

Master's thesis

NTNU
Norwegian University of Science and Technology
Faculty of Information Technology and Electrical
Engineering
Department of Computer Science

Trine-Lise Helgesen

Digital Service Outsourcing Through Sociotechnical Transformation

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Supervisor: Elena Parmiggiani

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Summary

Industries today are faced with a large market of digital services offered by IT corporations, and through the digital age the array of services has increased though constant innovation. However, with the integrated technologies advancing the complexity of the information infrastructures developed increases. The aim of this thesis is to investigate the phenomenon of digital service outsourcing in order to create new insight into the practical development of Information Infrastructures. This is done by adapting a sociotechnical approach, studying the technical and social factors, as well as their interactions, in the described phenomenon.

In order to provide this knowledge a case study has been conducted, investigating the processes, elements, actors, interactions and challenges occurring though service outsourcing delivered by an IT corporation among the global leaders in the market. Through semi-structured interviews and a stepwise-deductive inductive data analysis emerging concepts have been characterized and further validated in Information System literature and though discussion with the informants. These characteristics have been modeled, resulting in a service outsourcing framework, illustrating the complexity of the phenomenon.

Further the results indicate that the complex factors identified are interdependent and paradoxical. However, an emerging potential solution of a minimum viable data model has also been identified and is presented as motivation for further research.

Preface

The research work in this thesis is written for the Department of Computer Science, at the Norwegian University of Science and Technology in the period of January 2019 to February 2020 as the author's master thesis. The aim of the research included bridging the field of Information Systems to a practical phenomenon, as the case study illustrates. I would like to express my sincere thanks and appreciation to my supervisor Elena Parmiggiani, who has supported me throughout the research project and offered great encouragement and guidance. Additionally I would like to direct my regards to the informants at HAL, and the key representative in particular for their participation in the study, offering intriguing insight into the realm of service outsourcing. Trondheim, February

2020

Trine-Lise Helgesen

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Introduction

Throughout the digital age, innovations in information systems have provided grounds for an abundance of computerized processes and digital systems are getting ever more intelligent (Zysman and Kenney, 2018). This development has also led to innovations in business models, aiming to utilize the technology, create value for the consumer and leverage their market powers (Barrett et al., 2015). As a result, digital service outsourcing has become an enormous industry for IT corporations to frolic in, as multi-billion dollar contracts are being signed across a large specter of clients, including banking, finance, travel, and telecom corporations¹²³ However, as the technology and services increase in complexity and evolving into information infrastructures (Monteiro et al., 2013), challenges concerning the management and maintenance of the infrastructures follow (Costantinides et al., 2018), creating a further layers of complexity in the environment of digital service outsourcing

The case study in this thesis will be investigating one of the leading IT corporations delivering digital services and contributing to service innovation, referred to by the cryptogram HAL. As a global corporation, they operate with a broad spectrum of clients, and an even broader specter of standardized digital services to accommodate their clients' needs in a continuous pursuit to compel their market competitiveness and economic advantages. Knowledge existing in this competitive industry is not usually shared, but through SIRIUS⁴ the interest of HAL has been secured and executive informants made available to share their knowledge and experience. This is a unique opportunity to investigate how information infrastructures (Barrett et al., 2015; Monteiro et al., 2013) evolve in practice, and advanced technology is made available for corporations through the digital service providers.

This thesis aims to contribute to the field of Information Systems (IS). In so doing, it draws on conceptualizations of work practice from the field of Computer Supported Cooperative Work (CSCW). In particular, the thesis investigates the inner workings of IT

¹<https://www.computerworld.com/article/2587716/american-express-signs-4b-it-services-deal-with-ibm.html>

²<https://www.computerworld.com/article/3414498/tui-travel-books-six-year-infrastructure-outsourcing-deal.html>

³<https://www.ciodive.com/news/report-verizon-signs-700m-outsourcing-deal-with-infosys/538877/>

⁴<https://sirius-labs.no/>

service outsourcing as a phenomenon and providing new insight would offer inspiration for further research as new concepts are emerging. In order to fully utilize the opportunity offered by access to unique case, a sociotechnical approach, is used as a spectacle to provide an additional axis of cohesion Sarker et al. (2019), focusing on both technical and social elements of digital service outsourcing, and specifically the interdependent connections between them.

1.1 Research Questions

As a descriptive study, this thesis will concentrate on understanding (digital) service outsourcing as a phenomenon. In order to extract knowledge without constraints the research questions have been created to reflect openness and curiosity (Oates, 2005).

1.1.1 RQ1: How can we characterize the early stages of a service outsourcing process?

First and foremost, this study will investigate the processes that occurs when a digital service is developed and delivered by HAL as the service provider. The focus will be to understand the interactions taking place and which elements they interconnect. With the sociotechnical lens, both the technical and social interactions will be of interest during the investigation. As will be further described in section 4.4, the scope is limited to the early stages to be able to provide an in-depth description of processes and an overview of how dependencies create entanglement over time during service outsourcing (Parmiggiani et al., 2015).

1.1.2 RQ2: What are the challenges arising in the early stages of service outsourcing?

To further develop the in-depth understanding of the phenomenon, challenges occurring will be investigated. Conceptualizing these challenges and identifying involved dependencies will give additional insight into how processes and actors affect each other throughout service outsourcing. This will also contribute to motivate the involvement for HAL, as further areas of research can be recommended and aimed to eliminate the challenges identified.

1.2 Research Method

In order to contribute with an understanding of IT service outsourcing as a phenomenon, this thesis uses an interpretive case study Oates (2005) including semi-structured interviews with executive informants providing high-quality insights. The interviews are used to capture knowledge throughout the organization as the informants were selected on a globally distributed basis and across the phases of the service outsourcing process. This is the foundation of the qualitative data analysis where the stepwise-deductive inductive

data analysis method (Tjora, 2018), contributes to establish connections to the theoretical background and refine emerging concepts.

1.3 Contribution

The first contribution of this thesis is a service outsourcing framework consisting of condensed findings from the data collection and analysis in this study. The framework illustrates the processes, actors and elements involved in service outsourcing, and challenges that arises. Further, the timed processes are tied to the timeline of digital service outsourcing and potential factors of complexity are identified as areas of additional complication. These results serve as a foundation of understanding the phenomenon of digital service outsourcing, and how information infrastructures are developed in practice on a global scale, and the sociotechnical interdependencies occurring throughout.

By identifying challenges, this thesis will contribute to secure interest from the corporation in further research, as the existence of such proves room for optimization of the involved processes and procedures. This interest is crucial in order to continue a partnership where researchers will be able to success data material, a situation which is not a given when researching businesses that are highly affected by competitors in the market. Additionally, by enlightening issues also adds to the rich insight, uncovering potential areas for further empirical research within the field of IS, human-computer-interaction, as well as business management to some extent. The results could enlighten intriguing factors to motivate other researchers and add a notion of “where to start” the further research.

1.4 Structure

The following chapters in this thesis will be containing the material regarding the given parts of the study:

Chapter 2 elaborates further on the case background, and the motivation for the involvement with the case corporation. Chapter 3 includes a summary of relevant background literature within the field of IS, as well as system infrastructures, CSCW and sociotechnical capabilities. Further, Chapter 4 provides a description of the applied research methodology, as well the conducted research. Chapter 5 describes the findings and models that were derived from the data material, and finally Chapter 6 discusses the findings, their relevance to the research questions and their intended contribution.

Case Background

This study is inspired by and involved in a broader program focusing at industrial digital transformation at SIRIUS, Centre for Scalable Data Access in the Oil and Gas Domain, a center for research-based innovation and partner of NTNU. Though the supervising professor's involvement and contacts in SIRUIS access to the case and case material (see 4.7) was made available for this particular study. This chapter contains an introduction to the case, as a foundation for the upcoming findings in Chapter 4. Firstly, a description of the case corporation, HAL, is presented, followed by an elaboration on the process of (digital) service outsourcing, lastly an introduction to rationale of introducing sociotechnical approach.

2.1 The Case Corporation: HAL

As mentioned in the introduction, HAL is among the global market leaders within the digital service delivery industry. Additionally they are involved with the service innovation described by Barrett et al. (2015), investing heavily in advancing technologies as artificial intelligence, blockchain and quantum computing as a service. Through the innovative efforts HAL has developed an extensive variety of standardized tools, which they offer to clients through service outsourcing.

Typical clients are large corporations of a wide array of industries, each client receiving a personalized package of services. To exemplify these packages could contain single services as a customer service platform, or larger and advanced infrastructures, as an AI based financial infrastructure for all business operations throughout the corporation, additionally providing monitoring, reporting and managerial functions.

2.2 IT Service Outsourcing

Generalizing there are three main elements to service outsourcing, illustrated in the preliminary outsourcing framework in figure 2.1. Firstly, a client who are outsourcing by acquiring a service, provided by a service supplier. Further, service delivery is the term used for the process of supplying a client with an outsourced service. Additionally, the

outsourcing concerns an information system, or the lack thereof, which the client is using. This system gets altered or appended upon by the service provider, whether by simple standalone services or entire information infrastructures.

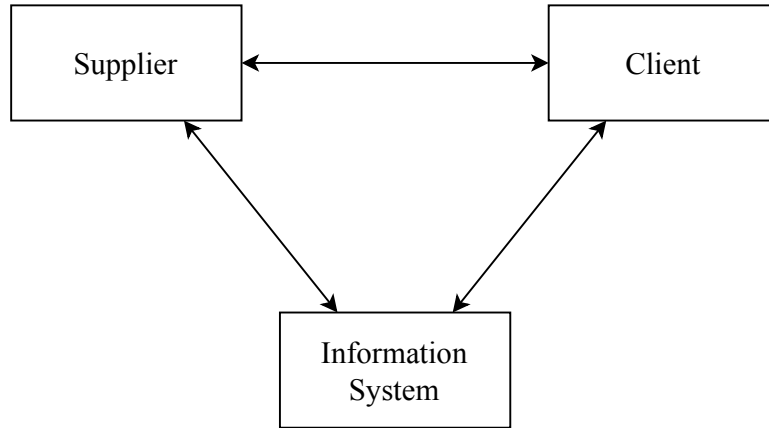


Figure 2.1: The preliminary service outsourcing framework

Further a service delivery is characterized by three phases: Engagement, where the contract is signed. Transformation, the development and deployment of the service. And lastly steady state, where the service operation and maintenance are continuously delivered. Further HAL operates with two main types of contracts for service deliveries, long-term engagements and project deliveries, where the latter is less desired from HALs perspective, hence less common. During the engagement and transformation phases both contracts follow the same procedure, however projects end at this point by an acceptance test and final handover to the client, who will be maintaining the delivered service internally. On the other hand, long-term engagements continue with a handover to a steady state phase, where HAL will be maintaining the service for usually 5-10 years to come, resulting in a typical timeline for the engagement as shown in 2.2. Within the longer phase of steady state, the most monetary value is generated for both parties, hence making these engagements of higher demand and of higher interest to investigate, as HAL experience the effects of the early stages. The timeline also include the definition of “early stages” in the research questions 1.1, as the processes up until, and including, the handover to steady state.



Figure 2.2: The typical service outsourcing timeline

2.3 Case Motivation

Further HAL's motivation for participating in this case study is based on two hypotheses, relating the research questions of the study to a practical relevance in order to be beneficial for HAL to partake in. These were developed during the initial proposal and planning of the research project, in a collaboration between the key representative at HAL and the involved researchers.

"HAL could learn from the approach adopted to similar problems in other industries"

Firstly, the motivation for HAL's involvement with SIRIUS and research in general is that there exist approaches to improvements and solutions to problems adopted by other industries that they could be learning from. Being involved in research is therefore grounded in a transactional effort where new knowledge is the outcome for HAL's participation.

"There exists knowledge that is not easily accessible during the early stages of service outsourcing, but if made available and used appropriately could improve service delivery"

Further HAL has observed opportunities for improvements within service outsourcing, however the knowledge of how to achieve it is not yet conceptualized. However, the key representative had an early observation of a mismatch between the financial focus during the engagement phase and the technical focus in the transformation phase, as will be further presented in the Chapter 5. Which was the origin of suspecting the early stages to contain further knowledge, which, if made available and conceptualized through research, could contribute to changes in processes and improvements of service delivery.

Literature Review

In this chapter the theoretical background for the thesis is presented and core terminology is described through relevant literature. As elaborated on in section 4.3, the contents of this literature review has been sourced to establish a foundation for the upcoming research, and additional literature has been included to reflect emerging concepts throughout the data analysis. As a result, this review includes background material for the case study itself, as well as the findings and discussion which will be presented in later chapters.

3.1 Theoretical assumptions

An imperative assumption underlying this thesis is the understanding of the origin of service outsourcing and why the design of such information systems requires knowledgeable considerations. Grounded in Gasser's (1986) description of adaptive work as coping methods occurring a result of misalignments between the design of information systems and the needs of its users, suitable design of information systems used by corporations is essential in order to exploit the competitive advantages and optimizations of business profits that has become available in the digital age (Barrett et al., 2015). Further Barrett et al.(2015) argues that increasing business complexity creates a demand for "professional coordination", which motivates service outsourcing and establishes the market for service delivery.

Gasser (1986) further points to technical disruptions in workflow as a source for adaptive work, exemplified by systems not being able to handle sufficient amounts of requests in peak periods, or not supporting appropriate user inputs. Disruptions which, from a system developers point of view, is a consequence of both the lack of development and development that is not customized to high enough extent (Gasser, 1986). However, even though adaptive work is characterized as non-optimal and demanding additional resources, such as training, to be handled, some adaptive work is identified necessary to accommodate for changes in routines and workflows as corporations responds to their ever-evolving environments.

Orlikowski(1992) elaborates further on the importance of training, and the users' mental models as a source of non-technical misalignment. Her research includes an example of users' mental models being neglected when introducing a new information system,

resulting in “Individuals trying to understand it in terms of their existing technological frames.” (Orlikowski, 1992). This shows a situation where, even if the information system is tailored to the needs of the users, its full potential is not possibly utilized without the users’ mind models being tailored to the information system. Therefore change management is crucial when implementing information systems in organizations in order to achieve full effect of new systems, which includes training employees sufficiently (Orlikowski, 1992). Additionally, work practices need to be customized to the new information system, and vice versa to reduce adaptive work (Orlikowski, 1992; Gasser, 1986).

The dependency of joint tailoring becomes increasingly important as the complexity in the corporations and information systems increases, which will be elaborated upon throughout this chapter. To describe the resulting complications Perrow’s(1984) definition of complexity, as an opposition to linearity, will be fundamental for this thesis. This entails that linear operations and interactions are not necessarily simple or computational, however predicable, visible and has the ability of being segregated into specified steps. Complexity, on the other hand, is characterized by intertwined processes with a variety of potential directions, it can be surprising as there exist limited understanding or unfamiliar feedback loops in interconnected subsystems (Perrow, 1984). With this understanding of complexity, the focus on tailoring is essential, although admittedly complicated, where workflows are becoming complex with internal dependency lattices and cross-departmental functionalities, as the coordination of adaptive work in these workflows would require exponential amounts of additional resources (Gasser, 1986).

3.2 Information infrastructures

As established, another level of complexity is added to the tailoring of information systems as, as large organizations are depending on complex systems in their operations (Barrett et al., 2015). These complex systems have, as described by Monteiro et al., evolved from systems as single artefacts, to information infrastructures (Monteiro et al., 2013). Interconnection of several modules and a constantly evolving ecosystem of modules are defining factors of an information infrastructure according to Monteiro et al.(2013), in addition to a fundament of an installed base of systems and practices shaping the ecosystem as it stretches across time and space . In addition, information infrastructures differ to single information systems by an openness to users, with no pinpointed target throughout its vast functionalities.

The definition of infrastructures evolving as a complex system with high levels of interconnectedness has been maintained across IS literature (Monteiro et al., 2013; Star and Ruhleder, 1996; Hanseth et al., 1996; Hepsø et al., 2009; Parmiggiani et al., 2015), and strategies for structuring the complexity are suggested to handle the increasing amount of data within the infrastructures (Monteiro et al., 2013; Parmiggiani et al., 2015), as the complexity in the use of data also has evolved (Kitchin, 2014). With the rise of Big Data, new methods of data-driven science (Kitchin, 2014) are becoming available for corporations as strategic analysis tools (Jones, 2019). However, how data is recorded and understood as information within the information infrastructure adds additional complexity, as variations in volume of data, velocity of recording, diversity in veracity across exhaust-

ing scopes (Kitchin, 2014) affects the stability, objectivity and transparency within the infrastructure (Jones, 2019).

Further advancements to information infrastructures include technologies such as cloud computing, digital platforms and blockchain technology, as the adoption of these developments is associated with value creation by corporations (Costantinides et al., 2018). Additionally, the use of new technologies opens a potential for new business models, which has been seen continuously through the digital revolution (Zysman and Kenney, 2018). Currently digital platforms in particular are discussed in competitive strategy as a technology that is opening markets where opportunities of “winner-take-all”, creating temptations and a sense of urgency of adaptation for corporations (Costantinides et al., 2018). Digital platforms themselves are characterized as an information ecology where a stable core, running in the cloud, is the foundation of complementary modules for functionality. Further each connected module has a large potential and usefulness, which is not limited to single services, rather a broader set of functionalities Costantinides et al. (2018); Zysman and Kenney (2018).

Although platforms are considered as a source for value creation, implementation of the technology is not single sided, and Constantinides et al.(2018) suggest that organizational issues must also be addressed by corporation seeking advancement in their installed base . By significantly changing the digital infrastructure they argue that changes in the governance of the infrastructure must follow, specifically affecting the authority and responsibility for decision making regarding data within the platform core. Following this, the corporate strategy of integrating digital platforms must also include policies and control mechanisms for data government reflecting the interests of the corporation, inter-connecting and technical and organizational development within the corporation Constantinides et al. (2018); Zysman and Kenney (2018). In addition to inspire innovations in business models, digital platforms feature a fundament of decreasing system complexity, as modules share the data standards of the data core Zysman and Kenney (2018) their functionalities subsequently share some linearity.

3.3 Standardization

The application of standards, standardization, in information infrastructures is an essential approach for handling and reducing system complexity Meum et al. (2011). As large-scale information infrastructures continue to evolve and integrate new technologies, interdependencies and embeddedness create an increasingly complex installed base and challenging environment (Monteiro et al., 2013; Hepsø et al., 2009; Parmiggiani et al., 2015), Particularly for service outsourcing suppliers standardization has become essential in order to reduce complexity (Barrett et al., 2015). Meum et al.2011 describe earlier definitions of standardization to have considered it a purely technical concept, regarding programmable standards in artefacts only, in order to achieve objective and static systems. From the point of view of the suppliers of information systems, this definition also carries “Fordist” ideals of effective production (Yates, 1989), resonating as a validation of the concept. However, the increased complexity in interactions and technology is linked to the need of a broader conceptualization of standardization, accounting for the interdependencies identified in

the interactions between technical and social capabilities and their embeddedness in information infrastructures (Meum et al., 2011; Mikalsen et al., 2014).

Rolland and Monteiro(2002) illustrate this argument by highlighting that any system must be tailored according to a local context while also being adaptable to global or distributed contexts, reasoning that standardization is a process of balancing between a uniform system and local adaptations of these systems. They further specifically illustrate their presumption with an empirical example where an information infrastructure standardizing a work process was applied globally. The standardization itself was essential to reduce complexity and improve visibility of processes. However, as the system failed to account for local contexts, geographically and departmentally, it resulted in creating a substantial amount of adaptive work(Gasser, 1986) for the users (Rolland and Monteiro, 2002).

The rationale of balancing is also backed by Mikalsen et al.(2014), who identify the equivalent tension between global and local contexts, geographically, and rigid and flexible processes as another approach to standardization across otherwise distributed contexts, such as departmentally where interdependencies exists . They further suggest that the balancing of flexibility requires system maintenance as information infrastructures evolve and new interdependencies occur, in order to minimize adaptive work for the actors involved. Turning the focus back to the dynamic interaction of tailoring specifically for the needs of the users, Monteiro et al.2013 enlightens a contradiction of standardization in information infrastructures, were the users are distributed and not specifically targeted .

3.4 The sociotechnical approach

By elaborating on standardization in information infrastructures, the discussion of who among the users will be subject to adaptive work, and who will be perceiving a well-suited and high-quality infrastructure (Rolland and Monteiro, 2002), has been opened, as reaching a perfect balance for all actors involved is ultimately unobtainable. Similarly, Meum et al.(2011) describes standardization as an ongoing pendulum, where negotiations among the actors contribute to minimize adaptive work over time , converging towards a well-adapted infrastructure. Elaborating on this, Rolland and Monteiro(2002) revisit the transaction costs of adaptive work and whom these will concern, as a fundamental question in CSCW literature, as they study an example of skewed transactional costs . In the case in question, a lack of the negotiation suggested by Meum et al. (2011) leads to a substantial amount of adaptive work and reluctance among the users. A similar situation is described by Jirotko et al.(2005), where users are not able to genuinely appreciate a system due to the lack of a multidimensional trust . The nature of trust in relation to information systems is further specified by Jirotko et al. (2005), who argue it to be an underestimated and incompletely understood capability in the design of information systems. In order to improve the usefulness and usability of a system they suggest that trust must be accounted for, also in relation to the technology in addition to interpersonal trust between relevant actors. They show that this multidimensional trust is partly a product of the trust developed through the relations between the involved actors, the users' will-

ingness to rely on the solutions developed for the system, e.g. security, policies for use. Further the willingness is affected by and the adaptive work occurring as a result of the system, as well as the work conducted to tailor existing processes, as the management and training suggested by Orlikowski (1992) (Jirotko et al., 2005).

Building on the interactions between human actors and technology affecting one another, as standardization is an example of, the sociotechnical approach offers an additional axis of cohesion in order to understand the broader effects that follow (Sarker et al., 2019). This perspective considers the bi-directional relation of the technical artifacts and the human capabilities, such as trust and relation, among the people involved with the technology, and specifically the interactions between these two entities. As a result, the interdependencies and effects of the interactions become available to investigate as a dimension of information system.

3.5 Summary

Through this review it has become apparent that information infrastructures provide a large variety of challenges when service suppliers are delivering their services to clients. Firstly, there is a technical challenge to navigate the complexity of the technical environment, its interdependencies and scale, and overcoming the hurdle with integrating new information infrastructures into this existing situation. Further they face the obvious intention of improving upon the given environment and understanding the needs of the involved actors and their varying perceptions of quality. Failing to do so results in additional adaptive work for said actors and potentially a less efficient solution for the client. To deal with the complexity of the situation, standardization has been a debated strategy. From an economic point of view standardization serves providers and helps to streamline operations within the clients' organization. However, flexibility and tailoring to local needs has also emphasized as a success factor. To further understand the local needs and the impact of interactions with information systems in general, the sociotechnical approach provides an additional axis of cohesion. Through this lens the interdependencies of interactions in and between social capabilities, as trust and human relations, and technology with its complexities is emphasized. However, the theories described must be applied to an empirical situation to be supplied with the context needed to witness its usefulness in practice. An application which will be provided through the case study of this thesis.

Research Method

This chapter will include a description of the research design and methods used in conducting the research in this thesis. All methodical considerations done will be accounted for and an evaluation of the design concludes the chapter.

4.1 Research Design

Conducting trustworthy research depends, among other factors, on the researcher's ability to establish a suitable research design with appropriate data generation and thorough methods for data analysis Oates (2005). The general research process is illustrated in figure 4.1, including common research strategies and methods. Additionally, the research design and methods for this thesis is highlighted.

As the motivation and intention behind the research questions is to investigate service outsourcing as a phenomenon new perspective, a correlating research strategy and method was developed. By the nature of the proposal through Sirius and available sources within HAL a case study was the apparent suitable strategy, as well as data collection through interviews with qualitative analysis. In order to structure the data analysis and iteratively extract new insight, the stepwise-deductive inductive analysis method Tjora (2018) was adopted. These elements are further elaborated on in their respective sections.

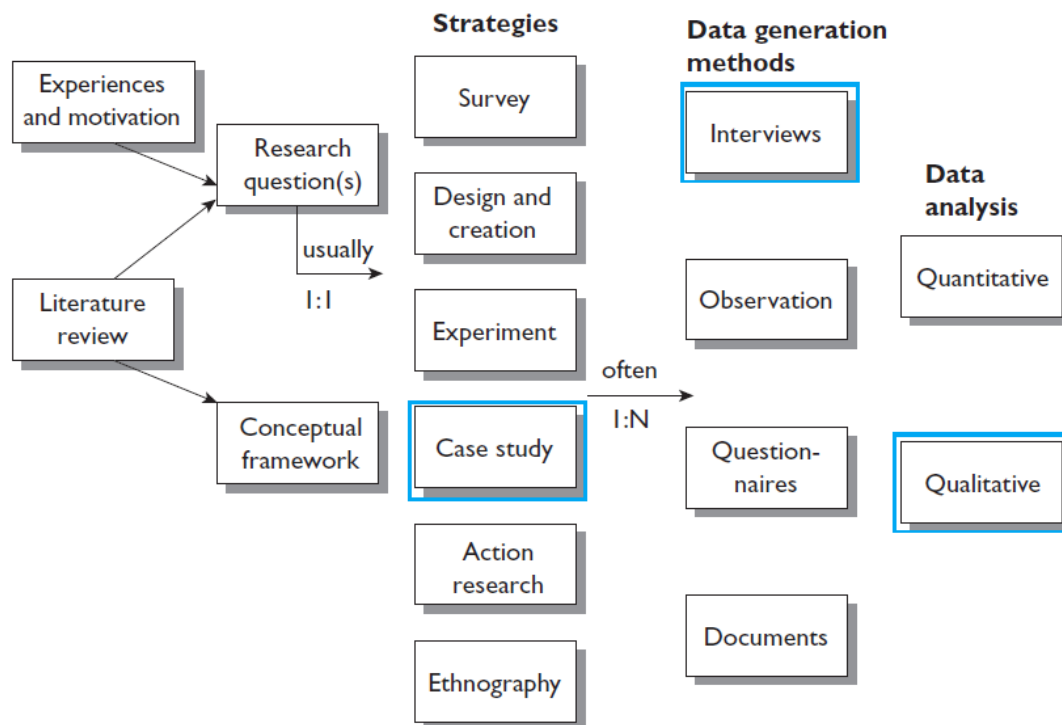


Figure 4.1: The research process (Oates, 2005)

4.2 Philosophical paradigm

The research conducted uses an interpretive approach, where the intention is understanding context, influences and interdependencies, rather than proving or disproving hypotheses Oates (2005). In other research paradigms, e.g. positivistic, the existence of factual cohesion is assumed to be existing and available for collection, making the research more specific to an extent where a presumed systematic external realism answer to the research is discovered Walsham (1995). Although similar in intention, the interpretive approach in this thesis' ontology includes an internal realism, as described by Walsham, characterized by knowledge being seen as a construction of the human cognitive apparatus and needed to be understood, rather than discovered (1995). On an additional note, although hypotheses have been used in establishing the motivation for this thesis, the research itself in this thesis does not aim to make conclusions on the hypotheses. Regardless, the insight gathered in order to answer the research questions will provide a foundation upon which the hypotheses can be evaluated to some degree, as further discussed in chapter 6.

Further Yin suggest three types of case studies, regardless of the paradigm adopted (2003). These range from exploratory studies, aimed to define grounds for subsequent studies, descriptive studies, telling a rich story of a phenomenon, and lastly explanatory studies, where events in a descriptive story, and their outcomes, can be explained and matched against existing theory. Although the results of the case study in this thesis additionally provides inspiration for further research, the aim for the study itself is categorized as descriptive, which influences the methods of data generation and analysis, as the study

is tailored to the phenomenon being studied Walsham (1995). For the case studying HAL, this implies constructing a heuristic contribution as a whole through interlacing insight iteratively Walsham (2006), which is reflected in the extensiveness of data analysis through the stepwise-deductive inductive method Tjora (2018), (see 4.6) being included, as it provides a framework for validation of insight throughout the analysis both in data material and relevant literature.

Another specific decision affected by the paradigm resulted in the research questions being altered from specifically targeting the transformation phase in isolation, to the including the wider duration of the “early stages”. This change was evaluated as unavoidable soon after the initiation of data generation, as at this point it became apparent that the transformation phase was more dependent on processes during the engagement phase, as well as directly causing challenges during steady state. Because these interdependencies are the exact areas of focus in the interpretive paradigm, extending the scope contributed to securing a more complete understanding of the phenomenon and its context Walsham (2006).

4.3 Literature Review

Reviewing literature has been an addition to the concept refinement in the study, and the contents of the literature review have been developed iteratively and driven by the data analysis using a snow balling (Oates, 2005) approach based on emerging concepts throughout the study.

Nevertheless, a primary review was essential to create the initial framework and starting point for investigation. A base of core literature has been reviewed in order to get a general insight into the case environment and components. This regarded the field of IS, as such systems are the core component in the value chain of service outsourcing. Additionally, the sociotechnical approach was researched to be used as a lens, through which the case would be investigated. This also included literature from the field of CSCW as a secondary field of interest, where some CSCW material served as inspiration and motivation for examining the human capacities in the case, supported by the sociotechnical approach. This primary collection of literature focused mainly on heavily established material and classics as a stable fundament, with the addition of contemporary research, resulting in an in-depth and cohesive conceptual framework, as opposed to a broad but shallow introduction. Evaluation of the usefulness and quality of the primary review was conducted in close partnership with the supervising professor in order to establish validity of the core material.

Following the data analysis, a secondary literature review concerned the emerging concepts, further investigating these in order to develop and refine them. For this process relevant literature on similar cases or topics were added to the review to provide potential further insight as the data analysis progresses. All the information collected though the added material was introduced to the key representative and relevant informants for validation, and material not reflecting to the case was not included for further analysis. The secondary review has resulted in linking practice and literature, which will be presented throughout Chapter 5.

4.4 Case Study

As presented, a case study has been evaluated to be the most insightful research strategy in order to investigate HAL's involvement in service outsourcing. It is suggested that this is the superior approach when one's desire is in-depth understanding of a situation or phenomenon and serves to conserve the complexity of said phenomenon Oates (2005), which correlates to the intended contribution of this thesis. This is further backed by Walsham who promotes the rich knowledge such studies can produce 1995; 2006. Throughout the design of the study common pitfalls suggested by Klein and Myers(1999) have been taken into consideration and intently accounted for.

For the case study, long-term engagements are the type of contract studied, as they are both of more higher interest HAL, and represents innovation of service delivery described by Barrett et al. (2015). As these service outsourcing contracts last for several years the scope of the study had to be limited, either in width or in depth based on the resources and time allocated for the reach project. According to the research of Parmiggiani et al. (2015), an increasing degree of entanglement and complexity occur over time in infrastructures. This makes the early stages a source of dependencies, and investigating these, rather than the later stages, has the largest potential of contribution according to the goal of this thesis. Therefore, a shorter period was appropriately chosen to conserve the depth of the study, and set as the "early" stages of service outsourcing. "Early" in this case is including the engagement, initiating the transformation, up until the handover to steady state.

4.4.1 Access to Case Material

The connection to Sirius described in Chapter 2 contributed singlehandedly to the access of the case. Specifically, a Chief Architect at HAL, involved in Sirius, was involved and committed to the role as the key representative and connection to other resources within HAL. The role of this representative was essential as an informant to establish a general understanding of HAL as a complex organization prior to the data collecting interviews, as well in discussing and validating findings throughout the data analysis.

Lastly the key representative contributed by recruiting other informants for the interviews, based on their involvement and experience with service outsourcing, geographical distribution as well as personal motivation to participate. The recruited informants were all characterized as holding senior positions at HAL, providing the study with an opportunity to collect uniquely high-quality data in relation for the scope of the thesis. Additionally, the quality of the data collected balance the modest amount of informants, favoring quality over quantity. Further, invitations to the feedback session were sent to additional informants to provide a wider selection for evaluating and validating the insights collected though the interviews.

4.4.2 Ethical Considerations

When conducting case studies, the relation built with the data sources, in this case through interviews and interview styles, are factors influencing the data which is made available for extraction Walsham (1995). Following this it is the work of the researcher to adapt to the people involved, while remaining objective and analytical. With informants in senior positions, remaining respectful of time as a limited resource is also urged by the key representative at HAL. Through the relation built with informants the researcher would benefit from being perceived as professional and trustworthy, which requires some understanding of the culture and language that is used Walsham (1995). Throughout this case study, the international cultural aspects are an area which has been considered in order to eliminate room for misinterpretation, as Walsham suggests 1995.

Specifically, language has been a topic of reflection, as all included informants and researchers are accustomed to English as a working language, and are considered more or less fluent speakers, however the majority are native to a country with other languages as their first. This results in knowledge going through translation twice in order to reach the other actor, and a potential of loss across this process is distinct, whether due to mistranslation or a lack of vocabulary. Although reaching mutual understanding when communicating has not been a large issue, an observation regarding ambiguous words and concepts has been made. In some instances, even relatively simple concepts, as “tools”, can possess several definitions across different cultures, as well as business processes, and create confusion as misalignments in understanding occur, exactly as Myers and Newmann suggest (2007). Through this observation an awareness of establishing mutual understanding where not explicitly expressed was adopted. Additionally, culture is a factor in as a source for misinterpretation that researchers should be aware of in terms of building trust and acting respectfully Walsham (1995); Myers and Newman (2007). This has been a useful remark to abide by, as conversational Norwegian does not comply with professional corporate conversation and conscious alterations had to be made.

4.5 Data Collection

4.5.1 Data handling

As emphasized by Walsham ensuring the privacy of informants and related organization is essential to the extent to which established when consent was given is of upmost priority in ensuring credibility as a researcher 2006; 2007. Consequently, and with respect to the severity of HAL’s market position and involvement with Sirius, privacy and data handling has been of high importance throughout the study in order to avoid obstruction of further cooperation. Naturally the study is approved by the Norwegian Centre for Research Data (NSD)¹, and content for participation was established for each participating informant. As established in the introduction of the study, the corporation referred to as HAL is anonymized, specifically due to competitors being interested in exploiting information about their business processes and vulnerabilities, making anonymization a prerequisite

¹<https://nsd.no/>

for the study. Further HAL specific business terminology has been generalized, and informants have been anonymized, to avoid them being recognized. An essential step as citation are being used to elaborate on findings.

4.5.2 Informal Discussion

A substantial amount of data material has been made available through conversations and discussions with the key representative. Frequent communication has made it possible to build a relation where the social dissonance Myers and Newman (2007) has been reduced on both sides, enabling engaged discussions and sharing of ideas, in addition to the ability of freely questioning without major concerns, and receiving in-depth answers and reflections. This relation is challenging to create for stand-alone interview sessions Walsham (2006); Myers and Newman (2007), however the commitment invested by the key representative has yield results in terms of high-quality data collection.

4.5.3 Semi-Structured Interviews

By Schultze and Avital's definition, interviews are an exchange of views between two people (2011), conducted in order to gain knowledge regarding a person's individual experiences and social reality. They can be a source of in-depth data contribution to a rich understanding of a phenomenon. For this study, semi-structured interviews have been conducted as a method of collecting these data, providing a general structure for the interviews which keeps the direction of the interview on track according to the research questions (Oates, 2005). At the same time, the semi-structured nature leaves room for flexibility to adapt to the interview subjects, as well as reflecting the interpretive paradigm, enabling further in-depth investigation as new opportunities for a thorough understanding arises (Walsham, 1995).

An interview guide (included in the Appendix) was developed to offer the structure needed to facilitate the formal structure of the interviews (Myers and Newman, 2007), and the initial sensemaking (Schultze and Avital, 2011), where the interview questions directly tied into the research questions of the study. Additionally, further potential follow-up questions were structured to aid and inspire the interviewer in the impromptu tailoring of the questions necessary to personalize the interview to the informants, their experiences and responses (Walsham, 1995; Oates, 2005; Schultze and Avital, 2011).

In addition to balance a structured and tailored interview, further precautions were made to secure the professionalism of the interviews. Firstly, the key representative at HAL handled the coordination and scheduling of the interviews to suit the dynamic and busy schedules of the informants and their responsibilities, greatly affected and complicated by the seniority of the positions held as time is considered a sparse resource at HAL. Further, the role of the key representative was extended, by mutual interest, from a coordinator to include the role of an observer during the interviews. This provided the opportunity to build upon the existing relation between the key representative and the informants when conducting the interviews, facilitating the openness of the informants. Additionally, this added to the experienced reliability of the interviewers, as the key representative had firsthand insight into the data material collected. By overseeing the research process

from HAL's point of view, the key representative acted as a control mechanism securing HAL's interest throughout the research, in which the informants could rely upon. Other mechanisms in the interviewing process included the use of a video conference tool as a pragmatic approach to communication across international borders. However, this also provided a tool for personalization of the interviews as a visual connection was established as the stage of the interview (Myers and Newman, 2007), as opposed to a voice call or written forms for interviewing, such as emails or surveys. Finally, the interviews were tape recorded, with the consent of the informants, securing the data for further iterations of in-depth data analysis.

4.5.4 Feedback Sessions

Towards the end of the research project, feedback sessions were scheduled, where the findings validity was evaluated through a presentation from the researcher and subsequent discussion and evaluation, as suggested by Myers and Newman (2007). Such feedback sessions were hosted for both HAL and Sirius representatives separately (see 4.7. For HAL the results were presented with a focus on the understanding of service outsourcing, the interdependencies and complexities identified, in addition to the emerging solutions or improvements. Afterwards, the representatives present were involved to evaluate the validity of the findings, in order to point out potential errors or incompleteness in the understanding established. Additionally, the degree of viability in the solutions suggested were discussed. In order to assemble the most representatives, the informants and other relevant representatives were invited to the feedback session, with an adequate turnup in respect to scheduling challenges on a global basis.

In the sessions with Sirius the focus shifted slightly to include the contents of the literature review and its implication, in addition to the researchable contribution of the study. For these sessions the connections between the practical and theoretical material were validated. Additionally, the relevance of the case study and its implications was validated as researchable foundation from both the practical and theoretical perspective, as a link between their interests.

4.6 Data Analysis

For the data analysis the stepwise-deductive inductive method proposed by Tjora (2018) was used. This method is designed to facilitate an unbiased, heuristic and dynamic approach to the data material, deducing theories and concepts through an iterative inductive process, grounded in a connection to the context of the data. The steps of the method are illustrated in figure 4.2, where data start at the bottom of the model, and are refined upwards towards becoming established theory, though deductive iterative steps. Through this section a brief description of the steps and conducted analysis is presented according to the step illustrated.

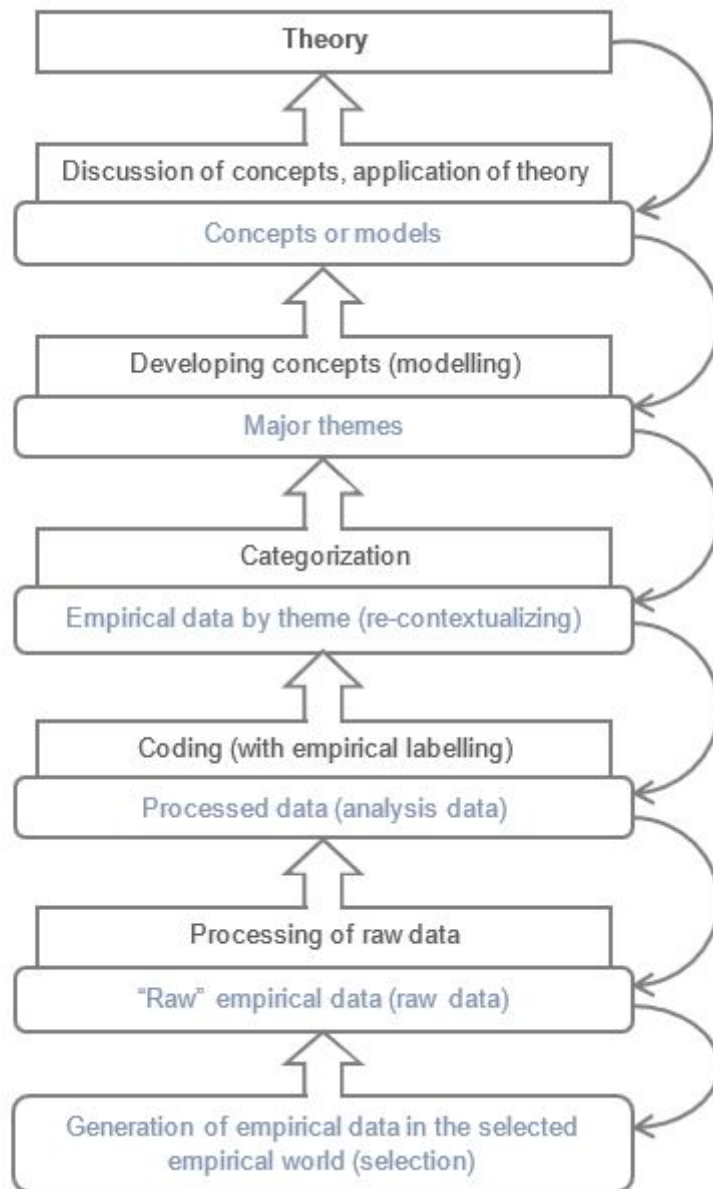


Figure 4.2: The stepwise-deductive inductive data analysis method (Tjora, 2018)

In order to conduct the interviews a general understanding of the case and its context, its “world”, was therefore needed and gathered through the primary literature review. This core material serves as the theory in which the deduced concepts are grounded. Then the generation of empirical data was done through interviews, as described, and made available as transcriptions, groomed for the upcoming analysis and iterations by anonymization, resulting in an accumulation of “raw data”.

The first step of the deductive inductive method introduces coding, where the material is being processed and sorted, however not analyzed. Resulting in a dataset of each of the phases during strategic outsourcing. Secondly the “analysis data” is coded by summing up the content in small sections, per statement or reasoning separately, into empirical “codes”. From this step reoccurring “codes” gives an impression of which themes that

are raised across the interviews. Re-occurring themes, and themes of common nature were plotted in a matrix as occurring results across the datasets.

From the matrix connections across the themes become apparent, resulting in emerging concepts which were reformulating or modeling. The concepts were further validated in both academic literatures, as application of theory, and conversation with the key representative and informants, a process that further evolved the concepts as more defined observations and constructed theory. As a final step these theories were presented through the feedback sessions, initiating the final iteration of validation and including the analysis.

Additionally, the stepwise-deductive inductive method includes iterative validation throughout the ongoing analysis. As concepts emerge, returning to the empirical world of theory for validation is essential to maintain the connection to the case context, and, if not sufficient, expand the data selection to account for the emerging connections. This resulted in the secondary literature previously described, which was iteratively built through the data analysis. Similarly, the introduction of new raw data, as other resources at HAL were made available and interviews were conducted (see section 4.7), the foundation for already emerging concepts was expanded and altered, resulting in the need of an iterative validation, as the new material contributed or challenged the existing concepts.

Through the stepwise-deductive inductive method an in-depth data analysis has been conducted and an iteratively validated understanding of the phenomenon of service outsourcing has been established. To present the results of the analysis in the upcoming chapters of this thesis, the strategy of sensemaking through a narrative approach (Langley, 1999) was adopted, elaboration on the timeline for the phenomenon of service outsourcing. Additionally, concepts not sufficiently covered in or connected to the timeline were included through additional visual mapping, supporting the narrative, and cohesively resulting in the service outsourcing framework presented in Chapter 5.

4.7 Data Sources

The data analysis described relied on a series of data sources which will be presented in this section. Firstly, as described in section 4.4.1, informants were the main resources made available for the case study, recruited by the key representative for interviews. In this process connections already established within HAL could be utilized to efficiently construct a selection of informants distributed across the corporation globally, as well as across functions throughout service outsourcing, in order to support the development of a rich understanding of the phenomenon. The geographic distribution was discussed with the key representative and landed as essential in understanding a universally representative version of service outsourcing and avoiding a specific local adaptation of the processes. The involved informants are presented in table 4.1. The titles of the informants' positions and connected departments have been generalized to a high degree to contain the informants' anonymity, as suggested by Walsham (2006). However, as country of residence is an identifying factor, while still anonymous, in this selection, it will be used throughout the thesis when referring to citations from the conducted interviews.

Following the initiation of the research project in January 2019, table 4.2 presents the data collection conducted, and its distribution across its duration.

Informant	Title	Country of residence
Key representative	Chief Architect	Norway
Informant #1	CTO	Belgium
Informant #2	Transformation Analytics Leader	Malaysia
Informant #3	Director	Italy
Informant #4	CTO	Germany
Informant #5	Director	United States
Informant #6	CTO	Brazil
Informant #7	Vice President (VP)	United States

Table 4.1: List of informants

Type	Amount	Description	Duration	Period of collection
Informal discussions and conversation	10	Video chats, calls and meetings with key representative	~ 1 hour	March -December
Semi-structured interviews	7	Video meetings with informants, observed by the key representative	~1 hour	June -September
Feedback session	2	With 1 and 2 representatives from Sirius and the key representative at HAL	~1,5 hour	December
Feedback session	1	Video conference with 4 informants and 3 additional	~1 hour	December

Table 4.2: List of data collection activities

In addition to the planned activities of data collection some documents and additional sources contributed to the study, as summarized in table 4.3. Most significantly the interviews were transcribed for further analysis, resulting in 45 pages used for the data analysis. In addition, informal discussion occurring with the key representative in connection with the video meeting set up for the interviews contributed to preparation and immediate clarifications of unknown concepts of HAL specific procedures that emerged without elaboration during the interviews, securing mutual understanding of such concepts. Further, documents describing HAL's core activities and general business processes provided in cooperation with Sirius and the key representative at an early stage of the project, elaborating on their previous involvements and foundation for their interest in the proposed research project. Lastly a pair of the informants contributed with written material to summarize and clarify procedures and thoughts that were discussed during their interviews.

Data source	Description
Transcriptions of the conducted interviews	45 pages across 7 interviews, excluding introductions, formalities etc.
Informal conversation before and/or after interviews	5-10 minutes discussing and summing up interviews with key representative
Presentation of HALs planned involvement in Sirius	20 slides
Meeting notes by key representative on HALs cooperation with Sirius partners	11-page document
Presentation on analysis tools from Transformation Analytics Leader, Malaysia	9 slides
Written material with personal thoughts from Director, Italy	2-page document

Table 4.3: List of additional data sources

4.8 Evaluation

Overall the research design provided a well-structured process for the thesis, while still accommodating for the flexibility needed for interpretive research. The insights provided by Walsham (1995, 2006) arguably improved the quality of the study as it facilitated reflection upon the researcher's decisions in reach design, as well as approach to conducting research in practice. Although being an extensive and time-consuming process though its many stages, the stepwise-deductive inductive data analysis method Tjora (2018) contributed adeptly to the extraction and development of insight from the case. The method was perceived as thorough with a tangible framework driving the analysis and aiding in producing emerging theories, resulting in an enjoyable research process.

As a case study was the proposed and therefore pragmatic choice of strategy, an elaboration upon other potential strategies is presented to justify this decision. Even though case studies, as previously stated, are superior to the other strategies in terms of exploration of a phenomenon, ethnographies and survey could have been relevant strategies as well. However, where ethnographies are constrained to exploring the culture and people involved, the case study allows for exploring the broader picture and other involved actors and artefacts, a key factor when considering sociotechnical approach. On the other hand, surveys can include the same explorative intent, but across several cases in order to generalize. Although this strategy could also have been used for answering the research questions, generalizing would conflict with HALs motivation of participation, as well as risk dwindling the significance of the emerging concepts in HAL's case in isolation.

As for data generation, the same situation occurred, and interviews were the apparent choice to utilize the available resources offered by HAL. Observations were considered

with a positive response, however, were excluded due to the nature of the case with global interest, in addition to and the timeline of contracts spanning over several years making short term observations less insightful on a broader scheme. Questionnaires were also excluded as they would not offer data of the desired in-depth quality. Similarly, quantitative analysis was not suited for the case study.

Admittedly the data collection conducted for the study could have included an increased number of interviews in order to increase the validity, and potential understanding, of the findings. However, with respect to the seniority of involved informants, potential and realized, and the experienced challenge to schedule time in their significantly occupied and dynamic schedule, settling with seven interviews was both a conscious decision and pragmatic solution. With regards to the key representative at HAL, the numerous discussions throughout the data analysis and three feedback sessions in total provided areas of additional data collection supporting the interviews in quantity of data. These interactions and session also provided multiple opportunities of validation of the findings, building confidence in the developed framework and results of the study as answers to the research questions, without claiming to be fully extensive.

Findings

By conducting the research designed as described in Chapter 4, answers to the research questions has been established and this chapter will present the findings from the data collection and insight emerged through the data analysis. Additionally, the knowledge acquired will be summarized, condensed and illustrated by extending the preliminary framework of IT service outsourcing, as previously presented in Chapter 2, and repeated in figure 5.1. Following this chapter, the resulting framework will be the foundation for upcoming discussion of the findings presented and their implications.

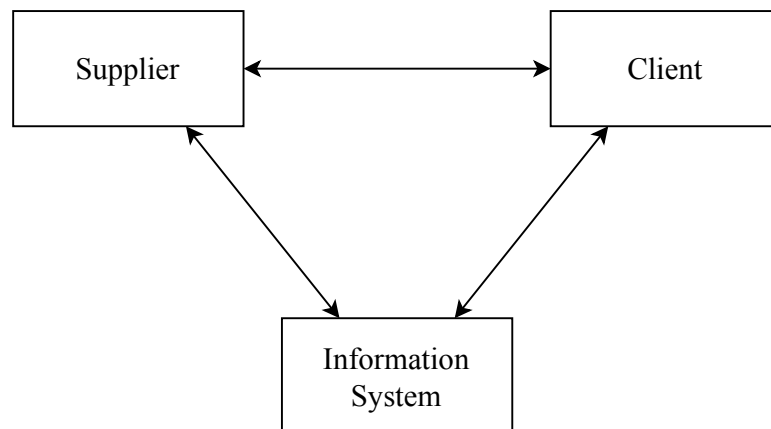


Figure 5.1: The preliminary service outsourcing framework

The findings are divided into two subchapters answering each research question respectively. The first subchapter will be elaborating on RQ1: “What happens during early stages of an IT service outsourcing?” by presenting a narrative, as suggested by Langley (1999), from HALs perspective, and visual mappings for the other entities. Following, RQ2: “Which challenges occur during IT service outsourcing?” is answered, presenting three categories of challenges that has emerged, and their relations to the processes in service outsourcing. To conclude each subchapter, a summary is offered including their presented additions to the IT service outsourcing framework. Consequently, the last section of this chapter contains the established framework in full, compactly illustrating the findings presented throughout.

5.1 RQ1:

The case description in Chapter 2 included the general timeline for an IT service delivery performed by HAL, distinguishing the three phases of service delivery. These phases, engagement, transformation and steady state, will be focus in the focus of the first three sections of this chapter, where HAL's chronological narrative will be presented, as the characteristics of the supplier entity. Secondary a visual mapping of characteristics identified in the other remaining entities of the framework, the client and the information infrastructure, will be presented. In these sections, findings specifically related to the respective entity has been extracted from the narrative and categorized to further append upon the understanding of IT service outsourcing and contribute to the IT service outsourcing framework. Lastly a short summary of the findings throughout this chapter is provided and illustrated.

5.1.1 The Supplier

Preceding the findings of this section, a few remarks is to be made. As will be presented in section 5.2.3, the deliveries performed by HAL have individual character, and the composition of the specialists involved possess the same characteristics. Common for organization of specialists is each phase involving a separate team, which is diversified to cover the needs of the phase and delivery they are involved with. Consequently, the teams are individually composed for each delivery, therefore a general annotation of "teams" will be used to describe the people involved at HAL, respectively assigned to the relevant phase and illustrated as a human entity, as further distinctions of the teams do not reflect reoccurring qualities.

Additionally, even though the research question states "early stages", insight collected regarding processes in the steady state phase occurring outside the boundaries set is included in this subchapter. This is done to provide a conclusive narrative to the highest degree possible, however, it should be noted that the processes in question is not researched as thoroughly as the rest of the chapter.

Engagement

All outsourced IT services delivered by HAL are based on a contract between them and their client, describing the specifications of the service and conditions for the delivery. This contract is the main focus in the engagement phase, which ends with an established agreement, signature and initiation of the transformation phase. Hence, this section will describe the process of securing a contract and establishing common grounds for the service delivery.

To start off, an IT service outsourcing delivery is initiated by a **request for proposal** from the potential client. In this request requirements of the desired service are stated, and potential suppliers are requested to propose a service solution to meet these requirements for further contracting. In order to be confident in the proposed service solution a **due diligence**¹ is conducted by the engagement team at HAL prior to proposal, which has a

¹Due dilligence: "the detailed examination of a company and its financial records, done before becom-

dual purpose. For the supplier it provides an opportunity to ask questions to the potential client to gather additional information, as well as providing “clarifications in interpretations and implications” (CTO, Belgium). On the hand, is used by the client to allocate accountability to the supplier and limiting the room for negotiations in later stages, arguing that the supplier “should have solved all doubt at the point of due diligence” (Director, Italy). To which extent HAL is able to investigate the situation at the potential client is an evaluation of the willingness to risk time and resources. Analyzing is a costly process for HAL, as a contract has not yet been established, and providing a proposal swiftly may leverage their position to secure the delivery. However, by neglecting the opportunity to gather information, a risk of unknowingness of potential hindrances of any form is involved, which limits the confidence in the proposed service solution.

Based upon the request for proposal and information gathered during the due diligence, the engagement team at HAL will provide a **service solution proposal** for the potential client. Although a strategy for the technical service solution is included in the proposal, e.g. moving a percentage of the workload to a cloud service or providing certain tools for the requested operations, an in-depth technical framework is not established at this point. On the contrary, the main concerns of the proposal are the cost case of the service proposed, describing the distribution of expenses related to the hypothetical technical solution, as well as the potential monetary advantages it would provide long term for the client. Additionally, a strategy for the transformation of involved assets, physical and virtual as well as staff, supporting the existing services is stated.

The proposal may be, depending on individual factors for each case, directed for **internal review** at HAL before reaching the client. For HAL specifically this is a centralized process, performed at global service integration hubs, where the cost case of the contract put up for a generic evaluation based on the proposed service solution. Then, approaching the climax of the engagement phase, the service proposal is offered to the client for consideration. Depending on the client wanting to follow through with HALs service solution an agreement can be reached, and a corresponding **contract** is signed to obligate both parties to a partnership based on the underlying documents. As a service outsourcing contract consists of more than 20 sections concerning complicated legal and managerial issues, the specific contents of the contract will be kept at a conceptual level, however recognized as an area of complex transactions.

Depending on the individual circumstances further **negotiations** are required and can be carried out at any stage throughout the engagement phase whenever mutual agreement and satisfaction is not initially reached. This also includes the post-signature stage, where a high-level description of the desired governance model and involvement of various stakeholders of both parties is discussed, prior to the initiation of the transformation. When such principles for the delivery are established, the engagement team has completed their involvement, and a **handover** to the transformation is initiated. This concluding process engages the transformation team to implement the agreed upon service stated in the contract, and the retreat of the engagement team.

As a preceding phase to the integration and development of the information system, this phase is characterized by linear and transactional interactions Perrow (1984) to reach

ing involved in a business arrangement with it”, <https://dictionary.cambridge.org/dictionary/english/due-diligence>

agreement, expected and in sequence as planned. Even negotiations at this point in the service outsourcing are falling into the linear category, although they are unplanned, as they are “quite visible” and in “an expected sequence” Perrow (1984), initiated by disagreement and resulting either in a closer agreement or further disagreement.

To conclude this section, the processes described are summarized in table 5.1. This summary also includes its functionality for the service outsourcing and the identified factors influencing the process, in addition to an illustration representing each process respectively.


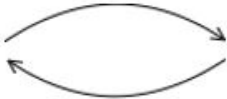

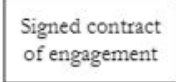

Process	Function	Influenced by	Illustration
Request for proposal	Initiation of IT service delivery	Clients' needs	 Action
Due diligence Service proposal Potential negotiations	Iterative transactional interactions to reach agreement of service delivery	Request for proposal, available monetary resources, information and time	 Communicative relational loop
Internal review	Securing financial confidence internally	Generic guidelines	 Actions
Signature of contract	Formalizing agreement and commitment	The service proposal, negotiations and agreement	 Artefact
Handover	Initiation of transformation	Signed contract and high-level strategy	 Action

Table 5.1: Processes during the engagement phase

Transformation

Moving onto the transformation phase, which is referred to as the “Build and deploy” phase (CTO, Brazil), this section will present a more complex phase, where the interdependencies between social capabilities and technology Sarker et al. (2019) is becoming apparent. Although this phase indeed includes the development of the service delivered, other processes also occur in this phase, however less in plain sight and rather as hidden interactions.

Although the engagement is handed over for service development as a conclusion to the engagement phase, the **initiation of transformation** starts by further negotiations. As the contract itself regards agreement on a strategic level, the transformation team must translate this into organizing the development in practice and “pulling things into context” (CTO, Brazil). As an example, this includes deciding on a governance model with the client. A model that will govern the structure of processes within the transformation, as well as which actors are responsible for what, who makes which decisions, and who are to be consulted and informed. In addition to ensuring the client’s preferences, CTOs

rely on their own experience and official guidelines when negotiating on the governance model. Parallel to negotiations, the **transferral of assets** is conducted, including both hardware and software related to the service delivery, as well as system accesses and other necessities. Additionally, HAL often operates with transferral of human resources, where the client's workforce directly connected to the system being outsourced is transferred into HAL's organization and taken over as new resources. This process of transferring workforces is heavily regulated by employment laws, varying across nations, and the execution of this process must be compliant to local regulation.

With a delivery structure established and assets transferred, an **environment analysis** is conducted. As the engagement phase has not included a substantial amount of insight into the existing system infrastructure, the analysis must be conducted as a crucial step in order to gain insight of the foundation on which the service is to be developed upon. In addition, the analysis provides an opportunity to check that the given information in the contract is correct. If this is not the case a renegotiation or request for change could be relevant. A director states the nature and importance of the environment analysis:

“It's a formal phase where the supplier, in this case HAL, can double check third party contracts, assets, or even . . . the people transferred to HAL in order to make sure that all these are coexistent to the scope of the contract. If there is some gap, then we can reopen the table for potential renegotiation.
(Director, Italy)

With this statement, the process of **renegotiation** is identified as a cause of incorrect or insufficient information, creating “gaps” in the contract that needs to be filled by renegotiation. An example of a renegotiation could, according to the CTO, be related to the overall technical knowledge shared across the client's company, or more specifically the lack thereof, in such a manner that it will require a substantial amount of increased resources in order to make use of the developed information infrastructure. However, not any given gap will be followed by a renegotiation, stated as the director further elaborates on its limitations being “... capped or limited to a specific amount because we cannot be renegotiating the entire contract” (Director, Italy). Specifically, renegotiations are usually only conducted when related to “critical elements that drive the commercial cost case”. Another informant supplements with a different consideration, limiting the room for renegotiations from the supplier side:

“The reality is that you don't want to be perceived by the customer that you are going to PCR [product change request] them to death. We don't want to be asking the executives every time you find something new. It is a way of doing things, but it does not raise a lot of confidence. It's a tradeoff of how you want to be perceived. (CTO, Brazil)

At this point, human capabilities such as confidence and trust are raised as limitations to renegotiating the strategy for service development, and accepting information “gaps”, even as they offset the foundation the delivery strategy is built upon. Whether choosing to renegotiate or not, **development** of the service delivery starts, as the superior part of the transformation phase, based on the understanding of the installed base gathered

through the environment analysis. For efficient development HAL operates with globally with a widespread set of standardized tools, ranging from individual services to entire information infrastructures, which are used for every client worldwide. A CTO explains the severity of the toolset:

“To support all the different processes, all the different aspects of operations, of security, of financial management, of whatever, it is very a complex and increasingly integrated set of tools on which we want to standardize on for HAL. For every [client], including the [client] I am focusing on, we have specialties which reflect the specific service model in their right. (CTO, Germany)

The wide array described for the services delivered additionally illustrates how the complexity of large organizations affect the complexity of service delivery, having to account for specialties related to service models, potentially individually. Although, regardless of specialties, some degree of tailoring must be done to accommodate each client specifically and according to the environment analyzed. A further understanding of the technicality within the services is included in its respective upcoming section, however, for the sake of the understanding of service outsourcing through the sociotechnical lens, the technical development of the services themselves is not necessary to further elaborated upon. The final delivery and **deployment** of the delivered service conclude the transformation phase, as the service is taken into action and the engagement is officially handed over to steady state.

Although seemingly straight forward, the activities described for the transformation phase is not strictly structures in order as presented. These processes are existing in parallel according to the nature of each individual service delivery and their own interdependencies. Contrasting the transactional engagement phase, the transformation phase introduces an environment where interaction dependencies are occurring, increasing the complexity of service delivery as unknown non-linearity is discovered though the environment analysis and further handled to varying degrees. As introduced in the previous section, the processes identified are summarized in table 5.2, including the same descriptive elements and respective illustrations.






Process	Function	Influenced by	Illustration
Initiation	Negotiating the structure of the delivery	High-level strategy, guidelines, experience and client's preferences	 Communicative relational loop
Transferring technical assets	Provide access to installed base	Contract, delivery structure	 Action
Transferring human assets	Provide workforce, remove redundancy	Contract, delivery structure, HR-regulations	 Action
Environment analysis	Gaining insight into the installed base, identify gaps in the scope	Contract, access to assets	Included in relational loop
Potential renegotiation	Closing the gaps identified	Environment analysis, knowledge gained through development, relation to the client, the	Included in relational loop
Development	Building the service solution	Contract, delivery structure, existing assets, access and authority	 Action
Deployment	Delivering the service solution and handover to steady state	The development, contract,	 Action

Table 5.2: Processes in the transformation phase

Steady State

The final phase of the service outsourcing is the steady state and far superior to the other phases in terms of duration. Throughout this phase, two processes are conducted, maintenance of the delivered service is provided, as well as renewal of integrations in synchronization with the development of technologies. Although sounding sweet and short, these processes are not straightforward to manage and are interfering with each other. To elaborate, one CTO offers a thorough description of his responsibilities when maintaining a service delivery during steady state:

”My role is to ensure (that) the technical infrastructure, the technical tools we are using to support these (clients) on a broader scheme, is fit for purpose. And in particular is supporting automation and the use of AI bought for the operations and practitioners who interfere with the systems. I’m there to make sure we have the right tools in place.” (CTO, Germany)

Through this description the CTO specifically points out several factors that affects the perceived quality Rolland and Monteiro (2002), the “fit for purpose”, however being

out of HAL's control to varying degrees. The latter mentioned, the "**practitioners** who interfere with the system", or generally the people using the information system, is a recognized factor of complication from the CSCW literature Gasser (1986). Further, as argued in chapter 3, such people require specific change management in order to unite with an information system efficiently and successfully. Nevertheless, as the supplier of the service, the opportunity to affect the management of practitioners is not directly available for HAL. Similarly to the people involved, the **processes** carried out within the client's organization is not included in HAL's mandate to influence. Business operations and organization is not likely to radically change without further involvement, however some variation for the client to optimize must be expected during a service delivery. To reach the contracted cost case it is crucial for HAL to be observant and provide the necessary support, or opt for renegotiations, constantly.

Lastly the CTO mentions the need for maintaining the **technology** acquired to supplement business operations for the client. Although this area is within HAL's expertise, the changes occurring outside their control, such as changes in business processes, could be creating a challenging environment to maintain the perceived quality. Even initially successful integrations could become insufficient as the surrounding factors change. To add complexity, as new technology is developed the clients too are looking for new technical solutions to leverage their business, creating a need for renewal of services. The CTO further expresses the dilemma that follows the desire for cloud services as an example of renewal:

"Everybody of our customers, and I say that with a high level of certainty, are looking into moving, at least some part of, the workloads to cloud and the problem which is coming with that is: how to manage this transition of operations in a cloud based model ... So, I have operational responsibilities and we do have discussions and designs and transformation plans for the future service model as we speak." (CTO, Germany)

Here there are two main arguments as to why renewal of services during the steady state is a complicated process. Firstly, new developments, such as cloud services, creates a desire for renewal from the client-side. However, the consequences, in this instance, includes a transformation to a service model that requires fundamental changes from the originally delivered service. Adding to the technical aspect of renewal, the obligations and operational responsibilities contracted during the engagement must remain sufficiently supported throughout a potential transformation. The processes of maintaining and renewing the services delivered consequently have the potential of opposing each other, where the support of operational responsibilities, in an environment prone to alterations, could be jeopardized by the desire of implementing of new developments. Although HAL remains strongly influential of the integrations within the information system, delivering to the needs of the client is always in their interest from a business point of view, and the resulting discussions are essential.

Furthermore, the duration of the steady state phase is of significance, as it opposed to the other phases, holds the majority of a service outsourcing's timeline. This is significant for the factors of complexity, as the outstretched duration increases the potential for significant turnover of people, the number process optimizations and developments of

technologies. With the constant operational responsibility looming overhead, the “steady” state in the contract possess several sources of uncertainty in practice.

The two processes involved in this phase, including their respective illustrations, is included in table 5.3. Eventually, the steady state phase, and the IT service outsourcing itself, simply ends by the termination of the contract, or is renewed for further service delivery, in which case the cycle repeat itself.

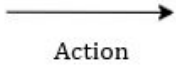
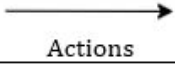
Process	Function	Influenced by	Illustration
Maintenance of system	Ensuring perceived quality	Changes in the client’s workforce and processes	
Renewal	Further development	New technology and investments	

Table 5.3: Processes in the steady state phase

5.1.2 The Client

Through the different phases and processes described there are different actors that are involved on the client side of the service outsourcing framework. A distinction of involved actors and their separate functions is a necessary addition to illustrate the findings and will presented be and mapped in this section. However, as explicitly urged by several informants; “No client is the same.” (Chief architect, Norway) and “typically complex companies” (CTO, Brazil) with an array of dependencies, a general structure of the clients’ actors cannot be pinpointed. On the other hand, there is a pattern to the function of the actors involved in the supplier-client interactions, and these can be mapped for further understanding of the processes in service outsourcing.

To start off, the supplier-client interactions taking place in the engagement phase has transactional characteristics where actions or information is requested by either party, and answered by the other. In these interactions the client’s involved actors has financial interests which influences their responses. Additionally, they, whether directly or indirectly in the organization’s hierarchy, behold some executive capabilities to make decisions regarding the SO contract and the supplier-client relation. Based on the function of executive decision making, this actor will be referred to as **Executives**. Additionally the client will often include a **3rd party** company to handle enquiries from the potential suppliers and manage the upcoming contract negotiation. However, 3rd party contracts can also occur as any partnerships the client is involved in, and could for instance be handling accesses or assets needed during delivery.

Post signature, HAL encounters new actors, as resources gets transferred from the client. Firstly, the actors that gets transferred are involved with maintaining the existing information infrastructure or system. They are characterized by having knowledge related IT and the information systems in use and will consequently be referred to as the **IT-workforce**. In the process of transferring human resources, the involvement of the client’s **HR-department** is natural as employments are affected and local labor laws must be taken into consideration.

Further into the system development another group of actors comes in play, the **Users** for whom the system is developed for and used by throughout steady state. These are the client's practitioners, the workers that uses the functions of the system. Depending on the contract and desired functions the users can possess a variety of positions; Operational functions would be I use by operational staff, users of organizational functions could be managers, and the HR-department be could be the users of resource administration functions. The latter would be a theoretical example of multi-functional actors, where the same person, or group of people, is connected to the service outsourcing with multiple interests to preserved. Adding to this, the distribution of users in an information infrastructure discussed by Monteiro et al. (2013) is a essential quality.

In summary, the provided actors give a description to the functions possessed by the different involvements on the client side of service outsourcing, which is also suggested by Rolland and Monteiro (2002). The identified actors are listed in table 5.4 below, with their interests, interactions and according illustrations for the service outsourcing framework. In addition to the differentiation of involvements, another factor mentioned is the variation of clients, by no two clients being the same. Lastly, the fact that clients typically are complex and cross-departmental dependencies add another factor of unknown variation of importance.



Actors	Interactions	Illustration
Executives	Activities related to the contract, managing the system users	 Human entity
3rd parties	Potentially handling negotiations and/or otherwise involved in the client	Human entity
IT-workforce	Transferred during transformation	Human entity
HR-department	Involved with resource transactions	Human entity
Users	End user of the service, managed by executives	 Distributed human entities

Table 5.4: Actors on the client side of service outsourcing

5.1.3 The Information System

For this section the illustration of the emerging characteristics will be presented in a different order than the other sections in this chapter. This is due to the significance of the

literature in section 3.2, which has already elaborated on a foundation for the emerging characteristics. As presented, the information systems HAL are operating with have become increasingly complex throughout recent digital service innovations (Barrett et al., 2015), and the evolution from artifacts to information infrastructure is therefore a foundational characteristic to be accounted for in the service outsourcing framework.

The findings of this section are collectively illustrated in figure 5.2, as a non-technical generalization of the identified system complexity. This is due to the individuality of each infrastructure, making a detailed architecture too specific as a characteristic. Additionally, the focus of the study regarding interdependencies of sociotechnical interactions, making the advanced technicalities obsolete. Although simplified, the identified conceptual characteristics of the information infrastructure is included in the illustration.

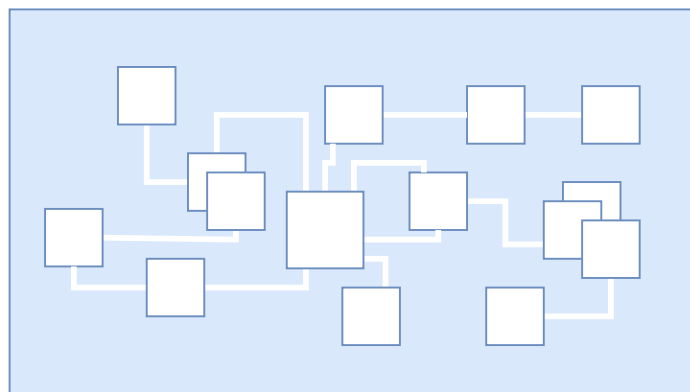


Figure 5.2: Generalized illustration of an information infrastructure

Firstly, the complex nature of an information infrastructure is illustrated by the lack of linearity in the figure. Although it consists of familiar artefacts, in this case lines and boxes, their placements are unexpected, illustrating standardized artefacts as the consistently shaped boxes, adapted and interconnected in a unique structure by the unexpected lines. This illustrates quote from a CTO regarding the implementation of automation services: “We have people saying “That’s easy, just do it”, but in reality it is not easy It becomes a really complex process.” (CTO, Germany). As simple elements build up a larger and more complex picture. Further, core the functionalities and data are illustrated as the centered and larger box. And the variations in the complexity of artefacts by the grouping of boxes, as both independent and interconnects tools.

Although providing a generalization of the findings in this case study, this illustration does not represent the sheer vastness of HAL’s specific case, and the services and infrastructures they deliver, as noted by another CTO “A typical company has up to 3000 applications to run. It’s crazy, but they do to keep their systems going” (CTO, Brazil). When entering a new service delivery, this is an example of installed base HAL will have to work with and integrate their tools into. The individuality of each client and consequently their installed base add further complexity to the situation for HAL, resulting in a challenging environment for the transformation phase, which will be presented in the next subchapter.

5.1.4 Summary

Throughout this subchapter an understanding of characterizing factors of service outsourcing based on the available data material has been presented. Firstly, a narrative of the processes HAL encounters characterizing the supplier side of service outsourcing was given. To summarize these processes figure 5.3 presents an updated timeline including the identified processes for each of the three phases of service outsourcing.

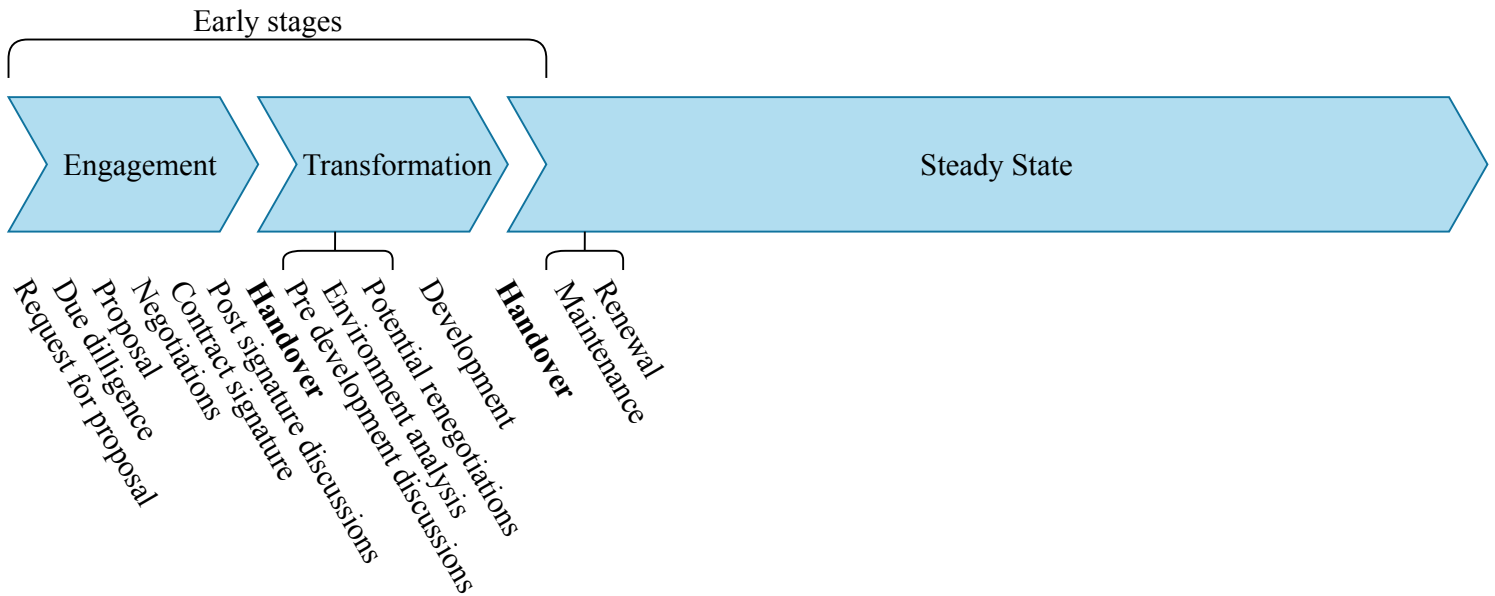


Figure 5.3: The timeline and processes service outsourcing

Further the findings presented has been illustrated to reflect the identified characteristics for each of the three entities partaking in service outsourcing. By combining these illustrations and linking the factors as the identified interactions describe, the preliminary service outsourcing framework has evolved into a more sophisticated framework, shown in figure 5.4, illustrating the phenomenon of service outsourcing more precisely.

Key

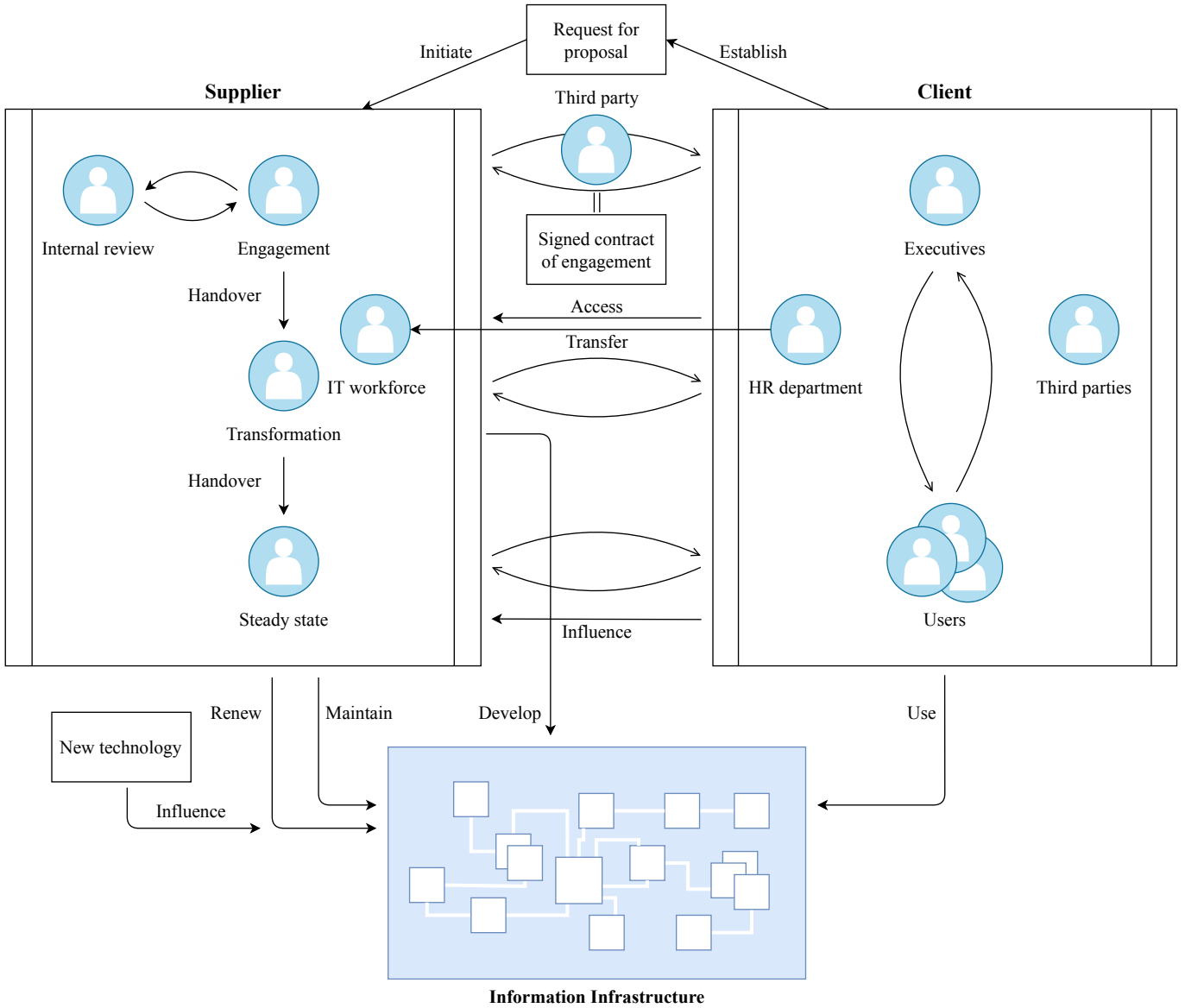
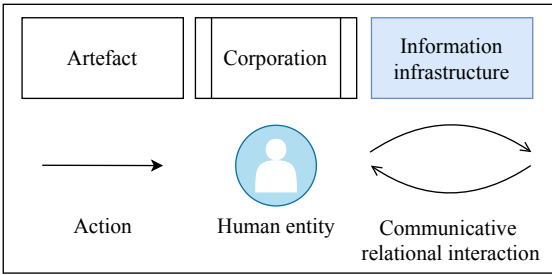


Figure 5.4: The evolved framework of service outsourcing

5.2 RQ2: What are the challenges arising in the early stages of service outsourcing?

Through the investigation of the characteristics of service outsourcing dependencies and complexities are becoming apparent. According to X, these factors are creating a foundation for tensions to occur, which often results in mismatches between the clients' expectations and the services delivered by HAL in the steady state:

“It is almost like during the engagement cycle the client is expecting a Ferrari, but he has bought a Volkswagen” (CTO, Brazil)

In this section cause of such mismatches will become clearer, as challenges occurring during service outsourcing will be elaborated upon. The challenges identified and the factors contributing in creating a challenging environment for HAL will be presented and illustrated similarly to the preceding subchapter. Reoccurring themes deducted during the data analysis has contributed to the structure of this subchapter as they divide the findings into three categories. These describe different aspects partaking in creating challenges throughout the phenomenon of service outsourcing and increase its the complexity in HAL's environment.

Firstly, technical roadblocks will be presented. Characteristics for such roadblocks are a direct disruption of the technical developments and implementations preformed during service delivery. The explained underlying reason for some of the experienced technical roadblocks are the focus in the second section, as social dependencies ventilated by the informants will be presented. These are human interactions and capabilities affecting processes in service outsourcing. Lastly, the challenging contextual restrictions will be presented. These are factors that are existing outside the domain of each individual service delivery, however an essential part of their context and affecting the actors and processes involved. In addition, these are factors characterized by not being malleable by HAL individually.

5.2.1 Technical Roadblocks

The main technical challenge that must be combated during the service delivery, which is emphasized by most of the informants, is the needed exploration of the clients' installed base as the transformation phase is initiated. This process is referred to as “the opening of Pandora's Box” by several of the informants, emphasizing the experience of encountering an **unknown environment**. During this crucial exploration process, there are several potential roadblocks that occur and threatens to disrupt processes as information or assumptions regarding the environment are not sufficiently verified, as stated by a CTO:

”The lifecycle assumes the same steady state for all clients, we know the end point. We think we know the start point, with transformation in the middle. But there but little verification of what we think we know. Which is why there is often delays.” (CTO, Belgium)

Indicating that disruptions and delays already form in initiation of the transformation. Additionally, the uncertainty of the environment itself is challenging, as this creates an unknown and unstable foundation onto which the services are to be built upon. The environment analysis is supposed to handle this challenge and verify the information provided during handover to the transformation phase, however, as information gaps are discovered, they are not necessarily accounted for, as stated in in . Disrupting the development process, and potentially adding to the **mismatch** between expectation and delivered service. Another cause of mismatch is identified in the general perception of technology within the client as they presume the implementation process to be simpler than the reality. A CTO expresses this concern related to the implementation services in the cloud “we actually had an argument with some people saying “when you go to cloud this goes away”, that worsens the case” (CTO, Germany). Highlighting the need of renegotiation of scope where misalignments are discovered. Nevertheless the VP expresses that they at times will “try to fit those processes in an environment that is not ready for those processes.” (VP, United States). Which sometimes result in a “transformation backlog” of processes that are not able to be included in the transformation phase, and a delivery not reaching the client’s expectations.

Another major challenge being raised is access to data needed to preform transformation and utilize the standardized tools, as HAL experiences **restrictive access** to data and knowledge. These restrictions can be regarding dependencies and integrations, occurring when the client is, whether unaware or intentional, due to social dependencies, not providing the sufficient amount of insight to establish a representative foundation for the transformation team. However, this is not a one-sided issue of the client not releasing information, as the Chief Architect elaborates on during an interview: “If only they could share the data is the concern, but in reality, the data does not exist or is poor.” Suggesting that the underlying and desired data is in fact not obtainable and characterized to be “sparse” or having **low veracity**. This is further established by a CTO stating that: “In some instances we can only get rough instances. The clients may not have that accurate data, and you have to deal with that” (CTO, Brazil). The lack of data is problematic when the transformation team is implanting advanced tooling, relying on a sufficient data input to provide their service. However, one CTO also offers an illustrative example of the location data for hardware owned by the client not being updated. Resulting in a technician supposed to preform physical maintenance not having the location of which date site to travel to.

A challenge not mentioned is handling the tools, on the contrary, more advanced adaptations are suggested, providing room for more elaborate atomization and optimizations. One of these suggestions are more granular solutions based on cloud platform technology, as described in section . Cloud platforms are suggested to combat the complexity of the information systems, especially with complex interdependency lattices in information infrastructures, and allow for an increased graduality of implementations. However, this requires a set of master-data upon which the platform can be based, and restrictive data access is a definite roadblock for this solution. In order to account for the four roadblocks discovered in service outsourcing framework, alterations must be done. Based on the conceptual illustration of information infrastructures presented in section , the roadblocks are summarized and illustrated in table 5.5.





Challenge	Result	Illustration
Unknown environment	Restrictions, dependencies and mismatches are discovered during transformation	 Unknown entity
Technical mismatch	Reduced perceived quality	 Pressure
Restrictive data access	Technical mismatches	
Low veracity data	Technical mismatches	

Table 5.5: Challenges regarding technical roadblocks

5.2.2 Social Dependencies

Through the sociotechnical approach, the interdependencies between technology and social capabilities are essential (Sarker et al., 2019), and is, as shown in the previous sub-chapter, observed in the service outsourcing HAL is involved in. The social relationship with the client, and how it affects the technical basis for the service delivery will be the focus in this section. Through the insight provided by the informants at HAL, numerous interactions between the corporations has been identified, contributing to their relationship. Through this insight **trust** is a reoccurring dependency in the relationship between the supplier and the client, where, more precisely, the lack thereof creates roadblocks for the development, as well as posing an increasing amount of risk for the delivery.

Examples of trust challenging processes occur in every phase throughout the service delivery. In engagement the lack of trust and formal obligation limits the insight HAL is able to collect through due diligence. Even if the resources were in place to perform an extensive analysis it is argued among the informants that the client will not fully expose themselves, as they are not naïve and do not trust the potential suppliers enough to share information unnecessarily. On the other hand, this is a tradeoff where the clients must be willing to trust the supplier’s ability to provide suitable services, regardless of the technical foundation being unknown to them. However, they still do not blindly the development either. In HAL’s experience, clients generally do not desire total dependency on a single service provider, they are “vendor agnostics”, as expressed by a CTO (Brazil), and rather competitively strategic than loyal.

Further, when approaching the users during steady state, another form for trust is needed. As suggested by Jirotko et al. (2005), the users must be willing to change their mind models and trust the new systems and procedures in order for the systems to reach their potential and benefit the users. However, this trust is not an automatic response, and might require suitable strategic management on the client-side (Orlikowski, 1992), creating another dependency for HAL, as the client’s internal management affects the perceived quality of the service delivered. Concluding on this finding, the lack of trust is paradoxical as the lack of trust itself results in roadblocks and a complex and challenging environment for HAL to be developing suitable services for HAL, which increases the

probability of mismatches in expectations, which in turn affects their relation and foundation for trust. Although the lack of trust poses a challenge, the underlying issue is not HAL not being untrustworthy. The informants rather identify the willingness to carry risk as the issue, as the danger of loss, whether financial, technical or social, is a concern when operating in a competitive market, a challenge that will be further discussed in the next section.

Specifically for HAL, another challenge occurs as a result of their own internal processes. As the three phases of service delivery are strictly divided, separated by rigid handovers. As predicted in the prompted hypothesis in section 2.3, this rigidity results in a loss of information across the phases and **knowledge silos** occur. To exemplify, the key representative singles out knowledge regarding cross-departmental dependencies being used as arguments regarding the proposed service solution in contract negotiations, however not articulated in the specification that is handed over to the transformation phase. Without this documentation, service architects will not be able to take these dependencies into account, which could be crucial in avoiding technical roadblocks. Related to this issue, the VP, also points to the successful service deliveries being partly based on experience, in addition to the official HAL guidelines. These experiences are collected in an existing system of records, however too complex to effectively learn from. Although different, both examples are instances of knowledge getting lost due to limitations in internal data flows as a result of said knowledge silos.

The social dependencies discovered, although few, adds a layer of complexity to the phenomenon of service outsourcing, as paradoxical interdependencies to the delivered services occur. The challenges are illustrated in table 5.6.

Challenge	Result	Illustration
Relational issues, lack of trust	Social dependency paradox, compromising perceived quality	 <p>Relational issue</p>
Knowledge silos	Loss of knowledge during handovers	 <p>Silo</p>

Table 5.6: Challenges regarding social dependencies

5.2.3 Contextual Restrictions

In understanding the phenomenon of service outsourcing, understanding the context is an important factor. This context puts pressure on both HAL and the clients, further complicating their interdependencies. To start off, service outsourcing is occurring as a transactional process in a competitive market (Barrett et al., 2015). This implies that there are market forces involved in shaping the interactions in the process of securing engagements. In such a market there will be **competitors**, also offering their service proposals

to the client, giving the client the opportunity to choose among them. In order to win contracts, HAL must therefore offer competitive service solutions. On which grounds the client evaluates the proposals may vary, however informants at HAL have experienced a trend where the monetary value being the main driver in the market, partly neglecting the potential quality of the delivery. Complying to the market powers HAL, the engagement is therefore financially focused to comply by the market powers when securing engagements.

Further the service outsourcing is affected by **time** being a sparse resource in the market, creating challenges in all the phases of service delivery. Both the engagement phase and the transformation phase experience the urgency, adding pressure to perform efficiently. Because of this, even critical processes with the potential of eliminating road-blocks or otherwise increase the quality of the delivery, such as due diligence, are compromised. For the process of service development, this creates further complications as the tailoring to the client which should, according to Meum et al. (2011), be developing over time through negotiation. On the other hand, the long span of time during steady state increases the potential amount of internal change occurring on the client side, which would increase the amount of additional tailoring needed to maintain the perceived quality of the system. Further, the pressure of time characterizing the processes puts further pressure on all the actors involved, as the humans executing the processes. Additionally, the client's **individuality** appears as a factor of the context, as pointed out in section 5.1.2. However, this is not recognized to a high enough degree according to 1, who ventilates: "It is challenging to always having to explain to global HAL that there is no standard client. In engagement this is the assumption". This individuality does not only concern the technical factors, as the installed base, however each client operates in their industrial context with **formal restrictions** that must be obliged, setting further limitations for the services delivered. This category of restrictions includes laws, regulations and political concerns that the client is subject to and project onto the service outsourcing. Some restrictions are geographically regulated, as local privacy laws, while other vary by industry. A CTO exemplifies this, by the flight traffic control systems in the airline industry being extremely sensitive to system downtime, while low-cost clothing industry with very low income margins are more sensitive to cost and can tolerate more system downtime as a compromise. Banking, as a third example, operates with penalties if regulations are neglected. Resulting in fines or even the loss of licenses if the system does not comply, adding a further risk when delivering banking services. The challenges identified in this section contributes to increasing the complexity of the context in which the phenomenon of service outsourcing is located in, and adds pressure on the interactions occurring throughout the involved processes. These challenges are summarized in table 5.7, with their corresponding illustrations.




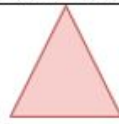
Challenge	Result	Illustration
Market powers	Competitors, financial focus	
Time	Pressure on all processes, actors and interactions	
No standard client	Unknown and individual internal context	 Unknown entity
Formal restrictions	Increased context complexity	 Restrictive entity

Table 5.7: Challenges regarding contextual complexities

5.2.4 Summary

In this subchapter several emerging categories of challenges occurring throughout service outsourcing has been identified. These have added to the understanding of the process presented in the preceding subchapter, elaborating on both interdependencies and increased complexities. Combining these findings results in a final version of the service outsourcing framework, as presented in figure 5.5. Which concludes the findings of the case study, as the foundation for the upcoming discussion.

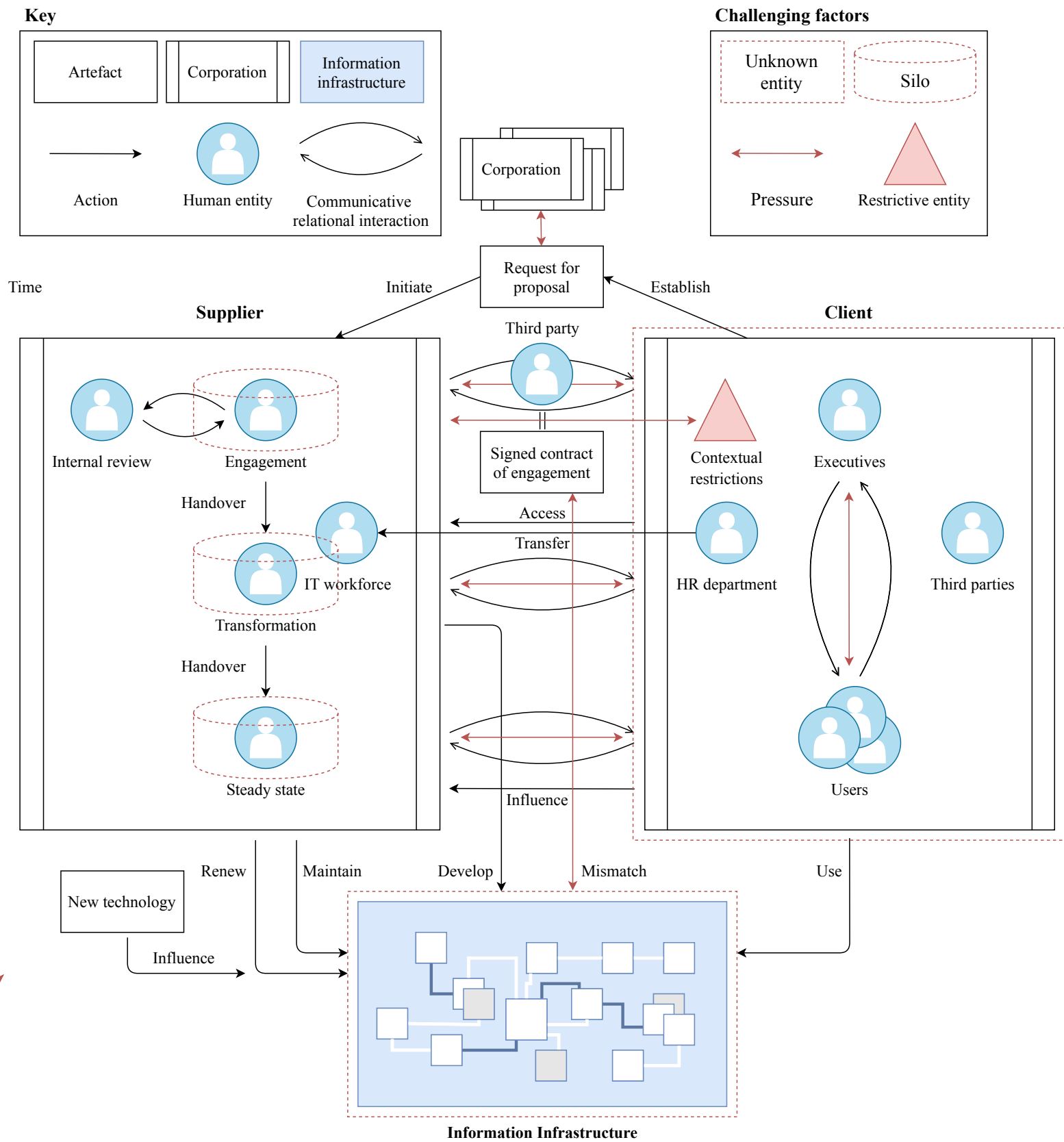


Figure 5.5: The finalized service outsourcing framework

Discussion

The previous chapter presented the findings that were gathered through the underlying case study, answering to the research questions and telling the story of what happens and which challenges that occur for HAL during service outsourcing. This chapter will discuss the theoretical relevance of the findings, and further implications that could be of interest to investigate in upcoming research. There are three main parts to this chapter, firstly discussing the relevance of the sociotechnical approach and sociotechnical observations. Further the complex nature of the case at hand is discussed, before the emerging solution of a minimum viable data model is presented and evaluated from a sociotechnical stand.

6.1 The sociotechnical transformation

Though the case study the use of a sociotechnical lens has provided a useful approach to cohesion, making the connection to the sociotechnical literature increasingly apparent and relevant. The technical aspects and human actors involved were a preliminary foundation, however the interdependencies of their interactions has been uncovered to be a complex system, containing paradoxical features and pressured from contextual restrictions. Additionally, service outsourcing has been perceived as a transactional technical operation to upgrade the information systems the client is operating with. However, through the analysis the service delivery itself has emerged as a sociotechnical phenomenon, as the technical is dependent on the interactions of the human actors who are providing needed technical access and insight, intertwining the social capabilities and technical aspects. By developing an understanding of service outsourcing as a sociotechnical phenomenon and process, and based on the principle proposed by Orlikowski (1992) stating that mutual technical and social tailoring is needed in order to reduce adaptive work, a more nuanced picture is being painted. Social capabilities within HAL have been thoroughly discussed by the informants, identifying a sociotechnical environment as a characteristic of the supplier side of service outsourcing. However, with clients being individual for each service delivery, establishing generalized characteristics of the client side has not been a possibility. Nevertheless, one reoccurring quality has been observed, namely that they are operating with CSCW using of information infrastructures. This requires internal tailor-

ing, as proposed by Orlikowski (1992), constructing a sociotechnical environment within the client's corporation, although specific to each client, as a general quality. With both the supplier and client side of service outsourcing operating with internal sociotechnical environments, a higher level of interdependency is emerging for the interactions between these environments. The embeddedness of the two corporations created by contracting a service delivery and complexity of the internal environments contribute to service outsourcing emerging as an advanced system of sociotechnical dependencies, as a sociotechnical infrastructure. This added complexity is a challenge itself in processes of aligning expectations and technical potential according to the restrictive context of resources and limitation. In order to reduce the complexity and the need for standardization is apparent by making technical developments more efficient and making processes more uniform and expected (Meum et al., 2011; Perrow, 1984). At the same time, standardization is a sensitive process, which is time dependent to be iterated upon through negotiations and requires insight into the context it is interfering with to be conducted effectively (Roland and Monteiro, 2002; Mikalsen et al., 2014). As time is a space resource in service outsourcing this is already problematic for HAL in service delivery, making the need of a thorough understanding of the interconnected is of even higher importance. As among the market leaders in service delivery, it can be assumed that HAL is able to perform their deliveries at a high standard and has accumulated an in-depth understanding of the surrounding complexities. However, as a part of the motivation of this study, there is an underlying hypothesis regarding the possibility of improvements to service deliveries being plausible by developing an even deeper understanding of the involved processes. An understanding that will be contributed to in the next section, as it elaborates on the interconnectedness of the identified factors and areas of complexities involved in sociotechnical infrastructure of service outsourcing.

6.2 Interdependent complexities

Within the sociotechnical infrastructure the service outsourcing is, there are many factors of complexity creating a challenging environment, both for service providers to leverage their business potential, as well as for the evolving service innovation ecosystem Barrett et al. (2015). Through this study, the complexities themselves have been observed to be interdependent, further complicating the interactions taking place in this context. Due to the exact nature of complexity, the interdependencies between complexities are complicated Perrow (1984). Due to this, Langley's strategy of sensemaking through a narrative approach 1999 has been used in order to structure this section to some degree, by applying a chronological structure, which will be used to summarize and illustrate these emerging observations.

As service outsourcing is initiated by the client requesting a service proposal, the market driven by price and agnosticism is already putting pressure on suppliers to win contracts to maintain profitable, as well as involving market powers regulating prices and the clients' willingness to pay for the services delivered. The market also affects the contract itself, mainly grounded in financial measures of risk and profitability, and only touches the technical aspects on a conceptual and strategic level. How this strategy is

formed is dependent on the needs of the client, which are indeed unique, following the uniqueness of the clients' individuality. Factors affecting the individuality include the industry, formal restrictions and the structure of the corporation of the client, as they too are complex and large corporations. Within these corporations, computer supported cooperative work occurs, indicating the existence of an internal sociotechnical system on the client side, as presented in the previous section, resulting service outsourcing as a sociotechnical infrastructure built on existing sociotechnical systems within both involved corporations and the interactions between them. The clients also provide an installed base of an information infrastructure, which is potentially severely outdated as the service outsourcing is a strategic executive decision. Regardless of the client's context the engagement is concluded by a signature of the contract, creating limited room for flexibility and negotiations during service development.

During transformation, firstly HAL loses information that is not specifically handed over, as their internal systems too are complex, and extracting the knowledge from the rigor in the handover process, is challenging, I turn creating knowledge silos internally for HAL. At this point a new relation must be built between the parties to secure knowledge transferal of the client's systems and dependencies, both technical and social. Assets are also transferred, changing connections within the client's processes of handling their systems simultaneously. Because of the business risk involved and rigorous data management, or lack there off, several technical roadblocks appear, limiting HALs room for action when developing their service solution. A further challenge encountered as the contract has obligated them to deliver a service and a cost case, as well as governing the strategy for the development, when in fact the existing installed base or access to it, is not ready for the changes contracted, or even formal restrictions not allowing desired developments. Especially when changes involve advanced and complex tools relying on sufficient data management to succeeded. But not being able to deliver will further limit the trust in the relation, which in turns reduces the willingness of sharing access to assets and knowledge, which further limits development. As an addition to the challenges directly related to accessing the existing systems, includes the client's technical knowledge or maturity to understand that the restrictions proposed is creating roadblocks to a high extent, also leading to mismatches in expectations at later stages of the delivery.

When the service finally is delivered, steady state takes over, taking over the backlog that should have been implemented. Their main task is to maintain the perceived quality, which again depends on the processes and people involved in the client's inner context. But executives seeking strategic innovation of their information infrastructure created a need for developments, whether directly affecting the delivered service or its integrations with the remaining information infrastructure, and renewing is being conducted parallel to the service maintenance. Additionally, the perceived quality of the maintenance is subject to change as internal changes within the client such as workforce turnover or process optimization.

Overhanging these interdependencies, time as a resource affects the service delivery across all phases. In steady state the long horizon enables the possibility for extensive business and market changes affecting service maintenance, and on the other hand, both engagement and transformation are pressured by time to an extent where urgency affects decisions, compromising the confidence and insight acquired through the service delivery.

Summarized the factors of people, processes, technology and their contexts are reoccurring as factors of complexity, but existing in different combinations and dependencies through the different stages of service delivery. These interdependent interactions affecting the relation between the technology and social capabilities make up the foundation of the sociotechnical approach, and concludes that service outsourcing itself can be seen as a sociotechnical process, consisting of components where sociotechnical processes occur internally, e.g. clients operating with computer supported cooperative work, affecting the interactions of the initially identified process. Though these observations service outsourcing has not only been transformed into a sociotechnical system, but broader sociotechnical infrastructure with interdependent interactions and contexts.

Upon presenting these observations to HAL, another aspect of this complexity emerged. As HAL is experienced with the described complex environment, they have observed the same factors of complexity: people, processes and technology. However, they have become accustomed to the challenges that occurs and developed an acceptance of them due to their complex nature. In other words, their observation of the complexity has led to a coping method where challenges are accepted as unavoidable, rather than developing strategies to peel back the complex layers and handle the underlying issue. Their experience is that this is how it is supposed to be in the HAL system, even with the amount of adaptive work it is accompanied with. After all, it is working sufficiently to maintain their position among the market leaders.

6.3 An emerging solution: The Minimum viable data model

Upon discussing the complexity experienced, and specifically how to gain sufficient knowledge in the engagement phase to be able to propose a system solution with calculated confidence, the idea of a “minimum viable data model” (MVDM) has emerged. In practice the MVDM is a model that, if combined with a predicting tool and provided with sufficient data, could propose a service solution and evaluate with what confidence it would be suitable for the client’s needs and context, as well as the needs of the transformation team. In doing so the MVDM could contribute to eliminating potential technical roadblocks and modifications of the service solution in later phases and optimize the conditions for service deliveries. Additionally, this tool could be further advanced to suggest which data would be needed in order to gain more confidence or propose a more suitable service solution, and potentially be automating processes during the engagement phase.

As the MVDM has emerged as an idea only, the practical implications are yet to be finalized, e.g. which data the model would include in order to require the minimum amount of resources simultaneously to provide a viable service solution. Through discussion of this topic, with several informants, an initial tridimensional need of data was established, reflecting the areas that are prone to creating rigid restrictions or roadblocks due to unknown information emerging. These areas are including explicit system data: numbers and tangible information about the existing information infrastructure, or the lack thereof, such as the location of hardware and amount of system dependencies. Additionally, the context of the service delivery must be addressed, both internally, such as the management and organization of the corporation, its employees, their technical knowledge and

approach to new developments, and externally with formal restrictions and other boundaries.

Even though not extensively collected or conclusive, the amount of identified constructive effects of the model is substantial. As to which data the MVDM would include for stability and exclude for validity the findings are inconclusive and these matters will need to be subject to further research. Based on the confidence predicted by the MVDM tool and the data provided, the transformation phase would benefit greatly, not only by the foundation the tool would provide as the data is handed over to the transformation phase, but additionally by the confidence in certain technical roadblocks being avoided and modifications not being needed to the same extent as the existing situation. However, it is of imperial importance that the practical context and sociotechnical factors are kept in mind, as there are concerns from a sociotechnical point of view. With outsourcing being a sociotechnical phenomenon, solving challenges with purely technical tools would seem suboptimal, neglecting the core ideology of tailoring to the context and actors involved. However, in the context and transactional engagement, a discovery tool to investigate the sociotechnical infrastructure and provide context grabbing Meum et al. (2011) qualities could be useful to handle parts of the complexity identified. These are considerations urged to be included as the concept is further iterated upon.

Conclusion

Within the phenomenon of service outsourcing, the digital age offers technological advancements Barrett et al. (2015), however service market is driven by monetary values, jeopardizing both resources available for the process of development . From a pro-technology point of view, being willing to invest will offer the opportunity of great advancements and revolutions in the information systems.

The idea of a MVDM is a step towards this change, where it by automating and securing confidence in the sociotechnical context could be a driver towards technical advancements. The potential of automating further processes, building platform solutions and leveraging the use of advanced technologies to optimize tasks of computer supported cooperative work offers an intriguing approach handling the sociotechnical context and would in turn have the potential of reducing costs significantly.

Yet, developing technology requires further considerations, as tailoring of information systems must be done in accordance to the humans interacting with it. With service outsourcing are human actors situated throughout the context, further complicating the environment that must be accounted for. Therefore, even as advancements in service delivery technically feasible, they must be placed in a suitable context to work in practice. As shown this context is complex, with additional external restrictions on top of the sociotechnical interdependencies identified in the service delivery, as well as in the unknown local contexts existing for each client. This concludes the validity of the motivational hypotheses (see 2.3) regarding the possibility of improving service delivery. However, this thesis does not conclude with solutions to how the improvements should be realized. The MVDM has emerged as a suggested solution, with its concerns and recommendations for developments of the model and other potential solutions.

This study has contributed by investigating the phenomenon of service outsourcing in practice, and unveiled practical challenges faced from a sociotechnical perspective. This approach has further made it possible to develop an understanding of the interdependencies and dependency paradoxes throughout the phenomenon, and describe the complexity of the context it is situated in. Although not validated outside the case of HAL, a service outsourcing framework has been developed to illustrates complexity and context referred to. This framework could be subject to further development by extension where increased understanding is uncovered or validation though comparative studies. With further it-

erations, the existing model could serve as the foundation or inspiration, to a general framework of service outsourcing as well as in understanding complexity in development of information systems.

7.1 Limitations

First of all, this study has been focusing on the early stages of service delivery, providing limitations by restricting the scope simultaneously to not being able to extensively research all interactions included in the scope, partly due to a limited amount of informants. As an example, the inner workings and deeper understanding of the contract has not been handled due to its complex nature combined with other fields of research outside information systems. Further the findings presented are valid to the case of HAL, and not validated for other service suppliers at this point, although argues that the findings could be the foundation of generalizations due to HALs position as among the leaders in the market.

7.2 Further Work

In response to the findings and secured interests of both HAL and Sirius, motivation for a continued partnership between them as been established and will be generating further research. Specifically, the idea of a MVDM has inspired though the early discussions and concept development and already become the core element for another master thesis at NTNU. Additionally, the framework and conceptualization of the complexity occurring in the sociotechnical infrastructure of service outsourcing can be used to understand the complexity of the context surrounding digital service innovation, as a secondary result to further development of the service outsourcing framework itself. In this process interesting addition includes expanding the scope of this thesis to construct a more conclusive framework across all phases, multiple suppliers of service delivery and affecting a wide variety of users. Lastly the sociotechnical approach as a lens has contributed in gaining the insights described, underlining the validity and usefulness of this approach in unison with Sarker et al.'s critique, stating that the foundation of the approach must be taken back and used throughout the field of information systems. A recommendation to which this thesis can show its support and urge other researchers to consider.

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