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Business Informatics

**SOCIO-POLITICAL CHARACTERISTICS OF  
COOPETITIVE RE FOR IOIS**

*A CASE STUDY OF TWENTY DUTCH LAW FIRMS COLLABORATIVELY PERFORMING  
REQUIREMENTS ENGINEERING FOR AN INTER-ORGANIZATIONAL INFORMATION  
SYSTEM*

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## PREFACE

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## 1. INTRODUCTION

In 2017 the Dutch government gradually digitalizes the way in which it processes litigation procedures. This means that Dutch law firms will be obligated to communicate their litigation procedures and communications digitally to the Dutch Judicial Administration (DJA), instead of using messengers and couriers to get their printed documents transported between law firms and courthouses. To enable this digital communication and transfer of documentation, twenty Dutch law firms have formed a collaborative body and have developed an information system that replaces the courier service.

Although a unique project in the Dutch law industry, collaboration between multiple parties in ICT projects is more common in other organizational environments (Premkumar & Ramamurthy, 1995). More and more companies realize that sharing knowledge and resources is an efficient way to boost odds for project success, and allow for bigger projects to be taken on (Gnyawali & Park, 2009). These collaborative endeavors do however mean, that multiple parties and their stakeholders need to agree on what is to be built. The first step in defining what is to be built is creating a set of requirements.

Requirements Engineering (RE) is a process in which ideally many different participants are involved to specify the needs of a system (Saiedian & Dale, 2000). In this specific situation the RE of the software project is to be performed with a more diverse group of stakeholders, compared to a traditional situation, in which the software only serves one party.

The inter-organizational relationships are fundamental for the success of a multi-organizational collaborative project (Premkumar & Ramamurthy, 1995; Kim, Park, Ryoo & Park, 2010). The quality of these relationships are largely the result of the (in)capability to manage the social and political factors that are in play (Premkumar & Ramamurthy, 1995). Even more so, when the collaborative project is concerning developing an Inter-Organizational Information System (IOIS), which is developed and is going to be used by competing firms. Coopetition, collaboration while simultaneously competing, has serious social and political implications that are to be managed, to ensure mutually beneficial collaboration (Gnyawali & Park, 2011; Ritala & Hurmelinna-Laukkanen, 2009).

In RE, social and political aspects also play a key role in the success of the activities involved. Discussion, negotiation, specification and decision modes, are social and political constructs, based on communication, understanding, strategic alignment, hierarchies and other power balances (Milne & Maiden, 2012). These form the basis for constructing a prioritized requirements bundle. We can therefore expect that the development of an IOIS in a cooperative environment, needs serious consideration of the social and political aspects that are in play.

This retrospective case study aims to shed light on such social and political charac-

teristics through the aforementioned case. In this study several stakeholders from the involved law firms are interviewed to identify their view on different social and political constructs that they have experienced throughout the development process of their new information system.

As digital innovation progresses exponentially, which in the popular media is often referred to as the Fourth Industrial Revolution, businesses and government bodies digitalize more and more of their work processes. Therefore it is important to keep studying how these changes are coped with, and what impact these may have on organizations. As these changes do not only touch upon the technological foundations of organizations, but also on social and political structures, this study aims to provide insight in these aspects. This means that it aims to provide understanding of social and political affectations on software development that is intended for digitalizing a branch of an industry. In this fashion, this study can be used by professionals, who find themselves on the verge of such a digital transformation, to be able to cope with the management of such social and political implications in comparable projects.

The thesis is structured as follows. Chapter 2 will identify how this research will contribute to academia, followed by the research questions, and methods. Chapter 3 contains an extensive literature review of established literature, which is analyzed and synthesized in Chapter 4. Chapter 5, elaborates on the scoping of the cases study research, for which the case situation is explained in Chapter 6. Hereafter the results from the conducted case study are explicated in Chapter 7, from which conclusions and propositions for further research are drawn in Chapter 8.

## 2. RESEARCH CONTRIBUTION AND METHODS

The following section will discuss the research contribution of this study. This includes the topics that have already been researched, what questions are still open in this field and what this research will focus on (Section 2.1). The research question and methods will be elaborated accordingly (Section 2.2). In Section 2.3 the methods for finding the answers to the research question are addressed.

### 2.1 Established research

Requirements Engineering (RE) is a field that features extensive studies and theories. It is credited to be a crucial part of the software engineering process (El Emam & Madhavji, 1995) and failure in software projects can commonly be related to deficient requirements (Hofmann & Lehner, 2001). Even though theories on RE are abundant, practitioners are not always able to apply these in actual Requirements Engineering processes within the industry (Sadraei, Aurum, Beydoun & Paech, 2007; Galliers & Swan, 2000). It is therefore essential to know how the RE practice relates to its theoretic counterpart.

Several case studies have been performed on the industry's practical application of RE. Most of these focus on a large variety of businesses, trying to identify common problems in fairly common business contexts, such as studies from El Emam & Madhavji (1995) and Sadraei et al. (2007) and recently Fernández et al. (2016). These studies effectively map what RE problems are most commonly encountered during a software development process. But, not all software projects share the same contexts. Software projects may be very context specific regarding the involved stakeholders, end users and environments.

One example of such a context specific situation is one in which several competitors collaborate to realize a software product. The practice of collaborating, while simultaneously competing, has been widely accredited as *coopetition* (Bengtsson & Kock, 2000). Coopetition is a relatively new term in scientific research, but has been gaining popularity over the last two decades. Most of the research done on this subject focusses on the benefits and risks involved in the collaboration of two competitors in a general scope. Specification of coopetition within software engineering has yet to receive broad attention from the academic world, and especially on the subject of RE.

Coopetition in RE is an interesting research area due to RE's characteristics of knowledge exchange, idea sharing and openness of wishes. One major benefit of cooperative alliances is the ability to share resources, financial as well as knowledge based assets, but due to the competitive nature of the firms involved in coopetition, these knowledge based assets may be restricted to avoid opportunistic behavior of the rivalling firm. Risks as such may induce tension between the firms as described by van Wassenhove (2016), who describes a case study in which the boundaries between collaboration and competition have

been tense between the four involved parties of a Logistics Emergency Team. Competitive tension may result in a lack of trust between the firms as shown in a telecoms cooperative case stated by Hsieh and Lo (2010), which seriously harms collaborative potential.

The introduction of a cooperative environment seems to be disturbing to the RE process on socio-political grounds. The influences of these socio-political factors, as well as other human factors, on the RE process have been acknowledged by the academic field (Goguen, 1994; Milne & Maiden, 2012; Galliers & Swan, 2000; Bergman & Lyytinen, 2002). Even though discussed, this view of RE is often overlooked in prescriptive literature, and the RE literature as a whole is lacking in-depth discussion of the need to incorporate such perspectives in the practice of RE (Bergman & Lyytinen, 2002), instead of treating RE as a largely technological discipline.

Another relevant research domain is the study of IOISs. IOISs are information systems that allow information transfer between different companies, to ensure efficient communication and appropriate and consistent data interchange. Research on IOISs is mostly focused on supporting a buyer-seller inter-organizational relationship. An example of this is an information systems that integrates the supply chain of several business partners (Choudhury, 1997). Not befitting this profile, the law domain has received little attention in this respect. Primarily the automotive, retail, grocery and manufacturing industries, which are typified by a clear supply chain structure have been the focus of research (Chaparro-Peláez, Pereira-Rama & Pascal-Miguel, 2013; Lee, Kim & Kim, 2013; Premkumar & Ramamurthy, 1995).

Also, research on IOISs is mostly based on the strategy, reasoning and decision mode of adopting an IOIS. That is to say, the aspects that need to be considered, when choosing to adopt and implement an "off-the-shelf" IOIS. However important these strategic choices are, little to no attention is given to the collaborative development of an IOIS.

Literature on IOIS is not very recent. The reason for this, is the emergence of a new terminology that has replaced IOIS, namely: supply chain management. This is not surprising considering that IOIS literature was mostly characterized by a buyer-seller relationship. Considering the fact that this research does not study a buyer-seller relationship, the term IOIS will be used instead of supply chain management.

## **2.2 Research questions**

As shown above, the topics of RE, competition and IOISs are all research domains that are fairly mature. It is, however the boundaries of these research domains, that allow for posing additional questions. In this section the research questions shall be posed that will be answered through a literature review and a case study.

The practice of RE in a competitive environment aimed at developing an IOIS is not

an industry wide practice, but as the case situation shows, may very well be happening more and more in the future when governments and other organizational bodies continue their efforts to digitalize their work processes. An example that demonstrates this, is the growing body of work on E-Governments (Ziemba, Papaj, Zelany, Jadamus-Hacura, 2016).

Social and political forces are evident to be present in the domains of RE, coopetition and IOISs, and have all explicitly been shown to affect the processes involved. The social and political implications of such efforts are in need of further investigation to shown what managerial understanding is needed in order to successfully complete a project in such environment. To do so, we need to know *how* and *what* processes are influenced by socio-political aspects, not only inherent to coopetition, but also to each process of RE in the development of an IOIS.

To specify what this means, it is needed to clarify what socio-political aspects are. In this study socio-political aspects, are in the first place, but not limited to, matters concerning *communication, power relations, decision making processes, political influence and conflict*. The importance of these topics is continuously stressed throughout several studies on the socio-political aspects of RE (Bergman & Lyytinen, 2002; Galliers & Swan, 2000; Milne & Maiden, 2012). While conducting this study, other important aspects may however emerge. These aspects are all related to the inter-human relationships within a business environment. If so discovered, these elements will be added to the matters mentioned above. Subsequently, the following research question (RQ1) is posed:

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**RQ1:** *What socio-political aspects characterize cooperative RE for an IOIS?*

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This question can be broken down into three main components, that lay the foundation for answering RQ1, namely the socio-political characteristics of RE, coopetition, and IOIS development. These can be translated to the following sub-questions (SQs):

---

**SQ1:** *What socio-political aspects characterize RE?*

**SQ2:** *What socio-political aspects characterize coopetition?*

**SQ3:** *What socio-political aspects characterize IOISs?*

---

Each of these sub-questions shall be addressed through existing literature in each domain, to uncover the existing socio-political views on these separate topics. These will then be combined and studied in the case study to reveal whether they show commonalities with the aggregated practical situations or whether additional characteristics should be considered.

Answering this research question will capture the essence of socio-political influences on the RE process for developing IOISs in cooperative environments, and stress the need for further research by supplying a starting point for the practical approach for socio-politics in RE.

### 2.3 Research Methods

This research will be of a predominantly qualitative nature, because social and political influences are mostly experience-based, but also because the Requirements Engineering processes will presumably be viewed differently by different stakeholders. Furthermore, opinions on where problems can be identified will differ among people and companies involved. Also, the *why* and *how* aspects are to be examined to captivate the essence and motivation of choices made in the RE process. This means that the measurements are hard to quantify and a qualitative approach is preferable.

This study is conducted using two main methods. First, an extensive literature research is done to establish an understanding of the scientific merit of the topics. This will help establish expectations and clear directions for the contents of the interview protocol, which will examine *how* and *why* practice performs cooperative RE of an IOIS the way they do and what socio-political influences can be discovered. An overview of the study can be found in Figure 1.

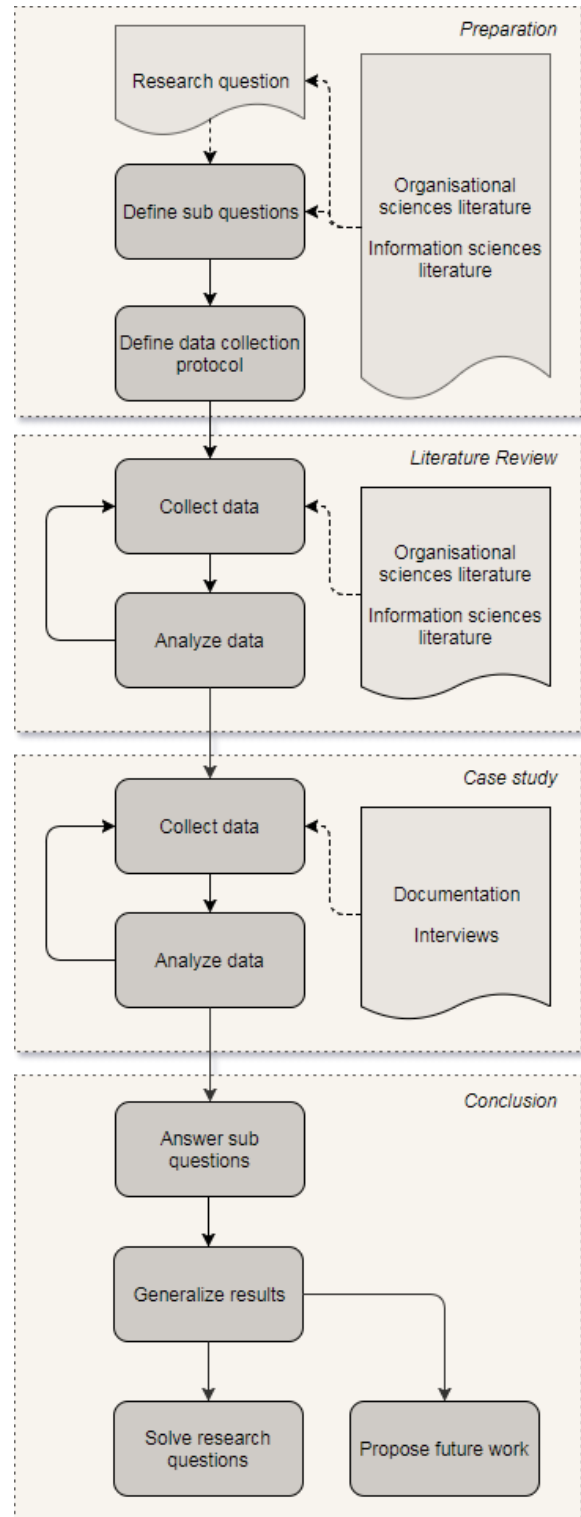


Figure 1: Overview of the study

### 2.3.1 Literature review

Identifying the common ground of established Requirements Engineering, Cooperation and IOIS theories through an extensive literature review will show how socio-political aspects of cooperation may influence these RE practices. Through this literature review a set of questions is constructed, which form the basis of the interview protocol. The literature review is conducted by extensive database searches including, but not limited to, *Google Scholar*, *IEEE-Xplore*, *ACM-DL*, *Elsevier's ScienceDirect* and *SpringerLink*.

These database searches will be complemented with the well-established snowballing method (Wohlin, 2014), aiming to find the most applicable pieces of literature to this context starting from the software engineering and organizational sciences domains. Figure 2 shows the combined procedure of the database search and the snowballing technique. Starting papers for the snowballing technique, were predominantly introductory papers on the current states of the different research area's (Cheng & Atlee, 2007; Irandoust & Benaskeur, 2008; Walley, 2007). Throughout the literature review new search terms were introduced, resulting in additional starting papers for snowballing.

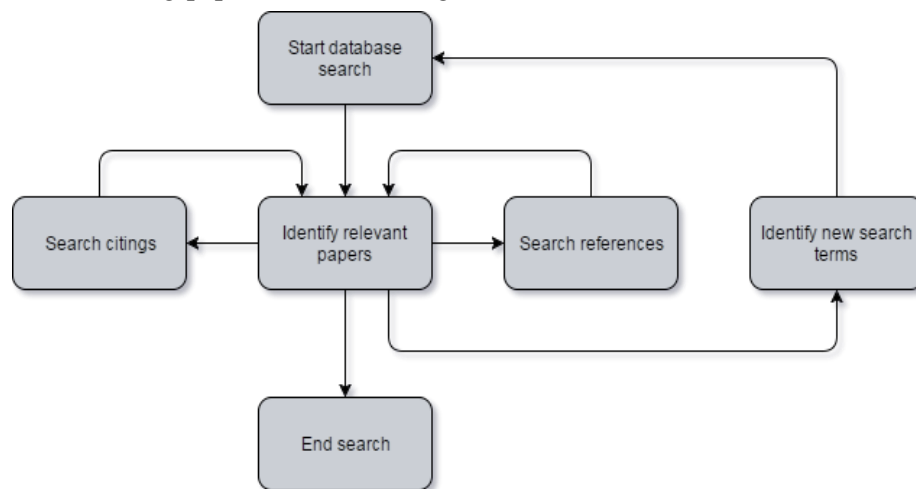


Figure 2: Literature review

The results of the literature study are found in Chapter 3, while further analysis and synthesis to fill the gaps of the literature are found in Chapter 4.

### 2.3.2 Case study

To conduct the case study, this research will adhere to the standards and guidelines proposed by Runeson and Höst (2008) for performing a case study in software engineering projects. Said article aggregates information from over sixty scientific sources to propose a set guidelines and best practices in performing case study research in the software engineering domain. According to the authors, case studies are performed through five steps: 1) Defining the objectives and planning of the case study in the *case study design*; 2) Defining procedures

and protocols for data collection, for which the methods will be discussed further on in this section; 3) Collecting the evidence data; 4) Analyzing the collected data, for which the methods will also be discussed later in this section; And 5) reporting the findings and conclusions.

### **Case study design**

Runeson and Höst (2008) state that the case study design should at least contain the following six elements: Objectives, the case, theory, research questions, methods, selection strategy. As this study combines two research strategies, namely a case study and a literature review, the case study design elements are spread throughout the document. Having stated this, the objectives, theory and research questions have already been discussed earlier in this document, so will not be repeated here. The rest of this section will discuss the data collection methods, the data selection strategy.

### **Data collection methods and selection strategy**

In order to acquire the data needed to study the situation of the case and to discern socio-political issues that are experienced in their RE processes, two primary methods of information gathering shall be applied. The first will be the review of archival data. These data will comprise of documentation generated throughout the development process within the consortium. These archives shall then be catalogued to give insight into the types of documents, subjects and information that is available. Furthermore, these will be analyzed to sketch the first image of the RE processes.

To complement this first image, and for ensuring a knowledge base existent of multiple sources, interviews shall be conducted with different stakeholders. As documentation generally does not include a lot of opinionated information, the interviews allow for inclusion of opinions on the effects of cooperation on the RE processes that have taken place. Additionally, these interviews are meant to ensure no information missing in the documentation will be overlooked, and to incorporate subjective information, like opinions and personal struggles involving the RE processes.

By conducting interviews with different involved stakeholders, with different functions and from different layers of the case companies, and using the documentation that has been composed during the Requirements Engineering process, the method that has been used will be identified, as well as how the inter-firm relationship has affected the RE processes

### **Data collection protocol**

As mentioned above, the empirical data is collected in two ways: by accumulation of archived documentation and by conducting interviews. The first step of accumulating the required archived documents is requesting all documentation available on the software project from the project manager, who has stewardship of these archives. These documents are then



catalogued in an overview on basis of type, subject, process, content and relevance. The most important documents that were used are catalogued in Appendix A.

The interviews are conducted in a semi-structured format, containing open questions to allow for the interview to flow naturally and not be inhibited by a strictly specified protocol. This protocol of the semi-structured interviews evolves over the span of the interviews to allow for new insights to be incorporated and discussed. A total of 11 interviews are conducted with stakeholders from 8 different firms. The final version of the interview protocol can be found in Appendix B. Regardless of what the contents of the interviews may be, they will always be transcribed to allow for further analysis.

The data collection process shall always be iterative until a level of information saturation has been reached, as shown in Figure 3.

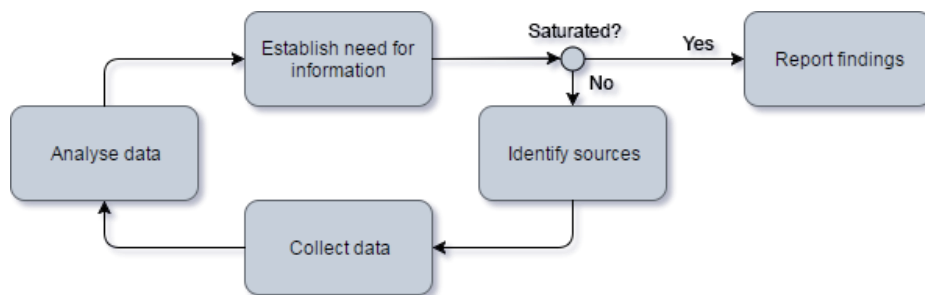


Figure 3: Data collection protocol

### Data analysis

All interviews are recorded and transcribed accordingly. These transcriptions are then analyzed with support of QSR-NVIVO software tooling for annotating and analyzing qualitative textual data. The data is labelled in different categories to identify how certain themes are responded to throughout all the different interviews. Based on these results, conclusions can be drawn to show how the case deals with the effects of cooperation on their collaborative RE processes.

### 3. LITERATURE REVIEW

This section will dive into the established academic literature to construct an understanding of the socio-political characteristics of RE, cooperation and IOISs. These understandings will then be combined in the next section to express a combined notion of these research fields.

#### 3.1 Requirements Engineering

To understand how RE works in practice, we have to define what requirements are. Chemuturi (2013, p.3) aggregates a definition from the *IEEE standard 610* and *CMMI for Development version 1.3* as “a need, expectation, constraint or interface of any stakeholders that must be fulfilled by the proposed software product during its development.” A more popularly adopted definition has been given by Robertson and Robertson: “A requirement is something the product must do to support its owner’s business, or a quality that it must have to make it acceptable and attractive to the owner” (2012, p.9). When defining this need, expectation or constraint it is important that it adheres to some characteristics as defined by Hull (2010). According to the author, they need to be *unambiguous, testable, and necessary for product acceptability* and they need to *adhere to specified quality assurance guidelines*. Robertson and Robertson (2012, pp.10-11) discern three types of requirements that can be distinguished, which roughly cover Chemuturi’s definition, namely: functional requirements, non-functional requirements and constraints. Table 1 reviews their definitions according to Robertson and Robertson (2012).

Table 1: Definitions of the different types of requirements according to Robertson and Robertson (2012)

Type of requirement	Definition
Functional requirement	An action that the product must take if it is to be useful to its operator.
Non-functional requirement <sup>1</sup>	Properties, or qualities that the product must have if it is to be acceptable to its owner and operator.
Constraint	Global requirements, which can be limitations on the project itself or restrictions in the eventual design of the product.

With these three distinctions, we can now see that requirements define capabilities of *what* a product must do, *how* it must do it, and to *what constraints* it must adhere.

RE can be naturally described as the engineering of requirements, metaphorically analogous to the physical engineering practice. This comparison is true for most part of the processes that can be associated to RE, as engineering relates to utilizing knowledge and

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<sup>1</sup> Also referred to as "quality requirement", but as the case companies use "non-functional requirement" this term will be adhered to.

principles to design, build, and analyze objects (businessdictionary.com, n.d.). These elements can be linked to the processes of RE. Hull (2010) defines RE as “the subset of systems engineering concerned with discovering, developing, tracing, analyzing, qualifying, communicating and managing requirements that define the system at successive levels of abstraction.” This definition shows that a high variety of efforts are related to the engineering of requirements as does the engineering of a physical object.

These efforts can be captured in four main activities, according to Sommerville and Sawyer (1997), as shown in Figure 4, namely requirements elicitation, requirements analysis & negotiation, requirements documentation and requirements validation. As shown this is a continuously iterative process, which is especially the case in RE, as throughout the development of the product new or changing requirements are presented, analyzed, documented and implemented. This means that even the agreed requirements can be used as input for the requirements elicitation.

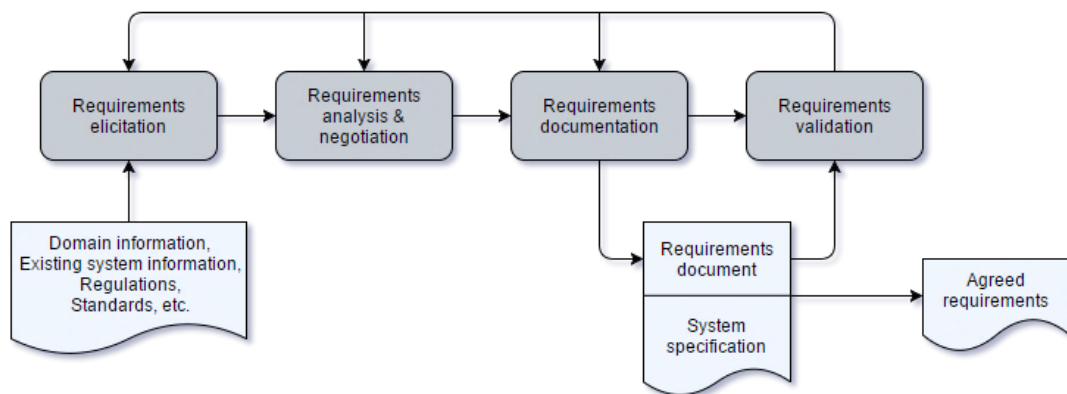


Figure 4: RE process as defined by Sommerville and Sawyer (1997)

Paetsch, Eberlein and Maurer (2003) add a fifth major activity being requirements management. All these activities are elaborated on in the following sections.

### 3.1.1 Requirements elicitation

Elicitation covers the discovery and capture of requirements (Hull, 2010). This discovery and capture of requirements, but also of the system context, is done by consulting the stakeholders of the software project. Understanding the system context, like application domain, business needs, system constraints, stakeholders and the problem at hand, are essential factors in eliciting appropriate requirements (Paetsch, Eberlein & Maurer, 2003). The most important elicitation techniques are:

- **Interviewing** stakeholders to discover facts and opinions on the system.
- Setting up **use cases** or **scenarios** to describe interactions between system and users.

- **Observation** of users to discover user behavior.
- Hosting **focus groups** to invoke stakeholders from different backgrounds to reflect on the system and devise a multi-disciplinary view on the matter.
- Having **brainstorming** sessions to capture and evaluate new ideas.
- **Prototyping** to give users a better understanding of the system.

*(Paetsch et al., 2003)*

### 3.1.2 Requirements analysis and negotiation

Elicited requirements are not always complete and may be vague and unstructured in their formulation. Analysis may lead to the identification of missing requirements, inconsistencies and conflicts (Sommerville & Sawyer, 1997). This means that the requirements that have been elicited, need to be analyzed to ensure their necessity, consistency, completeness and feasibility (Paetsch et al., 2003).

Necessity and feasibility may be negotiated to determine whether or not the requirement needs to be implemented in the product (now, or ever) or changed to allow for valuable implementation. According to Paetsch et al. (2003) this analysis and negotiation is mostly performed through one of the following techniques:

- **Joint Application Development (JAD)** in which group sessions, made up of participants from different backgrounds cater for discussion the requirements on various levels of detail to promote understanding and cooperation between the stakeholders.
- **Requirements prioritization**, which is best applied in fast moving projects, to prioritize which features to deliver first. The priorities of the requirements are determined through input of both the developer and the customer to include both demand and risks.
- **Modelling** the requirements into, for instance, data flows can reveal how the system may operate and reveal inconsistencies and other problems. Several modelling techniques can be used to prepare the requirements for analysis.

### 3.1.3 Requirements documentation

The documentation of requirements is an integral part of the RE process. According to Power and Moynihan (2003) and Paetsch et al. (2003) the requirements document serves several purposes:

- It serves as a means for communicating the requirements between different stakeholders and the developers.
- It serves as a set of agreements between the developers and the clients.
- It serves as a basis for estimating the costs of development, money- and time-wise.

- It serves as the input for design, analysis, evaluation and testing of the product.

There is no general consensus on the design and contents of the requirements document, as many different insights are proposed throughout the scientific world. But, in whatever way this document is constructed, the essence of the documentation is that there can be no ambiguity in the documented requirements (Chemuturi, 2012).

### **3.1.4 Requirements validation**

The validation process aims to certify that the requirements are acceptable (Paetsch et al., 2003) and that they meet the intentions of the stakeholders (Hofmann & Lehner, 2001). This means that problems with the requirements in the requirements document are identified and resolved so that all stakeholders can sign off on the validated requirements (Paetsch et al., 2003). Chemuturi (2012) proposes several techniques to support validation, including brainstorming, story boarding, prototyping, expert reviews and end user reviews. These techniques do not exclude one another. They are used to guide the validation and to discover potential problems within the requirements.

### **3.1.5 Requirements management**

The management of requirements is not a singular, bounded activity. It encapsulates the documenting, analyzing, validating of the requirements throughout the software project (Chemuturi, 2012). From the first instantiation until the final implementation of a requirement, they are managed to ensure that the requirements represent the needs of the stakeholders and are implemented as such. Or as Chemuturi (2012) puts it: "the process of requirements management begins with the starting of the project and completes with the ending of the project." Requirements management is not very different from management of other endeavors as it concerns identifying the needs of the project, constituting a planning and identifying what output is to be expected (Hull, 2010).

### **3.1.6 Dimensions of RE**

RE should not exclusively be seen as a sequence of activities. Klaus Pohl (1994) describes RE as an abstract process of requirements transforming the *initial input* into the *desired output*. To get to the desired output, the requirements are subjected to three dimensions: specification, representation and agreement, as shown in Figure 5.

According to Pohl (1994) reaching the desired output requires fulfilment of the following three goals:

- Improving an opaque system comprehension into a complete system specification.
- Transforming informal knowledge into formal representations.
- Gaining a common agreement on the specification from personal views.

The path in reaching these goals is the *trace of the RE process*. This trace contains all the alterations and decisions that have been made concerning the requirements. Pohl's vision of RE and the process-structure of Sommerville and Sawyer (1997) complement each other, in the way that the trace in Pohl's theory could be replaced with the process-structure of Sommerville and Sawyer. This means that starting with the initial requirements elicitation, iterative construction of *specification*, *representation* and *agreement* will result in the desired output of the agreed requirements.

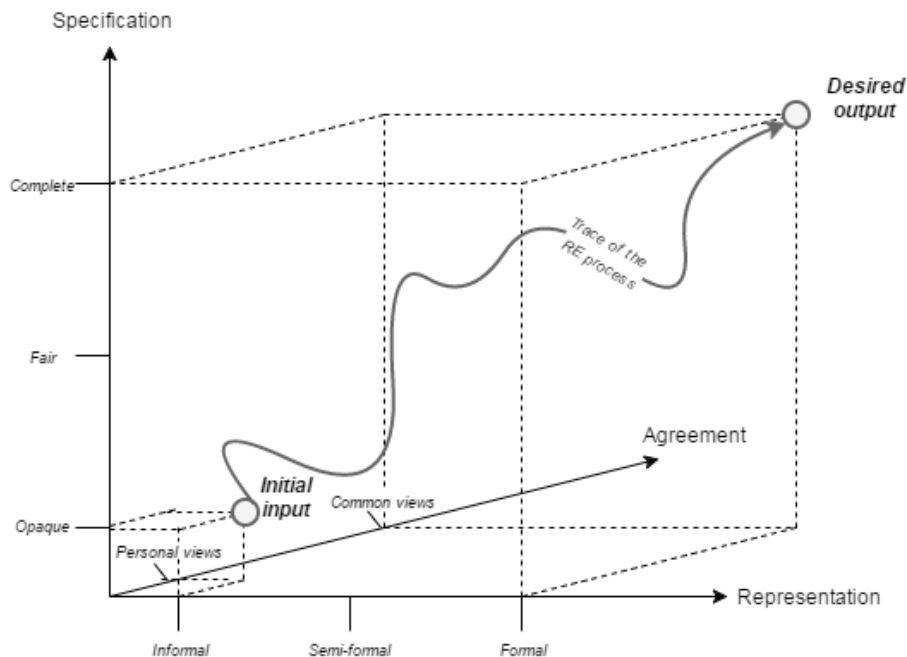


Figure 5: Pohl's RE dimensions (1994)

### 3.2 Coopetition

Ever since the rise of capitalism, the different relationships between competitive parties have been studied. Predominantly competitive or collaborative relationships have been the focus of research (Walley, 2007). Only around the twenty-first century, has the interest in collaboration between competitors, as a benefit to both parties, been sparked. Coopetition was defined in 2000 as the "*relationship that emerges when two firms cooperate in some activities [...] and at the same time compete with each other in other activities*" (Bengtsson & Kock, 2000). The act of cooperation, while at the same time competing has been widely acknowledged as coopetition over the last decade. This term is more generally defined by Gnyawali and Park (2011) as "*simultaneous pursuit of collaboration and competition between a pair of firms*". As "*dyadic and paradoxical*" (Bengtsson & Kock, 2000) as this relationship may seem, it shows that there are serious potential benefits to be considered for all parties involved (Zineldin, 2004; Gnyawali and Park, 2011; Chin et al., 2008; Walley, 2007; Bengtsson & Kock, 2000).

According to Gnyawali and Park (2011) cooperation greatly helps technological innovation. The authors argue that innovative firms cannot keep a leading position if no partnerships are made, including partnerships with rivals. Bengtsson and Kock (2000) state three different advantages of cooperation, derived from strategic alliance theories:

- Firms complement and enhance each other in several areas
- Firms can reduce (or divide) costs and risks
- Firms can transfer/share (technological) capabilities

Other drivers for cooperation relating to technological challenges in innovation, as stated by Gnyawali and Park (2011), are that:

- **Products life-cycles are getting shorter**, because of the speed of technological improvement and volatile customer preferences. This leads to the need for companies to expedite their innovation efforts, which can be done by collaborating with competitors.
- **Technologies are converging**, leading to more uncertainty in the market. This means that firms may reach out to competitors to share risks and combine sophisticated technologies.
- **Expenditures in R&D are rising** due to the fast paced innovation markets. Collaborating with competitors offers firms the chance to share costs and combine for a larger R&D budget.

Obviously, there are also risks attached to cooperation, especially in contexts in which company knowledge is shared. Expropriation of knowledge, lack of trust and loss of competitive edge all need to be considered in the establishment and management of cooperative alliances.

With these factors in mind, several authors constituted sets of propositions on the influences of cooperation based on empirical research. By cataloguing these propositions we find four main themes: business characteristics, cooperation benefits, cooperation risks and cooperation management. These themes will be elaborated upon in the following section.

### 3.2.1 Business characteristics

Not all businesses are likely to endeavor in cooperation practices. It is very dependent on business context and situations in which cooperation may be advantageous. Walley (2007) proposes several business characteristics which are commonly found in cooperative environments. According to the study cooperative relationships are most likely found in industries that are:

- **Concentrated**, meaning that cooperation is found in industries in which there is a high density of players, making competition fierce.
- **Less munificent**, meaning that the players are not in a monopolizing market position.

- **Regulated**, meaning that the industry is subjected to a set of rules and regulations imposed by government bodies.
- **Global**, meaning that cooperation is mainly found in big industries, with widespread presence.

Gnyawali and Park (2011) add that firms pursuing a prospecting strategy, like investing in new technological innovation, are also more likely to engage in cooperation. Furthermore, the authors add that cooperation is mostly found in industries characterized by short product life-cycles, technological convergence and high R&D costs, as discussed earlier. One prominent example of this is discussed in "*Co-opetition between giants: Collaboration with competitors for technological innovation*" by Gnyawali and Park (2011). This study describes how Samsung and Sony collaborated on the innovation of a new technology for LCD panels for television screens. This collaboration significantly increased their combined market share by combining their R&D expenditures in a fast paced technological market. By spreading risks and sharing capabilities the technological innovation within the market segment was boosted significantly, also triggering other competitors to build cooperative relationships, further boosting innovative endeavors. (Gnyawali & Park, 2011)

### 3.2.2 Cooperation benefits

There are several advantages that can arise from cooperation. Complementarity of resources is most recognized and tangible to the parties involved. This is especially the case if there is heterogeneity of unique resources, which the parties can share (Bengtsson & Kock, 2000). Additionally sharing a common knowledge base increases the value-creation potential in innovation, as knowledge of markets and technologies are key factors. Also, a wider network of contacts can be established by sharing a relationship base, further increasing the reach of the cooperative alliance (Ritala & Hurmelinna-Laukkanen, 2009).

Due to the aforementioned benefits, cooperative alliances may strengthen the combined market position to be able to compete against bigger players or speed up the developing process (Gnyawali & Park, 2011).

The goal for cooperation is, naturally for both parties to mutually benefit from the alliance, which is best achieved if the level of goal congruence between the members is high as well. This meaning that if both parties are looking for the same result, this result is best achieved. (Gnyawali & Park, 2011)

Aside from the cooperation partners, also the consumer may benefit from the alliance. "*For instance, firms can pool research and development activities to obtain the rewards of new product development by bringing customers products that they could not bring individually or could not bring at the same price.*" (Walley, 2007). This means that consumers may



have access to innovations that would not have been available if not for competitive cooperation. These benefits of cooperation are summarized in Table 2.

### 3.2.3 Coopetition risks

Opposing the benefits, there are also certain risks that need to be taken into account when contemplating a cooperative alliance. These are inherently present due to the competitive nature of the partnering firms.

Aspirations to become market leaders, or to at least trump their competitor, directly conflicts with the aspect of collaboration. This means that opportunism by one of the partners can have serious consequences to the other and may lead to lack of trust even before the project has been initiated (Gnyawali & Park, 2011; Ritala & Hurmelinna-Laukkanen, 2009).

Furthermore, cooperation of companies in a competing market can "flatten" the market so that the variability of what is offered declines. This can have consequences for both parties involved in the alliance as this means that they lose their market position or competitive edge (Ritala & Hurmelinna-Laukkanen, 2009). These risks accompanying a cooperative endeavor are summarized in Table 2.

*Table 2: Benefits and risks of cooperation*

<b>Benefits</b>	<b>Risks</b>
Complementation of resources	Opportunism
Complementation of knowledge	Lack of trust
Wider contact network	Flattening of the market

### 3.2.4 Coopetition management

The relationship formed during cooperation is one that needs a proper balance between competition and collaboration. Zineldin (2004) goes as far as drawing parallels between managing a cooperative alliance and marriage:

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*"[...] setting up and maintaining a successful co-opetitive relationship has close parallels with marriage. There is a courtship period, when both parties get to know each other. Then there is a ceremony, the signing of the business contract, which binds both parties to certain terms and conditions. Conflicts may arise in due course. They can be resolved if the mechanism is clear and agreed. If not, there is the constant spectre of divorce, initiated by one party or the other."*

(Zineldin, 2004)

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In order to harvest the benefits and mitigate the risks involved in this "marriage", managing principles are set in place.

Ritala & Hurmelinna-Laukkanen (2009) suggest that in cases of knowledge transfers between the competitors, companies may restrict knowledge to diminish the risk of expropriation. These restrictions are set in place by the management to ensure that only the appropriate knowledge, that which is essential to the collaboration, is transferred. Mitigating these odds of opportunistic usage of competitive knowledge, by managing what is and what is not transferred, may also limit the influence of trust issues as the opportunity for 'abuse' is no longer present. Even though restricting knowledge sharing may also limit the potential outcomes of the collaboration as not all available knowledge is shared between the parties, the instigation of obstacles to imitation may well outweigh this problem (Ritala & Hurmelinna-Laukkanen, 2009).

These issues, concerning knowledge sharing and barriers involved, touch upon the scientific area of Knowledge Management as well. A study on knowledge management in strategic alliances by Norman (2002) shows that knowledge restriction between partnering firms is indeed an issue, especially when trust between the partners is low. Close management of knowledge and communication flows is suggested to be an important way to protect a firm's knowledge. These protection efforts are shown to be greater between firms, when the partners have similar resources, and when the partner has a high learning intent (Norman, 2002).

The "flattening" of the market, as discussed in the previous section, can have disastrous results on the market positions of all involved in the cooperative alliance. To avoid this from happening, firms mostly choose to cooperate in areas that are not their core competencies, but areas that are supporting of these (Walley, 2007). In the case of the cooperation between Samsung and Sony, this has been achieved by not cooperating on the full production of LCD televisions, but just on innovation of screen technologies, maintaining a competitive environment in the television sales (Gnyawali & Park, 2011). However, if collaborating in core competency areas cannot be avoided, Walley (2007) suggests that firms can best adapt by treating different components of the relationship independently. This means that the collaborative components of the relationship are held separate from the competitive components. Bengtsson and Kock (2000) support this by acknowledging the fact that an individual cannot be competing and cooperating simultaneously, meaning that these contradicting logics of interaction need to be separated. This can be done by either dividing them through different units of the firms, or by appointing an intermediate organization to coordinate the cooperative alliance (Bengtsson & Kock, 2000).

### 3.3 Virtual Enterprises

In the organizational sciences, a concept that has emerged since the 1990's called Virtual Enterprises (VEs), strikes parallels with cooperative alliances. Like cooperation, VEs are characterized as being a temporary alliance between organizations, in which costs and skills are shared to exploit a certain business opportunity, which would otherwise individually not been achievable (Hardwick & Bolton, 1997; Gou, Huang, Liu & Li, 2003). As the term focusses on the industrial sector of manufacturing it is characterized as being part of the global supply chain of a single product of which its environment is constructed of a dynamic network of companies (Martinez, Fouletier, Park & Favrel, 1996). Notwithstanding its manufacturing focus, the term can still be useful when relating it to cooperative environments as *"it concerns collaboration among autonomous and not totally cooperative entities in a distributed environment"* (Gou et al., 2003).

To tend to their objectives and market opportunities, firms may join efforts in a VE to fulfil the requirements of a new product or service (Camarinha-Matos & Afsarmanesh, 1999). The main objective of this cooperative endeavor is to make different organizations work together in a collaborative and reactive manner (Martinez et al., 1996). This however, does not mean that competition is never part of a VE structure. Even though cooperation is the common denominator of all VEs *"individual companies have their own individual goals, sometimes even competing goals, and may naturally show different levels of distrust in openly cooperating with other VE members."* (Camarinha-Matos & Afsarmanesh, 1999). This is where cooperation becomes a part of a VE. Gou et al. (2003) agree on this parallel, stressing the need of individual companies collaborating, while maintaining their own approaches and procedures in an independent and secret manner.

VEs, when managed appropriately, seem to be the ultimate collaborative example of how different companies can function as a seemingly seamless whole (Martinez et al., 1996). Like a cooperative alliance, the lifespan of a VE can be discerned into four major phases: creation, operation, evolution and dissolution, of which the operation phase is of most stressed importance (Gou et al., 2003). In this operation phase communication and a shared information platform or repository are of utmost importance to sustain an open collaborative practice (Camarinha-Matos & Afsarmanesh, 1999; Martinez et al., 1996). Martinez et al. (1996) stress the importance of developing direct links between the partners, which obviously is eased nowadays with the availability of modern communication technologies.

As shown, cooperation shares many of the characteristics of VEs and can therefore aim to comply in characteristics of successful VE practices.

Managerial measures, mentioned throughout the previous sections, are very context specific and no one 'magic recipe' exists for all cooperative endeavors. Thus, a context specification is necessary, which is in this case the context of Requirements Engineering of a software project, which will be discussed in the following sections.

### 3.4 Inter-organizational Information Systems

Besides studying socio-political implications of how requirements may be constructed, it is also important to look at these implications of what the requirements are for, which is in this study an inter-organizational information system (IOIS).

IOISs have been focus of research for over three decades. In 1985 IOISs were defined as automated information systems that are shared by two or more companies (Cash & Konsynski, 1996). Over the years this relatively general definition has been made more specific according to the evolution of the industry. IOISs have mostly been deployed in inter-organizational relationships that have a buyer-seller typology, like manufacturing, automotive, retail and food (Premkumar & Ramamurthy, 1995). This makes it not surprising that nowadays IOIS research is mostly focused on Supply Chain Management (SCM). The following definition of IOISs exemplify this modern view: *"The concept of IOIS consists of the general idea of a collaborative system for supply chain management, enabling the flow of information between enterprise for competitive and collaborative advantage"* (Chaparro-Peláez, Pereira-Rama & Pascal-Miguel, 2013).

Understanding what SCM really is, makes it easier, to accept or reject the proposition that IOISs are per definition supportive of SCM. Stadtler (2015) defines Supply Chain

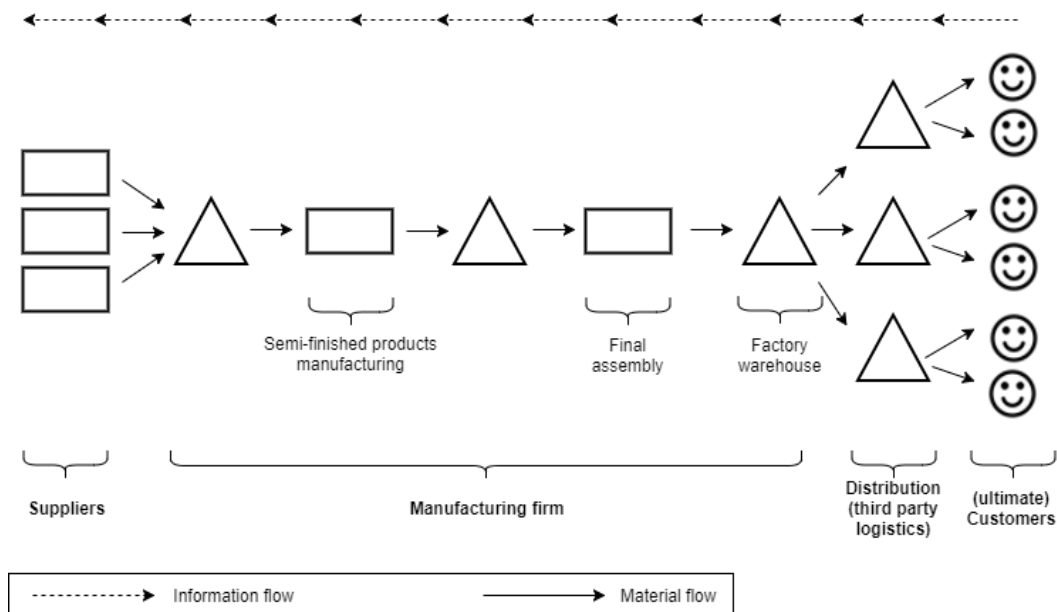


Figure 6: Example of a Supply Chain (Stadtler, 2015)

Management as “the task of integrating organizational units along a supply chain and coordinating material, information and financial flows in order to fulfil (ultimate) customer demands with the aim of improving the competitiveness as a whole”. The flow through the organizational units in such a supply chain are exemplified by Figure 6.

It is clear that the flow from raw materials, to a finished manufactured product, is the foundation of SCM. This, however, does not mean that it cannot be adapted to an information processing scheme, in which for instance litigation documents are the materials being transferred, and a final verdict by a courthouse being the final “manufactured” product. For this reason, this study will use, theoretical foundations based on IOISs focused on SCM and see whether these are applicable for non SCM use also. An example on how IOISs for information processing relates to SCM is given in Figure 7.

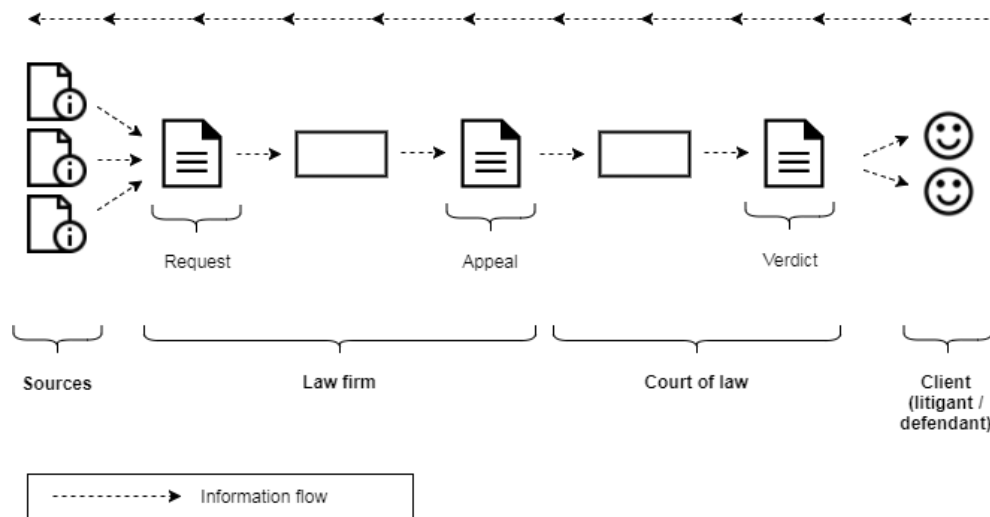


Figure 7: Example of adapting SCM to information exchange

Scholars have stressed that IOISs have a big impact on the institutional environment of an organization, but also the other way around, the institutional environment is a heavy influencer of the IOIS in question (Teo, Wei & Benbasat, 2003). This means that management of the social and political influences in the development and adoption of IOISs is paramount. Premkumar and Ramamurthy (1995) already stressed the importance of these influences, highlighting issues concerning power balance, resistance to change, stakeholder involvement and top-management support. The inter-organizational relationship between the partners can be of detrimental influence if there is a lacking commonality of goals (Chaparro-Peláez, Pereira-Rama & Pascal-Miguel, 2013), or inter-organizational trust (Lee, Kim & Kim, 2013).

A list of factors has been compiled by Allen, Colligan, Finnie and Kern (2000), that demonstrates the most important issues that need to be addressed, when adopting an IOIS. The list shows the major inhibitors of IOIS success (Table 3).

Table 3: Inhibitors of IOIS success (Allen et al., 2000)

Inhibitors of IOIS success	
In-effective communications	Cross-cultural issues
Lack of trust between participants	Resistance to change
Operational uncertainty	Disparate expectation levels
Differing objectives	Lack of user involvement
Changes in business processes	Lack of training of users
Information, data standards and protocol	Inadequate relationship management
Power relations and politics	

The above list shows that social and political issues need to be addressed in projects and research involving IOISs.

### 3.5 Political ecologies of decision making

Throughout the RE process politically challenged decisions have to be made. Different types of political ecologies may be at base for each of these decisions. Bergman and Lyytinen (2002) propose three different political ecologies that may be found in decision making in the RE process, of which the schematics can be found in Figure 8.

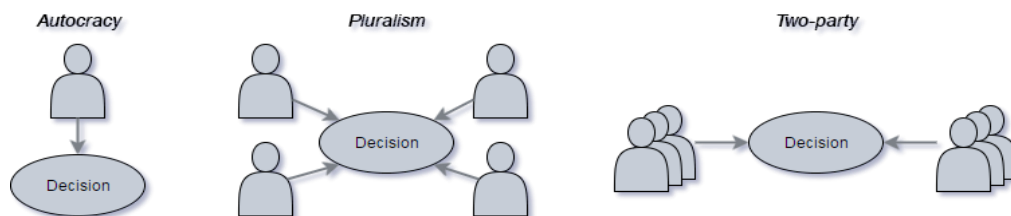


Figure 8: Schematic representation of political ecologies as proposed by Bergman and Lyytinen (2002)

- **Autocracy:** This ecology of decision making relies on one person or small group of people to make the political decision, to which the rest accordingly comply. According to the authors, this political ecology works for smaller, not very disruptive, or indisputable choices. Complex or important political challenges should not be addressed through this decision model, as it would be ineffective.
- **Pluralism:** This political ecology of decision making accommodates all the diverse interests of stakeholders involved, as long as they are reasonable. In an ideal pluralist ecology, all input is judged on its individual merit, but this does not mean that all input carries equal weight. Pluralism establishes a well-considered group of stakeholders, but sustaining a purely pluralistic decision model does not work very well for managing requirements, according to the authors. This seems likely, because of aforementioned socio-political influences, like goal and motivational incongruence.

- **Two-party structures:** In this political ecology, the stakeholders group together to form a front, supporting or opposing a certain set of requirements. The authors suggest that these ecologies are likely to be formed from pluralistic ecologies when disagreement and discontent are in play. This type of ecology is more likely to stably handle controversial political decisions.

## 4. LITERATURE ANALYSIS

To establish the relations between the three different topics, these theoretic concepts are analyzed, as to what extent they are applicable in the context of this study. This section bridges the gap between established theoretic frameworks and the combination of topics of RE, coopetition and IOISs, from a socio-political viewpoint.

### 4.1 Coopetitive RE

To establish what coopetitive RE really entails, this section will first identify relations of already established theoretic concepts and after this, associate these with the aforementioned theoretical assertions on RE and coopetition.

#### 4.1.1 RE processes and coopetition

As shown in Section 3.1, the RE process can be considered to be made up out of four main activities, namely: *elicitation*, *analysis & negotiation*, *documentation* and *validation*, which are controlled by the requirements management activity. In light of this research it is important to distinguish what activities may be affected by a coopetitive environment, as opposed to a "regular" single-company environment.

As discussed in Section 3.2, coopetition entails mainly the sharing of risks and benefits through sharing financial resources, competencies, knowledge and opinions. Financial resources which are shared in the collaboration are captured in contractual agreements and therefore not related to RE. Sharing competencies, knowledge and opinions however, do relate to the RE activities.

First, *elicitation* of requirements is based on the sharing of knowledge, insights and opinions of the stakeholders involved. This means that the risks of expropriation of knowledge, and lacking trust need to be managed. Several questions come to mind in this setting: Do all stakeholders feel free to express their needs? Are there knowledge sharing boundaries between the rivalling firms? And if so, how are these managed?

Secondly, *analysis & negotiation* of requirements may be affected by coopetition. Comparable to the characteristics of VEs, coopetitive firms have their own goals, therefore conflicts of interest may arise in the negotiation and prioritization of the requirements. Again, the same questions as before can be posed: Do stakeholders feel free to motivate their needs? Are the stakeholders limited in expressing the motivation for their needs? If so, how are these boundaries managed? But also, whether there are conflicts of interest, how is authority in decision making managed?

Thirdly, *management* of requirements can be subjected to the effects of a coopetitive situation. In a competitive environment, not only the management of the collaboration between the firms as a whole is subjected to Zineldin's marriage metaphor (2004), but also the



management of the requirements. This is reflected in the management of all the risks and benefits that affect each of the activities, throughout the endeavor.

The *documentation* and *validation* of the requirements are considered to be objective activities rather than subjective. This means that these activities will not be critically affected by its surroundings, and therefore not significantly affected by competition. This is due to the fact that the documentation of the requirements is not affected by opinions or input, as this activity describes the documenting of the output of the other activities. Also, validation is not affected by competition as the issues of colliding opinions and interests is concerned to have taken place in previous activities, as validation concerns the formal finalization of the requirements.

#### **4.1.2 RE dimensions and competition**

Revisiting Klaus Pohl's dimensions of RE, *specification*, *representation* and *agreement* of requirements to relate them to competition reveals how these dimensions are affected by a competitive environment.

The degree of *specification* of requirements goes hand in hand with the activities of analysis and negotiation of the requirements. The road to the desirable degree of specification is subjected to the opinions and input of the stakeholders involved to specify it from an opaque wish, to a specific requirement. The challenges that may be encountered due to the competitive nature of the RE process are concerned with the "freedom" of expressing specification and motivation of the requirements in terms of knowledge sharing. Also, different parties may agree on the first idea of the requirement, but differ when the idea is specified in terms of details, due to for instance different goals that are pursued. For this dimension the question arises again: How are boundaries for sharing inputs managed by the stakeholders involved? How are conflicts arising from competing goals solved? And also, how is authority on the specification managed?

Concerning the degree of *agreement*, competition may be of key influence. As mentioned before, conflicting interests are likely to be relevant between the different competitors. This obviously influences the degree of agreement and how the desired agreement is reached. It is very important for a competitive endeavor to be successful, that all parties involved feel like they are mutually benefitted. This means that agreement on the requirements is of utmost importance. It will be interesting to see how these are managed and how consensus on the requirements is reached.

The third dimension, *representation*, can be considered as a formal agreement, which is not influenced by the subjectivity of competitive relations. The degree of formality of the representation, just like the documentation, is a pre-composed standard that is not related to its contents. Therefore, this shall be considered to not be affected by competition.

### **4.1.3 Coopetitive RE management**

As discussed in the previous sections, proper management of the coopetitive relationship is needed to successfully perform RE activities and to fulfil the three requirement dimensions. Due to proper management, benefits from the coopetitive alliance may be harvested and risks mitigated.

In relation to RE these benefits include the sharing of a common knowledge base in developing requirements. This entails stakeholders expressing their true wishes and motivations for these wishes in requirements elicitation and analysis procedures. Reluctance or doubt about sharing knowledge and opinions on the desired functionality will inherently lead to incomplete satisfaction about the end product.

Additionally, sharing networks of contacts between firms may enrich the overall performance in their RE processes. Different stakeholders may be able to exploit these contacts in different ways. But once more, reluctance in sharing these contacts may inhibit the achievement of optimal results.

Harvesting the benefits of the coopetitive alliance also means mitigating the risks it brings. Full transparency of knowledge, motivations and network of contacts will inherently lead to risks of losing a competitive edge over the collaborating firms. This is why chances for opportunism need to be inhibited through the management of knowledge distribution and communication lines. Proper management of these areas will ensure no firm-specific knowledge is expropriated and will therefore grow trust in the competing partner firms, which in turn improves collaboration potential.

### **4.1.4 RE as a socio-political discipline**

When introducing a coopetitive environment to the RE process, we have distinguished that certain aspects of RE cannot be viewed as a purely technical discipline as traditional RE theory suggests. The suggestion that RE should be viewed also as a social discipline has been receiving more and more attention over the last two decades. Goguen (1994) already argued that social issues in software engineering, which cannot be modelled through the established technical methods, are proof of the need for a new approach to RE which takes into account the social and organizational environments of requirements. The traditional system development processes rely on structured approaches as a means of identifying requirements. However, this is problematic, because it fails to take into account the subjective nature of information use in organizations (Galliers & Swan, 2000). Several authors call for the need to reconceptualize RE as a social (Goguen, 1994; Milne & Maiden, 2012; Galliers & Swan, 2000) or as a political (Bergman & Lyytinen, 2002; Milne & Maiden, 2012) discipline.

The problematic key assumptions that frame traditional RE are that 1) requirements already exist within the minds of the stakeholders and that 2) the stakeholders operate with congruent goals in mind (Bergman & Lyytinen, 2002). These assumptions show to be problematic regarding the study of Goguen (1994), and more recent, Milne and Maiden (2012). The particular studies argue that requirements are to be assumed to be socially constructed and situated in a social context. They emerge from interactions between the different stakeholders and are subjected to the ever-changing context of the organization. Through this social context, interpretation of requirements can be contentious and contestable, and therefore open to political action.

Furthermore, Milne and Maiden (2012) argue that goal incongruence is inherently present in environments where individuals and groups work together. Even though resolving disagreement is regarded a fundamental part of RE, the authors stress that simply promoting collaboration and communication will not solve problems when goals between stakeholders are contradicting. These cases require a deeper understanding of the nature of social and political relationships between the stakeholders, as conflicts may depend on political action to be resolved (Milne & Maiden, 2012).

#### **4.1.5 Socio-political view on cooperative RE**

The understanding of RE as a socio-political discipline helps to understand RE in a cooperative context. As elaborated in previous sections, cooperation is also marked by the existence of discussion, communication difficulties, goal incongruence and political influences.

According to Milne and Maiden (2012) these human factors, that are often left out of scope in RE research, play an important role in the RE process. The authors express the need to incorporate these social aspects, especially in consideration of the requirement elicitation and prioritization processes, as these are characterized by individual motivation, emotion, and conflict (Milne & Maiden, 2012). As discussed in Section 3.3, these characteristics are also found in the interfirm relationships in cooperation. Therefore, these socio-political influences may very well be invigorated by such a cooperative environment.

Cooperation is marked by the existence of different values, goals, cultures and politics between the cooperating firms. As RE can be seen as a process of complex communication and negotiation, which is to be approached within the context of political, social, organizational and cultural issues (Milne & Maiden, 2012), the cooperative environment can well be expected to divide partner organizations and have influence in all of these contexts. These issues can vary from establishing stable networks of social and technical components in the midst of conflicts over resources and goals (Bergman & Lyytinen, 2002). These are issues, which again are relatable to cooperation.

#### 4.1.6 Layers of the socio-political environment

The aforementioned socio-political characteristics of cooptition can be found in several layers throughout the cooptitive environment. This section proposes a set of four layers, to encapsulate and delimit the different environments that may be in play. These delimitations can be used to generalize socio-political influences of groups of stakeholders, to be used in this but potentially also in further research.

The first layer, where socio-political influences can be distinguished in the *intrafirm environment*. In this layer, socio-political influences on RE that happen within each firm, part of the cooptitive alliance, can be found. Aspects of firm representation and input on the general RE process can be found here.

In the second layer, the interfirm or *cooptitive environment*, contains the socio-political influences on the RE process between the firms that are part of the cooptitive alliance. Aspects like hierarchy, role division, and interfirm bargaining for each firm's desired requirements can be found in this layer.

In the third layer, external stakeholders of the cooptitive alliance regarding the software product can be found. This can be seen as the *RE process environment*. These include advising parties, software producers and other direct advocates of the RE process. Even though these parties have no direct interest in the software product, they are still in chain of the RE process through a secondary interest, for instance because they are hired to do so.

The fourth layer includes parties that have no interest in the software product whatsoever, but do influence and shape its environment. These may include competing firms or other cooptitive alliances, law and policy makers, the software market driving competing products, or even the advancement of new technologies. This layer can be seen as the *influencing environment*.

Outside of these layers are all parties in the rest of the world, which in no way have any influence the RE process or conditions. The schematic of these layers can be found in Figure 9.

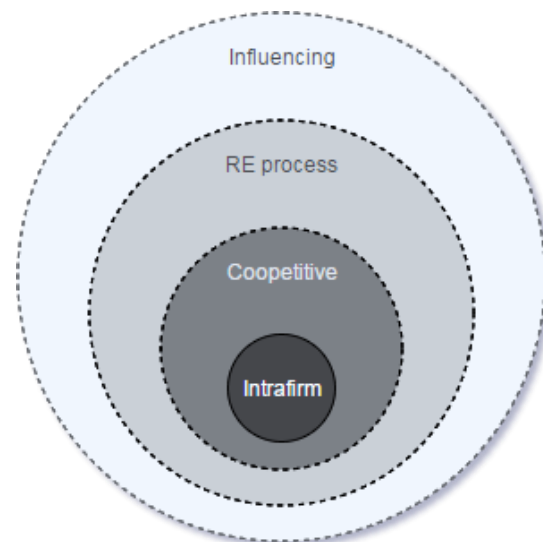
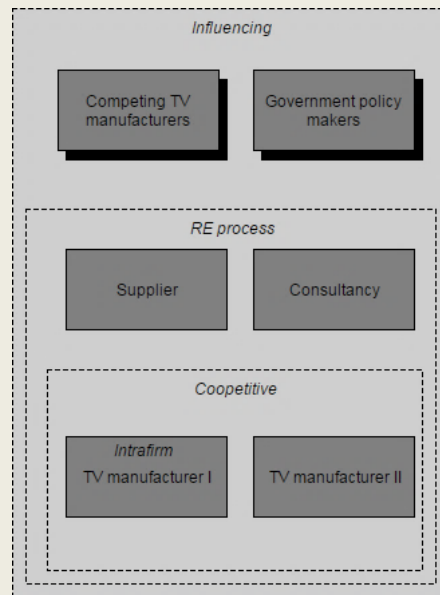


Figure 9: Four layers of socio-political environments of cooptitive RE

To illustrate how these layers can be used to delimit different stakeholder environments, an example of collaboration on the innovation in LCD screens, like the situation described in the study of Gnyawali & Park (2011), is shown below.

### ***Example of cooperative RE's socio-political layers - Innovation in LCD screens***

Suppose *TV manufacturer A* wishes to invest in developing an innovative new kind of LCD screen for the production of their TVs. To significantly enlarge their budget and R&D knowledge base, they decide to form a cooperative alliance with *TV manufacturer B*. Several stakeholders are influencing the development of the new TV screens, which can be divided into the four layers of socio-political environments as shown in Figure 10.



*Figure 10: Example of socio-political layers of the cooperative innovation of LCD screens*

#### ***Intrafirm:***

Within *TV manufacturer A* goals for the TV development are set after consulting the internal stakeholders and a working group is appointed to represent the firm in the cooperative alliance. These processes may be influenced by socio-political aspects in matters of wishes by different stakeholders, conflicts and hierarchies of power.

#### ***Cooperative:***

The cooperative alliance exists of *TV manufacturer A* and *TV manufacturer B*. The working groups representing these firms bargain for their needs to be represented in the development of the new LCD technology. Socio-political aspects within the process of decision making and communication are inherently present here.

#### ***RE-process:***

Directly influencing the needs and wishes for the new LCD technology are a consultancy firms, managing the cooperative alliance and the supplier of screen components. The consultancy firm influences the decision making process by aiming to fairly represent the common needs of the TV manufacturers and advising on prospected characteristics. The supplier can set constraints on innovative ideas, due to, for instance, their political stand on the manufacturing of certain components.

#### ***Influencing:***

Indirectly influencing the development process are competing TV manufacturers or cooperative alliances, which set the standard to which the new product must compete. Also, policy makers from governmental institutions can set constraints to the product in forms of, for instance, environmental standards.

-- Note that these are examples and that, while actually studying this case, a lot more stakeholders will need to be considered. --

## 5. CASE SCOPING

Concluding from the literature review and analysis, this section aims to limit the scope of this research to ensure the conductivity, as researching every single aspect that may influence cooperative RE on socio-political grounds in the slightest of ways is not very effective, and would stretch beyond the time-bounds of this project.

First of all, as discussed earlier, we find that socio-political influences are of a subjective nature. That said, we regard the subjective processes of the RE cycle relevant and the objective processes irrelevant. The processes that are relevant for this research then become *requirements elicitation* and *requirements analysis & negotiation*. The other processes, *requirements documentation* and *requirements validation* are regarded of objective nature and therefore left out of scope.

Secondly, the RE dimensions (Figure 5) are treated the same way. The dimensions of specification and agreement are regarded as being of subjective nature, and are therefore considered to possibly be affected by socio-political influences. The dimension of *formalization* is considered of objective nature, and is therefore left out of scope.

This means that the RE discipline that is considered in this contains two processes, which aim to fulfil two dimensions, of which a schematic is shown in Figure 11. Furthermore, these socio-political influences shall be considered within each of the four layers of the socio-political environments (Figure 9).

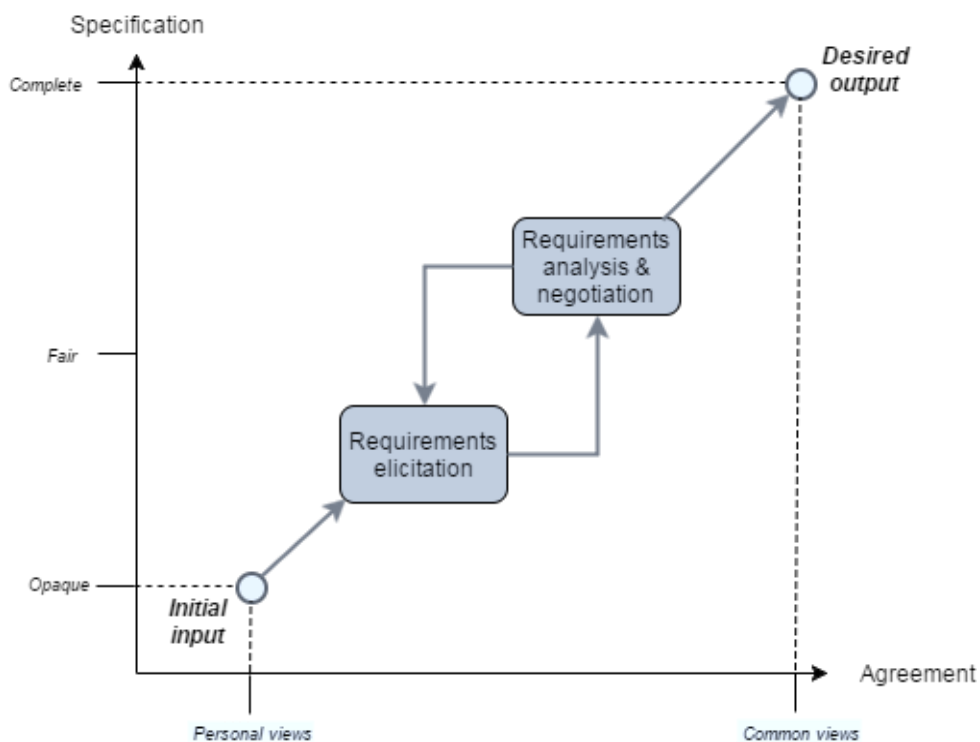


Figure 11: RE processes and dimensions within the scope of this research

## 6. THE CASE: SILEX

The Netherlands is modernizing their legal system to comply with the digitalization of society. To facilitate a faster and simplified legal system a program has been initiated by the DJA: Kwaliteit En Innovatie (Rijksoverheid.nl<sup>2</sup>, 2016) (in English: Quality and Innovation, further referred to as *KEI*). This program, guides legal procedures through a digital transformation by means of several phases. In each phase a different litigation case-type is digitalized. This digitalization means that all documentation transferred, to and from courts, shall be in a digital format to eradicate the use of paper documents.

Nowadays Dutch law firms still send their legal documents to courts through physical couriers, as, until *KEI* is in place, this has been legally required. To facilitate the digitalization of this courier service the Dutch Judicial Administration (further referred to as *DJA*) has developed a web portal through which law firms can connect and send their legal documents to the courts. Also a connection to the *DJA* is provided on which law firms can choose to build their own courier software if need be. The web portal had basic functionalities and therefore a limitations. For instance, it allowed for one document upload at a time, it is session based and progress on case work was not saved between these sessions. Furthermore, the web portal did not allow for a flexible authorization structure. This has shown to be problematic, especially for bigger law firms working big cases, which require many documents to be transferred in many iterations, and have the need for different authorization levels within a team working on a case. Also, the web-portal does not integrate with the Document Management Systems, disrupting the workflow within law firms. The web portal is therefore a good fit for law firms with low litigation frequencies, but not for firms that deal in higher numbers of litigation procedures. Because of this, a large number of law firms have seen the need to develop their own software for the provided connection, to ensure that their workflow is not disrupted by the limitations of the web portal and to exploit the opportunities

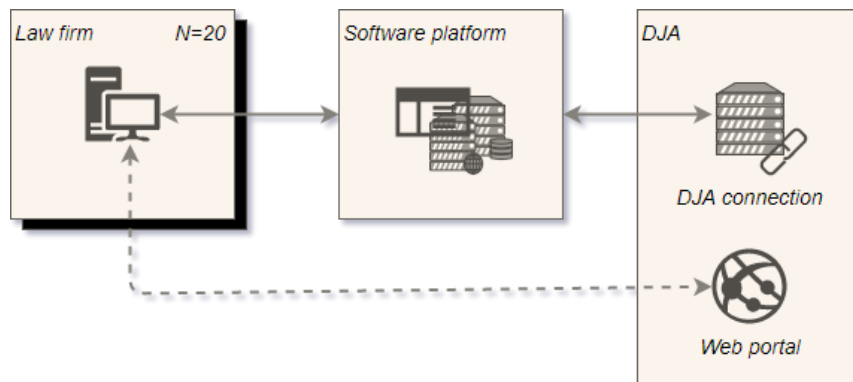


Figure 12: Representation of connection possibilities from law firms to DJA

<sup>2</sup> Dutch only.

that a self-conceived product may bring. Figure 12 shows a simplified representation of how the web portal and the software platform are situated between the law firms and the DJA. If each law firm would develop this software independently, to circumvent having to use the limited functionalities of the web portal, this may be a very costly endeavor, and would also limit the interoperability of the systems. Also a single law firm cannot be considered a serious conversational party towards the DJA. Forming a group of law firms to speak on a combined behalf has a better chance to being considered a serious party. Therefore, twenty of the Netherlands' largest law firms decided to group together in a consortium-like structure to develop one software platform that connects to the DJA. Regularly, a consortium is constructed of several, otherwise competing, organizations, employed by a third-party to fulfil a project (Irandoost & Benaskeur, 2008). In this situation the collaboration is self-initiated, without the involvement of a third-party employer. This consortium has been formed under the name *Silex*.

## **6.1 Situation**

The aforementioned presents a unique situation for the law industry, in which twenty rivaling firms combine resources to develop a software product that fits all of them. A situation like this may pose several problems for the Requirements Engineering process. First, requirements have to be elicited from a complex network of sources who are spread throughout several companies. Second, every company may have its own interest in the product, which may very well conflict with the other interests, for instance, as different law firms may serve different client segments, they may demand priority of functionalities that serve their customer segment best. Third, as the companies are rivals, some ideas to develop the product may not want to be disclosed as this would mean sharing ideas which may benefit all, instead the one being able to capitalize from it.

The challenge of this Requirements Engineering project is that all requirements must be specified in compliance with many cooperative stakeholders, and implemented in accordance with all of them. Furthermore, the new working processes that Q&I entails are unfamiliar to the stakeholders, meaning that the new software product will not digitalize existing workflows, it will digitalize a new way of practice. These challenges of this process of cooperative requirements engineering need to be managed properly to ensure that an optimal software platform is delivered, by the software producers that have been hired by the consortium.

## **6.2 Internal stakeholders**

The *Silex* consortium has been initiated by the IT managers of six law firms. They recognized the need for a software platform to overcome the limitations of using the DJA web



portal. Today the consortium comprises of twenty law firms, who combined employ 13% of all lawyers in the Netherlands. An alphabetical list of the twenty law firms is presented in Appendix D.

Silex has formed a project board consisting of two executives, who have formal signing rights, a user representative, three product owners, an external representative from the software platform producer, and an external project manager. This project board is authorized to make decisions on behalf of the Silex members. The project manager, from an independent consultancy firm, is in charge of managing the project within the boundaries of the project plan and reports back to the project board. Furthermore, the three product owners have been appointed to make decisions within the limits of a product specification ("koppeling") document that was created later in the project. Finally, Silex members have constituted a *User Forum*, comprised of future end-users of the product and an *IT Forum*, comprised of IT specialists. The users in the User Forum will test product iterations, give feedback and supply new insights and functional requirements for the software product, while the IT specialists in the IT Forum are responsible for the non-functional requirements and the DMS connectors. The organogram of this organizational structure can be found in Figure 13.

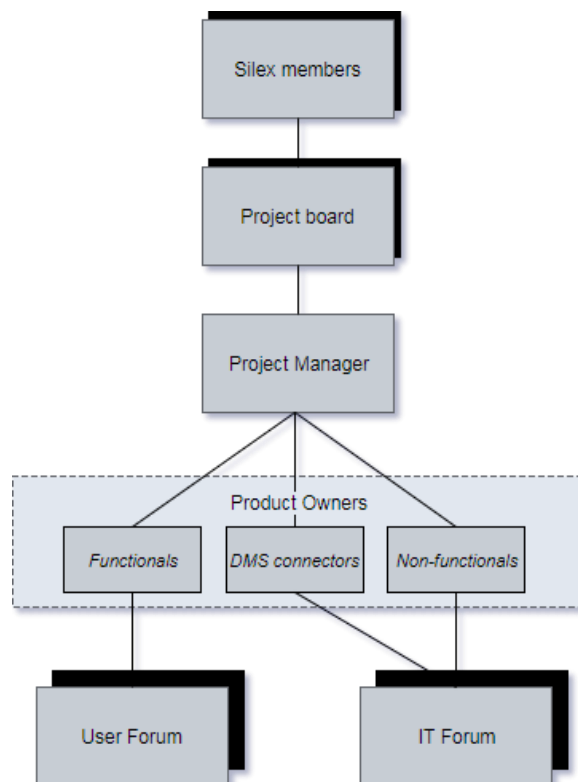


Figure 13: Organogram of Silex

### 6.3 External stakeholders

To realize their new software product Silex is involved with other external parties besides their cooperative partners. First, a consultancy firm called Anderson MacGyver (AMG) has been hired to take on an advisory and project manager role, as seen in Figure 7. The consultancy firm has been involved in project since the early stages to help specify the core functionalities of the software and to select appropriate software producers. Throughout the project AMG organizes and advises on the project activities and helps to create the appropriate documentation. Also, AMG plays the role of trusted third party, meaning that confidential information is only overseen by them, allowing the consortium members to share this information when needed.

Furthermore, there are two software producers in play. The main contractor, Topicus, is responsible for building the generic software platform that complies with the requirements directed to them by the Silex consortium. The second software producer, acting as subcontractor to Topicus, called Epona, is responsible for creating the connections between the law firms several Document Management Systems (DMS). As the twenty law firms use seven different types of DMS, these connectors need to be specifically tailored for each one.

Another external stakeholder is, as mentioned before, the DJA. This stakeholder essentially is the reason for the need of the software platform as they supply the limited web portal and the connection point, to which law firms can establish a connection of their own software. The software Silex is developing is subjected to the characteristics of the DJA connection point. This means that the DJA dictates how they want to receive the messages to which the Silex software will have to comply. These dictated requirements are communicated to Silex in the form of technical documentation. This documentation communicates the characteristics of the connection point so that the Silex software platform can connect to the DJA system. As a consortium, Silex has established itself as a big player in the digital transformation of the judiciary system, so that it can rightfully discuss its wishes for the upcoming iterations of the technical documentation on an operational level, which may then be taken into account by the DJA.

On a strategic level however, all Dutch lawyers are represented by the professional organization of Dutch lawyers (Nederlandse Orde van Advocaten, hereafter referred to as *NOvA*). Silex therefore is involved with the *NOvA* to influence the KEI program on a strategic level. These external relations are represented in Figure 14.

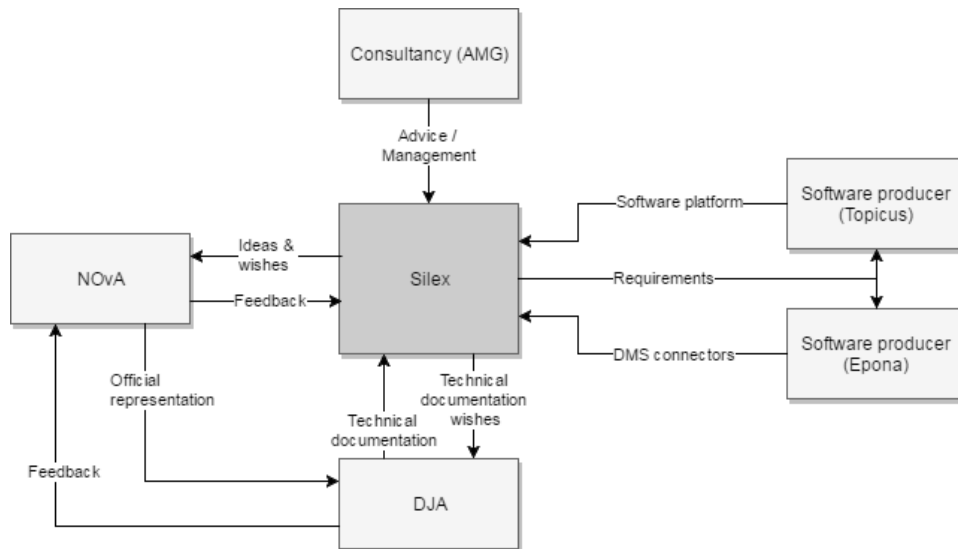


Figure 14: Silex's relations to external stakeholders

## 6.4 Clients

One of the most important stakeholders in any software production endeavor are the client organizations. These have not yet been discussed as being an internal stakeholder, nor as an external stakeholder. In this case the clients are both.

Silex is developing the software in the first place for its own members, but the general aim of the product is that it will be available for the full Dutch law firm market. This means that the software is aimed to comply with the needs of all law firms in the Netherlands. That said, the members of Silex do have a primary position in the operationalization trajectory of the software, and will keep a dominant vote in deciding the preferences on the future development of the product.

## 6.5 Business model

Before this project was initiated, the market for this type of courier-software was non-existent. Silex aims to ignite the market to drive competition between software producers, to enforce faster innovation. This was done by agreeing with the 'runner up' of the software producer selection, meaning the company that did not get awarded the Silex project, to develop a competing software platform. This has led to the existence an alternative product to the one Topicus is building, thus avoiding a monopoly. Also, Silex are not in an ownership role<sup>3</sup> over the Topicus software product. By remaining a pure investing party they essentially ignited the market, while ensuring a software product that fits their need would be created. And indeed they have sparked the market as several other software companies are now producing these sort of products.

<sup>3</sup> Topicus has ownership of the product, but Silex does have intellectual property of the product.

After the production of the software product, Topicus has ownership and will sell licenses to non-Silex members, but they are obliged to keep evolving the product. Contractually, this entails that the system will need to be adapted to incorporate new litigation case-types that are digitalized, so that the software will support the full KEI program. This means that Topicus will receive the revenues, while the Silex members will only see their investments partially returned to them. This hands Topicus a low-risk basic product, but pushes them to further develop the system themselves, to stay ahead in the newly established, competitive market.

## **6.6 Project planning**

The project has been set up in five phases. This project plan and the main activities performed in each phase can be found in Figure 15.

In the first phase, exploration and acquisition of an independent party supply a lead architect and to manage the project and of possible partner firms to establish the consortium with, has been done. Also, the work processes that are affected by the digital transformation are identified and mapped.

In the second phase a request for information (RFI) has been set out to attract and select a shortlist of candidate software developers. Furthermore, use cases have been established, translating the generic work processes that were identified in phase 1. These use cases, in combination with the technical documentation supplied by the DJA are the foundation for the first set of functional and non-functional requirements.

During the third phase the business case for the project has been developed to specifically map involved costs, benefits and risks. Also, the criteria for awarding the project to one of the software producers were established, after which the 'winner' was selected and contracted.

The fourth phase involved the iterative developing of both the software platform and the DMS connectors. These were constantly tested and after successful testing, implemented throughout the twenty law firms.

In the final phase, which is in progress at this moment, pilot cases are conducted, combined with continuous end-to-end testing. In April 2017, the DJA has formally given its approval of the software platform, so that it can be connected to their systems, which can be used since May 2017 on a voluntary basis. Meanwhile, training courses for end-users of the platform are to be provided to ease the transition into using the new system.

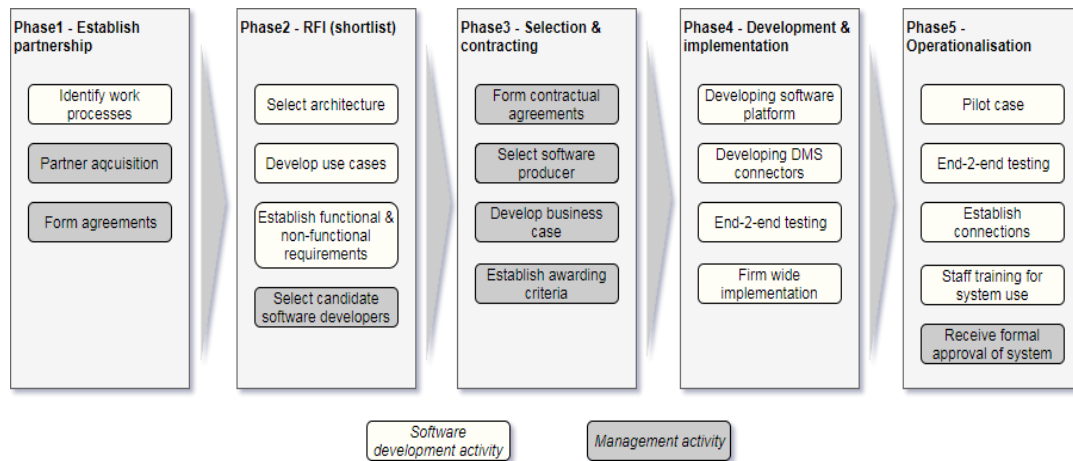


Figure 15: Project planning

## 6.7 Requirements Engineering process

This section will elaborate on the process that has been undertaken in the project that has led to the requirements backlog that has formed the basis of the development of the information system. Also the roles that the different stakeholders have played in this process and the techniques that were used, will be described.

### Initial input

As a means to delineate the starting set of requirements, the first six firms that were involved in the start of the Silex initiative have organized three "Use Case sessions". Participants of these sessions were lawyers, personal assistants and docket administrators. To ensure that the participants would adhere to their own wishes, they were not inhibited by the scope and technical specifications that were imposed by the DJA.

As these use cases did not adhere to the specifications and constraints imposed by the DJA, these have been rewritten into "generic use cases", which form the basis of the agile development process. This step was performed through a gap-analysis, to specify '*what was wished for*' by the users and '*what was allowed*' by the DJA.

The first step in this agile development process has been a "Deep Dive". In this Deep Dive, the generic use cases have been specified further to include technical realizability and time- and budget constraints. These constitute the base set of requirements, which form the skeleton of the software product. This skeleton will be used in the User Forum sessions as a base frame to further obtain the requirements for the software in an iterative RE cycle.

### The User Forum

To allow the end-users to participate in the process of developing the software, a User Forum was constituted. This User Forum comprises mainly of lawyers and their supporting staff, who will be using the system for digital litigation procedures. Each law firm has deputized

a number of participants to participate in the bi-weekly User Forum sessions, to reflect on the software and supply new wishes and ideas where they deem necessary. In total, 86 participants were registered to the User Forum.

### **RE cycle**

As mentioned above, an agile approach was used to develop the software incrementally. In 'sprint 0' a first design was created from the initial input requirements, to serve as a starting prototype. Each following sprint, lasting two weeks, resulted in new screenshots that were presented to the User Forum in a total of twenty-two *calls*, and four workshops. These calls are video conferences in which all participants of the User Forum could dial in and partake, while the workshops were live events.

In such a User Forum session, the new screens would be presented, while all the participants had the chance to comment on what they saw. Discussion based on these comments was followed by decisions on what to change, add or remove. This information was all taken in by the Product Owners. After the User Forum session the Product Owners sent a report of the User Forum session to all the stakeholders, to allow them to also supply feedback (through e-mail), even if they had not participated in the session.

All the feedback was collected and aggregated into a set of new requirements that was sent to the developer, to be integrated into the software. After this a new sprint is conducted and new additions to the prototype are made, as the RE cycle keeps repeating. This cycle is illustrated in Figure 16. As shown, the constraints that are presented by the DJA, DMSs and security standards are constantly taken into account.

This process was undertaken to develop the front-end and particularly the User Interface of the product. The responsibility of the back-end and its technical specificities fell into the responsibility of the IT Forum.

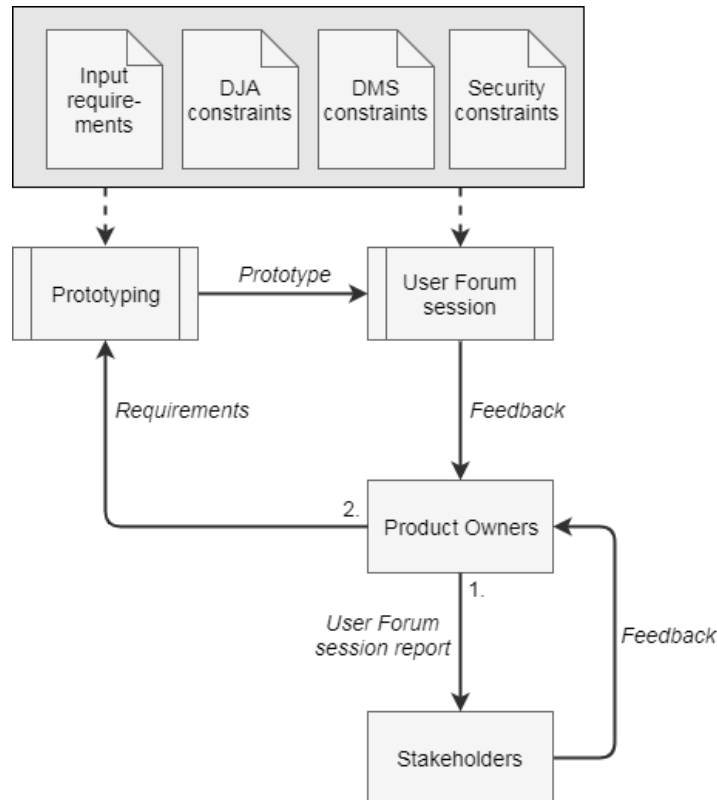


Figure 16: RE cycle of the User Forum in the Silex project

### The IT Forum

The functional requirements are collected through the participation of end-users, but the non-functional requirements are dictated by the IT forum. The IT forum consist of ICT experts from the twenty firms, ranging from ICT directors to ICT consultants. The IT forum convened twice in IT forum sessions.

Due to the many technical constraints that were imposed by the DJA and the security standards that needed to be adhered to, there was little room for new or changing requirements in the non-functional aspects. The IT forum mostly focused on the DMS connectors that needed to be adapted to each firm's respective DMS. The IT forum sessions were therefore more focused on information sharing, than on requirements engineering. However, these sessions did reveal problems connected to the DJA constraints, which in turn could be used as requests towards the DJA for altering these constraints.

## **7. RESULTS**

As shown in the previous section, the case presents an interesting situation in which twenty competing law firms collaboratively develop, elicit and negotiate requirements for a software system that will support their interfirm communication of documents and transactions. Thus, it presents a project in which cooperative RE for an IOIS is performed.

This section will discuss the socio-political characteristics that are found in the case situation through presenting the results from 11 interviews that have been conducted, supported by documentation that was supplied by one of the Product Owners of Silex. First, a reflection on the conducted interviews will be delineated, after which the most notable results will be discussed.

### **7.1 Conducting the interviews**

Generally, the process of conducting the interviews was smooth. All participants were able to reflect on their experiences of their involvement in the project, and answer all the relevant questions accordingly. When a question in the interview was deemed irrelevant for the participant, it was skipped, and if other interesting or variations on existing questions came up, these were posed. This made conducting the interviews a smooth, and conversation-like process, which demonstrates an open atmosphere between interviewer and interviewee, as is preferable for qualitative interviews (Hove & Anda, 2005).

### **7.2 Interviewees**

The 11 interviewees originate from 8 different firms. These participating firms range from the smaller Silex firms, to the larger ones. Also, all levels of the organizational structure have at least been represented by one participant. This spread of participants ensures that all experiences are incorporated in the results, and that all stakeholders should be represented. Because of anonymity agreements, nothing will be disclosed about the identities of the interviewees. Quotes that are used to support the arguments will therefore not be references to an interviewee, but do originate from one or more of the interview transcripts. Details on the spread of involved firms, the interviewee function types and their role in the project, as far as preservation of anonymity allows, is given below, in Table 4 and Table 5.

The number of interviews was decided on the go, in accordance with the previously established method. As the data collection protocol (Section 2.3.2c) describes, new sources had to be exhausted until a level of information saturation had been achieved. This means that, in the last interviews, barely any new information was added, but only previously mentioned information was repeated. This level of information saturation justifies not further extending the interview series.



Table 4: Details on the aggregation of the interviewees

Firm size		Number of interviewees
Big firm	(>150 lawyers)	7
Medium firm	(75 - 150 lawyers)	1
Small firm	(<75 lawyers)	2
Consultancy		1
Function		Number of interviewees
Fee earner		2
Supporting staff		4
Management		4
Consultant		1
Project role		Number of interviewees
User Forum		5
IT Forum		2
Higher Management <sup>4</sup>		4

Table 5: Details on individual interviewees

ID	Firm size	Function	Project role	Duration of interview
I1	Big	Fee earner	User Forum	51 min
I2	Big	Fee earner	User Forum	39 min
I3	Big	Management	Higher Management	53 min
I4	Big	Management	Higher Management	44 min
I5	Big	Supporting	Higher Management	52 min
I6	Big	Supporting	IT Forum	58 min
I7	Big	Supporting	User Forum	65 min
I8	Medium	Supporting	User Forum	41 min
I9	Small	Management	User Forum	48 min
I10	Small	Management	IT Forum	47 min
I11	-	Consultant	Higher Management	64 min

### 7.3 Interview findings

The interview findings are reported according to the conceptual framework of socio-political layers in cooperative RE for IOIS development. Firstly, all the players that have affected the project in some way will be identified, and placed in the appropriate layer, building the layered model. Subsequently, for each of the layers, the socio-political characteristics that have prominently affected the Silex project are discussed. The interviewees will be referred to by their interviewee ID, for instance 'I2' or 'I10' as shown in Table 5.

<sup>4</sup> "Higher Management" includes all levels higher than the User Forum and IT forum. These levels have not been further split up, as this may compromise the anonymity of the interviewees.

### 7.3.1 Socio-political layers of the Silex project

There are several different players that have been identified to be playing a part in the social and political playing field of developing the Silex software platform. All players are shown in their respective socio-political layer, as described in Section 4.1.6, in Figure 17. Below each of these layers will shortly be addressed.

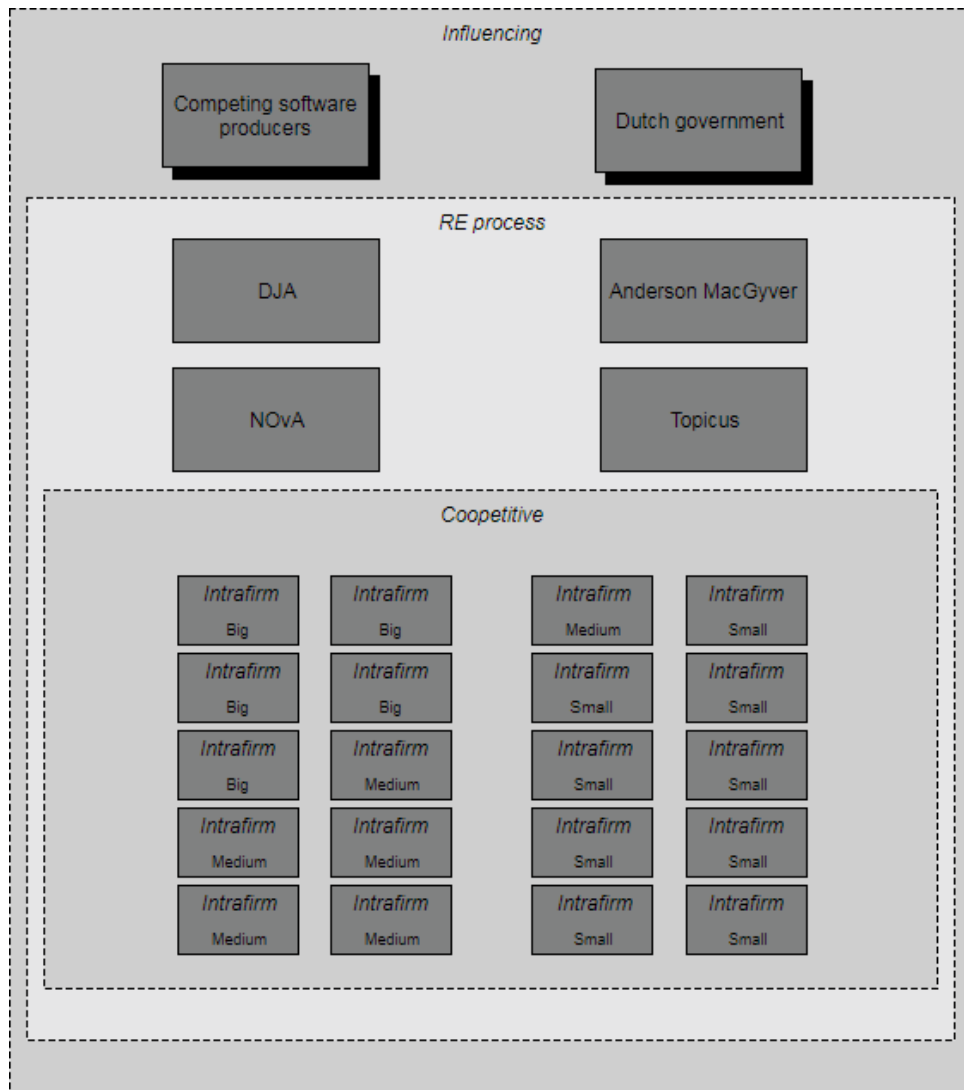


Figure 17: The socio-political layers of the Silex project

**Intrafirm layer:** Each law firm has their own internal socio-political influences affecting the project as a whole. The most prominent in these, are matters of representation and involvement.

**Coepetitive layer:** The interrelations of all the law firms are characterized by different socio-political aspects that affect the project. The most important aspects mentioned in the

interviews are management and communication structures, relationship characteristics, power balances, the balance between competition and collaboration, and resistance to change.

**RE process layer:** External parties affecting the consortium's project have been identified to be four organizations. 1) The Dutch Judiciary Administration (DJA) who supply the connection to which the software platform will be connected. 2) The NOvA, the Dutch industry association for lawyers, who represent all Dutch lawyers. 3) Anderson MacGyver, the consultancy firm that have guided the project. 4) Topicus, the software producer, responsible for final development of the software platform.

**Influencing layer:** The organizations that have influenced the project, while not having any stake in it, have been identified to be software producers developing a competing product, and the Dutch government responsible for passing new laws and policies.

The next sections will elaborate on each of these layers and all the socio-political influences found in each of them.

### **7.3.2 Intrafirm environment**

#### **Firm representation**

All firms have had their own representative(s), who are the first line of contact to Silex. The number of representatives for each firm varies between one and three. Mostly, these are the ones responsible for the ICT in their respective firm. All interviewees stated that their position, as either representative, or User/IT forum participant was made on the basis of their experience and expertise on the subject. The criterion for representing a firm has been expertise and experience in combining knowledge on ICT and knowledge of the litigation processes, to ensure capable execution of the role.

This experience was acquired by roles like ICT director, application- or DMS manager positions. Each firm has also selected their participants in the User- and IT Forums on basis of experience with each of the topics: The User Forum was mostly populated with lawyers and supporting staff, who are the end-users of the system, and the IT Forum was populated with relevant IT employees. Documentation on the deputized people in all of these groups support this basis of expertise, based on their function. This is illustrated by Figure 18.

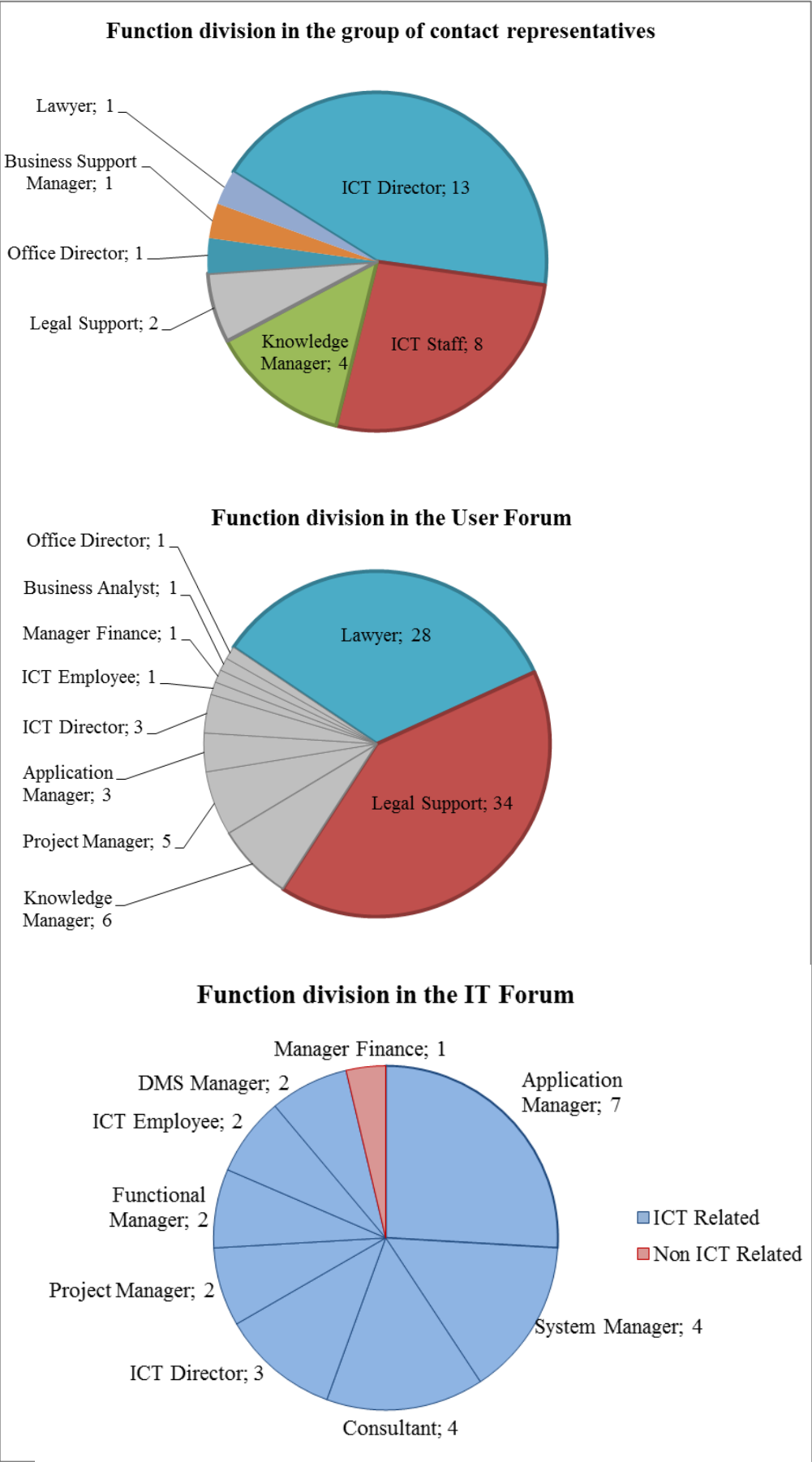


Figure 18: Division of (related) function titles in the participant categories

## User involvement

The involvement of the end-users in the User Forum is described as a big influencing factor throughout the interviews. Two specific factors affecting the extent of this involvement are mentioned, namely: the nature of the end-users, and the consequences of involvement.

The end-users are made up of lawyers and their legal support staff, but *“the degree of participation from the supporting staff, has been much higher than that of the fee-earners”* (I5). One of the reasons given for this lacking participation of the lawyers may be found in their nature. Lawyers are described to have a specific disposition, which is not very planning-oriented. *“It is in their nature to have a short-term horizon”* (I10), meaning a matter of days or weeks. *“This does not match software development”* (I10), which in this particular project has a stretch of more than a year. This means that the subject is *“not very much alive”* (I8) within this function group, as the deadline, which has been moved several times throughout the project, did not feel like a pressing one to them (I5).

The consequences of involvement in the User Forum, which is described as very *“time intensive”* (I3) are also typical for the business environment that this project finds itself in. Law firms have a big focus on billable hours, meaning that fee-earners, like the lawyers, feel a big pressure of maximizing these hours. *“Within the legal profession, there is a strong drive to do everything for clients [...], because it is not very much appreciated to spend time on non-billable things. Especially in the smaller firms.”* (I3). One interviewee added: *“They have trust in the bigger firms, because these have more capacity to be involved”* (I10). This financial reasoning is engraved by the fact that most lawyers have been viewing this project as an *“obligation instead of opportunity”* (I1) and that *“they do not see it as business development, while business- and process development and efficiency are key in this project”* (I10).

The result of this lack of user involvement has been that *“at times, there was a wish for more feedback from the group”* (I11). *“Most times, out of twenty firms, only six or seven responded”* (I9) to requests for input in the feedback round after each User Forum session. The management team had to adhere to the principle *“not to give feedback, means to agree”* (I11), as there was no time to keep waiting on possible agreeing parties. *“The train has to keep moving”* (I11).

In the User Forum calls however, *“all the participants were assertive enough, but one can expect that if someone decides to join the call, they will want to have input.”* (I8), meaning that it did not come as a surprise that the participants were actively involved within the sessions.

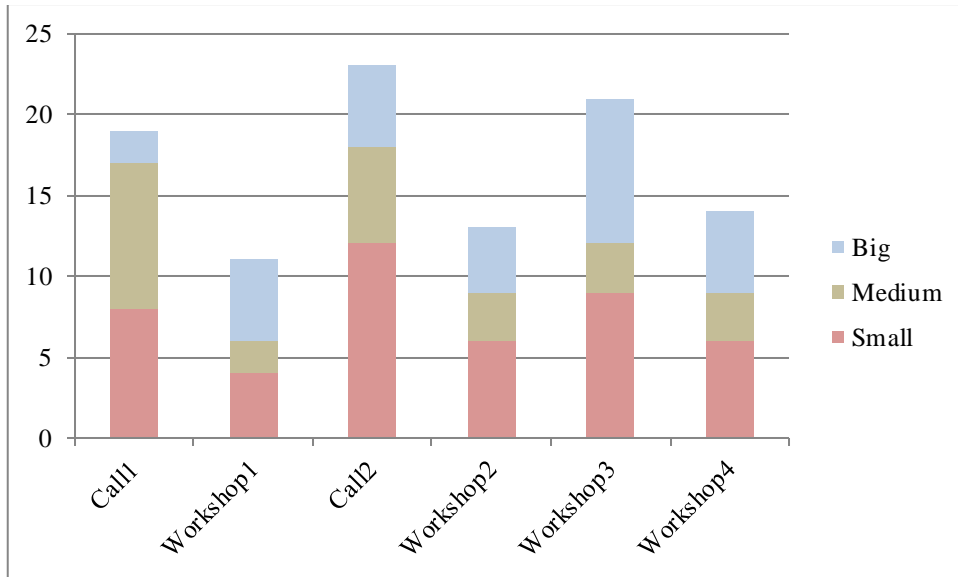


Figure 19: Number of participants in User Forum sessions by firm size

Looking at the logs of participants of the first two User Forum calls<sup>5</sup>, and the four workshops that were organized, it shows that the smaller (<75 lawyers) and bigger (>150 lawyers) firms were overall equally represented (Figure 19). The division in function type, however shows that indeed the supporting staff was substantially more represented than fee-earners in these sessions (Figure 20). Furthermore, when comparing these fee-earner participants based on their firm, it shows that fee-earners from smaller firms participated less than those from bigger firms (Figure 21).

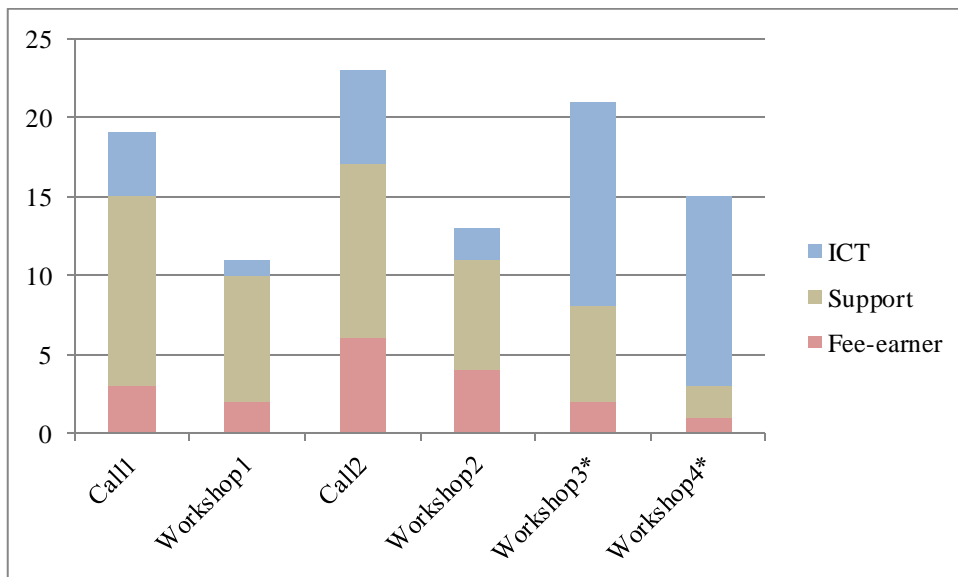


Figure 20: Number of participants in User Forum sessions by function type<sup>6</sup>

<sup>5</sup> Only the logs of the first two User Forum calls have been stored. The rest of the calls was conducted through a different conference application that does not log attendance.

<sup>6</sup> Workshop 3 and 4 have significantly more participants with an ICT background as the topics of these workshops were more ICT related (DMS and logging).

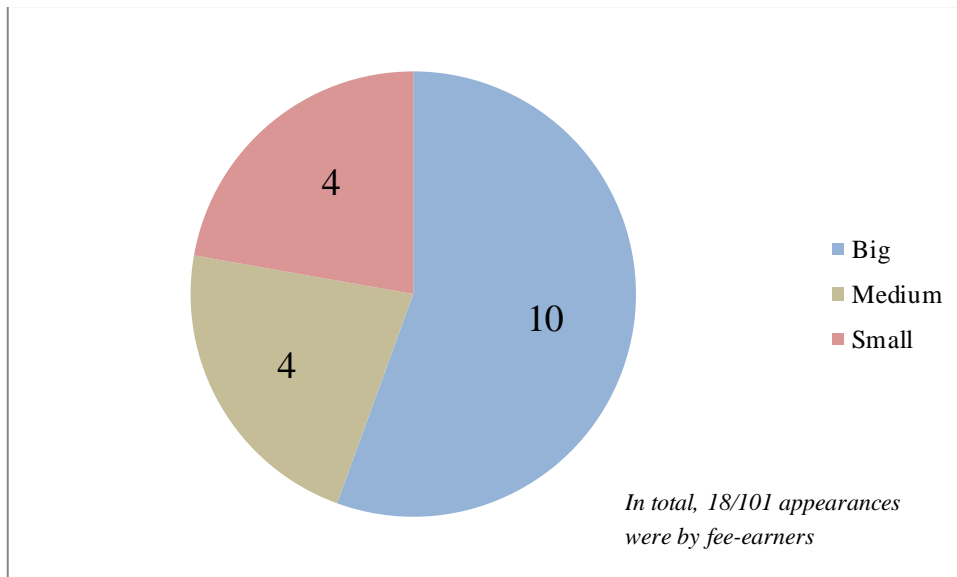


Figure 21: Number of fee-earner appearances in User Forum Sessions by firm size

The non-billable characteristic of the project has made it, especially for smaller firms, harder to free up its people for this project. Project Management saw the need for user involvement, also from the smaller firms, which triggered lobbying from executives to the boards of other firms to ensure that participants for the User Forum sessions were made available (I3).

### 7.3.3 Coopetitive environment

#### Management and communication structure

Overall the interviewees were satisfied with the governance of Silex. There has been a clear separation of Executives carrying final responsibility, and the project management, coordinating the project. The Product Owners, organizing the User Forum sessions and communicating the development, are seen as the backbone of the project. The five interviewees, participating in the User Forum, support the acknowledgement that *"the Product Owners were clearly in a leading position, as they were the ones communicating with us"* (I9). The Executives, however are considered higher up the chain of command and have not been involved in the User Forum sessions: *"The Silex management has never really touched the User Forum. That was separated."* (I2). *The Executives have initiated this project, and then left the coordination to the Product Owners* (I8). I10, who carries a management position at their firm, nevertheless recognizes the importance of the role of the Executives on a higher level: *"The success of this project can be credited to the initiators and the continuous hauling of the Executives"*.

The structure of communication in this project was that the User Forum reported to

the Product Owners through their firms Representative(s)<sup>7</sup>. The Product Owners in turn discussed in the project management group, which includes the Project Manager, which was then reported to the Executives. However, communication of User Forum sessions reports was also done directly from the Product Owners to the User Forum members, to avoid the Representatives being in a "gatekeeper" position (I5). This structure of management, in which communication lines were top-down and bottom-up have been experienced to be efficient. Stakeholders were always aware of where to go to with questions or remarks. I2 describes how they are "very happy with our Representative, managing all our communication [with Silex]. This made working on the project easier for the internal team" (I2). A representation of the communication structures in the Silex project can be found in Figure 22.

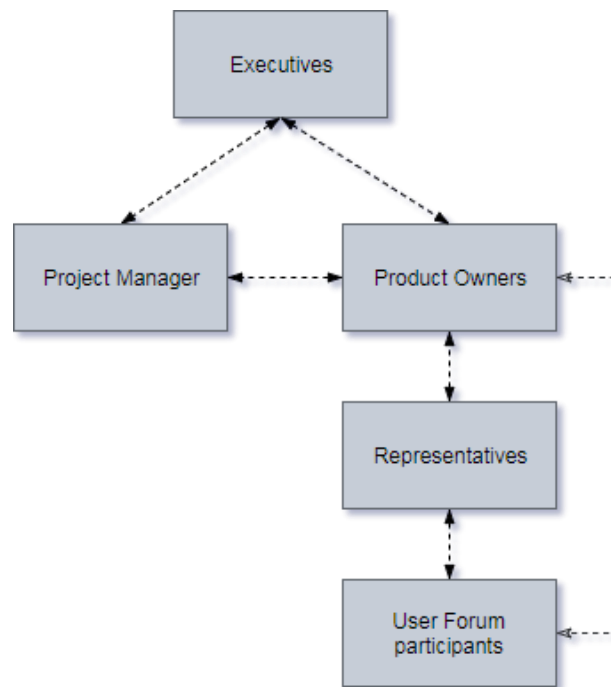


Figure 22: Communication structure of Silex

The fact that communication structures have been clear throughout the project, has led to the quality of communication being perceived positively. Within the consortium, the primary line of communication has been in bi-weekly update calls from the Product Owners, to the User Forum and monthly update calls to the firm representatives. These ensured continuous communication on project development, and involvement of the firms. Also, the results of the User Forum sessions, were reported back to all the stakeholders to allow for follow-up questions, remarks and to keep the ones who had not participated up to date. Questions and remarks were generally answered timely and adequately by the Product Owners (I9).

<sup>7</sup> It should be noted that for some firms, especially the smaller ones, the Representatives are also User Forum participants.



### **Interfirm relationship**

The interfirm relationship has been characterized by a congruence in goals, a high degree of trust and an open atmosphere of information sharing.

Goal congruence had to grow in this project. At the start the participants noticed that people in the User Forum were trying to get their “own” specific wishes passed as requirements (I8). Obviously, people would participate with their own firm in mind, and definitely oppose anything that would go against their interests (I6), but over time, group coherence started to grow, and goal congruence developed. The common goal of “*developing a workable system*” (I8), which is “*an opportunity, not a burden*” (I1) has been the aspiration of the group, due to the influence of the Product Owners, who kept expressing the ideal of a ‘system for everyone’ (I1).

This does, however, not mean that all participants were always aligned in their opinion on the requirements. It is acknowledged that this has to do with the fact that “*working with different groups of people always results in differing opinions, also between firms*” (I6), but the main divider of opinions have been the function groups. In general the lawyers have tended to agree with each other on their requirements, as have the supporting staff members (I10). This is “*due to the similarity of their tasks*” (I10).

In this project, trust was seen to be very high between the competing firms. Some of the interviewees found the amount of trust positively notable (I9), “*however naïve that may be*” (I1). The reasons for this trust were said to be the congruence of goals and the fact that the ICT product that was developed does not strike the core business, meaning that it is less sensitive to their competition. This trust between the firms made it possible to closely cooperate, and that participants did not feel restricted in their information sharing.

The result of this trust meant an open atmosphere of collaboration within the requirement sessions. However, it should be noted that the basis of information sharing is one that is set in stone in these law practices, as all the interviewees acknowledged. Professional secrecy is one of the highest standards within these law firms (I10). “*We do not share any client information, but when in need of examples we can always use fictional examples*” (I8). Even though it comes natural to the stakeholders, using fictional examples, like a simulated Document Management System to demonstrate the software is a form of information restriction that should be noted. This professional secrecy however, is a standard in the law domain, meaning that it has not shown to be caused by the competitive characteristics of the project.

The fact that these twenty law firms are competing is recognized but not felt through the project. As mentioned before all stakeholders feel a big amount of trust and an open atmosphere for collaboration. The most prominent reason mentioned is the separation of this project and the core businesses: “*The lawyers compete with each other, the ICT guys don't*”

(I1). One interviewee remarked that the only competition that you are able to create with this software product is the way you use it, and extend on it (I5, I10).

### **Decision making**

All participants have experienced the decision making process to be just and fair. Open discussions within the User Forum sessions "*created a bigger picture of what the views of others were*" (I6). Also these discussions "*made people change their minds*" (I1) and "*aligned the thoughts of the participants*" (I6).

Fair discussion on requirements were the foundation of the requirement analysis, after which a democratic decision was made. The basis for this was pluralistic, in which every man stood for his/her own opinion, or in a party structure, in which two or more possibilities were offered, from which the group needed to choose. These possibilities varied from lay-out options to more functional options, such as determining what notifications to receive from the system.

To not let discussions drag, some decisions were made pluralistically by the Product Owners, to ensure rapid continuation: "*sometimes a discussion just needed to be settled, to not let it drag on uneventfully*" (I8) or "*about insignificant details*" (I3). These decisions were mostly based on settling on a mediated solution between the different opinions. Interviewees express to admire and respect the way the Product Owners have continuously found the common denominator to comply with the wishes of most attendants. Yet, in some cases, (I8) found that there still were discussions that dragged on over these aforementioned insignificant details, like the exact placement of a single button, on which they would have like the Product Owners to decide and take control quicker.

All the interviewees acknowledged that one can never satisfy everyone's wishes fully in such a project. But, because decisions were always made after reasonable discussions, or by choosing middle ground, everyone agreed or accepted them: "*Not everyone has the same preferences, but everyone could concede when things were decided after reasonable discussion*" (I2). Because the participants are all people of equal expertise, there was generally a feeling of mutual understanding.

### **Input appreciation**

It has always be intended to let everyone's input be equally appreciated and judged on its merit, not on its accompanying firm (I5). However, some of the bigger firms have the idea that this has not been the case. An interviewee from one of the larger firms claim that they had a bigger influence in the requirements process: "*there is a hierarchy in play, between the larger and the smaller firms*" (I3). Contrarily, this was not perceived this way by the smaller firms. "*We never expected to have influence on the process, we just wanted to tag*

along. *But in the end, we had a lot of influence*" (I9).

I4 says that *"to think that all firms have had the same amount of input, would be an illusion"*. I4 refers to the way the software has been built. In the early stages the framework of the software and the process in which the product would be developed has been decided by the larger firms, after which the smaller firms could join in the process of the User Forum calls to fill this framework. I4 claims that all input was appreciated equally, but within the boundaries set by the larger firms. Several interviewees remarked that the amount of influence you had was directly linked to the amount your amount of participation (I8, I9, I10). I6 adds that this was necessary for a smooth intercompany collaboration, because unequal appreciation of input may *"lead to losing [commitment of] the smaller firms"* (I6). Nonetheless, experience is mentioned as a factor that may have influenced the weight of one's input. *"People who were involved earlier, and therefore had more experience with the system, carried a heavier opinion than new comers"* (I10). Also experience in their respective function mattered according to I3: *"Someone who is full-time functional manager brings more experience to the table, than a secretary who does ICT on the side. Here's a difference in input and impact"*. I3 refers here to smaller firms, which give part-time responsibilities to employees to cover their ICT, as they have no capacity or need to employ full-timers for this.

The fear of being overshadowed by the larger firms, is demonstrated by the appointment of a mediator. This mediator, a manager from a smaller firm, designated himself to communicate with the smaller firms and the Silex project board, to ensure their input being appreciated. The reason for this was that *"even though it was agreed that in the User Forum calls, a vote of a big firm would not be more significant, there was a fear for situations in which interests would have to be weighed against each other, the larger firms would be considered over the smaller firms"* (I5). Whether this fear was actually present cannot be concluded from the interviews as I9 contradictorily states: *"[The mediator] asked us if we felt we did not have enough influence in the project, but we never felt that way"*.

#### **7.3.4 RE process environment**

##### **AMG**

Due to the amount of trust between the cooperating parties, AMG has not been needed to act as a trusted third party. The only instance in which this role was needed, was when visiting companies to test the software, which was done with a real DMS, which can only be shared with confidants and not with competitors (I6).

The most important role that AMG has played is that of neutral project leader (I11). *"We were the go-to guys, for questions"* (I11). One consultant was instigated as project leader and another has taken the role of Product Owner. Fulfilling these roles as a neutral party ensured that all stakeholders were taken into account, and that there was no biased

judgement, which would be more difficult if the twenty law firms had to manage this themselves (I11).

The influence that AMG had on the project has mostly been in the process of development of the software product. *"AMG has selected Topicus as a candidate supplier and they have taken us by the hand in the ways of the agile development process"* (I3).

As AMG started the project with limited knowledge on the business context, their influence on the contents of the software product itself was in its origins minimal. Due to their commitment in the project, and as the project progressed, their knowledge grew significantly, making them able to also contribute to ideas on the software product (I6).

## **DJA**

The connection to the DJA, which is offered to the industry, is shaped to the new digitalized way of working of the DJA. This means that the outside software that wants to connect to this system, needs to adhere to the specifications set out in the connection. These are software constraints that have to be accepted by Silex to be able to connect to the systems of the DJA. This implies that the DJA has been in a monopolizing position considering a large part of the software specification: *"The back-end [of the Silex software product] has largely been dictated by the DJA's technical documentation"* (I11).

With intend to influence these technical constraints, Silex has tried to address the DJA to discuss the needs of the law domain, but the DJA has proven hard to communicate with. All the interviewees describe the relationship between Silex and the DJA as one that was not characterized by collaboration. *"They speak, but do not listen with the same intensity"* (I5). This one-way street of communication has brought frustrations, but has also cost time and money in trying to influence the DJA.

The lack of partnership or cooperation from the side of the DJA has been an inhibitor of the software requirements. Four interviewees (I1, I5, I6, I10) stated that if the DJA would have opened up for ideas from Silex, or at least for some cooperation, the software could have been of higher quality for both sides. For instance if the DJA allowed for hyperlinked documents to be sent through their connection, the courts would have had directly linked documents instead of having an unordered stack of documents (I1).

The contrasting side of this lack of partnership is the fact that Silex is not the sole group of users of the DJA connection. Silex represents almost 13% of all Dutch lawyers, meaning that 87% of the Dutch lawyers are not represented by Silex. This has led the DJA to claim that Silex cannot be seen as to represent all Dutch lawyers and can therefore not be appreciated as such. Also, lawyers are not the main group of litigators: *"Immigration and Naturalization Services and other social entities administer significantly more litigation*

*procedures*" (I9). This means that even though the Silex focusses on the DJA as a sole influencer of the connection, the DJA has many more influenced parties. "*The DJA has always claimed to aim for a level playing field*"(I5) meaning that no party would have preference over another. These reasons have all contributed to "*a sort of divide-and-conquer strategy*"(I5) in which Silex could not become a full collaborating partner.

The Silex project has also been influenced by the DJA in its fickleness. The time-lines in which digital litigation would become obligatory have been postponed several times. In total this has elongated the project more than two years. This has led to frustrations, in the Silex group as this influenced the engagement of the stakeholders, as mentioned above (user involvement). Also, the technical documentation that was supplied by the DJA has fluctuated over time. There have been changes in the contents of this documentation affecting the functionalities of the software product that Silex was building. One of these specifications was that a document sent through the DJA connection has a limit of 10MB. This was argued to be too small to comply with the needs of the law industry<sup>8</sup>. The DJA aptly enlarged this limitation to 25MB, but without any discussion changed it back to 10MB in the following version of the technical documentation (I2). This has led to discontent throughout the project group.

## **NOvA**

The NOvA, the professional organization for all Dutch lawyers, has played a disappointing role in the Silex project, according to eight interviewees (I1, I3, I4, I5, I8, I9, I10, I11). As the KEI project affects all Dutch lawyers, they were expected to stand up as a representative party to serve the interests of its constituency. However, "*they have retained a very passive role*" (I8). They have claimed to represent the entirety of Dutch lawyers, but as the DJA connection only serves a part of these, as the web portal may also be used by, they could not take on that role (I10). "*This is a strange viewpoint, as using the one thing should not exclude the other*" (I9).

For this reason they also did not want to represent Silex, as this is only a selection of lawyers. The NOvA did not feel that the wishes of Silex were representative for the whole professional domain. The interviewees agree that there may be some differences, but that the NOvA should have represented them all, as Silex is made up of a large portion of all Dutch lawyers (13%). According to the interviewees, the NOvA should have stepped up and represent all lawyers towards the DJA in this digitalization project, as the NOvA is considered a well-respected conversational partner to the DJA. Not having the full support of the NOvA is described to be "*a missed opportunity*" (I10), and has slimmed their chances of

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<sup>8</sup> To illustrate: A scanned document, containing only text, of 10 pages has a size of approximately 2MB. Documents in this industry are regularly over 100 pages and may contain pictures and graphs (field tested at one of the law firms).

influence at the DJA. Even though there were periodical meetings between Silex and the NOvA, there has never been any indication of the result of influence at the DJA, which those meetings would have.

### **Topicus**

Topicus, the contracted developer of the software system, was described to start the project off with a laid-back approach following the lead of the project team. They did not have any knowledge on the law domain, and used that to maintain a contrasting perspective on the project (I1).

One of the demands Topicus made, on initiation of this project, was that they wanted a central communication point, to *"not have to deal with twenty different law firms"* (I5). This has led to the installation of the Product Owners at the side of the consortium. At this point, the Silex's Product Owners were responsible for collection wishes and requirements from the User Forum, which were then communicated to Topicus. Requirements were then developed by Topicus into new prototypes or screens, which would then be communicated back to the Product Owners.

The build on the software was started with the back-end, which was mostly dictated by the DJA's technical documentation. *"During this build there is no user interface yet, and therefore no representation of what the software will look like. This makes technicians inclined to develop this outside of view of the Product Owners"* (I5). This, was mentioned to not be very surprising, but the result has led to some discontent with Silex, as some of the decisions made would not have been their choice. An example of this, is the fact that they have developed the system to synchronize through 'pull data'. If Silex would have had the opportunity to choose, they would have preferred a 'push data' synchronization process (I5). The argumentation for deciding to go with a pulling synchronization process is probably funded in time constraints, as it would be easier to develop (I5). I5 argues that there should have been a closer and earlier cooperation between developers and Product Owners, to avoid such disagreements.

### **7.3.5 Influencing environment**

Outside of all parties that have been recognized of direct influence on the developed project there are also factors that have influenced the project, without have any stake in it. These factors comprise of the emerging legal software market, and law- and policy makers.

As Silex aimed to spark the market for software which could connect to the DJA, so it did. Several competing parties have risen, developing products that each in its way aim to bridge the digital gap between law firms and the DJA (I4). The rise of these competing products is seen as a positive development, as this will force Topicus to try and stay ahead

of competition with a cutting-edge product (I5). One disadvantage of this disseminated software development is that considering the strict constraints imposed by the DJA, all parties are developing a similar back-end. *"If all developers would come together and devise one standard for their back-end, they could still compete on their front-end, but then all these products would have a superb engine under the hood"* (I5). I5 stresses that developing one standard for the back-end would strengthen the market's position towards the DJA. As a unified party could then present its wishes or demands, which would be beneficial for the whole domain.

Also, the Dutch general elections which were held in March 2017, have led to insecurities and tension within the project group. A newly elected government could have reversed the KEI project if new governmental budgetary measures demanded so. *"Around the time of the elections, no one really wanted to stick their necks out, because no one wanted to be responsible for a failed ICT project"* (I3), resulting in slower decision making. This eased as became clear that the KEI project would continue unscathed.

## 8. CONCLUSIONS AND FUTURE WORK

Throughout this study, several social and political characteristics of cooperative RE for IOISs have been distilled. This study has shown how theories of RE, cooperation and IOISs lay out a foundation for research into the combined field. Multiple characteristics that were found in each respective field, can be recognized also in the case study, which will be elaborated on below.

Scientific literature delineates the need for a socio-political view on RE and through analysis of the literature we have found that socio-political characteristics may be predominantly present in the processes of *elicitation* and *analysis* of requirements, with respect to the framework of Sommerville and Sawyer (Section 3.1) and in dimensions of *agreement* and *specification*, with respect to Pohl's framework (Section 3.1.6). In these processes groups of people are involved in speaking their wishes and discussing on the merit and priority of each wish, fulfilling the dimensions, which will result in a set of requirements that is to be developed. Satisfying these dimensions is done through a process which can be marked by communication difficulties and goal incongruence, answering our first SQ: *What socio-political aspects characterize RE?*

To further specify the context in which these processes of RE are set, we looked into the specific organizational context of cooperation. From the literature study we can conclude that cooperating with competitors, needs management of knowledge transfer and levels of trust between competitors (Section 3.2). This context for RE delineates how participants of the RE processes may want to restrict knowledge from their competitors if trust is low (Section 4.1.3). Management of this trust, ensuring goal congruence between the stakeholders and separating core business from competing business should mitigate negative afflictions cooperation may have, answering our second SQ: *What socio-political aspects characterize cooperation?*

Specification of the system for which RE is performed, helps us further distill socio-political workings. IOISs are socio-politically characterized by issues of: communication, trust, operational uncertainty, differing objectives, changes in business processes, standardization, power relations, cultural differences, resistance to change, disparate expectation levels, user participation, training and relationship management (Section 3.4), answering our third SQ: *What socio-political aspects characterize IOISs?*

Having answered the three SQs, gives us an image of what socio-political characteristics may be expected from the aggregated topic of cooperative RE for IOISs. In the case study we have found several socio-political characteristics that are delineated by the different scientific areas. The most important similarities were the importance of managing the socio-political characteristics: communication, trust, power relations, user involvement and relationship management. This does not mean the other characteristics have not been in play in



the case study, it means that they were not identified by the interviewees as being of substantial influence in this particular project. These common characteristics however, have already been established in previous literature. The most interesting characteristics are the ones that have not already been established.

Socio-political aspects that are typified by the character of this specific cooperative IOIS RE project were found in topics of *user participation*, *decision making process*, *influence of regulatory bodies* and the *position of the software developer*. The implications of these aspects will be elaborated on below.

### **User participation**

The case companies take a classical approach which has become very popular in software development practices, namely the involvement of end-users. For decades there has been a general consensus in scientific literature that usability of a system is achieved by involving end-users (Groen et al., 2017; Majid, Noor, Adnan & Mansor, 2010; Kujala, 2003; Damodaran, 1996). In the case study these users are involved in developing functional requirements, but not non-functional requirements as these were already established, which is in line with common practice according to Majid, Noor, Adnan and Mansor (2010). There are a lot of different studies that delineate problems in involving users in the design of information systems, but there is no well-established framework on how substantially boost participation.

The case study has shown that user participation has not been optimal in terms of representativeness of users, as supporting staff was overrepresented, while fee-earners (lawyers) were underrepresented. The motivation to participate was mentioned to be found in the nature of the end-users. This means that there is a deeper need of understanding the stakeholders. Also, the lack of a business development perspective, and disappointment over constraints in freedom of designing an optimal system in end-users, may all influence the motivation to participate.

This asks for consideration of methods in which proper end-user participation is guaranteed. As guaranteeing user participation is a "*top management role*" (Damodaran, 2010), a standardized framework of achieving this would be preferable. The "engineering" of user participation is a thought to consider. For instance Shahri et al. (2016) propose the use of software-based solutions to enhance the engagement and efficiency of people in performing tasks. The authors argue that using a persona-based approach has good potential. Even though this research also raises many challenges, the main point that research in this area aims to make is that the end-user should no longer be envisioned as a participant, regardless of context, but as a person with a variety of drivers. Ensuring user motivation and engineering a group of participants in RE sessions, yet requires more attention in further

research.

### **Decision making process**

The decision making process was not typified by any of the political ecologies of decision making as proposed by Bergman and Lyytinen (2002). Different modes were recognized throughout the project, but decisions were mostly made by choice of a superior after consultation and deliberation with a stakeholder group. This is a consensus-oriented decision making process. By motivating choices and finding middle grounds, consensus within the group was built, so that all would agree on the choices that were made (Hartnett, 2011). This manner of decision making is in the Netherlands known as the "poldermodel", but is also favored in the United States in governmental policy making (van de Kerkhof, 2006). The case study has shown this decision making process to be a successful approach, as it achieved consensus over the stakeholders, within strict time boundaries. This falls in line with literature on consensus-oriented decision making, claiming that it "*recognizes that groups need to be able to produce decisions efficiently, so as not to burden the members with long meetings or stagnant progress on popular ideas*" (Hartnett, 2011). This suggests that this opens up an interesting research field, in combining this decision mode with RE practices, as research focused on this decision mode has been largely based either non-specified environments or policy making until now.

### **Regulatory bodies**

It has shown that regulatory bodies can have a big impact on digitalization processes, especially when they are the ones initiating them. Having imposed constraints may serve problems for the external parties having to connect their systems to the systems of the regulators. To enhance the effectiveness and quality of the connection between the governmental institution and the business world one would expect collaboration between the parties to be the best approach. Fact of the matter is that collaboration may be harder than it seems, due to the vast amount of affected parties and the complexity of the project itself.

To be able to have input and influence in the regulatory institution, a group of advocates<sup>9</sup> can try to get a seat at the table, to be able to discuss wishes or demands. To be successful this needs to be a strong representative group, to avoid being one group out of many. A strong influencing party is a professional or industry association, as described by Damsgaard and Lyytinen: "[Associations] *must engage in a number of maneuvers [...] that can lead to the achievement of a common solution and later on the successful inscriptions*

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<sup>9</sup> Chosen to use "advocates" over "lobbyists" due to the negative connotation of the latter term.

*and institutionalized use*" (Damsgaard & Lyytinen, 2001). Even though the authors are talking about an industry wide adoption of IOISs, the same principle goes for institutional collaboration: Associations must engage in maneuvers that can lead to the achievement of a common solution, meaning a collaborative approach to the connection made between institutions and the industry organizations. This however does not mean that the industry should solely rely on existing associations, especially if their technical knowledge falls short, for new mediating associations may come into existence (Attewel, 1992). But, one should bear in mind that, again, a new association should be representative for the whole domain.

### **Detachment of Software Development Company**

The case study has shown a software producer that distanced itself from the client, by demanding a mediator group between themselves and their customer companies. This mediator group was responsible for collecting the requirements and communications back and forth. In this project this has shown to be an effective strategy in which the software company received consistent requirement from one source.

This approach has been accredited to be a successful solution for issues of communication problems and cultural differences in distributed RE projects, suggesting election of a central project leader to verify and validate communication and information (Hanisch & Corbitt, 2004). The scientific field however, contains no dominant study on this situation in which the software producer itself is detached, instead of a widespread RE team, which distributed RE implies.

The advantages of this structure may be clear, as a clear and focused line of communication is established. There are however some possible downsides to this situation, which need further investigation. The software company can still verify that what it developed is in line with the requirements they received. However, since the software company no longer collects the requirements, the traceability of the requirements may be lost, and therefore the possibility to validate the developed information system against the initial wishes and needs of each respective stakeholder may be lost. This may hurt future maintenance, as misconceived developments cannot be traced back to its source.

Whether these negative outcomes will show and what are ways to cope with these dangers are interesting topics of future studies, as it is conceivable that in practice, comparable situations will also motivate software producers to take in a detached position from dealing with multiple parties at once.

To answer the Research Question of this study (*What socio-political aspects characterize cooperative RE for IOISs?*), we conclude that through a retrospective case study this research shows that socio-political characteristics of cooperative RE for IOISs, can be found in the

foundations of the established literature on the separate topics of RE, cooptation and IOISs. However, the case illustrates some important particulars which have not been addressed as such in scientific literature. These include:

- The need for improving user involvement for RE in such complex environments by 'engineering participation';
- The effectiveness of a consensus-oriented decision making process, which is has not widely been recognized in RE;
- The need to influence governmental institutions to allow for closer collaboration;
- The separation of software producer and end-users, to streamline communication and decision making.

As these considerations may be particular to this situation, further research is needed to conclude these. As we can expect governments to continue to digitalize their work processes, comparable situations are bound to arise, for which knowledge and learning can be taken from this body of work.

## 9. LIMITATIONS

Notwithstanding that this research has been carried out with utmost precision and aims for representativeness of a generally unexplored research domain, some limitations must be acknowledged. This section will elaborate on two main limitations that can be distinguished in this work, which are the degree of subjectivity in the results, and the degree of generalizability of the study.

Qualitative studies are rarely not influenced by some degree of subjectivity. In this case it is conceivable that some kind of response bias has occurred throughout the research. This means that during the interviews, answers may have been subconsciously influenced by the way questions were asked. As the interviews were semi-structured, not all questions were posed in exactly the same way, or with a different tone or build up. This may have been of some influence on the answers given. To minimize this, some example questions were added to the interview protocol, to help ask specific questions in the same wording.

Also, the interviewees are all part of the group that successfully completed a software project, of which they are proud. This leads to generally positive attitudes towards their past experiences within the group. Even though anonymity of the interviewees was guaranteed, it may still be the case that some negative experiences or complaints have not been ventilated during the interviews. This positive attitude towards them as a group, may also be negatively reflected into the "other" parties. Meaning that an "us versus them" idea may have been in mind when, for instance, discussing the DJA or the NOVA. This may have led to slight exaggerations in the negative experiences with external parties.

Furthermore, as the interviews were led and analyzed by one interviewer, there can be a degree of interpretative freedom. There may be a chance that answers given during the interviews may have been interpreted with slight differences, by a different researcher.

Lastly, a limitation on the basis of subjectivity is the fact that the interviews were conducted in Dutch, and translated to English to be used in the results section. To keep the content and interpretability of the statements of the interviewees as close to the original as possible, some translational freedom has been taken. This means that literal translation were sometimes, not adequate and needed to be changed. This leaves room for subjectivity in choices of wording used.

The degree of generalizability of the study could be limited two fold. The generalizability of the answers given by the respondents, and the generalizability of the case.

Firstly, the answers given by the interviewees, may be lacking full representativeness, due to the fact that the people eager to respond to interview requests, may well be the people that have been most actively involved in the project. If this is the case, this means

that the less active participants have not been represented in the interviews, and therefore it cannot be concluded whether different socio-political characteristics may have been present in this group. This may well be a general problem in research that needs participants, as the researcher is dependent on the reaction of a group.

Secondly, the generalizability of the case conducted may be limited due to its specific and complex nature. Also, it cannot be determined whether the fact that this project took place in the Netherlands has any influences. For these specificities to be determined, more similar case studies need to be conducted in similar, but not equal contexts.

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## APPENDIX A: CATALOGUE OF PRIMARY DOCUMENTS

Document Name	Document Type	Subject
Silex - Toelichting investeringsbesluit [final]	Decision presentation	
Silex - dialoofase - voortgangsrapportage (13x)	Progress presentation	
Silex - Projectmanagement - Voortgang	Progress presentation	
Aanwezigen workshops	Administration	User forum
Silex - koppeling document Increment 2	Formal document	
Werkprocessen Silex - Aansluitpunt Rechtspraak (1.0)	Work processes document	Functionalities
Referentieprocessen	Work processes document	Functionalities
Generieke Use Cases Silex (leveranciersversie)	Work processes document	Functionalities
Canvas proces architectuur	Work processes document	Functionalities
Silex - Samenvatting technische vragen spir-IT	Regular meeting presentation	Functionalities
Silex - Controlelijst aanbidding	Checklist	Supplier selection
infopack Silex - koppeling document Increment 3	Formal document	Functionalities
Silex - Projectplan	Planning	Planning
Silex - koppeling document	Functionalities	Functionalities
Referentieprocessen	Work processes document	Functionalities
Canvas Silexstyle Silex processen A0	Work processes document	Functionalities
Silex - koppeling document Increment 2	Formal document	Functionalities
Silex - koppeling document Increment 3	Formal document	Functionalities
Presentatie RvdR 2 juli 2015	External presentation	KEI
Silex 2 juli 2015	External presentation	Formation consortium
Silex - Presentatie 19 februari Silex leden (Totaal pakket)	Internal presentation	Formation consortium
Silex - Presentatie niet leden	External presentation	Partner acquisition
Silex Projectplanning	Planning	
Silex - Tafelindeling	Project definition	
Silex - Presentatie niet leden	External presentation	Partner acquisition
Testpartnerschap Rechtspraak	Contract	Partner contract

Ontwikkelcontract	Contract	Supplier contract
Contractinformatie leden Maart 2016	Information	Supplier contract
Silex Contract zoals opgeleverd 8 juli 2016 (Silex intern)	Contract	Partner contract
Generieke Use Cases	Use cases	Functionalities
Referentieprocessen	Work processes document	Functionalities
Silex - Presentatie 19 februari Silex eindgebruikers	Progress presentation	Functionalities
Proces documentatie (funtioneel)	Work processes document	Functionalities
samenvatting requirements ketenpartijen Bestuur 2 incl belang	External requirements	
Verslag bijeenkomst werkgroep advocatuur algemeen 16-02-2016	Meeting report	KEI
Silex - Aanvullingen brief Nova 7 december aan Rechtspraak (verzonden versie)	Information	KEI
Silex _ Voorbereiding EK commissie ronde tafel 7 juni 2016	Information	KEI
Specificaties rechtspraak juli 2015	External requirements	KEI
Specificaties rechtspraak september 2015	External requirements	KEI
Specificaties rechtspraak maart 2016	External requirements	KEI
Specificaties Rechtspraak mei 2016	External requirements	KEI
Silex input op documentatie Rechtspraak	Information	KEI
Silex presentaties	Internal presentation	Project process
Silex RFI (fase 2)		Supplier selection
Silex - proces dialooffase 9021016	Project definition	Supplier selection
Silex - Projectplan dialooffase	Project definition	Supplier selection
Deepdive deliverables	Information	Supplier selection
Berichtenboek v4.0 (publicatiedatum: 26 april 2016)	External requirements	Functionalities
tijdslijn-KEI	Planning	KEI
Berichtenboek technisch koppelvlak v3 99 concept 26 februari 2016	External requirements	Functionalities
Berichtenboek v3.99 ter review	External requirements	Functionalities
Codelijsten technisch koppelvlak v1 4 concept 26 februari 2016	External requirements	Functionalities
Toelichting gebruik S2S koppelvlak Release v3.99 concept 26 februari 2016	Information	Functionalities
Codelijsten technisch koppelvlak v1.6 (met wijzigingen gemarkeerd)	External requirements	Functionalities
Berichtenboek technisch koppelvlak v4.01 (wijzigingen gemarkeerd)	External requirements	Functionalities

Silex - Bevindingen en Besluiten	Requirements document	Issues
Gebruikersforum - presentaties	Progress presentation	User forum
Techniekforum - presentaties	Progress presentation	Technical forum
Backlog Instrumenti	Requirements document	Functionalities
Architectuurdocument	Requirements document	Functionalities
Silex Generieke Use Cases	Use cases	Functionalities
Silex Referentieprocessen	Work processes document	Functionalities
Rechtspraak - Proeve Technische procesregeling 0.9 PDF	Requirements document	Legal compliance
Workshop - loggen uitwerking	Workshop presentation	Functionalities
Installation Guide Courtflow DMS Connector version 0.9	Manual	Installation
Voorbeeld werkprocessen ter inspiratie kantoren voor inrichting interne werkprocessen	Manual	Example

## **APPENDIX B: INTERVIEW PROTOCOL**

The following subjects were discussed in the interviews, the questions are example questions, aimed for guidance during the interview:

### **Introduction**

- Name, function, Silex responsibilities

### **Requirements Engineering**

- Requirements sessions
  - What was your role?
  - Why were you chosen to participate?
- RE process
  - Through what process were requirements elicited?
  - How were requirements negotiated?
  - What is your opinion on these processes?
- Input appreciation
  - Do you feel your input was appreciated?
  - Do you feel all input was equally appreciated?
- Goal congruence
  - Did all participants operate with the same goals/targets in mind?
  - Did you encounter any problems in these sessions?
- Decision making
  - How were decision on requirements made?
  - How did this affect the product?

### **Coopetitive alliance**

- Interfirm relationship
  - How would you describe the relationship between the firms?
- Competition/ collaboration
  - How did the competing characteristic influence the project?
- Information restriction
  - Did you notice any kind of information restriction between the firms?
  - Where there initiatives in place to restrict knowledge?
- Power balance
  - Was there an (im)balance of power throughout the project?

- Was there a clear hierarchy?
- Did you feel like the firms were equals?
- Project management
  - Has the project been managed adequately?
  - How did you experience the management team?
  - What roles can you distinguish within the project?
  - What would you change about the management structure?

#### **External influences**

- Direct environment
  - Are there "outside influences" that shaped the software product? (outside of Silex)
  - What were they?
  - How did they affect the product?
- Political forces
  - Do you recognize any political forces in play throughout the development?



## APPENDIX C: CODING TREE

- RE Process
  - Elicitation
  - Negotiation & Analysis
  - Sessions
  - Project Engagement
- Coopetition
  - Coopetition Management
    - Executives
    - Product Owners
    - Project Manager
  - Decision Making
    - Debate
    - Democratic
    - Singular
    - Two-party
  - Goal Congruence
  - Information Restriction
    - Pre-existent
    - Professional
  - Interfirm Relationship
    - Competition & Collaboration
    - Consensus
    - Hierarchy & Power Balance
    - Input Appreciation
    - Trust
  - Internal Politics
  - Representation
- External Influences
  - Direct Environment
    - AMG
    - DJA
    - NOvA
    - Topicus
  - Meta-Environment
    - Policy Makers
    - Software Market
- Opinion on Software
- Personal Info

## APPENDIX D: SILEX MEMBERS

<b>Firm name</b>	<b>Number of lawyers<sup>10</sup></b>
<b>AKD</b>	178
<b>Bird &amp; Bird</b>	65
<b>CMS</b>	116
<b>De Brauw Blackstone Westbroek</b>	310
<b>Dirkzwager</b>	95
<b>DLA piper</b>	107
<b>Ekelmans &amp; Meijer</b>	36
<b>Höcker</b>	33
<b>Hogan Lovells</b>	42
<b>Houthoff Buruma</b>	240
<b>Kienhuis Hoving</b>	43
<b>NautaDutilh</b>	269
<b>Nysingh</b>	82
<b>Pels Rijcken &amp; Drooglever Fortuijn</b>	144
<b>SRK Rechtsbijstand</b>	69
<b>Stibbe</b>	188
<b>Trip</b>	49
<b>van Doorne</b>	144
<b>van Traa</b>	29
<b>Wijn &amp; Stael</b>	37

<sup>10</sup> According to the 2017 “Stand van de Advocatuur” (freely translates to: State of the Bar)

