customer see each other as partners. This transition requires Athlon to centre future solutions around the customer instead of the asset and ensure that touchpoints with the customer throughout the service provision are designed. Athlon can play a consultative role, but in the end, the customer should come up with relevant needs, not Athlon.

Also the supply chain of Athlon needs to change. In a collaborative value network, the orchestrator Athlon should engage in more dynamic partnerships to integrate new services and have a team that is looking for new value-adding partners, based on the changing needs of the market and their customers. Supplier-supplier interactions will also become more dynamic instead of rigid. Such a value network can be described as modular suppliers that are loosely coupled and co-create integrated solutions.

Because of the shift from viewing the value from the supplier perspective (as value-in-exchange) towards viewing the value from customer perspective (as value-in-use), Athlon’s business environment will emphasis on the role of the customer in adapting the network. This transition can be realized by having dialogues with customer about customer needs, rather than sending surveys with closed questions.

So far, the future position of Athlon is in line with the Service dominant logic. However, Athlon’s future position (based on interviews and workshops) in the control framework differentiates with the ideal position according to the SD logic. The coordination of interactions among suppliers will still be focused on decreasing the cost of the service by eliminating unnecessary costs. The reason according to Athlon is that they operate in a highly competitive market. So not focusing on efficiency will be a danger. However, the SODSC framework argues that in order to offer complete solutions, a decentralized structure of coordination will fit better for Athlon’s future business environment. In this way, Athlon and its suppliers can share mutual knowledge to innovate (which is not shared in a formal central govern structure according to some literature) and they can develop together new services.
5.1.3 Which IQ challenges are relevant in Athlon’s 2020 SD-business environment and which IG requirements are necessary?

At RQ 2, briefly some action points for Athlon to realize their transition path were described. For example, in order to move from a supplier-centric value obtainment process towards a customer-centric value obtainment process Athlon needs to give the customer the opportunity to co-create their own solution. A way of doing this, is to develop a value proposition based on individual user experience and discuss this with the user how this proposition can be even better. This is also reflected in the recommendation for the control transition. This example was concretized by an executable business process model. When analysing this model some information quality issues were elicited.

Firstly, in order to develop a unique value proposition you need to have user experience. You will need to have a lot of information from the customer, but you first have to define which information products are relevant for Athlon to know. Then you need to link those information products together and make a logical story out of it. This is already a firstly explored information quality issues.

Secondly you might not have always access to user experience information products. This was a second important issue that was outlined by the respondents.

Before stating the other information quality issues, it is important to remember again some directions for Athlon as stated before under RQ2. One important condition to transform from a rigid stable supply chain towards a collaborative value network is that Athlon should look for new partners in a structured way and should remove partners from the network when they are not relevant anymore based on the new customer needs. These dynamics: partners are entering and leaving the network, will result in other IQ issues. As an example, the cost-overview process was used. An Athlon customer can log in their virtual environment and request for an update on the costs made by him.

A third relevant information quality issue was therefore that you will have more difficulties in aligning all the different (metadata) information semantics. Based on the invoices of the several partners in the network, you want to produce reports that enables Athlon and customer to make strategic decisions. Different definitions of services and fees can endanger the strength of the cost overview and reports.

Moreover, as a fourth relevant IQ issue, you still want to trace the source of each information product. This is difficult in dynamic business processes, were different IT systems, protocols and accuracy-levels are used. Related to this, the fifth information quality problem is that Athlon has difficulties to identify all the actors in the network. Currently this was simple; you have a car, a contract and a car related service. In the future, the customer will be central, instead of the car. Moreover the customer will make use of more different services, compared to the car.

These five information quality issues support the hypothesis that service orientation has impact on IQ. It does not confirm exactly the relation that the more service dominant a network the more IQ challenges. It rather shows that more Service Orientation in a business environment will lead to new IQ challenges.

5.1.4 Summary

Athlon’s business environment will look differently than now. Athlon will keep its network orchestrator role, but the mobility network will obtain value from real customer’s mobility needs, rather than from mobility products that are pushed into the market by the network. Athlon will collaborate with its customers to develop new products. In order to meet (always changing) customer needs, Athlon needs to work with more partners, but also needs to change its partners when they cannot meet new
customer needs, with new ones who can. Therefore this transition will lead to more dynamic Athlon to supplier interactions and to dynamic to customer interactions and this will cause information quality challenges. The interactions with the partners will still be controlled centrally by Athlon, but the interactions with the customers will be a dialogue rather than a monologue (enabled by the Internet of Things Technologies). To tackle IQ challenges, Athlon needs to include the following IG requirements in their transition plan;

- Handle information product repetition
- Link relevant information products
- Manage information ownership issues
- Identity federation
- Modify semantic and metadata inconsistency
- Traceability of information provenance
- Metadata collaborative repository

These requirements satisfy the other objective to develop a set of Information Quality requirements that are relevant for Athlon’s future Service dominant Business environment (see paragraph 1.3).

5.2 IMPLICATIONS FOR AND LIMITATIONS OF THE SODSC FRAMEWORK

Some limitations and future directions of the SODSC framework will be presented in this paragraph.

Both the researcher as Athlon had the opportunity to work with the SODSC framework in practice. The researcher experienced that it did create a challenge to introduce the framework to the respondents without them reading whole the paper and its references. From all the three frameworks, the partnership framework was the most clear and easy to understand.

The control framework (with network adaption and decentralized and centralized coordination) is very abstract and difficult to grasp. Terms like exogenous customer centric network adaption are too difficult and abstract to understand in a glance.

The Service Oriented value framework was clearer. Especially the value delivery dimension was understood quickly by practitioners. The customer centric value obtainment dimension, where the customer is co-creating together the service, was more difficult, since it is not yet happening a lot in industries.

So the experience is that the framework is very theoretical. In order for companies to use it for understanding better their transition process, it need to be translated to a more applicable tool. This master thesis aimed to make a first step in developing such a tool by developing the tables Table 11, Table 12 and Table 13 (see paragraphs 3.6.1, 4.2, 4.3 and 4.4). By using these ‘tools’, it was easier for the researcher to position answers of the respondents more objectively in the four quadrants of each of the three frameworks.

In addition to this method, scales can be added to the dimensions in order to position an organization more objectively in the framework. However the rigor and relevance need to be balanced, see Figure 7. Scaling will help to make the framework more relevant for businesses. However, it will be more difficult to generalize the theory around the scales to other businesses, since scales and numbers are usually very context specific. This will endanger the rigorness of the framework. If future researchers want to dive deeper in the scaling, I would recommend to continue with the approach of this thesis as is
described in paragraph 3.6.1, since the different concepts can be fine-tuned even more. The following top 3 is proposed where researchers can dive deeper into:

- Different forms of Co-creation (e.g. self-servicing, relational development)
- Different forms of relational interactions (we are very used to transactional interactions (4P’s), but what are the alternatives?)
- Different forms of decentralized control (what does controlling the network based on trust and responsiveness really means for a network?)

Summarizing, the SODSC framework was experienced as a very nice tool for structuring thoughts about the SD logic. In order to really prove that the quadrants are relevant, you will need a wider range of case studies with a focus on diving deeper into these quadrants and on what is in-between these quadrants (reality is usually a mixture several quadrants).

5.3 IMPLICATIONS FOR AND LIMITATIONS TO THE IQ FRAMEWORK

It is too early to state that there is a strong relation between service orientation and information quality. This research proved that one cannot ignore this relations, for in Athlon’s future business processes relevant IQ issues were explored. The method that was used was a very structured one. However the explored IQ issues were based on potential Service Dominant business processes, not real ones. This makes the outcome of this research less strong. A good next step is to look for Service Dominant organizations who have inter-organizational processes.

One can even turn the relation around. So when there is low IQ, no SD business environment can exist. This would be interesting future research, for it can enhance the understanding of the relation between IQ and dynamic inter-organizational processes that occur in SD business environments.

Then the framework (list of IQ requirements) as is shown in Table 15 was used, which is based on theory (academic journals) only. The frameworks is not validated before and was used for the first time during this thesis. Therefore, based on the experience of the researcher, some recommendations about this list are given.

The list of requirements is long (28 requirements). If two issues differ slightly from each other, immediately two separate requirements were developed. An example is the requirement for information service clarification and traceability of information provenance. In practice, they are experienced as the same issue (see paragraph 4.5.2.2.6). The researcher already bundled several other requirements in one question, see for example question 5 (paragraph 4.5.2.1.5). Other opportunities for bundling, are integrating the meta-data requirements with the security and information quality requirements. This is because the nature of the issues, whether it is meta-data or normal data, are usually the same. Future research should focus first to make a shorter and workable list of IQ requirements that address on high level the most important IQ issue.

Summarizing, this thesis provided a method for organizations and researchers to elicit IQ issues. Whether the true IQ issues and IG requirements are found can be questioned, but now Athlon can do the same exercise again in e.g. a year time, when the dynamic inter-organizational processes become clearer. Also they now know what they are looking for, since a list of potential IQ issues and requirements are provided in Appendix E.
REFERENCES


APPENDIX A: ORGANIZATION CHART ATHLON
The relation Athlon and DLL and this research project

*DLL (De Lage Landen)* is a financial service provider for many companies and offers solutions to his clients like vendor finance, leasing products, commercial finance, extra working capital, consumer finance and mobility solutions. Some of the solutions have their own brand name and organization (e.g. *Freo* and *Athlon*). *DLL* is present in 36 countries and is specialized in many industries like food and agriculture, healthcare, office technology, automotive, construction and transportation.

*DLL* recognizes “*an increasing need for integrated services and solutions as customers trend towards using instead of owning assets*” (DLL, 2013). In their company review (DLL, 2013), *DLL* recognizes several global, industry and customers trends. Two of these trends are:

- **The consumerization of IT:**
  Cloud services, online communities and mobile devices give more power to the customer

- **A move from owning to using assets:**
  Customers are more interested in total solutions. Using and sharing assets is coming to replace ownership.

*DLL* wants to cooperate in this research in order to increase its knowledge about current developments on service orientation constructs that offer opportunities for dealing with the above mentioned trends. As already mentioned, *DLL* is active in many industries. In order to scope this project down, the best business unit of *DLL* for this project had to be chosen. The innovation department of *DLL* recommended to choose *Athlon*. *Athlon*, the mobility solutions business unit of *DLL*, is due to its ambition to become a provider of mobility solutions, one of the business units within *DLL* that is closest to the shift towards a service dominant business.
APPENDIX B: SOURCES OF EVIDENCE

People consulted
The people below were participants of several exploratory interviews.

DLL/Athlon:
Caren Weisleder, Project Supervisor, Innovation Consultant, Strategic marketing department, DLL
Harald Kroon, Project Supervisor, Manager Business Excellence, Sales, Athlon
Hans Tonneijk, Enterprise Architect, IT Architecture, DLL/Athlon
Bob van Eeuwijk, Innovation manager, Market Research, DLL
Valentijn de Jong, Head of Innovation, Strategic Marketing, DLL
Laurent Vanderheijden, IT Manager Athlon, Corporate IT, DLL
Alexander Prinssen, Head of Mobility Consultants, Project Management, Athlon

TU/e:
Kostas Traganos, Researcher, Fac. Industrial Engineering & Innovation Sciences, TU/e
Jenny Weingarten, Master Student, Fac. Industrial Engineering & Innovation Sciences, TU/e
Mohammad Rasouli, PhD, Fac. Industrial Engineering & Innovation Sciences, TU/e

Respondent to the in-depth interviews

Mobility Solutions Manager
The mobility solutions manager is responsible for the future mobility scenario project. He organizes this together with the Innovation Department of DLL. He visits congresses about mobility projects. Moreover he is responsible for the consultative sales department. The consultative sales man start with advising the customers for the best mobility solutions. Sales usually follows after.

Marketing Manager
The marketing manager is responsible for all marketing related activities within all the countries in Europe Athlon is active. He develops marketing strategies. Moreover tactical marketing is within his portfolio; product development and innovation. When an innovation initiative is developed, the marketing manager will be responsible for bringing it on the market.

Enterprise Architect Athlon
The enterprise architect manager of Athlon is part of the enterprise architect team of DLL. They are involved in the ‘big picture’ project. This big project established an IT vision for DLL. Summarizing, this vision implies that IT systems should be more agile. Not everything needs to be insourced anymore. The enterprise architect manager is safeguarding if IT projects are in line with the corporate IT strategy.
Sales Manager
This manager is now responsible for business excellence, but his former function was sales manager. He has been doing this for about 20 years, implying that his knowledge about sales within Athlon and the car leasing industry is huge.

Innovation Manager/Strategic Marketing
This manager is responsible for innovation project within DLL. She was involved in many project with Athlon in the past to set up innovation. Although this manager does not belong to the Athlon organization, she as an outsider can bring other perspectives in this research.

Procurement Manager
The procurement manager is responsible for setting deals with suppliers. The strength of the procurement department is to find discounts at suppliers, from which customers benefit.

IT-manager
He used to be the marketing director of Germany, so he has two perspectives. Now he manages all the IT employers of Athlon and the delivery teams of all countries. He also worked on the future vision, as is described in paragraph 4.1.2.

Documents Consulted
This section gives an overview of which documents were made available to the researcher and are not academic papers.

- Assignment University Course, Skarabahataya, Khramava and Li, Database Design for DLL
- Bachelor thesis Tim Claessens: Developing a Prototype for the Service Composition layer of the BASE/X Framework
- Bachelor thesis Sander Weerdenburg: Service orientation in Supply Chain Management, 2014
- Beta paper: Lüftenegger, The service dominant business model a service focused conceptualization
- Company Review DLL, 2013
- Dissertation Egon Lüftenegger, Business agility through cross-organizational service engineering
- Europe on the move 2020, Reader that was used in the mobility future workshop at 14 January 2015.
- Literature Review Service Orientation, Jennifer Weingarten
- Master Thesis Kostas Traganos, Designing a standard architecture for service management based on base/x framework
- Presentation Business Model Design, Kostas Traganos
- Presentation Frost &Sullivan Corp Mobility
- Presentation Mobility Solutions, IT R&D, March 2014
- Presentation Athlon MKTG Sales Pitch France, 2015
- Paper Draft, Mohammad Rasouli, Dynamic Capabilities Perspective on Service Orientation in Demand-Supply Chains
- Paper Draft, Mohammad Rasouli, Information Quality issues in dynamic networked business Processes
Moreover process models of Athlon were consulted, stored on an online application, called BeWyse. Cees Ruler from Athlon International is the contact person of this BeWyse process models. Figure 14 shows the domain structure of the Process Model Architecture.

Meetings Attended

This section gives an overview when certain exploratory interviews were hold and briefly the purpose and content of the interview is described. Moreover other workshops that were participated during the orientation phase are stated here. Regularly meetings with Caren Weisleder, Harald Kroon, Jos Trienekens and Mohammad Rasouli are not stated here. The four mentioned persons (the supervisors) were consulted once a week on average.

3 December: End presentation Frost and Sullivan
Workshop to present the findings of Frost and Sullivan’s corporate mobility research and implications to Athlon Car Lease. General mobility trends were discussed as were the current and future actors in the mobility industry.

10 December: Company presentation by Bob van Eeuwijk. Bob gave a general presentation about the company DLL and the business models.

10 December: Thesis presentation Kostas Traganos. Kostas presented his work together with his future project to Patrick van Beek and Mohammad Rasouli. Moreover he explained the business models radar.

11 December: End presentation Jennifer Weingarten (TU/e Master Student and participant of International Research Project of the study association Industria). Presentation of a literature review done for DLL. Research questions where: What defines a service dominant business, what are drivers of the service dominant business paradigm and what obstacles occur when moving towards a service dominant business model?

12 December: Interview with Hans Tonneijk about Information Quality aspects in an extensive network of different business. Hans told me that Athlon wants to be the integrator of all the information.

16 December: Company tour Athlon. Harald Kroon explained one day what Athlon is about and showed me around the car park and company building.

17 December: Interview Valentijn de Jong about de SODSC concepts and innovation department


20 January: Meeting with Hans Tonneijk about information systems and IT projects at Athlon

22 January: Meeting with Laurent Vanderheijden about IQ aspects and important challenges for Athlon

9 February: Meeting with Marco van der Pol about Contract Management within Athlon

5 March: Workshop #2 taking position. Selecting new value propositions (3 out of 9). Workshop organized and lead by Reframingstudio. (Hold in Brussels)

# Appendix C: Business Model Canvas and Radar

**Legend business model radar** (Luftenegger E., 2014)

<table>
<thead>
<tr>
<th>Outer layer</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Customer</strong></td>
<td>Actors that are the main beneficiaries of the co-created value proposition</td>
</tr>
<tr>
<td><strong>Focal Organization</strong></td>
<td>Actor who defines the value co-creation proposition</td>
</tr>
<tr>
<td><strong>Core Partners</strong></td>
<td>Actors that are needed to offer the co-created value proposition to the customer</td>
</tr>
<tr>
<td><strong>Enriching Partners</strong></td>
<td>Actors that complement the co-created value proposition by enhancing it</td>
</tr>
</tbody>
</table>

### Layers

- **Green layer**: Benefits of each actor
- **Red layer**: Costs of each actor
- **Blue layer**: Co-creation activities: how does an actor participate in the value co-creation proposition
- **Yellow layer**: Value network proposition: what is the actor’s impact on the value network
- **Orange center**: Value co-creation proposition: goal of the business model

**Legend Business Model Canvas** (Osterwalder, 2004)

| Key partnerships: “describe the network of suppliers and partners that make the business model work”. | Key activities: “describes the most important things a company must do to make its business model work”. | Value propositions: “describes the bundle of products or services that create value for a specific customer segment”. | Customer relationships: “describes the types of relationships a company establishes with specific customer segments”. | Customer segments: “defines different groups of people or organizations an enterprise aims to reach and serve”.
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Key resources</strong>: “describes the most important assets required to make a business model work”.</td>
<td><strong>Channels</strong>: “describes how a company communicates with and reaches its customer segments to deliver a value proposition”.</td>
<td><strong>Revenue streams</strong>: “represents the cash a company generates from each customer segment”</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Business Model Canvas applied on Athlon's current business model

<table>
<thead>
<tr>
<th><strong>Key partnerships:</strong></th>
<th><strong>Key activities:</strong></th>
<th><strong>Value propositions:</strong></th>
<th><strong>Customer relationships:</strong></th>
<th><strong>Customer segments:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Insurance Company</td>
<td>Orchestrating network of car dealers, car maintainers, insurers</td>
<td>Asset Management Services Tiers, substitute car, accident or damage service</td>
<td>Staying customers Customers are charmed by the ease of use of mobility cards and administration thanks to having Athlon as a partner.</td>
<td>Car as a tool Companies that need their employees to have a car because they have to travel a lot</td>
</tr>
<tr>
<td>Tier procurement Company</td>
<td></td>
<td>Fleet Management Services (monitoring and reporting fuel consumption)</td>
<td>Leaving customers Price is an important factor</td>
<td>Cars Hierarchy Companies that offer their employees a car as an extra income benefit</td>
</tr>
<tr>
<td>Car Dealers</td>
<td></td>
<td>Invoice Settlements Different types of invoicing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occasions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Car Repair Companies</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Petrol pass providers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roadside assistance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Key resources:</strong></td>
<td><strong>Funders</strong> (residual value estimates)</td>
<td><strong>Channels:</strong> Website</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Funders (DLL)</td>
<td>Marketing Campaigns</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Asset managers (buying and reselling the car)</td>
<td>Face 2 Face</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Asset Service Providers (insurance, maintenance)</td>
<td>Tender</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cost structure:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Variable costs</strong></td>
<td>Fees Athlon has to pay for using different services</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Fixed Costs</strong></td>
<td>Employees that resell old leasing cars, that make invoices for customers, sales persons, Contract Managers, IT, Car Damage managers, Evaluating value/supply chain, Time to find reliable partners</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Revenue streams</strong></td>
<td>Fees paid by customers to use the leasing car and all the corresponding services.</td>
<td>Calculated risk benefits on the assets (Margins on residual value, repair, maintenance, tiers and insurance)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Business Model Radar: Athlon's current situation

- **Athlon** (Company)
  - Lease price per car
  - Administration & partners’ fees
  - Mobility hassle outsourced

- **Customer**
  - Lease price per car per month
  - Establishing contract
  - Choosing car (dealer)

- **End User**
  - Offerings: mobility, feedback, experience
  - Enables: flexible mobility, transport

- **Dealers**
  - Car delivery
  - Pay outs
  - Risk Assessment Management
  - Asset/Contract Management
  - Selling cars
  - Buying cars

- **Insurer**
  - WA Insurance
  - Car Lease
  - Cost price car
  - Selling price

- **MultiTank Card**
  - Card usage fee per month
  - Manning equipment
  - Maintenance consumption

- **Repair shops**
  - Service fee + material
  - Manning and equipment

- **Used car dealer**
  - Selling price
  - Car Leasing Solution

- **Road Assistance**
  - Providing Assistance
  - Assistance fee
  - Monitoring
  - Card usage fee per month
APPENDIX D: SERVICE ORIENTED PROCESS MODELS WITH DYNAMIC INTERACTIONS

Choreographic Model
Executable Process model: Service Selection Process – Part 2
Executable Process model: Cost Overview Request– Part 1
Executable Process model: Cost Overview Request– Part 2
This Appendix presents the result of the literature review performed by P.S.N. van Beek (author of this thesis) and M. Rasouli (Ph.D., TU/e). The table is based on 51 publications.

The explored IQ requirements – definitions

<table>
<thead>
<tr>
<th>Induced IQ requirement</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Modification of syntactic and semantic information product inconsistency</td>
<td>Due to the autonomous nature of parties in a BN, a certain information product can be produced by different parties by using of different rules (syntactic) and different language and norms (semantic). This issue is more highlighted in a dynamic BN, which parties can repeatedly be switched. Moreover, the presence of parties from different contexts, which each have various norms and language, stimulates this issue in a dynamic BN aiming to provide integrated solution for customers. The governor of a dynamic BN requires modifying the syntactic and semantic information inconsistency to enable information exchange between parties.</td>
</tr>
<tr>
<td>2 Handling information product repetition</td>
<td>In a dynamic BN that parties are loosely linked, each party needs to produce and keep critical information about its environmental entities (e.g. the customer related information). This independent view on the reality by each party can easily result in repetitive information products. To avoid garbling information, unnecessary information production costs, and repeating information entry by customers, the governor of a dynamic BN requires managing the master information production coherently.</td>
</tr>
<tr>
<td>3 Linkage of relevant information products</td>
<td>Because of the independent view on fact by parties, information about similar facts can be distributed among different parties. This distributed information about facts might be biased due to a party’s interest or perspective. A well-established decision making that is supported by consistent evidences requires the linkage of the relevant information about similar facts.</td>
</tr>
<tr>
<td>4 Dismission of not added value information products</td>
<td>The change of information needs in a dynamic BN can result in the disutility of an information product. To avoid the cost of production and storage of not added value information, the governor of a dynamic BN requires pursuing polices to remove not added value information products.</td>
</tr>
<tr>
<td>5 Information product synchronization</td>
<td>Because of the distributed nature of a BN, a change in the environment can be recognized by a party. To keep the information products consistent and updated, the recognized change needs to be disseminated in whole relevant information products distributed among different parties.</td>
</tr>
<tr>
<td>6 Information product pooling</td>
<td>Since the bilateral information exchange between parties has proven to be costly and complex, the centralization of critical information products (i.e. master data) that are repeatedly used by parties is inevitable. In a dynamic BN context, the master data needs to be evolved regarding the change of information requirements.</td>
</tr>
<tr>
<td>7 Information service clarification</td>
<td>The governability of information service in a dynamic BN depends on its transparency. Exposing the information service interface without sufficient visibility of its internal view (e.g. relating information production process) can limit its usability.</td>
</tr>
<tr>
<td>8 Information service quality certification</td>
<td>Information services provided by parties within a BN are different from the quality point of view. To ensure that an information service has sufficient quality to be used by another party, a quality certification is required. In the context of dynamic BN, this certification should be based on standards that are globally regarded. But, on the other hand, these standards need to be flexible to cover the emerging requirements of a dynamic BN.</td>
</tr>
</tbody>
</table>
### Quality aware information service brokery

The information need of a party in the context of the BN can be responded by different information services. The information governor of a BN needs to ensure that the best matched quality information service is selected and used by an information consumer. The information service brokery can facilitate this quality aware match-making in a dynamic BN.

### Information networkability modification

Information networkability refers to the usability and understandability of an information service by different parties within a BN. For the modification of the information networkability in a dynamic BN, diversified B2B syntactic and semantic interaction protocols need to be governed.

### Continuity of information service

In a business networking information services are mostly composed to respond to an operational or decision making request. In a dynamic BN, this composition might be dynamic because of the switching information sources. To avoid the interruption of the operation, a composite information service requires being reliable.

### Information security requirements

<table>
<thead>
<tr>
<th>13</th>
<th>Prevention of information leakage and misappropriation</th>
<th>The BN necessitates sharing information assets based on a trust between parties. But, shared information assets are threatened by opportunistic behaviors. This issue can be more highlighted in a dynamic BN due to the loosely link between parties. The governor of a dynamic BN requires ensuring that these treats are sufficiently prevented.</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>Information asset ownership management</td>
<td>In a BN, valuable information assets are mostly created collaboratively. In a dynamic BN, which collaborations are short-term, the information governor requires to distribute collaboratively created information assets after the dissolution of certain collaboration.</td>
</tr>
<tr>
<td>15</td>
<td>Prevention of data remanence</td>
<td>Collaboratively created information assets are distributed among parties within a BN. In a dynamic BN that parties can easily be switched, the information governor requires ensuring that information assets has not been used illegally by a departed party.</td>
</tr>
<tr>
<td>16</td>
<td>Preserving added value information</td>
<td>When a party leaves collaboration, a part of critically important information asset can be loosed. To avoid the interruption of BN operations due to its dynamism, a well-established legal policy is required for preserving added value information.</td>
</tr>
<tr>
<td>17</td>
<td>Traceability of information provenance</td>
<td>Information provenance is used to access the IQ reliability of different information sources. The traceability of information provenance in a dynamic BN enables to ensure the integrity of the information that is consumed by a party.</td>
</tr>
<tr>
<td>18</td>
<td>Dynamic trust management</td>
<td>The access to information asset in a dynamic BN is based on the trust between parties. To secure information assets within a BN, a well-established policy is required to determine the trust value for parties and manage the access to information assets based on this trust value. In a dynamic BN, this trust value needs to be updated continuously.</td>
</tr>
<tr>
<td>19</td>
<td>Aligning diversified security ontologies</td>
<td>Each local security system, which is used by a party, has an understanding about its own vulnerabilities and threats that is addressed by the security ontology. In a dynamic BN that parties are loosely linked, these diversified security ontologies need to be aligned. This aligned security ontology supports a shared understanding of threats and vulnerabilities.</td>
</tr>
<tr>
<td>20</td>
<td>Creation of trustworthy information exchange environment</td>
<td>The role of trust as a basis to shape a BN is proven. However, the loosely linkage between parties in dynamic BN encounters the trust. To deal with this issue, in addition to mechanisms ensuring the prevention of opportunistic behaviors, the information governor of a dynamic BN needs to create a trustworthy environment. This trustworthy environment can be based on legal foundations as well as the reputation of BN orchestrator.</td>
</tr>
<tr>
<td>21</td>
<td>Modification of inconsistent security policies</td>
<td>Autonomous parties within a dynamic BN may have inconsistent security policies. To facilitate the secure access to information distributed in a BN a coherent security policy requires to be regarded by all parties.</td>
</tr>
</tbody>
</table>
Identity federation

Autonomous parties within a BN store identity related information locally. The heterogeneity and distribution of identity related information, which can be intensified in a dynamic BN, can result in unauthorized and incorrect service delivery. To counter this issue, identity related information requires to be federated.

Metadata requirements

23 Metadata collaborative repository

Because of the independent view on the reality by parties within a dynamic BN, each party has a certain ontological view that results in diversified metadata. The metadata collaborative repository is required for the recognition of metadata used by each party.

24 Metadata traceability

To counter the semantic inconsistency in a dynamic BN, the metadata used by an information service provider needs to be traceable. The governor of a dynamic BN requires ensuring the traceability of metadata related to information services.

25 Modification of collaborative metadata inconsistency

To enhance a shared ontological understanding about the reality, a collaborative metadata needs to be managed. The collaborative metadata, which can be represented in the form of metadata standards, requires for governing the information exchange.

26 Metadata evolution

The dynamism of a BN, like switching parties or emerging environmental needs, can result in the adaption of ontologies and metadata used by parties. A collaborative metadata requires to be evolved to keep aligned with realized changes.

27 Collaborative metadata robustness

Since a collaborative metadata is regarded as a semantic foundation for all parties within a BN, it needs to be sufficiently robust. Otherwise, unceasing change will be loaded to all parties that can disturb a BN.

28 Metadata context awareness

Within a BN to provide an integrated solution, parties collaborate from different contexts. Standardization of metadata is usually context-specific. The semantic information exchange between parties from different contexts requires the context awareness in collaborative metadata used by parties.

The explored IG requirements - sources

<table>
<thead>
<tr>
<th>Induced IG requirement</th>
<th>sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 Linkage of relevant information products</td>
<td>(Lu and Xu, 2014, Falge et al., 2012)</td>
</tr>
<tr>
<td>5 dismissal of not added value information products</td>
<td>(Botha et al., 2014, Mohammad R. Rasouli, 2015)</td>
</tr>
<tr>
<td>6 Information product synchronization</td>
<td>(Lu and Xu, 2014, Nakatani et al., 2006, Schemm and Legner, 2008d, Hoellrigl et al., 2010, Demeter et al., 2007)</td>
</tr>
<tr>
<td>8 Information service clarification</td>
<td>(Felici et al., 2013, Lotz et al., 2012)</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>11</td>
<td>Information networkability modification</td>
</tr>
<tr>
<td>12</td>
<td>Continuity of information service</td>
</tr>
<tr>
<td><strong>Information security requirements</strong></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Prevention of data remanence</td>
</tr>
<tr>
<td>16</td>
<td>Preserving added value information</td>
</tr>
<tr>
<td>18</td>
<td>Dynamic trust management</td>
</tr>
<tr>
<td>19</td>
<td>Aligning diversified security ontologies</td>
</tr>
<tr>
<td>20</td>
<td>Creation of trustworthy information exchange environment</td>
</tr>
<tr>
<td>21</td>
<td>Modification of inconsistent security policies</td>
</tr>
<tr>
<td>22</td>
<td>Identity federation</td>
</tr>
<tr>
<td><strong>Metadata requirements</strong></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Metadata collaborative repository</td>
</tr>
<tr>
<td>24</td>
<td>Metadata traceability</td>
</tr>
<tr>
<td>25</td>
<td>Modification of collaborative metadata inconsistency</td>
</tr>
<tr>
<td>26</td>
<td>Metadata evolution</td>
</tr>
<tr>
<td>27</td>
<td>Collaborative metadata robustness</td>
</tr>
<tr>
<td>28</td>
<td>Metadata context awareness</td>
</tr>
</tbody>
</table>

**Reference Details**


BATINI, C. A survey of data quality issues in cooperative information systems. 2004.


**APPENDIX F: TABLES FROM YIN, 2014 AND BLUMBERG ET AL., 2008**

Table 16 Relevant situations for different research methods (Yin, 2014) (COSMOS corporation, 1983).

<table>
<thead>
<tr>
<th>Method</th>
<th>Form of Research Question</th>
<th>Requires control of behavioural events?</th>
<th>Focuses on contemporary events</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experiment</td>
<td>How, why?</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Survey</td>
<td>Who, what, where, how many, how much?</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Archival Analysis</td>
<td>Who, what, where, how many, how much?</td>
<td>No</td>
<td>Yes/no</td>
</tr>
<tr>
<td>History</td>
<td>How, why?</td>
<td>No</td>
<td>no</td>
</tr>
<tr>
<td>Case Study</td>
<td>How, why?</td>
<td>No</td>
<td>yes</td>
</tr>
</tbody>
</table>

Table 17 Six sources of evidence: strengths and weaknesses (Yin, 2014)

<table>
<thead>
<tr>
<th>Source of Evidence</th>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Documentation</td>
<td>• Stable-can be reviewed repeatedly • Unobtrusive – not created as a result of the case study • Specific – can contain the exact names, references and details of an event • Broad – can cover a long span of time, many events, and many settings</td>
<td>• Retrievability – can be difficult to find • Biased selectivity, if collection is incomplete • Reporting bias - reflects (unknown) bias of any given document’s author • Access – may be deliberately withheld</td>
</tr>
<tr>
<td>Archival records</td>
<td>• [same as those for documentation] • Precise and usually quantitative</td>
<td>• [same as those for documentation] • Accessibility due to privacy reasons</td>
</tr>
<tr>
<td>Interviews</td>
<td>• Targeted- focuses directly on case study topics • Insightful – provides explanations as well as personal views (e.g., perceptions, attitudes, and meanings)</td>
<td>• Bias due to poorly articulated questions • Response bias • Inaccuracies due to poor recall • Reflexivity – interviewee gives what interviewer wants to hear</td>
</tr>
<tr>
<td>Direct observations</td>
<td>• Immediacy – covers actions in real time • Contextual- can cover the case’s context</td>
<td>• Time- consuming • Selectivity- broad coverage difficult without a team of observers • Reflexivity –actions may proceed differently because they are being observed • Cost- hours needed by human observers</td>
</tr>
<tr>
<td>Participant-observation</td>
<td>• [same as above for direct observations] • Insightful into interpersonal behaviour and motives</td>
<td>• [same as above for direct observations] • Bias due to participant-observer’s manipulation of events</td>
</tr>
<tr>
<td>Physical artefacts</td>
<td>• Insightful into cultural features • Insightful into technical operations</td>
<td>• Selectivity • Availability</td>
</tr>
</tbody>
</table>
Table 18 Structured and Unstructured interviews (Blumberg, Cooper, & Schindler, 2008, p. 386)

<table>
<thead>
<tr>
<th>Type of study</th>
<th>Structured Explanatory or descriptive</th>
<th>Semi-structured or Unstructured Exploratory and explanatory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purpose</td>
<td>Providing valid and reliable measurements of theoretical concepts</td>
<td>Learning the respondents’ viewpoint regarding situations relevant to the broader research problem</td>
</tr>
<tr>
<td>Instrument</td>
<td>Questionnaire (i.e. specified set of predefined questions)</td>
<td>Memory list Interview guide</td>
</tr>
<tr>
<td>Format</td>
<td>Fixed to the initial questionnaire</td>
<td>Flexible depending on the course of the conversation, follow-up and new questions raised</td>
</tr>
</tbody>
</table>

Table 19 Five Case Study Analysis Strategies (Yin, 2014).

1. Pattern matching; compares an empirically based pattern—that is, one based on the findings from your case study— with a predicted one made before you collect your data.
2. Explanation building; the goal is to analyse the case study data by building an explanation about the case.
3. Time series analysis; you have a single dependent or independent variable.
4. Logic models: operationalizes a complex chain of occurrences or events over an extended period of time. The use of logic models consists of matching empirically observed events to theoretically predicted events.
5. Cross-Case Synthesis; only for multiple cases.
## Appendix G: Motivation and Challenges for Service Dominancy

*Table 20 Motivation and challenges of paradigm shift from leadership in technology to leadership in use (Manufacturer perspective) (Meier, Volker, & Funke, 2011)*

<table>
<thead>
<tr>
<th>Motivation for the OEM</th>
<th>Motivation for the customer</th>
<th>Challenge for the OEM</th>
<th>Challenge for the customer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rise of customer loyalty</td>
<td>Focusing on core competences</td>
<td>Create new business models</td>
<td>To evaluate chances and risks</td>
</tr>
<tr>
<td>Opening of new business fields</td>
<td>To make new technologies accessible</td>
<td>Development of service processes</td>
<td>Identification of core competencies</td>
</tr>
<tr>
<td>Development of market shares</td>
<td>Reduction of capital lock-up</td>
<td>Industrialization and automation of services</td>
<td>To calculate own processes</td>
</tr>
<tr>
<td>Information about the use of its products to create innovations</td>
<td></td>
<td>New understanding of products:</td>
<td>Openness to the supplier:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Innovative product-service-systems</td>
<td>Transparent processes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Suitable development processes</td>
<td>Organization</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Internet (remote service)</td>
</tr>
</tbody>
</table>
APPENDIX H: SUMMARY SODSC FRAMEWORK

This appendix gives

The Service- Oriented Value Aspect of SODSC

In Athlon there are demand and supply chain processes that shape value for their business network. The focus of this research is to focus on service-oriented value. Figure 15 shows the service oriented value framework with two dimensions; the demand chain/value obtainment dimension and the supply chain/value delivery dimension.

There are many ways how you can look at value creating processes, e.g. value in use and value in exchange (see 2.1.1). From the demand chain perspective, the first dimension of the framework, you can view value from a supplier centric perspective: a supplier creates value by creating an economic benefit by selling products or services (GD-logic of Marketing). However we do not see this economic benefit (also called value in exchange) as a service oriented value. A service oriented value is determined by a customer in the form of the value-in-use (SD-logic of marketing). The service oriented value concept is also described in Service logic revisited: who creates value? And who-co-creates? (Gronroos, 2008). The paper argues that value is created by customers during a usage of a service or product. The role of a supplier is to facilitate the usage of a product or service by a customer.

Figure 15 The Service oriented value framework

Figure 16 The Partnership framework

Figure 17 The control framework
The second dimension of service orientation is the value delivery chain. This dimension should be analysed from a supplier perspective; inbound logistics, operations and outbound logistics. Traditionally based manufacturers companies are moving their position in the value chain from product manufactures to providing customers with integrated solutions that can include multi-vendor products (Baines et al., 2008).

The Partnership Aspect of SODSC
The first framework was about what value customers get when companies are service oriented. The second framework deals with the question how service oriented value can be created. It focuses on partnerships as the most important input of the cybernetic system (Figure 6). The partnership aspect describes the alliance of stakeholders to provide service-oriented value (Rasouli et al., 2014). Again there are two dimensions as is shown in Figure 16.

The first dimension of the partnership aspect on the x-axis as the supplier-supplier relationships. There can be stable partnership and adaptive partnership. Figure 16 shows that adaptive partnerships occur in an adaptive supply network or in a collaborative value network.

The second partnership aspect dimension is about the customer-supplier relationships where the customer can be a passive partner and when the customer can be an active partner. This can be measured in terms of customer involvement in value creation. Customers can engage in dialog with suppliers, for example during each state of product design or product delivery.

The Control aspect of SODSC
Service Oriented value networks (consisting of a demand chain and a supply chain) can be controlled in different ways. The framework in Figure 17 distinguishes again two dimensions: the network adaption dimension and the network coordination dimension.

The network adaption is about whether a customer in a business environment adapts a network or the supplier (as in the GD Logic). The network coordination dimension is about keeping the control on a central level (by one dominant party) or dividing the control (control in the sense of making sure you offer a high quality service that is relevant for customer needs) on a de-central level (by your suppliers).