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Extracting Value from Lightweight IT: A New Approach to Benefits Management?

A case study of the implications lightweight IT has on benefits management

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Abstract

This thesis aims to answer the following research question: *"What are the implications of lightweight IT on benefits management?"*. The motivation to this thesis is that there is extensive literature on how to conduct benefits management of heavyweight IT, however there is little found on lightweight IT. Traditional benefits management has been criticized to be a lengthy and slow process, much due to the complexity of large-scale IT systems. There is also a lack of knowledge on how to conduct benefits management in businesses, which partly explains the low uptake of benefits management. In recent years, easy-to-use lightweight IT solutions have become more appealing to organizations due to its characteristics of user-centricity, rapid deployment and low cost of implementation. Additionally, lightweight IT is easier to adopt compared to heavyweight solutions, as non-IT professionals now also have the opportunity to innovate their IT-services. Lightweight IT is a relatively new concept in literature and the fact that we are dealing with a phenomenon that goes beyond the IT department.

To answer our research question, we have conducted an exploratory case study in a Norwegian bank. They have implemented a new lightweight IT solution to govern their RPA digital workforce, called RPA Supervisor. Our primary data was collected through 11 in-depth individual interviews.

Our findings show that conducting benefits management on lightweight IT differs from conducting benefits management of heavyweight IT. Despite this, a new benefits management framework for lightweight IT might not be necessary. However, we suggest that there should be a changed emphasis on each step in the benefits management framework, the Cranfield method. Several factors seem to influence this change, which are organizational factors, governance models for lightweight IT and practitioner-tools for benefits management support. With this, we found six implications of lightweight IT on benefits management. With a changed emphasis in the framework for benefits management of lightweight IT, we argue that this can lead to an increased adoption of benefits management in businesses.

Contents

1. Introduction

This thesis aims to look at the implications of lightweight IT on benefits management. Benefits management, which is how an organization measures and realizes benefits, arose as a response to the growing concern that traditional information technology (IT) projects were not achieving the expected benefits (Breese, Jenner, Serra & Thorp, 2015; Hesselmann & Mohan, 2014). Traditional IT is referred to as heavyweight IT throughout the thesis, and with benefits we mean a positive outcome of change (Bradley, 2006, p. 102). Existing literature does not seem to cover benefits management of lightweight IT, as lightweight IT is a concept introduced in 2016 (Bygstad, 2016), making it a relatively new phenomenon. This technology is represented by tools ranging from robotic process automation (RPA) and the Internet of Things (IoT) to sensors and mobile apps. Lightweight IT and heavyweight IT differ in regard to systems, technology, IT architecture, development culture and discourse (Iden & Bygstad, 2017). By differing in so many areas, this might imply that benefits management of lightweight IT can be conducted differently than heavyweight IT. It might be that the characteristics of lightweight IT will change the nature of benefits management, leading us to see if benefits management should be seen in a new light.

Lightweight IT solutions have become appealing to organizations due to its characteristics of user-centricity, rapid deployment, and low cost of implementation (Gartner, 2019). It is easier to adopt lightweight IT, compared to heavyweight IT solutions, as non-IT professionals now also have the opportunity to innovate their IT-services. This is enabled by consumerization of digital technologies (Bygstad, 2016). RPA, a lightweight IT tool for automating routine-based processes (Lacity & Willcocks, 2016), is the fastest-growing segment of the global enterprise software market, with an annual revenue growth of 63 percent in 2018 (Gartner, 2019). This illustrates the growing interest in automation tools. However, in many organizations the increased workload related to RPA means that the supervision of the digital workforce has become too complex for human operators to manage efficiently alone (RPA Supervisor, 2019). RPA Supervisor is a response to this challenge, being a governance tool for RPA created to manage businesses' digital workforce. The need for such a governance tool goes to show that automation tools are rapidly adopted in businesses.

When organizations deploy new technological investments, they mostly focus on the implementation of technology and not on the realization of expected business benefits (Breese,

Jenner, & Serra, 2015). However, there is still a limited understanding of how technology contributes to a measurable value for organizations (Ward & Daniel, 2012, p. 1). To understand the value lightweight IT solutions can add to organizations, benefits management seems to be a suitable approach. However, traditional benefits management has been criticized to be a lengthy and slow process due to the complexity of large-scale IT systems (Terlizzi, Albertin & deMoares, 2017; Doherty, Ashurst & Peppard, 2012). There is also a lack of knowledge on how to conduct benefits management, leading to a low adoption rate (Terlizzi et al., 2017). Therefore, we find it necessary to explore if benefits management of lightweight IT is conducted differently than heavyweight IT. With the emergence of lightweight IT, we believe the purpose and scope of existing methodologies need to be understood in a different way. We also find it interesting to see if a new approach to benefits management might influence the adoption rate of benefits management.

We aim to answer the following research question:

"What are the implications of lightweight IT on benefits management?"

With implications we mean a future condition or occurrence traceable to a cause (Merriam-Webster, n.d.). This can be effects, consequences, and outcomes of the cause, which in our case is lightweight IT. To answer our main research question, we seek to investigate i) if conducting benefits management on lightweight IT differs from benefits management on heavyweight IT. If they differ, ii) will there be a need for a new benefits management framework for lightweight IT.

An assumption we have taken into account is that the implications lightweight IT solutions have on benefits management will also influence how benefits management is conducted on lightweight IT.

To be able to answer our research question, we find it useful to follow an abductive approach. To our knowledge, this will be the first study to look at the implications of lightweight IT on benefits management. This makes it necessary to conduct an exploratory study with qualitative data as a basis for our analysis. This is because there is little to no data on the topic so far, making it hard to navigate in this complex and unstructured field. Our research strategy is a single case study in InnoBank, which is the fictive name of a Norwegian bank due to

anonymization. Our primary data will be collected through semi-structured interviews, while relevant documents and observations from InnoBank will be our secondary source of data.

In chapter 2, we present the theoretical foundation. Our research methodology is presented in chapter 3. Chapter 4 contains the empirical background for our study. The empirical findings are presented and analyzed in chapter 5, followed by a discussion in chapter 6. Lastly, we conclude on the implications of lightweight IT on benefits management in chapter 7.

2. Theoretical foundation

In this chapter we present relevant literature on benefits management and lightweight IT. In section 2.1, we first provide an explanation of benefits management, followed by the history of benefits management, its challenges, types of benefits, and lastly an overview of the most known benefits management framework, the Cranfield method. Section 2.2 elaborates on the differences between lightweight IT and heavyweight IT. An explanation of the generativity mechanisms of lightweight IT is then given, followed by the various governance models for lightweight IT found in literature.

2.1 Benefits management

2.1.1 What is benefits management?

The term benefits management is referred to in several ways in literature, where benefits realization management, benefits realization and project benefits management are used. At first glance, it might therefore be difficult to understand what benefits management is. Ward, Taylor and Bond (1996) defines benefits management (BM) as "the process of organizing and managing such that potential benefits arising from the use of IT are actually realized". Similarly, but slightly different, Bradley (2006, p. 29) defines benefits realization management as "the process of organizing and managing, so that the potential benefits, arising from investments in change, are actually achieved". The common denominator for both definitions is that change has to happen to extract value from a project. This illustrates how different definitions of benefits management are used synonymously with each other in literature. However, the definition from Ward et al. (1996) specifically points out the benefits arising from the use of IT. As we focus on lightweight IT solutions, this definition will therefore be the basis of our thesis.

2.1.2 History of BM

BM has evolved since the term was first introduced in the 1990s and has increasingly gained more attention (Breese et al., 2015). To understand the current and future implications of BM on lightweight IT, it helps to understand the origin of the concept. Recognizing the challenges and limitations of the past might highlight the need of new approaches and relevant issues to be addressed. One of the important aspects in this matter is that BM arose as a response to the

growing concern that large information technology (IT) projects were not achieving the expected benefits (Breese et al., 2015). Several authors argue that the traditional appraisal approaches of IT investments might be one critical factor (Doherty et al., 2012; Ward & Daniel, 2006, p. 27). The dominance of a financial mindset within investment appraisal methods favors cost cutting and efficiency. This requires financial metrics such as ROI (return on investment) and NPV (net present value), as leaders favor this approach to express the activities within an organization (Ward & Daniel, 2006, p. 29). As many IT investments call for business and process change to deliver benefits, such considerations are not included in the appraisal of IT projects. Hence, improved effectiveness, social aspects, and qualitative benefits are often overlooked or ignored (Ward & Daniel, 2006, p. 30).

As the challenges with IT projects emerged, large consultancy firms and business-oriented universities in the UK caught interest in this field through their interlinked research on project management and consultancy activities in IT (Breese et al., 2015). These scholars became known as the benefits management pioneers. One of the most well-known BM methods that arose from this era is the Cranfield method (Terlizzi et al., 2017). This is because it was undertaken at the Cranfield School of Management as a response to organizations' dissatisfaction with the result of IT projects (Hesselmann & Mohan, 2014).

BM received increased attention in the late 1990s and attracted the interest of government departments involved in project management and IT investments (Breese et al., 2015). More specifically, BM gained large influence on government guidance for the use of public spending and was incorporated into policies and procedures for large parts of the public sector (Terlizzi et al., 2017). Although BM is mostly used in English-speaking countries, it is also applied in Norway. In recent years BM has been extensively used in the public sector, for instance in the guidelines issued by the Norwegian Government Agency for Financial Management (DFØ, n.d.) and the Agency for public management and eGovernance (DIFI, n.d.).

There was also interest in BM among international professional associations, such as the Project Management Institute (PMI), incorporating several activities in programme and portfolio management associated to BM (Breese et al., 2015). BM functions in parallel to project management where the aim is to deliver a project's benefits (Terlizzi et al., 2017). Project benefits are "the flows of value that arise from the achievement of a project's outcomes" (Zwikael & Smyrk, 2012). Where traditional project management focuses on time,

cost and quality, BM focuses on different dimensions such as identification, planning, realization and reviewing benefits (Ward & Daniel, 2012, p. 69).

In the mid to late 2000s, networks associated with BM started to expand, models to map the capability and maturity of BM in organizations were introduced, and Specific Interest Groups (SIG) were developed to promote BM practices (Terlizzi et al., 2017). The use of social media also proved to be a new and flexible opportunity to create collaborations (Breese et al., 2015).

Despite the traction of BM in literature over the years, few consistent and standardized models are available for conducting BM across industries. For instance, there is limited BM literature in the curriculum of project management, and large commercial research organizations such as Gartner have noticed the low level of BM utilization (Breese et al., 2015).

2.1.3 Challenges of BM in practice

The likelihood of projects achieving organizational goals, both IT-related and more generally, increase with the use of BM practice (Doherty et al., 2012; Ward & Daniel, 2012, p. 201). However, few organizations have taken a full life-cycle approach to BM (Berghout, Nijland & Powell, 2011). This might be due to numerous reasons. One of them is the lack of agreement on how to classify and measure benefits (Jenner, 2009, p. 20), as the word itself has been given various definitions from different professional groups (Breese et al., 2015). Moreover, there is no evidence of BM approaches being adopted in any consistent, comprehensive or coherent manner (Ashurst, Doherty & Peppard, 2008). This makes it challenging to justify, prove and monitor the expected benefits, adding on to the complexity of IT management (Terlizzi et al., 2017; Ashurst et al., 2008). Tallon and Kraemer (2007) also point out that the challenge of conducting BM on IT projects is often based on perceptions rather than formalized processes.

Most studies report low BM adoption rates among businesses (Hesselmann & Mohan, 2014; Breese et al., 2015; Ashurst et al., 2008). The following emphasizes the challenges associated with the low adoption rate: (1) Adopting IT BM in agile projects is difficult (Terlizzi et al., 2017), (2) benefits are difficult to quantify (Berghout et al., 2011), (3) the process is slow and bureaucratic (Turner & Ledwith, 2016), (4) a lack of knowledge on conducting BM (Love, Irani, Standing, Lin & Burn, 2005), and (5) various BM practices due to a variety of models

(Terlizzi et al., 2017). Although this list is not complete, the sum of these challenges partly explains the low uptake of BM (Terlizzi et al., 2017).

On the other hand, Hesselmann & Mohan (2014) claim the reason BM might be branded as a failure is due to the lack of a holistic approach in understanding the problem. The attempts to study other perspectives of BM are rare. For instance, the adoption and the use of BM from a user perspective has received minor attention. Additionally, employee needs, governance mechanisms, and organizational culture are contextual elements underrepresented in the BM research domain (Hesselmann & Mohan, 2014). With the emergence of lightweight IT, it will therefore be valuable to see if these implications still remain unsolved or not.

2.1.4 Types of benefits

Among the potential implications of conducting BM is the measurement of different types of benefits and their definitions. As previously stated, traditional investment appraisal methods require financial values to be placed on qualitative benefits, which are values that might be difficult to calculate (Ward & Daniel, 2006, p. 28). This chapter will provide general definitions of benefits and elaborate on different types of benefits that organizations can obtain.

Ward and Daniels (2006, p. 107) define benefits as "an advantage on behalf of a particular stakeholder or group of stakeholders". Bradley (2006, p. 102) provides a similar definition of the term; a benefit is "an outcome of change which is perceived as positive by stakeholders". Despite the similarities, Bradley's definition puts more emphasis on the stakeholders' perceptions of benefits, and that benefits are an outcome of change. Due to the nature of our case study we therefore use Bradley's definition as we will emphasize the respondents' perception of benefits.

According to Ward and Daniel (2006, p. 19), benefits can be categorized as tangible and intangible benefits. They consider tangible benefits as those that can be measured by an objective, quantitative, and often financial measure. Hares and Royle (1994) elaborate on this by seeing tangible benefits as positive effects that can be operationalized, measured, monitored and controlled. Intangible benefits, on the other hand, tend to employ qualitative measures (Ward & Daniel, 2006, p. 21). These are outcomes that cannot be measured in a monetary

sense. These intangible benefits include, but are not limited to; relationships, knowledge, processes, systems, management, communication, values, reputation, trust, skills, and competence (Bradley, 2006, p. 112). Throughout this thesis we refer to benefits as either quantitative or qualitative as we find it easier to comprehend.

Not all IT investments yield positive outcomes, but might also be negative and unexpected (Bradley, 2006, p. 36). Such outcomes were introduced as disbenefits in the context of the many failed IT projects in the 1990s. It can give rise to implications for BM as it is claimed to be a critical performance aspect when investing in new technology (Fox, 2008). The word disbenefit has several definitions. These include, but are not limited to; "an impact, direct or indirect, of ICT which has unwanted and negative effects on the performance of an individual or organization" (Bannister et al., 2001), and "the adverse impact on a business or organization" (Ward et al., 1996). Bannister's definition is used throughout our thesis as it focuses specifically on the disbenefits of technology. The BM discipline has had a strong focus on identifying benefits in investment appraisal methods for a long time, however, disbenefits has often been an overlooked factor (Fox, 2008). Therefore, the author argues that disbenefits deserve more attention in traditional investment appraisal methods, as performance might suffer when not taken into consideration.

2.1.5 BM frameworks and models

In addition to classifying the types of benefits, several frameworks are established to conduct BM. After two decades of research, there seems to be consensus among scholars that the BM approach mainly consists of five steps, better known as the Cranfield method (Ashurst et al., 2008; Peppard, Ward & Daniel, 2007; Ward et al., 1996). The Cranfield method is the BM method we choose to use throughout this thesis. An important presumption for identifying implications of lightweight IT on BM is to first explain a general approach for conducting BM.

2.1.5.1 The Cranfield Method

In 1996, the Cranfield method was developed by the professors Ward and Daniel as a result of conducting extensive and in-depth implementation research on numerous IT projects in large organizations (Ward et al., 1996). These studies clarified why some projects were more successful than others in delivering benefits. Although the Cranfield method is based on the

model for managing change developed by Pettigrew and Whipp (1991), the Cranfield method remains one of the most widely used and cited methods in the BM research field (Hesselmann & Mohan, 2014).

By applying the method, it is possible to "avoid the loss of achievable benefits", and "identify and realize far more benefits than before" (Hesselmann & Mohan, 2014). It is argued that the value of the method increases as the issues associated with the delivery of benefits become more complex (Ward & Daniel, 2006, p. 104). In essence, the Cranfield method focuses on the relationship between the enabling technology and the changes of processes or structures in order to identify the best way of realizing all feasible benefits. Figure 1 shows how the method outlines the scope and nature of BM as an iterative process in five stages; (1) identify and structure benefits, (2) plan benefits realization, (3) execute the benefits realization plan, (4) review and evaluate the results, and (5) establish potential for further benefits.
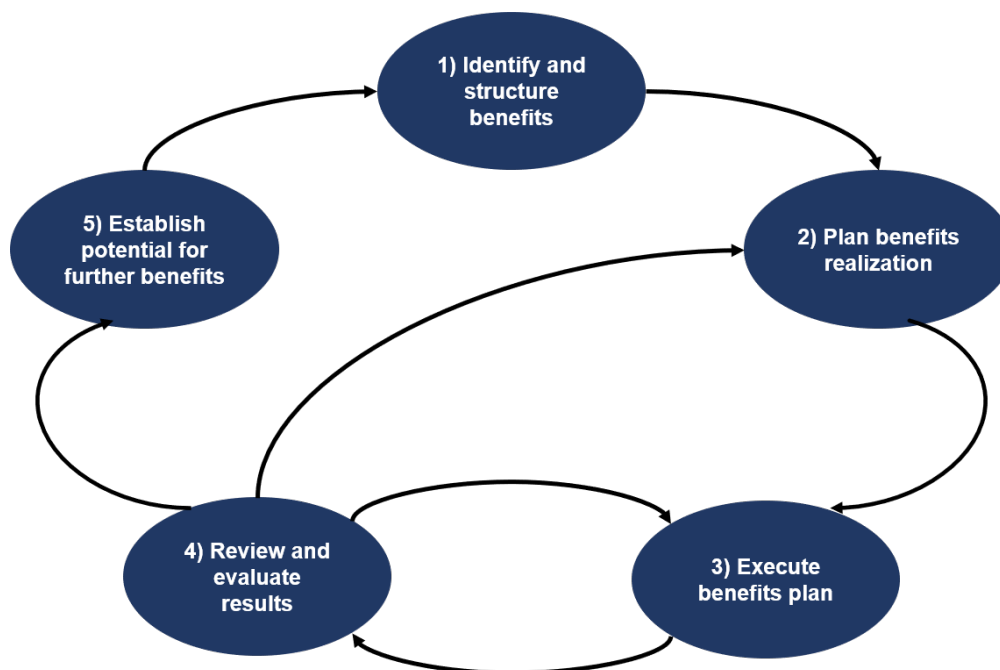
Figure 1: The Cranfield Method (Ward et al., 1996).

The first stage in the Cranfield method entails identifying the overall nature of the business contribution expected from the IT investment, for instance strategic, managerial, operational or functional and supportive character (Ward & Daniel, 2006, p. 105). The authors further emphasize the following key principles of this stage. First, a comprehensive and robust review of the objectives for the IT investment must be established. This implies identifying the potential benefits that can be obtained if the related objectives are achieved. The second key

consideration is feasibility, by understanding how the combination of business change and IT functionality causes benefits to be realized, and where the ownership and responsibility lies. Lastly is the identification of organizational implications for stakeholder groups, as the achievements might affect a variety of benefits across the organization and external stakeholders.

The second stage is about developing a comprehensive BM plan (Ward & Daniel, 2006, p. 110). The purpose is to cover a full documentation of the relationships and dependencies between benefits, responsibilities and activities for delivery. Underpinning this logic is the benefits dependency network which is presented in the following subsection (2.1.5.2). In addition, a comprehensive outline of the different benefits measurements and criteria for assessing success is necessary.

The third stage is to carry out the BM plan and adjust it as seen suitable if any issues occur (Ward & Daniel, 2006, p. 112). It is emphasized that the monitoring of progress against the objectives is equally important as the first two stages. During the evaluation, additional benefits might occur and be identified, hence it is key to revise the plan and accommodate activities accordingly.

The fourth stage of the Cranfield method is about reviewing and evaluating whether the planned benefits have been achieved after completion of the IT investment (Ward & Daniel, 2006, p. 114). It further includes understanding why the benefits were achieved or not, to provide lessons for future investments and improve the first stages. Unexpected benefits and disbenefits might also have occurred, which can be uncovered in this stage. Few companies have been found to review projects after completion as a part of BM (Ward & Daniel, 2012, p. 7). Poor reviews might be due to the lack of proper preparations or absence of monitoring progress during its execution. Hence, the authors claim that thorough post-implementation reviews are important factors to be successful with BM.

The last stage is establishing the potential for further benefits (Ward & Daniel, 2006, p. 116). It is equally important to consider the possibilities of improvement by identifying the opportunities based on an increased knowledge in the previous stage. This might initiate action and change that strengthens overall business. Additionally, it is also important to collect current performance data to provide a baseline for future comparison (DFØ, 2014). The

purpose is to measure the magnitude of the intended benefit. Hence, this makes it possible to identify areas for future improvement and allows for documentation of the realized benefits.

2.1.5.2 Benefits Dependency Network (BDN)

The benefits dependency network (BDN) is designed for explicitly linking the overall investment objectives and the resulting benefits in a structured way (Ward & Daniel, 2006, p. 133; Peppard et al., 2007). It is the core tool underlying the first and second stage of the Cranfield method of creating a benefits' realization plan. The construction of BDN is dependent on whether it is a problem-based or innovation-based intervention that takes place. A problem-based intervention relates to being "ends" driven, for instance focusing on the end result. This means to "identify the most cost effective and lowest risk combination of IT and business changes that will achieve explicit quantified improvements" (Peppard et al., 2007). In other words, the focus is to remove existing problems or constraints by reducing the downside of the investment.

On the other hand, innovation-based interventions can be "ways" and "means" driven, both aiming at creating advantages for the organization (Peppard et al., 2007). The purpose of the "ways" driven approach is to explore whether the company can make the necessary changes required to gain an advantage from an opportunity. The "means" driven approach has the technology itself as a point of departure. The purpose of investing in IT is to either capitalize on a business opportunity, create competitive advantages or build new organizational capabilities. Both types of innovation-based interventions are characterized by being inevitably iterative, as the benefits are difficult to define and "are dependent on the changes the organization is willing to make and its ability to develop and deploy new technology" (Peppard et al., 2007).

The perspectives on problem-based and innovation-based interventions might be important to take into consideration when discussing implications of lightweight IT. Lightweight IT comes with other characteristics than heavyweight IT that might affect which intervention is favored, in the context of conducting BM.

2.2 Lightweight and heavyweight IT

In the following we will direct our attention to lightweight IT and how it differs from heavyweight IT. The literature on BM has until this point mainly focused on heavyweight IT solutions. Our contribution aims to explain how BM might differ now that lightweight IT is more prominent. To be able to identify the implications, we will provide our understanding of lightweight IT as there exist many types of lightweight IT solutions.

2.2.1 What is lightweight and heavyweight IT?

There has been an emergence of lightweight IT solutions in recent years, building on the existing mainstream IT solutions referred to as heavyweight IT (Bygstad, 2016). Heavyweight IT can be regarded as a knowledge regime driven by IT professionals. This is where back-end solutions such as enterprise resource planning (ERP) are based on database servers and integration software. This is realized through software engineering. The IT department puts much emphasis on reliability and security requirements and is becoming more complex and specialized. However, it also suffers from rising costs, increased complexity and delays (Bygstad, 2016).

Lightweight IT, on the other hand, is defined as a "socio-technical knowledge regime, driven by competent users' need for solutions, enabled by the consumerization of digital technology, and realized through innovation processes" (Bygstad, 2016). Willcocks and Lacity (2016, p. 167) suggest an extension to this definition to also be "(...) consistent with IT governance, security, architecture and infrastructure". This extension is due to the new set of challenges concerning use, security and IT governance that Bygstad (2016) similarly recognizes as well.

Lightweight IT can be regarded as a new knowledge regime, represented by mobile apps, sensors and bring-your-own-device (Bygstad, 2016). IT-based innovation is increasingly being conducted by non-IT professionals, as the technology allows them to utilize cheap and easy-to-use mobile technology. Hence, such technology is referred to as "lightweight" IT. An example is the growing trend of robotic process automation (RPA), where non-IT specialists are implementing service automation tools in white-collar work processes (Willcocks, Lacity & Craig, 2015; Bygstad, 2016). Table 1 illustrates the differences between heavyweight and lightweight IT.

	Heavyweight IT	Lightweight IT
Profile	Back-end: Supporting documentation of work	Front-end: Supporting work processes
Owner	IT department	Users and vendors
Systems	Transaction systems	Process support, apps, BI
Technology	PC's, servers, databases, integration technology	Tablets, electronic whiteboards, mobile phones
IT architecture	Fully integrated solutions, centralised or distributed	Non-invasive solutions, frequently meshworks (heterogeneous networks)
Development culture	Systematics, quality, security	Innovation, experimentation
Problems	Increasing complexity, rising costs	Isolated gadgets, security
Discourse	Software engineering	Business and practice innovation

Table 1: A comparison of heavyweight and lightweight IT (Bygstad, 2016).

The digital infrastructure is what distinguishes lightweight and heavyweight IT, not the technology itself. Digital infrastructures are networks of interconnected systems, including technology, users and developers that contribute to the maintenance of an IT-system. These are kept together by a knowledge regime (Henfridsson & Bygstad, 2013; Bygstad, 2016; Bygstad & Iden, 2017). While heavyweight IT supports back-end systems, lightweight IT typically supports the immediate needs of the user, often by providing process support with simple applications on cheap technology. Generally, lightweight IT solutions tend to be more user-centric compared to the highly structured and integrated solutions designed by enterprise architects that heavyweight IT represents (Bygstad, 2016). While the lightweight culture is more experimental and innovation-oriented, the heavyweight culture focuses more on systematics, security and quality. Going forward, we will emphasize the following characteristics of lightweight IT (Figure 2), based on the findings from Bygstad (2016).

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┌─────────────────────────────────────┐
│        Lightweight IT archetype      │
└─────────────────────────────────────┘
┌─────────────────────────────────────┐
│     Low-cost and fast implementation │
└─────────────────────────────────────┘
┌─────────────────────────────────────┐
│             Experimental             │
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│            User-centered             │
│   solutions for non-IT professionals │
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│           Process support            │
│      Improve resource utilization    │
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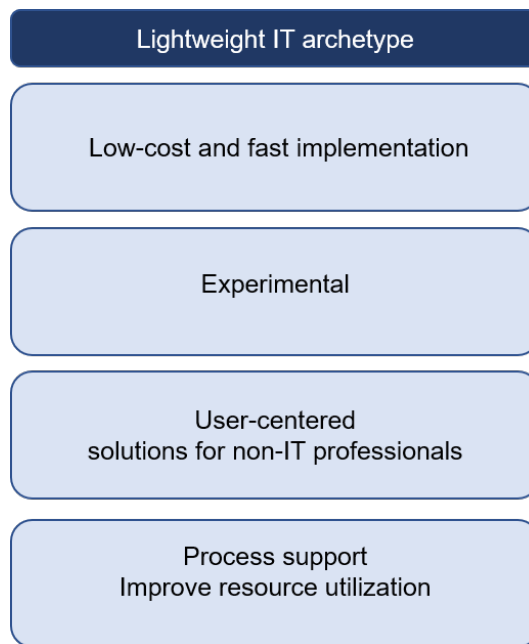
Figure 2: An archetype of lightweight IT (authors).

The IT silo problem, a large number of poorly integrated legacy systems, concerns many organizations. This is because it represents a barrier to organizational change and innovation (Bannister, 2001), as there has been an increase of bureaucratic solutions and security mechanisms of large-scale IT systems (Bygstad, 2016). This growing complexity is due to the increased security and resilience requirements that arise as systems become more integrated, referred to as coalition of systems (Sommerville et al., 2012). The emergence of the consumerization trend of lightweight IT has therefore been a response to the growing complexity of IT solutions. Despite this, Bygstad and Iden (2017) point out that lightweight IT solutions might create new IT silos as the solutions are not part of a holistic architectural thinking.

2.2.2 Generativity mechanisms in lightweight IT

In the context of digital infrastructures, generativity is essential. Generativity is the ability of technical and social elements to interact and recombine to produce or expand new solutions (Bygstad, 2016). It is a key attribute since digital infrastructures evolve through innovation and organic growth, not management interventions (Henfridsson & Bygstad, 2013). Generativity is interesting in the context of lightweight and heavyweight IT because it looks at the relationship between the technologies, and not the attributes itself. According to Henfridsson & Bygstad (2013), these dynamics can be understood by describing the evolution

of digital infrastructures as the interplay between three self-reinforcing generative mechanisms as presented in Figure 3.
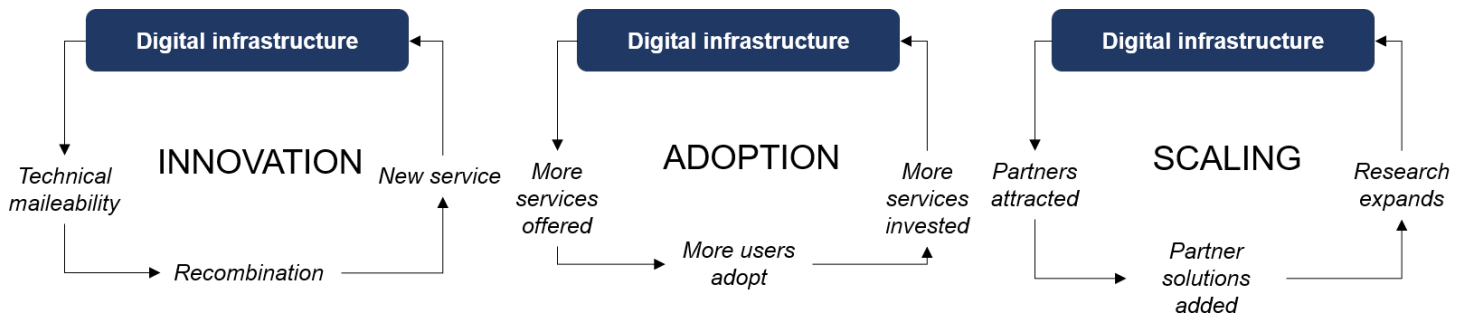
Figure 3: Generative mechanisms (Henfridsson & Bygstad, 2013).

Henfridsson and Bygstad (2013) point out innovation to be the first generative mechanism. This is the creative combination of social and technological elements in order to create new services. Thus, this mechanism promotes user-centricity ahead of IT expertise. Adoption is the recruitment of users through easy-to-use solutions, allowing more lightweight IT investments. When such solutions increasingly become adopted, more resources are released which in return enhances value creation. Last, there is scaling which is the expansion of the network to include more partners to provide more services. However, scaling is challenging in lightweight IT applications due to the dependency upon key resources and people that customize the solutions to a given user base (Bygstad, 2016).

2.2.3 Governance models for lightweight IT

As local units and end-users are increasingly starting to acquire and implement lightweight IT outside the realm of the IT function, this poses a challenge to the tidy relationship between the IT department and the business units (Bygstad & Iden, 2017). Since the traditional knowledge regime has changed, the emergence of lightweight solutions makes it difficult to deal with important issues like security, privacy and reliability. This makes the IT department more hesitant to the new wave of user-driven IT solutions, referring to it as shadow IT (Goyöery, Cleven, Uebernickel & Brenner, 2015; Bygstad & Iden, 2017).

To deal with the untidy relationship between heavyweight and lightweight IT, Gartner (2014) proposed the concept of bimodal IT. Bimodal IT suggest that the focus of managing two separate units within the organization should be on both stability and agility. Stability is traditional and sequential where safety and accuracy is emphasized. Agility is exploratory and non-linear, emphasizing speed and swiftness (Bygstad & Iden, 2017).

Bygstad and Iden (2017) build on the concept of bimodal IT and proposes three additional governance models for lightweight IT. The incoming of lightweight solutions rises the need for a governance toolbox to deal with the increased security measures and the fact that user-driven IT is an important source of business innovation. The researchers therefore propose a governance framework for lightweight IT, presented in Figure 4. The framework consists of the two dimensions; resourcing and securing. Resourcing is the process of enhancing innovation and the use of lightweight IT for business purposes, while securing is the process of controlling the use of lightweight IT (Bygstad & Iden, 2017). The framework is constructed in high versus low ideal type, but they emphasize that the processes are exercised in various degrees.
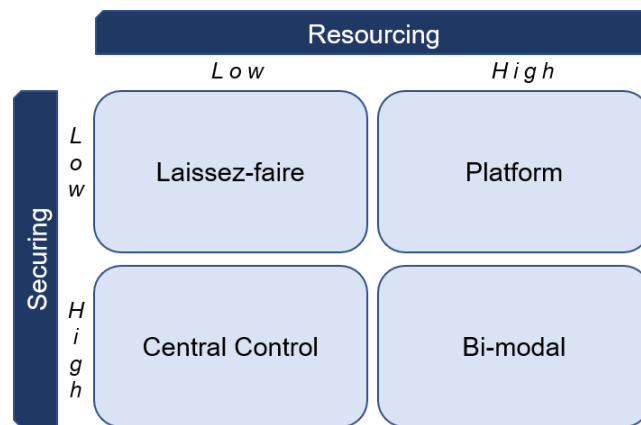
Figure 4: Governance models for lightweight IT.

The laissez-faire model does not allow heavyweight IT management to make decisions regarding lightweight IT. The solutions in this model are implemented as stand-alone solutions. The advantages are fast innovation and user-friendly solutions. However, it gets difficult to scale the solutions and the threat to security and privacy increases. Internal monetary resources and the local users' computing literacy and skills are also threatening to this approach (Bygstad & Iden, 2017).

The bimodal model refers to the principles presented by Gartner (2014). This model proposes that lightweight solutions are developed in separate processes, but when the solutions are integrated and set into production they are under the heavyweight regime. A separate lightweight IT management section regulates its own initiatives, but they are based on the policies and standards from heavyweight solutions. The benefit of a bimodal model is that it

takes advantage of the strengths of both heavyweight and lightweight IT. On the other hand, innovation can be limited as it is dependent on the available capacity in the IT department and internal budgets (Bygstad & Iden, 2017).

Central control is where heavyweight IT management decides which lightweight IT initiatives to prioritize, using predefined assessment criteria. This is done in order to maintain tight control over all lightweight IT activities. Full integration and security are the biggest benefits in this model, but this also leads to little innovation and high costs. A consequence of this might be the loss of opportunities for productivity enhancement and organizational innovation (Bygstad & Iden, 2017).

With a platform model approach, there is a division of labor between heavyweight and lightweight IT. Central IT is to encourage and support lightweight IT initiatives. Heavyweight IT becomes a platform for lightweight solutions and offers APIs for third-party innovations. The platform owner has to certify the lightweight solution to compete in the market. The advantages in this model is that the information resources of heavyweight solutions trigger lightweight innovation and enables innovation to emerge quickly at low cost. The disadvantage is that it requires advanced middleware that holds software solutions together, and mechanisms for dealing with security and privacy (Bygstad & Iden, 2017).

3. Methodology

This section details the methodology used to answer the study's research question. In section 3.1 we explain our research approach and how we find this approach suitable to answer our research question. Further, section 3.2 elaborates on our research design, which includes research purpose, method, strategy and time horizon. We then explain how we collected our data in section 3.3, followed by how we analyzed it in section 3.4. The quality of our research is discussed in 3.5, while the research ethics is accounted for in 3.6. We provide a summary of our methodological choices in section 3.7.

3.1 Research approach

The research approach ought to explain how the researchers approach the theory development (Saunders, Lewis & Thornhill, 2016, p. 144). We found an abduction to be suitable for our study as our research question seeks to answer our two sub-questions. An abductive approach is a combination of induction and deduction. In the first sub-question, where we compare lightweight IT to heavyweight IT, it requires deductive reasoning as it aims to test theory. The second sub-question investigates if a new BM framework is needed for lightweight IT. Therefore, an inductive approach is used as it aims to explore a new phenomenon, identify themes and patterns, and build a conceptual framework (Saunders et al., 2016, p. 145).

3.2 Research design

Research design is the general plan of how to go about answering the research question (Saunders et al., 2016, p. 163). This includes the purpose of the research, methodological choice, research strategy, and time horizon, which is presented in the following.

3.2.1 Research purpose

Research can be designed to fulfill either an exploratory, descriptive, or explanatory purpose, or all of these combined (Saunders et al. 2016, p. 174). We want to analyze and explore the new phenomenon of lightweight IT on BM and map out which implications that follow this new area of study. Following an exploratory study is therefore useful as it allows us to clarify our understanding of the situation by asking open-ended questions in an unstructured manner. Despite BM being a frequently discussed concept among scholars, the concept of lightweight

IT solutions is to our knowledge unexplored in the BM literature. This makes an explorative design useful as it has the advantage of being flexible and adaptable to change, allowing us to change the direction of our research as new information and data appear (Saunders et al., 2016, p. 175).

3.2.2 Research method

The methodological choice is whether the study follows a quantitative or qualitative approach (Saunders et al., 2016, p. 164). This study follows a qualitative research approach as we emphasize the participants' thoughts, meanings and opinions, and the relationship between them (Saunders et al., 2016, p. 168). This allows us to explore the phenomenon more in-depth and deepen our understanding of the implications of lightweight IT on BM. A qualitative research design is well suited to the abductive approach we chose, where inductive inferences are developed, and deductive ones are tested iteratively throughout our research (Saunders et al., 2016, p. 168). Our data is collected through a multi-method qualitative study as we use more than one source of data and methods to confirm the validity. These data sources are in-depth interviews with respondents, supported by company documents and meetings with employees from RPA Supervisor (Table 2). During one of these meetings, we were given an introduction to how RPA Supervisor works.

ID	Name
Dialogue 1	Introduction meeting 30.08.2019
Dialogue 2	Demonstration meeting 11.09.2019
Dialogue 3	Information meeting 17.09.2019

Table 2: List of observation and meetings.

3.2.3 Research strategy

As the goal of a research strategy is to ensure coherence across the research design, the choice of research strategy should therefore be linked to the research question, choice of research approach, purpose and method (Saunders et al., 2016, p. 173) As lightweight IT is a contemporary and rather unexplored phenomenon in the BM literature, we believe that a case study is an appropriate research strategy.

As we wish to explore the implications of lightweight IT on BM, we found RPA Supervisor to make an interesting case. This is because RPA Supervisor represents the growing use of easy-to-use technology and solves the need to govern the complexity of lightweight IT tools. The disadvantages of case studies are that they are time-consuming and resource demanding. Moreover, case studies have little ability to provide statistical generalizability as they do not provide an adequate sample size to represent a larger population (Yin, 2014, p. 40). This aspect of statistical generalizability is discussed further in section 3.5.1.

3.2.4 Time horizon

The time horizon of a research study can be classified as longitudinal or cross-sectional (Saunders et al., 2016, p. 200). Our research has a cross-sectional time horizon due to our time constraint, and because the interviews were conducted over a short time period, during October 2019. As lightweight IT is a new concept, it is important to consider the implications at this point of time might change in the future. In order to discuss which implications lightweight IT has on BM, it is therefore favorable to gather data beyond our timeframe to achieve a comprehensive insight to this phenomenon.

3.3 Data collection

To answer our research question, we collected both primary and secondary data. Multi-method through the use of several data sources strengthens the grounding of the insights discovered in the research (Eisenhardt, 1989; Guba, 1981). We conducted semi-structured interviews to collect our primary data, interviewing respondents in InnoBank's RPA center of excellence (CoE), consultants in Avo Consulting and RPA Supervisor, and researchers at NHH (Table 3). Secondary data were collected from company websites, news articles published in the media, PowerPoint presentations and whitepapers on the RPAS. These supporting documents are however not included in our thesis as they are regarded as sensitive information by InnoBank and RPA Supervisor. Interview guides were used to provide direction during our interviews, but with the opportunity to ask the respondents follow-up questions.

3.3.1 Semi-structured individual interviews

As the nature of our study is exploratory and follows an abductive approach, we found it suitable to conduct semi-structured interviews to collect our primary data (Saunders et al., 2016, p. 392). These interviews provide important background and contextual data material to our study. Choosing semi-structured interviews allowed us to explore certain topics by altering the interview questions and to ask open-ended follow-up questions when important topics emerged. All interviews were conducted face-to-face to increase the trust between the researcher and interviewee, except for two, which were conducted through Skype. This was due to geographical distance. Semi-structured interviews are however time-consuming, both in regard to the necessary preparations before the interviews and transcribing the interviews after they are conducted. The preparations we had included research of the theoretical BM and lightweight IT landscape as we compare our findings to existing theory in our first sub-research question.

3.3.2 Respondents

When we chose our interview objects, it was important that all respondents could provide us with good quality data. Therefore, we used a purposive sampling method to ensure that we only interviewed the most informative respondents (Saunders et al., 2016, p. 301). Our contact person in InnoBank therefore provided us with employees that either worked closely with RPA Supervisor or were affected by the technology in some way. First, we chose to interview candidates from InnoBank that were familiar with RPA Supervisor, and consultants in Avo Consulting and RPA Supervisor who had implemented the RPA Supervisor technology. To gain in-depth insight on lightweight IT solutions in general, we supplemented the interviews with researchers from the Norwegian School of Economics (NHH) and the University of Oslo (UiO). One of the consultants at Avo Consulting and the researchers at NHH were not familiar with RPA Supervisor. They provided examples from other lightweight IT solutions.

The number of respondents were somewhat limited, much due to the newness of the technology. However, we held interviews until the marginal improvement of conducting a new interview became small (Terlizzi et al., 2017). We were able to retrieve the necessary information to answer our research question. We had 11 respondents in total (Table 3). Five of these were employees at InnoBank, four were employees at Avo Consulting and RPA Supervisor, and two were researchers at NHH and UiO.

ID	Organization	Role
Respondent 1	InnoBank	Employee in RPA CoE
Respondent 2	InnoBank	Employee in RPA CoE
Respondent 3	InnoBank	IT consultant
Respondent 4	InnoBank	IT consultant
Respondent 5	InnoBank	Employee in RPA CoE
Respondent 6	RPA Supervisor	Employee
Respondent 7	Avo Consulting	Consultant
Respondent 8	Avo Consulting	Consultant
Respondent 9	Avo Consulting	Consultant
Respondent 10	NHH	Researcher/ professor
Respondent 11	UiO	Researcher/ professor

Table 3: List of respondents.

3.3.3 Interview guide

An interview guide was developed as part of the preparations for the interviews. The interview guide was helpful in order to keep track of the main questions we wanted to ask and to speak freely during the interviews. When we created the guide, we ensured that the questions were open-ended and not leading, that they were asked in a logical order, and in a neutral language to avoid misconceptions.

The respondents received information about the purpose of our thesis a couple of days before the interviews. In addition, we prepared participation information sheets and a consent form to prove our trustworthiness (Appendix 2 and 3). As we interviewed respondents with various expertise, we revised the interview guide as necessary.

3.3.4 Conducting the interviews

Before starting the interviews, we asked the respondents for permission to record the interview for transcription purposes. This allowed us to pay full attention to what the respondents were

saying and minimizing the risk of misquoting them after the interview. However, we still took some notes during the interview to remember especially important comments. The respondents were informed that the recording will be deleted after the end of the study. A consent form was handed out at the beginning of the interview which the respondents signed. The form included information about the study, that they will stay anonymous at all times, and how the interview would be conducted. We also pointed out that it was voluntary to participate in the study. Before starting the interviews, we took the time to explain our research study to hopefully make them feel more comfortable with sharing information and opening up (Saunders et al., 2016, p. 406). To get the conversation going and create a level of trust (Qu & Dumay, 2011), we started the conversation with simple questions like "what is your position in InnoBank?" and "how long have you been working here?". We made sure the respondents were in a location they felt comfortable and undisturbed in. For this reason, we conducted the interviews in private meeting rooms at the respondents' office locations (Table 4).

ID	Date	Location
Respondent 1	15.10.2019	Meeting room at InnoBank's offices
Respondent 2	15.10.2019	Meeting room at InnoBank's offices
Respondent 3	15.10.2019	Meeting room at InnoBank's offices
Respondent 4	16.10.2019	Skype
Respondent 5	15.10.2019	Meeting room at InnoBank's offices
Respondent 6	24.10.2019	Meeting room at Avo's offices
Respondent 7	22.10.2019	Meeting room at Avo's offices
Respondent 8	25.10.2019	Meeting room at InnoBank's offices
Respondent 9	25.10.2019	Meeting room at Avo's offices
Respondent 10	28.10.2019	Meeting room at NHH
Respondent 11	28.10.2019	Skype

Table 4: List of interview locations and time.

When we asked questions, we used a neutral tone of voice and open-ended questions to allow the respondent to talk freely. We tried to avoid using theoretical words in our questions, but if we did, we provided an explanation of the concepts (Saunders et al., 2016, p. 407). To explore responses of significance to the research topic, we used probing questions. For instance, we

asked for clarifications from the respondents by asking questions like "that is interesting, why do you think benefits ownership is important for BM?".

During all interviews both researchers were present to ensure that we understood the respondents' answers in the same way and discussed unnoticed comments in more detail afterwards. This also proved useful as we could give each other feedback in between each interview to improve our interviewing technique and receive better answers from the respondents. Lastly, we made sure to include contextual data after the interviews. We took note of the location, the time, the setting of the interview, some background information about the respondent and our immediate impression of how it went. As we promised to keep full anonymity of the respondents, we stored the contextual data separate from the interview transcripts, making it hard to connect and pair these documents together.

3.3.5 Processing of data

As the primary data we collected can be regarded as personal, the Norwegian Centre of Research Data (NSD) requires that the data is correctly processed. This is to ensure the anonymity of the respondents. As stated in the interview, the data will be kept anonymous at all times and deleted after our thesis has been handed in. The respondents were familiar with their right to review, alter or withdraw personal data at any point during the research project.

3.4 Data analysis

After the interviews we immediately started transcribing the audio-recorded interviews. Transcribing means reproduced verbatim as a word-process account (Saunders et al., 2016, p. 572). When transcribing, we tried to give an indication of not only what was said, but also how it was said. We compared this to what was stated in the contextual analysis. It was important to stay true to what the respondents explicitly said while transcribing, but we started to leave out filler words like "eh" and "uhm" after a few rounds of transcribing. This was because it became harder to grasp the intention of what the respondent was saying when many of these words were included. We strived to start the transcription after each interview to start processing the data. This was to limit the chance of data overload and to avoid collecting data without sufficiently analyzing them (Saunders et al., 2016, p. 571). However, this became challenging to do during the first round of interviews as we held four interviews in one day.

To analyze our data, we followed a thematic analysis, where the purpose was to search for themes or patterns that occurred in our dataset (Saunders et al., 2016, p. 579). A thematic analysis was found beneficial as we followed a deductive approach. This allowed us to commence our analysis with theoretically-derived themes which we modified and added to as we explored the data. As we transcribed the interviews ourselves, we became familiar with the data and could analyze it continuously (Postholm, 2010, p. 104). The interviews were conducted in Norwegian. To ensure what the respondents' said would not lose its meaning, quotes were not translated until after we had written the empirical findings.

Analysis of qualitative data consists of summarizing, coding and categorizing the data (Saunders et al., 2016). NVivo 12 was used to aid this process. We first started this process individually. The codes were a combination of themes that emerged from the data, while a few were based on themes from existing literature. After our first round of initial coding, we met up to compare what we had found. We discussed and iterated our codes before we ended up with our final coding list. Following this, we separately started to search for themes, patterns and relationships in our list of codes. We then used post-it notes to write down the themes and patterns we had found and started to compare. The themes related to each other were then grouped into three high-level themes. These were (1) the differences between lightweight IT and heavyweight IT (2) factors that influenced BM of lightweight IT and (3) factors that need more attention in BM of lightweight IT. With these themes as our point-of-departure, we read through all the transcribed material again to re-categorize the quotes to fit our final themes.

3.5 Research quality

Four logical design criteria are commonly used to assess the quality of the research design. These are construct validity, internal validity, external validity and reliability (Yin, 2014, p. 45). As internal validity is used for causal and explanatory studies, it is not of relevance in our case study and hence not addressed further. As construct validity is largely concerned with how well researchers have succeeded in measuring the particular concept they intend to investigate, it is mainly focused on quantitative methodologies (Mills, Gabrielle & Wiebe, 2010, p. 960). Therefore, construct validity is not discussed further either. The two remaining criteria and the associated concerns are elaborated in the following.

3.5.1 External validity

External validity refers to the generalizability of the study to the population as a whole, or to all relevant contexts. As the sample size of our study is not sufficient, it will not be statistically generalizable either. In such studies Lincoln and Guba (1985) argues that one should rather measure the transferability of the study instead. Transferability encompasses providing a full description of the research questions, design, context, findings and interpretations. As we have documented these aspects, the reader might determine the transferability of the study to another setting (Saunders et al., 2016, p. 206).

3.5.2 Reliability

Reliability is a key characteristic of research quality and relates to whether the data collection techniques enable consistent findings if a replication of the study finds place (Saunders et al, 2016, p. 202). There are four important considerations; participant error, participant bias, researcher error and researcher bias (Saunders et al., 2016, p. 203).

Participant error refers to factors that might alter the respondents' performance (Saunders et al., 2016 p. 203). As we conducted nearly all the interviews within working hours and at their locations, we attempted to reduce the risk of participant errors. In addition, we ensured to wear appropriate clothing as appearance might also affect the perception. We perceived the participants to feel safe in the situation, thus concluding that the participant error was low.

Participant bias entails factors that might cause a false response, for instance if the respondents fear being overheard, they might provide falsely positive answers (Saunders et al., 2016, p. 203). This relates to the potential bias that can come with audio-recording, as the respondents know they are being recorded. To prevent this from occurring, we therefore emphasized the importance of honest answers, and ensured them that their statements and thoughts would not be traceable back to them. The meetings were held in closed meeting rooms at their offices so that the respondents would not be overheard by colleagues.

Research errors might be any factor contributing to altering the researchers' interpretation. This can for instance be if we come poorly prepared for the interviews or misunderstand subtle meanings of the respondents (Saunders et al., 2016, p. 203). It is further emphasized that credibility shall be promoted through the supply of relevant information to participants before

the interview. Thus, in order to develop a sufficient interview guide, we prepared for the interviews a couple of days in advance by reviewing literature on interview techniques and research on InnoBank. To establish credibility among the interviewees, we prepared a consent form found in Appendix 3. With this, we believe the researcher error is limited in our study.

Researcher bias is any factor that induces bias in the researcher's interpretation of the responses (Saunders et al., 2016, p. 203). To reduce the risk of such bias we ensured to use relatively short, open-ended questions without the extensive use of jargon. Where such specific terminology was deemed necessary, i.e. "benefits management" and "lightweight IT", we spent some time to ensure we had the same understanding of the concept. The questions can be found in the interview guide in Appendix 1. With the complementary audio-recording, we argue that researcher bias has little impact on our study.

3.6 Research ethics

Research ethics refer to the standards of behavior that guides the researchers' behavior in relation to the rights of the respondents (Saunders et al., 2016, p. 249). The participants were given information on the process in advance though an information letter (Appendix 2). We made it clear that the participation was voluntary and informed them that they could withdraw from the interview or study at any time. The respondents have remained anonymous at all times. To ensure that their identities were not revealed, we took additional precautions when storing the data, during analysis and the presentation of the respondents in the paper. The data stored from the interviews and any related notes will be deleted after the research project has ended.

3.7 Summary of methodological choices

Table 5 summarizes our methodological choices, as elaborated for in chapter 3.

Dimension	Methodological choices
Research approach	Abductive
Research purpose	Exploratory
Research method	Qualitative
Research strategy	Single case
Time horizon	Cross-sectional
Data Collection	Semi-structured interviews
Data Analysis	Thematic analysis

Table 5: Summary of methodological choices.

4. Empirical background

This chapter presents the bank we have chosen as a study object and how they have applied RPA Supervisor, a lightweight IT solution, in their digital business unit. It should be noted that RPA Supervisor is also the name of the company behind the RPA Supervisor technology. Therefore, the technology will be referred to as RPAS. As it is a governance tool for RPA, we first briefly elaborate on the RPA technology and how it is applied in InnoBank. However, our main focus is on RPAS and not RPA. We continue with an explanation of how the RPAS technology works before we elaborate on how InnoBank has applied this in their digital business unit, the center of excellence (CoE) for RPA. The following information is retrieved from InnoBank and RPA Supervisors' own webpage, interviews with their employees, and other supporting documents.

4.1 InnoBank as a study object

The bank wants to remain anonymous and is therefore addressed with the fictive name InnoBank. The numbers and facts presented below are real, but only information about the company that is of relevance for our study is included. InnoBank is a Norwegian online bank with around 100 employees. The bank has several branch offices, including corporate market and commercial real estate. With customer centricity as one of their core values, InnoBank embarked early on in appropriating digital technology to stay connected with their customers. They were for instance early adopters of artificial intelligence (AI) in assessing loan applications.

4.1.1 RPA in InnoBank

As InnoBank operates in the banking sector, they have been challenged to meet the increased requirements from regulatory authorities (Ministry of Finance, 2018, p. 13). Besides shorter time frames, meeting the regulations calls for a larger back-office workload. To handle the increased workload, often characterized as repetitive and rules based, InnoBank has adopted the use of robotic process automation (RPA). RPA is part of the new era of lightweight IT solutions as it supports work processes, is non-invasive and does not disturb the underlying computer systems. Implementing RPA in InnoBank means they can automate their routine-based processes (Chappell, 2017; Lacity & Willcocks, 2016). As the robot mimics the behavior of a human by carrying out a task within a process, it allows it to do so quicker and

more precisely. Humans are unable to compete with the level of efficiency and accuracy conducted by the robot on these tasks (Lacity & Willcocks, 2016). This allows InnoBank to focus more on value-adding activities that require emotional intelligence, reasoning, judgement and interaction with their customers (Leopold, van der Aa & Reijers, 2018).

RPA has three distinctive features compared to other service automation tools. First, RPA is easy to configure, and the implementation does not require programming abilities. In InnoBank, non-IT specialists in their RPA CoE are in charge of automating the processes. Second, the software does not invade with other existing systems, allowing it to access the systems in the same way a human would. The robot in InnoBank then gets access to the data systems with their own login details. Third, RPA is enterprise-safe, meaning that it easily meets the IT requirements such as security, scalability and auditability (Osmundsen, Iden, & Bygstad, 2019). InnoBank bank ensures this by working closely with the IT-department, both during implementation and on a day-to-day basis. Examples of service automation programs are Blue Prism, UiPath and Automation Anywhere (Willcocks, Lacity & Craig, 2015).

InnoBank has automated over 100 processes since they implemented RPA in 2016. With the growing number of automated processes, InnoBank faced challenges with increased scheduling complexity. This led to difficulties with efficient RPA schedules. In addition, the RPA controllers spent much time on maintenance work. This eventually required the controllers to be available every hour of the week, also during weekends and holidays. RPA Supervisor proposed to implement RPAS in InnoBank to address these challenges instead of alternatively buying another RPA license. RPAS would replace the need for this license, thus leading them to try out the new technology.

4.2 RPA Supervisor

RPA Supervisor is an automated controller that optimizes RPA resources with advanced algorithms and event handling capabilities (RPA Supervisor, 2019). It was originally developed as the scheduling-function in the RPA software did not satisfy the customers' needs. According to RPA Supervisor (2019), the product is the culmination of five years of experience of building and running RPA operations in more than 80 organizations. RPA Supervisor is a subsidiary of Avo Consulting. With this, some consultants in Avo Consulting helped implement RPAS in InnoBank.

Before RPAS, controllers had to align the different schedules with the licenses and resources available ("Before" in Figure 5). They also had to account for varying workload on each process. This would often lead to uncertainty regarding task completion, making it hard to ensure the processes met the required lead time. However, with RPAS, process execution is optimized. The optimization is based on available resources, RPA licenses and service level agreements (SLA). An SLA specifies the metrics by which the service is measured and is an important component for technology services contracts in general (IBM, 2019). The SLA can also specify levels of availability, performance, operation or other attributes of the service. RPAS allows the possibility for changing the SLA as necessary.

RPAS has three main functionalities and features; (1) operating as an automated controller, (2) optimizing resource allocation, (3) providing live business reporting ("After" in Figure 5).
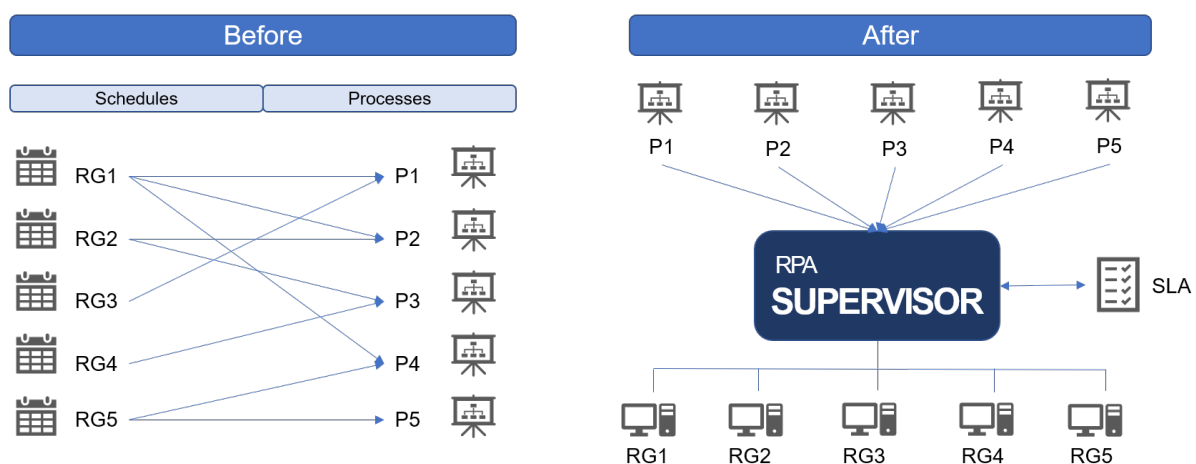
Figure 5: From Scheduling to SLA-driven operations in RPAS (adapted from BluePrism World Conference 2019)

First, an automated controller implies managing the robot workforce through scheduling all future processes. This is done by providing different SLA requirements to RPAS. Another feature of RPAS is monitoring all available workload, where it can minimize any issues by warning a human controller. This leads to a more stable infrastructure (RPA Supervisor, 2019). Second, intelligent and powerful algorithms ensure optimization of resources. By knowing each processes' individual business requirements, this enables RPAS to continuously reallocate the combination of resources in the most adequate way possible. This is done

according to the priority and availability of the items to be processed. Third, RPAS provides live reporting and a configurable notification center. Potential breaches of SLA's, infrastructure events, and other exceptions that require manual handling, are examples of such notifications. In addition, a web-based interface provides business users with easy access to information (RPA Supervisor, 2019)

InnoBank were one of RPA Supervisor's first customers. This led to some implications for the bank as not all capabilities were fully developed yet. Despite this, RPAS is considered to be a story of success in InnoBank as they now have available capacity on their licenses and a stable infrastructure. Smarter adjustments of process execution provide predictable response times for InnoBank, improving overall satisfaction and reducing requests from process owners (Blue Prism World Conference, personal communication, April 3rd, 2019).

To be able to recognize where RPAS belongs in the RPA-technology landscape, the RPA operating model introduced by Lacity and Willcocks (2016) is as our point of departure and forms the contextual setting for RPAS (Figure 6). The authors studied a large European utility company's successful implementation of RPA, who had over time built mature RPA capabilities housed in business operations rather than as part of the IT department (Lacity & Willcocks, 2016). Their operating model became well-established with regards to RPA governance, RPA demand management within the company, RPA development and strategic outcomes. A key factor was the CoE team that worked across organizational boundaries to help the other divisions with automation. They consisted of two main teams; RPA developers to build the RPA solutions, and RPA controllers to operate the processes once in production. In this context, RPAS can be seen as the equivalent to the RPA controllers. It executes the same tasks, such as managing the robot workforce, coordinating the daily stream of work, production of daily reports, and notification of irregularities.
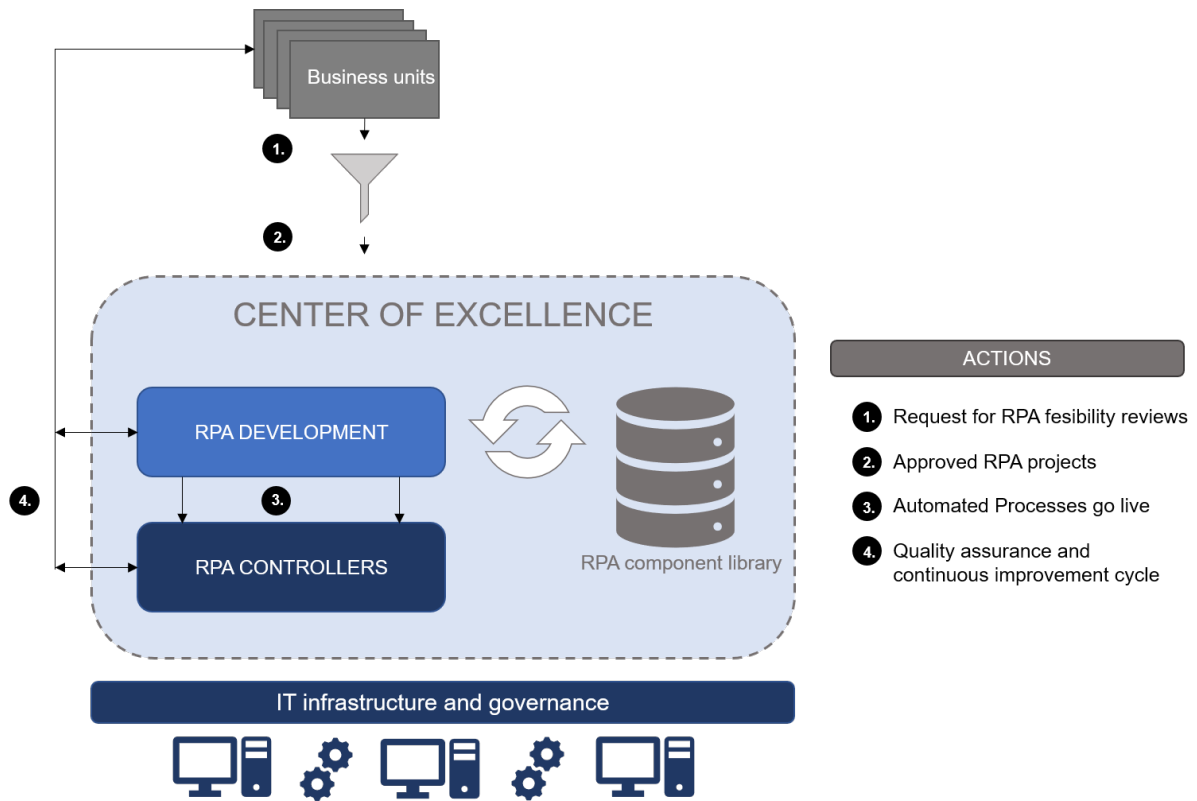
Figure 6: The mature RPA operating model (from Hjelset & Ulfsten, 2018, p. 21).

5. Empirical findings and analysis

Chapter 5 showcases our findings from the interviews in relation to our research question *"What are the implications of lightweight IT on benefits management?"*. To be able to answer this, we structure the analysis in the following way; in 5.1 we present our findings on whether conducting BM on lightweight IT differs from conducting BM on heavyweight IT. In section 5.2 we present the factors we found to influence BM of lightweight IT. Lastly, in 5.3 we present the factors we consider need more attention to be able to successfully conduct BM on lightweight IT. Section 5.1 addresses the first sub-research question on whether conducting BM on lightweight IT differs from BM of heavyweight IT. Section 5.2 and 5.3 allows us to answer our second sub-research question on whether there is a need for a new BM framework for lightweight IT or not.

Our findings are first visualized in a model to provide the reader an overview of how the analysis is structured (Figure 7). We believe this helps the reader follow our analysis better. A summary is given at the end of each section.

5.1 How BM of lightweight IT differs from BM of heavyweight IT	5.2 Factors that influence BM of lightweight IT	5.3 Factors that need more attention in BM of lightweight IT
Easier to identify the benefits receiver	Identification and planning	End-to-end thinking
Easier to measure the benefits		
Less formal measurement of benefits		
More immediate benefits	Organizational factors	Value creation
Utilization is easier		
Can allow an agile approach	Practitioner-tools for BM support	
Enables fast response to market changes		
Scaling can be difficult	Type of governance model for lightweight IT	Qualitative benefits
Can be less reliable		

Figure 7: Visualization of empirical findings.

5.1 How BM of lightweight IT differs from heavyweight IT

In order to answer our research question, we first need to investigate if BM of lightweight IT differs from BM of heavyweight IT. It is important to state this first because if they do not differ, there might not be implications specifically for lightweight solutions. However, the following findings indicate that there exist differences between the two in regard to BM. We present the findings on how they differ.

Easier to identify the benefits receiver

The main differences between lightweight and heavyweight IT are the digital infrastructures mentioned in section 2.2.2. Our findings indicate how this can influence the way BM is conducted in several aspects. Innovation is among one of the generative mechanisms that for instance promotes user-centricity ahead of IT expertise (Bygstad, 2016). Respondent 11 highlights how it might be easier to identify the receiver of benefits when conducting BM of lightweight IT. This is due to the user-centricity of lightweight solutions. Concerning heavyweight IT, which is typically characterized by large systems, it might be unclear who the receivers of the benefits are and what type of benefits that are received.

> *That is the reason why we have lightweight solutions, so it can be an advantage for the user. So, in that way it is easier to see the direct consequences for the user with lightweight IT, than it is when one makes large systems where the effect for the user actually might be a bit unclear.*

> *If we compare it [heavyweight IT] with lightweight solutions, then we see that when you introduce a SAP system in a large company, it is difficult to identify who it is who actually gets the benefit because you think that the system keeps track on it all, but actually it is not that easy to see who it is that specifically gets benefits – and what type of benefit that is.*

Conclusively, with lightweight IT solutions it is easier to identify the benefits receiver. With heavyweight IT solutions it is unclear who the benefits receiver is.

Easier to measure the benefits

In addition, the proximity to users makes it easier to measure the benefits as one can for instance easily ask the users directly, as explained by respondent 11: "*With lightweight IT you are kind of closer to the user, and you can ask the user directly. Do you save time by doing it this way or that way. So, I would say that in many cases, it will be easier to gain benefits from lightweight IT*".

However, two respondents claim it is difficult to measure benefits of heavyweight IT. This is due to the long implementation time and that large systems consist of many complex processes. This finding is backed by literature in which one of the problems of heavyweight IT is the increasing complexity and rising costs (Bygstad, 2016). Respondent 6 and 8 explains it in the following manner:

> *Well, I think that the large systems are a hindrance to extract the benefits. The large processes.*

> *With heavyweight IT there is terrible measurement of benefits (...) If you make the core-system in insurance, it is difficult to say that we have spent 200 million, and say "nope, that doesn't work. Let's try something else". Because, it takes three years to build something else and all that comes with it. So, it might be more of a sunk cost (...) So it is incredibly easy and simpler to put up a business case [of RPAS]. You know if the business case is OK the moment you are done with the project. However, you rarely know that with heavyweight.*

Conclusively, lightweight IT enables easier measurement of benefits, while the opposite goes for heavyweight IT due to the complexity of the systems.

Less formal measurement of benefits

The BM of lightweight IT does not need to be complicated or comprehensive. When asked how the respondents would like to measure satisfaction of employees or customers, respondent 6 and 11 answered that one can simply just ask. This sentiment is mirrored by respondent 7, saying: "*I think that it doesn't necessarily need to be that formal. And tedious. You can do very simple measures, at least in the start. It can be as simple as to say you will increase the customer satisfaction with a solution, then you add on some smileys in that solution if the*

customer interacts directly". The same respondent also had other examples such as using post-it notes. This is aligned with the previous notion of how benefits might be easier to measure.

Conclusively, due to the proximity of the users, BM can be conducted in an easy manner through for instance post-it notes, smileys, or by simply asking customers that are satisfied with the service.

More immediate benefits

One of the characteristics of lightweight IT is the low cost of implementation. This allows for faster and immediate benefits to be realized. Respondent 11 summarizes this the following way: "*Well, the good side of lightweight IT is that you can implement it quite fast, it is relatively reasonable in terms of investment level, and provides immediate benefits for each of the users"*. On the contrary, especially with large heavyweight IT solutions, the benefits might occur several years after the implementation, and therefore makes it more demanding to execute the BM process:

> *Often, it [lightweight IT] can be done in a relatively short time frame, because often when you have very large heavyweight projects you can say that the benefits might occur several years later. Then, no one will bother to conduct benefits management. But with lightweight projects, the benefits often occur quite quickly. Then it will be easier to conduct benefits management.*

Conclusively, more immediate benefits can be realized with lightweight IT as opposed to heavyweight IT where benefits might come years after implementation.

Utilization is easier

Utilization can play a significant role in the performance of IT solutions (Fox, 2008). If the IT solutions are under-utilized, this can hinder the capabilities the new technology was supposed to provide in the organization, and benefits will most likely not occur. With the user-centricity feature of lightweight IT, one can argue that utilization is more likely to occur because it is often easy and intuitive to use. Respondent 2 in InnoBank highlights the user-friendliness of RPAS by how it demands little time and effort in learning how to use it: "*Well, it kind of speaks for itself, where things are, kind of. (...) But it hasn't been like we have used a lot of resources to become familiar with Supervisor"*. This notion is mirrored by respondent 1 in InnoBank:

Well, I like it more and more. It gives a very nice and simple overview of the sessions. You can arrange on status and sessions etc. (…) it is easy to start and stop processes, which is much more convenient (…) So I think that many see this as a tool that is useful.

In addition, the use of lightweight IT does not require an IT background. Respondent 1 and 2 in InnoBank are non-IT specialists, and highlights that anyone can utilize and administer RPAS: *"Well, the management of this [RPAS] can actually be done by anyone. You don't need an IT background to know how the Supervisor works".* In light of this, respondent 8 highlights the importance of having the people on board if one is to realize the benefits from technology implementation: *"So if you don't have the people on your side, you won't be able to extract the benefits. That is the most important factor".*

Conclusively, utilization is easier with lightweight IT due to its user-friendliness and that it does not require an IT background. So, to avoid the risk of under-utilizing technology, one can argue that there has to exist an interest and drive from the employees to realize the potential benefits.

Can allow an agile approach

Respondent 8 is of the opinion that there exists a positive relationship between agility and lightweight IT: *"I think that lightweight IT goes hand in hand with agile".* The respondent further highlights their interpretation of agility in the context of rapidly changing environments. The respondent suggests that an agile methodology entails dealing with uncertainty in terms of not knowing the direction of where the organization is heading. That is something one gradually finds out along the way.

All of a sudden something happens, a new technology or a new regulation or something comes in from the side. Which means you have to do things differently. I mean, how will you be able to reprioritize and actually do that. And speaking of agile, it is innate the method that you don't quite know where you are going, you find out a long the way.

This type of experimentation is also confirmed as one of the characteristics of lightweight IT, as opposed to heavyweight IT which is preoccupied with systematics (Bygstad, 2016). Experimentation entails dealing with uncertainty and coping with "trial and error".

Respondent 6 confirms this, by highlighting how lightweight IT allows for "trial and error". That is to say, the risk and magnitude of failing with lightweight IT is potentially smaller than failing with heavyweight IT due to investment costs:

> *It is with many of these lightweight solutions that one can just try. It is not expensive to fail. And if you fail half of the time, I believe you do damn good business (…) I think it's about the attitude to that it's not that expensive. One can just "fail fast", it is not worse than that. But daring to fail. Try it out and fail. But failing on the core system, that is pretty expensive. I mean, it can cost you the business.*

Conclusively, if lightweight IT allows for "failing fast", this can enable organizations to evaluate benefits faster along the way, and thus adapt more quickly. Hence, agility can be seen as a positive feature in the context of conducting BM of lightweight IT.

Enables fast response to market changes

Above we argued that the agile feature of lightweight IT can enable quick evaluations as part of conducting BM. In addition, lightweight IT can enable a more agile approach by meeting external demands such as increased regulatory requirements and customer preferences more proficiently.

Several of the respondents highlight that lightweight IT can contribute to faster adaptation to market changes. Respondent 2 experiences that customer preferences are one of these external changes: "*I think that is what the consumer expects, perhaps, expecting to get faster, or quicker responses*". This sentiment is also pointed out by respondent 7: "*I also think that customers to a larger extent are more mobile than before. Which means that making a good product in itself is not good enough anymore, you have to make a good product on a platform*". Respondent 6 further highlights that responding fast to customers can be vital to win them over. Having the capacity to respond fast through lightweight IT, such as RPAS, provides evident benefits to the customers:

> *So, for instance, take a customer that applies for a loan. So, once they apply, they are treated fast so they can receive an answer immediately. If they apply for a loan at four different places, and you can save them 30 seconds, the chance of winning them over as a customer is much higher… So that obviously creates value. You get your answers*

immediately, something is running, that's good. When you are able to address things fast, you can perhaps change the whole process.

Another important external factor that was reflected in the interviews was the increase of regulatory requirements. Respondent 5 explains this in the following manner: *"The challenging thing is that the activity in the bank varies, and new things appear…new solutions, new products, new regulations"*. This is also pointed out by respondent 7: *"They [InnoBank] have gained a lot of extra capacity to do things. Follow up regulatory requirements, among them money laundering, where everyone must legitimize themselves all over again in the banks"*. Being able to comply with the regulatory requirements can be enabled through lightweight IT solutions, in this instance RPAS. Adapting to fast-changing external demands might not be as easy with heavyweight IT. Such large complex systems with interconnected processes can be difficult to modify. Respondent 8 emphasizes that lightweight IT's ability to adapt to market changes can be a benefit itself. The respondent also claims that lightweight IT in that manner might challenge BM, as change can occur in such a high pace that it is difficult to realize the benefits:

> *Regarding lightweight IT, you can actually say that it challenges benefits management, because change can occur so suddenly and so often that you might not be able to realize the benefits every time change occurs. Actually, it could perhaps be a benefit in itself, that you are able to adapt to the pace of market changes.*

Conclusively, lightweight IT can enable fast responses to changing market demands, such as customer preferences and regulatory requirements. This way, lightweight IT can enable a more agile approach to BM. Adapting quickly to market changes can be a benefit itself.

Scaling can be difficult

One of the challenges of lightweight IT is scaling, which is one of the generative mechanisms. Bygstad (2016) argues this is due to the dependency upon customized solutions to a given user base. Despite gaining immediate benefits from lightweight solutions, the poor replicability to other environments might limit the potential for realizing the benefits amass. This might lead to a scattered BM approach on different lightweight IT solutions, making it harder to justify as business cases for managers.

The disadvantage with lightweight IT is that it can be difficult to scale. A solution that works in one type of environment does not necessarily transfer well to another environment. With heavyweight IT, one can handle hundreds, thousands, or millions of users, and that can be challenging with lightweight IT.

Conclusively, the challenge with lightweight IT is scaling, which potentially makes BM more difficult.

Can be less reliable

The users of technology recognize the need to address reliability problems of new technologies (Fox, 2008). This also applies for lightweight IT, as many bugs can occur with the software, and might represent a disbenefit which can influence the BM process. Respondent 5 highlights the maintenance issues with RPAS concerning the reliability: "*The risk now is that… if Supervisor fails, is down for too long. Then everything stands still*". However, it is to be noted that InnoBank was among the first firms to implement the technology, and respondent 1 and 3 highlight that this can be one of the reasons for the issues they have had:

There isn't any downside or negative experiences around it [RPAS] actually, other than implementation issues, which you will most likely encounter anywhere you implement something new. But it's been a bit stressful with the latest update we've had until now, though. So, we have paid a bit more attention to ensure that things run smoothly.

But what we experienced though, and the reason that we have had some problems, is that we were the first to implement it.

Conclusively, it is important to take the reliability issues of lightweight IT solutions into account, as these might represent disbenefits when conducting BM.

Summary 5.1

Due to the characteristics of lightweight IT being a cheap and easy-to-use technology with proximity to the user, one can argue that conducting BM differs from heavyweight IT. Benefits might be easier to measure and realized immediately. In addition, it is easier to identify the receiver of benefits and utilize lightweight IT solutions as it does not require IT background.

The agile nature of lightweight IT enables a fast response to changing market demand. Moreover, due to the low cost, the magnitude of failing would be less in comparison to heavyweight IT. However, scaling is recognized as a challenge. This might lead to implications for developing business cases as the poor replicability to other environments limits the potential for realizing benefits amass as opposed to heavyweight IT. In addition, maintenance issues can become a disbenefit due to varying reliability.

5.2 Factors that influence BM of lightweight IT

With the assumption that BM of lightweight IT differs from heavyweight IT, we believe this comes with several implications for how BM is or can be conducted. Our data reveals that several factors are particularly important in this regard. Some findings are unique for lightweight solutions, while some are found to be important for BM of both lightweight and heavyweight IT. The factors that are presented below are identification and planning, organizational factors, practitioner-tools for BM support, and governance models for lightweight IT.

Identification and planning

Despite the fact that the Cranfield method was originally developed for BM on heavyweight IT solutions (Ward & Daniel, 2006), our respondents confirm that identifying the benefits and planning benefits realization are still important implications for successful BM of lightweight IT solutions. This seems to be regardless of whether it is a heavyweight and lightweight IT solutions that are implemented.

Identifying which benefits to extract from a new solution is emphasized by several of the respondents: *"To set goals in advance is essential. Or else you will not quite make it"*. Respondent 10 elaborates more in-depth on this by saying that one should set clear objectives and intention before implementation of a new solution. The respondent explains this in the following manner:

> *If we go back to the development process, then it is at least important to start with having clearly defined goals and to define what they will actually be. What should the benefits from this technology be, and what do we have to do throughout the process, and not to say at least when the solution is implemented, to extract those benefits.*

This relates specifically to the first step in the Cranfield Method, where identifying and structuring the benefits are important. In this step, Ward and Daniel (2006) also state the need to establish benefits ownership, and hence be responsible for the delivery of the benefits. Respondent 8, who has extensive experience of systematically conducting BM on large IT projects, mentions the importance of choosing a benefits owner. This is emphasized because it is vital to have a person responsible knowing if the desired benefits are achieved or not.

> *The benefits responsible and the benefits owner are those who should be able to tell you that the benefits are realized. Let's say you are in a program, and that program runs for a while, where you are also to start realizing the benefits. Who is it that you will ask if the benefits are extracted, and who has the responsibility and is the owner of those? Because it doesn't happen by itself, usually.*

Even though the respondent does not explicitly state that establishing benefits ownership is important for lightweight IT specifically, its importance in general is still emphasized. We therefore find it to be an important factor for BM of lightweight IT as well.

Respondent 8 further highlights the importance of clearly defining BM-related terms. One of the challenges of BM mentioned in section 2.1.3 is the lack of agreement on how to classify and measure benefits (Jenner, 2009), as the word itself has been given various definitions from different professional groups (Breese et al., 2015). The respondent confirms existing theory, that little consensus on the underlying meaning of the words creates confusion among the ones involved in the BM process. During the interview, the respondent for instance referred to the BM frameworks suggested by the Norwegian Government Agency for Financial Management (DFØ) and the Agency for public management and eGovernance (DIFI) and found it problematic that they were not "speaking the same language". Agreeing on the definitions is therefore regarded as a "key thing" for successful BM.

> *Are we speaking the same language? Clearly defining the terms is a ... key thing then. That you agree on the definitions.*

In addition, planning benefits realization is also deemed important by some respondents. This relates to step 2 in the Cranfield Method. The main purpose of step 2 is to develop a benefits

plan and a business case for investment (Ward & Daniel, 2012). Respondent 11 claims that for BM to happen, it needs to be planned and accounted for: *"But the point with benefits management is that it has to be planned. That is does not happen by itself"*. This is supported by respondent 8 who stresses the importance of understanding the methodology of BM and actually following the steps. *"I think that benefits management has a lot to do with understanding the methodology and following it. To extract it [the benefit]. And to focus on it"*.

Although the importance of planning benefits realization was emphasized during the interviews, it was mainly stressed by the consultant, respondent 8, and a professor, respondent 11, but remained unmentioned by the employees in InnoBank. The point of differentiating the respondents this way is because the characteristics of lightweight IT might help explain why the employees did not focus much on the planning aspect of BM. Implementation of new solutions like RPAS occurs faster in the business units. Due to this, the extensive planning usually recommended by consultants and scholars for heavyweight IT investments, might not be as necessary for lightweight solutions.

Conclusively, identification and planning in the Cranfield Method should still be emphasized with lightweight IT. However, extensive planning might not be as necessary for lightweight IT. Lastly, consensus on BM-related term and benefits ownership is deemed important.

Organizational factors

How and to what degree InnoBank conducts BM is found to be influenced by organizational factors like management, culture and the size of the organization. First, it became evident that management must focus more on the qualitative benefits that arise from lightweight IT solutions, and not only the quantitative benefits. An innovation-oriented culture can be enabled by lightweight IT due to the technology being cheap and easy to implement, allowing a "trial and error" approach. Lastly, the size of the organization might affect the adoption of BM. Bigger organizations will be more shaped by extensive BM processes.

Management

The role of management was a frequently discussed topic among the respondents during the interviews. Respondent 11 said that if BM was not prioritized by management, there was little belief that it would be carried out elsewhere in the organization: *"It is obvious that*

management is of relevance in regard to benefits management. Because if the manager is not interested in it and promotes it, then it will not be done".

Generally, managers explicitly want to see the results and benefits of a technology on a report and expressed in numbers (Terlizzi et al., 2017). However, respondent 6 explains that the employees are often more concerned with the functionality of the technology, which is RPA in this case. *"Management would like to see the report and that is has gone well. While the ones working with it [the technology] just want it to go well".* Respondent 6 noticed this conflict after implementing numerous RPA solutions, and recently RPAS. It was explained that since managers have so many tasks to attend to, seeing the numbers on a report is more important for them. *"And management is of course also concerned with that too, but they have so many other things to worry about. They want to see results in a report. Very concerned with that".* This raises the question of how and which benefits should be measured. If managers do not understand the qualitative benefits that arises from lightweight IT solutions like RPAS, there might arise a misconception that the tool is not worth the investment since it is not yielding the expected results in a report. Respondent 6 illustrates how this misconception might create unwanted consequences for the business:

> *Many are experiencing the benefits from it [RPA], right. At work. I mean, you have removed a lot of shitty tasks for a lot of people. So, at management level, if you follow these standard benefits management approaches, then "nah, this doesn't really make much sense". But I think that if you pull the plug and let them do the tasks they did before, then I believe there would be a lot of people quitting. But then it's too late.*

This focus on quantitative measures was found to be prominent in InnoBank as well. Their previous manager was particularly concerned with cutting costs and doing tasks as efficiently as possible. Automating what could be automated almost became a requirement: *"If it can be automated or digitalized, then it will be automated. I don't care about anything else; it will be [automated]. If it can be done on this machine, then it will be done".*

It might be possible that some automation tools benefit the employees more than management on a day-to-day basis. Automating routine-based processes makes room for more exciting tasks for the employees (Lacity & Willcocks, 2016), which in turn can make them more satisfied. However, such qualitative benefits do not necessarily equal a good business case per

se for a manager who is focusing primarily on costs or financial measures. As respondent 6 states above, not acknowledging the importance of qualitative benefits might be fatal. Respondent 1 states:

> *There has been a focus on costs. There has been a heavy focus on costs in the bank for many years. Drive the costs down, do things as efficiently as possible. And the manager then, who was the CEO at this time last year, had a huge focus on that, costs. So that in relation to management, or top management, I believe is everything. Simple as that.*

By putting more emphasis on the qualitative benefits from lightweight IT solutions, for instance more satisfied employees, this might create ripple effects like more satisfied customers. This in turn will give added value to the company, which is part of the managers' responsibility.

Conclusively, the focus managers have on qualitative benefits will determine to what degree benefits are extracted from lightweight IT solutions.

Culture

Organizational culture also is also proved to influence how BM is conducted in InnoBank. Although there has been a focus on automating tasks to cut cost in InnoBank the last years, their culture is still highly influenced by interventions that are innovation-based (Peppard et al., 2007). The employees in InnoBank for instance point out that they are not afraid of "trial and error" when it comes to implementing new technological solutions. Respondent 1 says: *"We are a small bank, there are short decision-paths. And the previous CEO said "go for it, robotizes as much as possible""*. The solutions have not always yielded the expected benefits, but not being afraid of testing new lightweight IT solutions has paid off in the long run for InnoBank.

> *So, some want to try things and such. It is with many of these lightweight solutions that one can just try. It is not expensive to fail. And if you fail half of the time, I believe you do damn good business.*

A culture that promotes "failing fast" might be easier to foster with lightweight IT solutions. This is related to the fact that the technology is cheap and fast to implement. Creating a culture

where "failing fast" is encouraged might be harder with heavyweight IT solutions as the consequences of failed investments are significantly higher. Respondent 6 explains this in the following manner:

> *I think it's about the attitude to that it's not that expensive. One can just "fail fast", it's not worse than that. But daring to fail. Try it out and fail. But failing on the core system, that is pretty expensive. I mean, it can cost you the business. But if you fail on deciding to have RPA or not to have RPA, try and do an evaluation.*

Conclusively, lightweight IT enables innovation-based culture where the magnitude of failing is small due to the low cost of implementation. Therefore, to what degree you extract the value of lightweight IT solutions is culture dependent.

Size of organization

How big or small the organization is, also influences how BM is conducted. One respondent is of the opinion that bigger organizations often have to undertake more extensive processes in regard to meetings, documentation and measuring of benefits. The bigger the organization, the more complex the processes become. In smaller organizations, however, it is likely that BM becomes easier as the processes are smaller, and less people are involved. Respondent 11 elaborates on this:

> *It is demanding to do benefits management in large organizations because one suddenly gets so many extra processes from it; you must have meetings and documents and documentation and measuring. All of this is tedious in a large organization. In smaller organizations, then it's probably easier to conduct benefits management, at the same time, smaller organizations are also more shaped by individuals and less defined processes.*

The size of the organization also affects the need to control which new IT solutions are implemented and not. This makes is difficult to do "trial and error" with new lightweight IT solutions, as mentioned under culture. Strict budgets and need for control are found to be a hindrance for adopting new technology:

[Large organizations] hinder digitalization, really. To take in new technology (...). Ehm, I think that if you have a traditional budgeting processes then you are bad at taking in new technology (...) It is especially big companies who have a complex organization, because they need control.

InnoBank acknowledges the advantage of being a small bank in regard to implementing lightweight IT solutions. Respondent 3 says this allows them to implement new IT technology rather quickly and compares InnoBank to a larger bank in Norway who might need several years to implement small IT solutions. *"(...) as a small bank like we are, then we are early out with a lot of things. We have the possibility, we don't have it like a larger bank for instance, who has... 30 different banks across the country who has to agree to start using a solution, where it will take several years to implement a small thing".* Respondent 3 continues to explain that being small allows them to work closely with their manager and have informal discussions about new and interesting IT solutions. A week later, the manager might have the respondent work on that new solution.

Our department is so small, such a small firm that ... it is easy to come up with ... When your boss sits right next to you, kind of, then you can just say "hey, have you seen this?". And "yeah, that was interesting". And then he might say to me the next week "you can start to work on... changing out the system with this". Then... only with a random comment the week before, then you all of the sudden are working with it the week after, and a month later I've changed it out. Well, depending on how big the project is.

Conclusively, being a small bank allows for fast implementation of lightweight IT solutions due to a flat hierarchical structure. Additionally, BM becomes less complex in smaller organizations.

Practitioner-tools for BM support

The findings presented in this section shows that documentation and data analysis are important presumptions for conducting BM on lightweight IT. Documentation in terms of SLA reports, recordings and activity dashboards from RPAS enables visualization of benefits by bringing awareness and predictability for employees, discovering important trends and reducing reliability issues. Data analysis through documentation helps identify areas for future

improvement and better prioritization of goals. Thus, it can enable better decision-making and unleash potential benefits.

Documentation

RPAS, as an example of lightweight IT, enables easy access to data through its user-centered feature. One of our findings show that the reports provided by RPAS for instance enables an awareness of the number of tasks executed as respondent 7 explains: "*[RPAS] logs in a larger degree what one is doing, which provides more awareness or right numbers on how much one is doing of the right tasks*". When asked about how and to what degree the RPAS reports are important to visualize benefits, the respondent highlights that the reports are used to calculate savings of full-time equivalents (FTE) and other measures that contribute to valuable insight when looking into new processes:

> *They have been used quite a lot [to see the benefits of RPAS]. Without them we would not be able to say anything about the license capacity. They are important when calculating how many full-time equivalents they think they save during a year. They provide quite valuable insights when looking at new processes.*

With this, the respondent elaborates on how RPAS can help uncover important patterns that can be used for decision making. The respondent also highlights that the documentation RPAS provides clearly contributes to added benefits, and that the most dangerous thing to do is not include documentation at all:

> *Are there times during the day where there is very much free capacity? If so, those kinds of jobs that are smart to run then, will be smart to focus on. So yes, they definitively provide a benefit.*

> *(...) so one way or another, you can go back to some sort of history (...) That gives you a trend which you can say something about. So, the most dangerous thing you do is not taking notes anywhere or document in any kind of way what has happened.*

Identification of patterns is related to the importance of recording historical data. This is also mentioned by respondent 2, who explains the advantage of examining these patterns in light of the previous years: "*Or that you can compare with last year, for instance. Then you might*

see some patterns. Okay, at this time of the year, then there is especially much to do". The importance of comparison is also pointed out by respondent 9, emphasizing that comparison is the basis for measuring benefits: *"we have to establish that in advance really, if we are to say how much time we are saving, then we need to know how long it takes in the first place"*. This relates to the concept of "baseline value" (DFØ, 2014), as referred to in section 2.1.5.1. Literature states the importance of collecting current performance data to provide a baseline for future comparison, with the purpose of measuring the magnitude of the intended benefit. Hence, this makes it possible to identify areas for future improvement and allows for documentation of the realized benefits.

Respondent 2 highlights the importance of the awareness that the RPAS reports provide. The visualization enables InnoBank to be aware of the workload that lies ahead of them, and this predictability can be viewed as a benefit for the employees. Thorough and efficient documentation might therefore lead to increased awareness of the benefits that occur, and helps to explicitly value the contribution of lightweight IT.

> *Because then we, who sit and review these [reports] see that "wow, now we have had a week with many loan applications. Okay, that means that we will have a lot to do next week", for instance. And one can benefit from that (…).*

Existing BM literature claims that justification of investments are often highly dependent on financial documents. This creates a risk of underestimating many projects as one fails to acknowledge important qualitative benefits that can be hard to express in quantitative terms (Ward & Daniel, 2006). However, lightweight IT enables a more effortlessly visualization of several types of benefits through documentation and also making it easier to justify such type of investments. It does this by bringing awareness of value enhancement rather than cost-cutting and efficiency. This is explained by respondent 7 on how RPAS contributes to create curiosity, such as identifying areas of improvement for the organization:

> *The Supervisor has that role of tracking and visualizing the data (…). This can trigger a curiosity when "okay, we saved this much on this process, what do we actually get from this? Or how many new customers do we get? Did we manage to reduce our staff with the same number of customers, or why did we not?". So just being able to make such data available is hopefully going to trigger some curiosity.*

Respondent 3 and 4 from the IT department also highlight the importance of documentation. It can contribute to reduce reliability issues that often occur with lightweight IT, such as maintenance issues and bugs. These are potential disbenefits as mentioned in section 5.1.

> *What is important for me in the IT department is documentation (...). I have worked many years with things that have not been documented and I think that it's the worst, because then you have nothing to work with if there is something wrong.*

> *It [RPAS] was pretty unpredictable, though…*

Conclusively, thorough and efficient documentation leads to increased awareness of the benefits that occur, and helps to explicitly value the contribution of lightweight IT.

Data analysis

Utilization of data is especially important in step 4 in the Cranfield Method. Data analysis induces future possibilities and improvement by identifying the opportunities based on data insight and increased knowledge. It is an important consideration for BM of lightweight IT as it might initiate change that can strengthen the overall business.

Respondent 11 highlights that the lack of data analysis utilization can be a barrier for realizing potential benefits: *"There is not created a lot of information for making decisions … data from [IT] solutions are not used a whole lot in Analytics and such. That makes it hard to realize benefits"*. This poses challenges for conducting BM in terms of measurement, evaluation and possibilities for future improvement. By making sense of data, one will be able to identify potential benefits and areas that need to be revised. This is important for decision-making as with documentation, and to determine profitable business areas that can initiate enhanced value creation. Respondent 7 puts forward the following challenge:

> *I think it's never too late to start gathering those data. The longer you wait, the worse it gets. So basic data analysis from aggregated customer data, which is not related to a specific product, but which rather defines a customer and the customers' life cycle. Many will benefit from this when they are to look at the profitability, both for the business, and how they should be automated.*

With data insight, it can be easier to prioritize goals and activities that contribute to enhanced value creation. The following respondent talks about a worst-case scenario in the absence of such insight, which can result in disbenefits. For instance, by not conducting data analysis, one risks putting a lot of effort in customers that do not generate income to the firm instead of concentrating on the customers that do matter. This implies that data analysis from lightweight IT might be an important presumption for conducting BM to avoid disbenefits.

Worst-case is that you prioritize to develop a lot of good apps and automate processes for the most challenging customers who costs you the most money to stay, while the ones you actually make money off of, has zero need for this and don't really care (...) So you end up throwing away a lot of money on the ones you don't really want, and give zero value to the ones you do want.

Conclusively, data analysis is important because it enables organizations to understand why benefits were achieved or not, enables better decision-making, and provides lessons for future improvements.

Type of governance model for lightweight IT

Which governance model for lightweight IT an organization follows was found to have implications for how it conducts BM. The four governance models presented in section 2.2.3 explains the relationship between lightweight and heavyweight IT. Several respondents stated that how integrated lightweight and heavyweight IT solutions are, is likely to determine the degree of BM in an organization. Respondent 8 explains that it needs to be clear for the business units to what degree they may implement new lightweight IT solutions without it interfering with the underlying heavyweight systems. *"It [the relationship between heavyweight and lightweight IT] matters for being able to extract the benefits. That is, how to organize the governance models and how aware you are about that".*

Respondent 10 believes governance models for lightweight IT have implications for BM. The respondent emphasized that "resourcing" (section 2.2.3) was an especially good point of departure for BM. Resourcing can for instance be to what degree the business units get support and help to realize the intended benefits from an investment. Such support can be a help desk

or educating employees. The respondent explains the governance model framework in light of BM in the following manner:

> *It was divided into "securing" and "resourcing". And that is a pretty good point of departure for benefits management. Especially "resourcing". I can't remember all the details in this, but resourcing can for instance be financial support in a project, but also all the way until the benefits are realized. It can be support regarding competences, it can be support with help desk or superusers or whatever. Preferably the ones who are to use the tool.*

Respondent 8 further talks about how the IT-department can find it challenging that new lightweight solutions are implemented in the business units without their involvement. This is primarily due to data quality and security. In the interview he referred to the concept of "shadow IT", as we in section 2.2.3 explained was the IT department being hesitant to the new wave of user-driven IT solutions (Goyöery et al., 2015). Thus, there needs to be a clear understanding of how to solve this problem, or else the IT-department will put constraints on to what degree lightweight solutions can be implemented. Respondent 8 explains the problem of shadow IT:

> *To be aware, kind of, in which "sand box" you can play within, without destroying what the IT department has going on. Not compromising on data quality and security, especially security.*

> *Lightweight IT in itself might be scary for the IT department. And with citizen development or shadow IT. Things are happening (...) again, related to security "we are not included". Being aware on how to solve this. How much should the business units be allowed to do - do they have their own "sand box and playground", without it ruining or compromising the infrastructure...*

How the IT department and the business units work together brought the topic over to Gartner's concept of bimodal IT. The relationship between these departments poses both advantages and challenges for conducting BM. One challenge relates to the need for involving more people when BM is conducted in both the business units and the IT department. Another is the fact that the lightweight and heavyweight IT environments are so different that it makes

collaboration difficult. However, several respondents express that collaboration is required to realize the intended benefits from the new solutions.

> *I think the fact that you have to do it [BM] of both heavyweight and lightweight IT, it makes benefits management demanding in one way, since there is a need to involve so many people.*

> *When you have combinations of both heavyweight and lightweight solutions, it is likely that benefits management becomes more challenging. The reason for this is that the heavyweight environment is completely different from the lightweight environment, while the [realization of] benefits requires a good relationship between the two.*

Respondent 11 is of the opinion that BM can be conducted in a bimodal model as long as it is part of the project: *"One can probably say that the bimodal model allows for planned benefits realization and I think that is if it's made part of the project"*. This is emphasized at several points during the interview. *"What I am trying to say is that if benefits management is made part of the project, then it can easily be conducted in a bimodal environment"*. By making it part of a project, one must ensure that BM is taken into account and planned for in both the IT department and the business unit. Or else, BM will be challenging: *"If one has a bimodal IT model, then benefits management must happen at both the heavyweight and the lightweight side. I believe that is quite challenging because it requires that one has a project where one can conduct benefits management both places"*.

The advantage with a bimodal model is that both departments can benefit from each other. *"I believe one can get much bigger value from the relationship between heavyweight and lightweight, that they acknowledge each other; which possibilities and limitations it has, right"*. This will allow for local innovation in the business units while the IT department can still meet their security concerns and provide support when needed: *"Yes, it can be a model where you combine local innovation with resourcing and securing from a central unit"*.

Further, the lassiez-faire model is mentioned by respondent 11. In this model, as business units are left to themselves and can implement lightweight solutions as they see fit, this promotes innovation and enable new technology. *"It is something that promotes innovation, that no one has to get involved or care, or hinder the local unit to implement technology or innovate to*

get places". According to this respondent, the lassiez-faire model is the easiest to conduct BM with, since it is almost entirely independent from the IT-department. *"Seen from a benefits management view, then a lassiez-faire model is the easiest. Because there you don't have any heavyweight IT. So, there you will only look at the lightweight solutions and see if they are necessary or not"*.

As the business units mostly operate alone, the lassiez-faire model also poses a challenge for BM. The business units usually lack the support needed to execute BM as they are often left to themselves without the competencies needed to realize the intended benefits from the investment:

> *If the firm chooses a lassiez-faire model, then the units are very much left to themselves. And that is a challenge with that model (...) This model is also vulnerable at the same time, especially in relation to benefits management, because it can mean that the local unit does not have special competencies or understands the concept of benefits management. And they could use some specialized support, for what methods and frameworks to use, or financial ... Whatever it might be...*

If the organization has a central control model, where the IT department has full control over the solutions that are implemented, BM of lightweight IT becomes challenging. However, BM of heavyweight solutions can follow the traditional BM approach that is well established in literature, without taking lightweight IT into consideration. This is because only heavyweight solutions are present.

> *If you have the monopoly [central control] model, then benefits management is also easy because then lightweight IT is forbidden. In central control, then there is only big solutions what work, so if one wants to conduct benefits management then it is relatively clear how it should be done.*

Lastly, respondent 11 addressed during the interview how the platform model fits with the BM framework for lightweight IT. This model enables little collaboration between heavyweight and lightweight IT, as the heavyweight side mostly provides the underlying database. He explains that the benefits therefore arise from the lightweight solutions, while the heavyweight side primarily generates costs: *"Then one often gets the benefits on the lightweight side and*

only costs on the heavyweight side". With this, the platform model might be harder to conduct BM on, as the lightweight solutions are loosely coupled. Therefore, it is reasonable to believe that it is difficult to realize the benefits.

> *If one looks at this platform model, then it is not a model where it is easy to conduct benefits management. This is because there is a platform core and you could say that the lightweight IT solutions are rather loosely coupled from each other.*
>
> *And with this platform model, then I believe benefits management mainly will happen at the lightweight side because in a platform model there is really little collaboration between the lightweight and heavyweight side. The heavyweight side mainly works as a database you use.*

Conclusively, a laissez-faire model seems to be the easiest as there is no intervention from heavyweight solutions. If bimodal models prioritize BM to be part of project management, this might be a good governance model to follow. The central control model keeps a firm hand on lightweight solutions, which makes it harder to realize the full benefits of such IT. The platform model will mainly conduct BM on the lightweight solutions, as the underlying platform core mainly generates costs.

Summary 5.2

The most important factors that influence conducting BM on lightweight IT are identification and planning, organizational factors, practitioner-tools for BM support, and governance models for lightweight IT. Regarding identification and planning, it is found that extensive planning might not be as necessary for lightweight IT, and that consensus on BM-related terms and benefits ownership are important. Concerning organizational factors, to what degree benefits are extracted from lightweight IT solutions are dependent on management and culture. Further, BM of lightweight IT becomes less complex in smaller organizations. Thorough and efficient documentation and data analysis is important because it enables organizations to understand why benefits are achieved or not, enables better decision-making, and provides lessons for future improvements. Lastly, which governance model for lightweight IT the organization follows influence how BM is conducted on lightweight IT.

5.3 Factors that need more attention in BM of lightweight IT

The previous section presented the factors that influence BM of lightweight IT solutions. These were factors that our respondents seemed to follow or have implemented already. However, our data also reveals some factors that need more attention in regard to BM of lightweight IT to be able to extract the full benefits from a lightweight solution like RPAS. Our findings show that organizations must not only see lightweight solutions as a tool to improve efficiency, but rather as a tool that can change work practices for the better. Thus, the following chapter addresses the topics; end-to-end thinking, value creation, and qualitative benefits.

End-to-end thinking

The consultants and researchers we interviewed agree that there lacks a focus on how lightweight IT can enable end-to-end thinking. Traditionally among businesses, the focus is put on how a single part of the process can be automated. This limits the benefits that can be extracted from a lightweight IT solution. However, respondent 10 claims that the focus should rather be on how the entire process can be improved.

> *Many people think that we get a new tool at hand. "Okay, so to be able to realize the benefits, we must at least learn to use these tools". But few think that this tool, when we get it up and running, can lead to other ways of working, in total. Let's call it the process. That we can organize the process a different way.*

The respondent explains how the potential of new technology can be overlooked: *"one often only see technology as a new tool for the employees, but not as a tool or opportunity to change how the work is carried out".* The emphasis should therefore be on the importance of process management and end-to-end thinking. Respondent 5 states that one has to get past the point of only automating a task the way it is carried out today, and rather look for ways to work better and more efficient. *"We need to get beyond the point of simply automating [tasks]. How can we work in a better way and in a more efficient way".* To overcome this, planning and analysis of work processes affected by the new IT solution is required:

I mean, not only give the tool to someone, but that the organization has thought it through, "Okay, we have made an RPA-solution, we had a goal, an intent of what this RPA-solution would do", but that they rather think of it as "what does this mean for the process that is affected".

Undertaking such end-to-end thinking can be regarded as what respondent 8 refers to as "digital transformation". This highlights that holistic thinking is lacking. He explains how one should not implement a new application without identifying what the benefits are needed for and plan how to realize these benefits. This relates back to the steps of identification and planning elaborated on in section 5.1. The respondent states that users of new lightweight solutions should ask themselves why they need it and have a plan for what they will do with the benefit, for instance the time they have saved.

And digital transformation, which is a new area for us, is part of that end-to-end thinking, I guess. To be part of it and through that be allowed to talk with customers and advise them, get them to recognize that holistic thinking, not that we just come in and implement a chatbot or develop an RPA solution or application without thinking of how it should be applied or why you should realize that benefit. Why do you want it? Then they can figure out what they want to do with all the saved time etc., but they ought to have a plan for it. So...That holistic thinking is much of what is lacking.

Conclusively, end-to-end thinking is important for extracting the full value of lightweight IT solutions. A holistic view on processes thus needs more attention. Technology should be regarded as a way to change work practices for the better, and not just as a tool to automate a process.

Value creation

Related to the point that organizations need to redefine how tasks are carried out when automating processes, they should also look for the added benefits that lightweight IT solutions can provide. With such, it can contribute to focus on added value such as increased customer and employee satisfaction, instead of savings and cost-cutting. RPAS has for instance enabled InnoBank to respond quicker to customers' needs, and also provide better satisfaction among the employees. Respondent 4 highlights this:

I think many just automate what they have. And then they say "we have saved this much". They don't ask "what do we earn?". And that is what we focus on with the customers of Supervisor (…) Since we can deal with things much faster.

The respondent further elaborates that lightweight IT can enable more benefits if the focus is shifted to improving every aspect of the work: *"So, I think there is much more to gain on lightweight stuff if you focus on becoming better in everything you do".*

This brings attention to what kind of benefit the lightweight solution contributes with, which can be either "increasing the upside" or "reducing the downside". This shows that it is not only about changing the process itself or how to carry out the different activities. Respondent 6 explains for instance that cost-saving is the minor part of the benefits as opposed to increased satisfaction among employees and customers: *"The savings are the minor part of the benefit. I mean, the increased satisfaction internally and externally is much larger. Some get increased value directly by gaining more customers just because of this".*

Among several benefits from RPAS, there is a general agreement that they now have increased their capacity in the RPA CoE. As a consequence of utilizing lightweight IT solutions, resources can be allocated in a better way, which in turn ensures that additional value-adding tasks can be carried out. For instance, respondent 2 explains how RPAS freed up capacity to do more important tasks: *"I mean, obviously we can relieve a department, or that a department has increased their capacity for example… Then they get the time to do other types of tasks, which can be more important".* Taking all this into account, it seems that lightweight IT with its easy-to-use features and cheap technology, releases more capacity and can enable organizations to rethink how they create value.

The following respondent highlights the challenge with the traditional investment appraisal methods, where managers often require a good business case in terms of positive ROI, NPV and other financial documents. The respondent has the impression that innovation projects often aim to explore new opportunities, and therefore might be omitted if managers evaluate them on the basis of the traditional appraisal methods. For instance, innovation projects are omitted often as they tend to have negative ROI or NPV. This has implications for BM of lightweight IT as it will not take into account the potential benefits that might come with innovation projects, in which lightweight IT can be a part of.

It is possible that within the world of innovation, where trying out new things has its own value – then perhaps this [benefits management] is not quite valid (...) because innovation projects don't often have a positive business case. I mean, the benefit, what is the benefit with that? Well, it is to explore something. I mean, it is not as traditional, then... regarding a project which is a result of a specific demand and you know where you are going, or at least which area. Most... don't want to initiate a project with a very negative net present value.

Conclusively, lightweight IT brings attention to what kind of value the lightweight IT contributes with. This can be either "increasing the upside" or "reducing the downside".

Qualitative benefits

In light of the findings above on value enhancement and management in section 5.2, it is emphasized that a focus on qualitative measures is lacking. It became evident that there needs to be more focus on the qualitative benefits, and not only judge a business case on NPV and ROI. Respondent 4 confirms this by saying: "*The soft benefits. There is too little focus on them*". He continues to explain how it is important to ask if for instance the workday has become better after the implementation of a new lightweight IT tool (in this case RPAS) or if there are less angry customers. With this, is there perhaps "*more focus on the soft values and value creation, meaning, has it provided other opportunities?*".

This brings us to the challenges of measuring the benefits. Often, this is harder with qualitative benefits than with quantitative. Respondent 9 expresses this: "*Just like the soft benefits. They are difficult to measure quantitively. It's challenging*". Respondent 10 believes it is hard to measure these qualitative benefits because one for instance has to quantify "*how much a human life is worth*".

The reason qualitative benefits are challenging is because "the someone who needs to report on how much one saved" wishes to convert qualitative to quantitative, then you are talking about how much a life is worth.

In the extension of this, the reason benefits can be hard to measure might be explained by several factors. Three challenges became particularly prominent during our interviews; that

benefits are difficult to realize, difficult to locate and that it is difficult to get a business case approved. These will be presented in the following.

The first challenge is that the respondents find it difficult to visualize the benefits they experience from RPAS. If the employees do not see the benefits realized from a solution, it becomes challenging to know they exist. This in turn leaves a lot of benefits to be unrealized and never accounted for. Respondent 8 explains this in the following manner: *"I think that there is a lot of unrealized benefits, spread all over the place. A lot of potential is identified. But managing to extract those values in the business or for users, that is very difficult"*. Respondent 11 also provided an example on how for instance better quality information to employees is a benefit. However, showing this with quantitative measures might not be as easy. "*Well, you can say that better quality information to employees is also a benefit. But exactly how it should be realized in quantitative terms is not as easy"*.

The second challenge is being able to locate where the benefits arise, and who the benefits owner is. The benefits from the lightweight IT solution that is implemented in the organization might occur in another department internally or customers externally. Respondent 11 says: "*Well, I think part of the challenge is that benefits often are extracted at a different place than where the investment is placed"*.

The last challenge is that getting a business case approved by managers might be difficult. This is because it is hard to quantify a qualitative benefit. As NPV traditionally has been used as an indicator for assessing the profitability for a business case, those with more qualitative benefits are deemed as less valuable. This is supported by Terlizzi et al. (2017)'s finding that only the IT business cases with the highest NPV are considered to be implemented. Respondent 7 has experienced this with several clients when working as a consultant: "*We have visited customers where you can't do anything before you in one way or another can showcase that there for instance is a financial type of benefit. Or quantify a qualitative benefit. It's like, we have to show this first, and then we can start doing something"*.

Despite the complexity of measuring, visualizing, and locating the qualitative benefits, it is evident that the value of lightweight solutions might be much larger if one finds a way to measure them. This leads back to the implication that many benefits exist, but remain

unrealized as they are not being measured, also backed by literature (Terlizzi et al., 2017). Respondent 8 highlights this complexity:

I think that the qualitative benefits are perhaps more comprehensive, while the quantitative ones are converted to money. And are easier to measure. However, the value might be larger with the qualitative benefits if one could only agree on how to measure the changes, though.

The following quote expressed by respondent 5 illustrates the unrealized benefits of RPAS: "*Before we got Supervisor, then... they [the RPA-controllers] had to fix something every day and in weekends. Something to stop. But with Supervisor, it all disappeared. So, they have a better every-day life, with Supervisor*". As it is found difficult to measure qualitative benefits, a list of the qualitative and quantitative benefits from RPAS is listed in Appendix 4. This is to raise awareness of the different types of qualitative benefits that can arise from a lightweight IT solution.

Conclusively, even though quantitative benefits are more appreciated in traditional investment appraisal methods, the value of the qualitative benefits might be larger. However, qualitative benefits are difficult to monetize and quantify. Hence, when overlooked in traditional investment appraisal methods many potential benefits remain unrealized.

Summary 5.3
First of all, end-to-end thinking is important for extracting the full value of lightweight IT solutions. Technology should be regarded as a way to change work practices for the better, and not just as a tool to automate a process. Lightweight IT can bring attention to what kind of value the lightweight solution contributes with, either by "increasing the upside" or "reducing the downside". Lastly, the value of qualitative benefits might be larger than what is typically accounted for in traditional investment appraisal methods, leading to unrealized benefits.

5.4 Summary of findings

Our empirical findings are summarized in Figure 8 as shown below.

Section	#	Finding
5.1	**How BM of lightweight IT differs from BM of heavyweight IT**	
	1	Easier to identify the benefits receiver with lightweight IT
	2	Easier to measure the benefits of lightweight IT
	3	BM of lightweight IT can be less formal
	4	Lightweight can provide more immediate benefits
	5	Utilization of lightweight IT is easier due to user-centricity
	6	Lightweight IT can enable an agile approach
	7	Lightweight IT can enable faster response to rapidly changing environments
	8	Scaling of lightweight IT can be difficult
	9	Lightweight IT can be less reliable
5.2	**Factors that influence BM of lightweight IT**	
	10	Identification and planning is still important
	11	Consensus on BM-related terms is still important
	12	Benefits ownership is still important
	13	Management's focus on qualitative benefits determines to what degree benefits are extracted
	14	Culture influences to what degree organizations extract value of lightweight IT
	15	Organizational size influences to what degree BM of lightweight IT is conducted
	16	Documentation enables increased awareness of benefits that occur
	17	Data analysis utilization provides better decision-making and lessons for future improvement
	18	Type of governance model of lightweight IT influences how easy or hard it is to conduct BM
5.3	**Factors that need more attention in BM of lightweight IT**	
	19	End-to-end thinking is important for extracting the full value of lightweight IT
	20	Lightweight IT brings attention to value creation
	21	Qualitative benefits are difficult to quantify, but the value is potentially larger

Figure 8: A summary of the empirical findings.

6. Discussion

Through our case study of RPAS in InnoBank our empirical findings show that (1) BM of lightweight IT differs from heavyweight IT, (2) several factors play a significant role in conducting BM of lightweight IT, and (3) factors that need more attention in BM of lightweight IT. We find it important to address these factors as they enable us to answer if there is a need for a new BM framework. In the following we answer our research question *"What are the implications of lightweight IT on benefits management?"* in light of our empirical findings. This is in relation to the existing literature on BM and lightweight IT.

In section 6.1 we first discuss if there is a need for a new framework for BM with the emergence of lightweight IT solutions. To answer this, the Cranfield method is our point of departure, comparing each of the five steps in the Cranfield method against our empirical findings. In section 6.2 we discuss which implications lightweight IT has on BM. This allows us to conclude on our main research question. We draw our conclusions on what these implications are in light of the factors we found to influence how BM of lightweight IT is conducted. Lastly, in 6.3 we discuss whether a revised framework for lightweight IT might increase the adoption rate of BM. Despite not being part of our research question, we find it to be an interesting contribution to the topic of how to deal with the low adoption rate of BM.

6.1 Is there a need for a new BM framework for lightweight IT solutions?

Our analysis shows how BM of lightweight IT differs from BM of heavyweight IT in several ways. These differences are our point of departure to discuss whether a new framework is needed or not. However, our empirical findings indicate that the Cranfield method is still relevant for BM of lightweight IT. Despite the fact that the framework was originally developed for BM of heavyweight IT solutions (Ward & Daniels, 2006), our respondents confirm that the first two steps, identifying the benefits and planning benefits realization, are still important for successful BM of lightweight IT. This seems to be regardless whether heavyweight or lightweight IT solutions are implemented. More specifically, it is still essential for both lightweight and heavyweight IT to establish clear goals, determine who should be responsible for the benefits delivery, and a mutual agreement of BM concepts to avoid misunderstandings. This is in accordance with existing BM literature (Ward & Daniel, 2006;

Terlizzi et al., 2017). We also discuss if the last three steps in the Cranfield method should be carried out differently.

Step 1 and 2: Identification and planning

One of the aspects of the first step of identification is to determine whether the benefits can be measured to prove they occurred (Ward & Daniel, 2006). This is related to another aspect of identification, which is to establish a business case to decide whether or not to proceed with the IT investment (Ward & Daniel, 2006). The literature particularly emphasizes the traditional investment appraisal methods for justifying business cases on IT solutions, focusing on quantitative measures like ROI and NPV (Terlizzi et al., 2017; Ward et al., 1996). Our findings show that reasons for this might be that managers tend to focus more on quantitative measures that can be reported, as they are easier to measure, to prove the value of, and thus favored as a means of justification on investments.

Step 1 does, however, not take into account the potential value added from qualitative benefits. Our case study of InnoBank proved to have many benefits from RPAS, such as increased capacity to do more rewarding work, reduced RPA maintenance, and enhanced employee satisfaction (see Appendix 4). Hence, RPAS is regarded as successful by the respondents in InnoBank. However, the qualitative benefits are difficult to prove occurred in financial measures and remain as potential but unrealized benefits. Thus, the implication is the fact that they are satisfied with RPAS despite not proving that the qualitative benefits occurred. This contradicts existing BM methodology as one typically regards an IT solution as successful when it proves high ROI and NPV. This is also backed by Hesselmann and Mohan (2014) who argue that the majority of BM literature tends to focus on methodological aspects such as tools and "how to" guides, and less on other humanistic perspectives like employee needs. Our empirical findings show that despite the complexity of measuring benefits, the magnitude of added value could be much larger with qualitative benefits than with quantitative benefits. However, one should be aware that the challenge of measuring qualitative benefits will still be present with lightweight IT. This is also confirmed by several authors in BM literature (Ward & Daniel, 2006; Terlizzi et al., 2017; Hesselmann and Mohan, 2014).

The first proposition is therefore to encourage that step 1 should put more emphasis on the value of qualitative benefits. Although identifying and structuring the benefits from lightweight IT solutions are important, qualitative benefits of the investment should have more

significance, taking into consideration the added value in a human perspective, which is also requested from Hesselmann and Mohan (2014) in BM literature.

Related to the proposition above, the investment cost of heavyweight IT solutions is often much higher than of lightweight solutions, which naturally makes it more important for managers to see that the investment is yielding the expected benefits. Hence, acquiring such systems calls for extensive planning and consideration. This is, however, not the fact with lightweight solutions. Systems like RPAS are cheaper to acquire and takes less time to implement. This allows for an experimental approach, being one of the characteristics of lightweight IT (Bygstad, 2016) and is supported by our finding that lightweight IT is closely associated with agility. We find that an experimental and agile approach entails dealing with uncertainty and coping with "trial and error". This favors less extensive planning. With the low implementation cost, the magnitude of failing with lightweight IT is smaller than with heavyweight IT. An interesting note to this, is some of the findings from the case studies of Terlizzi et al. (2017) on the adoption of BM. One of the companies only followed the BM procedure if the investment cost exceeded more than $100 000. If this is the case for many companies, it questions if the traditional BM methodology is "not worth" carrying out otherwise. Despite this, our findings emphasize that it is still important to plan ahead of the lightweight IT investment.

The second proposition is therefore that planning still remains an important step in the Cranfield method, but needs less attention. As lightweight IT often has a low investment cost and can be implemented relatively fast, it can enable an agile and experimental approach to BM. Therefore, the extensive planning stated in existing BM literature might not be as necessary for lightweight IT solutions.

Step 3, 4 and 5: Execution, review and further potential

The Cranfield method entails step (3) executing the BM plan, (4) reviewing and evaluating the benefits achieved from the IT investment, and (5) using this for establishing potential for further improvement (Ward & Daniel, 2006). It is important to note that these steps are iterative. As with any plan, the next stage after planning is to carry it out and adjust it as necessary. However, a critique to traditional BM is that many companies experience the process as slow, complex and bureaucratic, making it difficult to execute (Turner & Ledwith, 2016). Moreover, Terlizzi et al. (2017) highlights that companies find it difficult to adopt BM

in agile projects. The lightweight characteristics also apply to this stage, facilitating a more agile BM with faster and more frequent iterations. This in turn enables faster organizational learnings, allowing for more frequent reviews to see if the benefits have occurred or not, and identifying business areas to improve. The risk of failing is also smaller in comparison with heavyweight IT due to low implementation costs.

Our findings show that documentation and data analysis are important presumptions for conducting BM on lightweight IT. We believe these are important for step 4 and 5 specifically, but they are not taken into account in the Cranfield method. Existing BM literature puts a different emphasis on documentation than what we found was relevant for lightweight IT. In accordance to literature, documentation includes "the benefits plan; any project or system quality review report and a summary of key decisions during project implementation" (Ward & Daniel, 2012, p. 221). Although we acknowledge this is important, documentation here is regarded as physical documents. Additionally, reviews are structured meetings with relevant stakeholders. Our findings bring a new meaning to documentation, supported by the use of data analysis, which are the activities recorded by lightweight IT. For instance, RPAS reports provide important information to RPA controllers, enabling valuable insight when looking into new processes, and provides predictability about the upcoming workload. This in turn can be significant to decision-making. In addition, these tools help uncover unexpected benefits, which is also an important aspect of step 4. It is equally important to consider what kind of further improvement is available in step 5 and use increased knowledge to identify new opportunities. With this, data analysis comes in handy, assisting in identifying areas for future improvement. Additionally, understanding the bigger picture and end-to-end thinking will be important. Thinking ahead and trying to foresee how implementing a new lightweight IT solution might create other opportunities for the business, will enable more benefits to be realized.

The third proposition is to emphasize the use of documentation and reports in terms of data analysis when conducting BM in step 4 and 5. We regard these as important because proper utilization enables organizations to understand why and how benefits were achieved or not. It provides lessons for future improvements in a simpler way than what is stated in existing literature. We further suggest emphasizing a holistic end-to-end thinking, and not only see the technology as a way to automate single processes.

We started this section by stating the importance of the Cranfield method. However, it became evident that employees in InnoBank did not embrace these steps as extensive as some of the BM literature claims it should be. This is a challenge pointed out by Tallon and Kraemer (2007) who found that measurement of benefits of IT projects are often based on perceptions rather than formalized processes. Little formality is applied in the BM process, and that one of the main barriers for the lack of such formal methodologies is bureaucracy (Lin & Pervan, 2003). In light of the increasing complexity of heavyweight IT solutions (Bygstad, 2016), formal BM methodologies might be harder to incorporate. However, our empirical findings show that BM methodologies do not necessarily need to be as complex with lightweight IT. With close interaction of customers, one can easily ask them directly, or simply track the process informally with post-its, as suggested by our respondents. Love et al. (2005) confirm this and suggest that another useful practice can be to use a checklist during the evaluation to ensure that most benefits are accounted for.

Despite that our findings show that BM of lightweight IT differs from BM of heavyweight IT, the Cranfield method as an example of BM methodology is still important. Making a new framework might make the gap of BM practices even bigger. We therefore argue that there is no need for a new BM framework for lightweight IT solutions. However, we believe that lightweight IT calls for a different emphasis in each step.

6.2 Implications of lightweight IT on BM

To be able to answer our research question *"What are the implications of lightweight IT on benefits management?"*, we first identified if there is a need for a new BM framework for lightweight IT. As concluded in the last section, creating another framework for BM will not be necessary with the emergence of lightweight IT, but how the five steps in the Cranfield method are carried out should be emphasized differently. Based on that, we further discuss how the changed emphasis is related to the different factors that we uncovered in our empirical analysis. Different organizational factors and governance models are either drivers or hindrances for BM, and practitioner-oriented tools can support the BM process. Thus, these represent implications, and are factors that are likely to either influence how or to what degree BM of lightweight IT is carried out.

Implication 1: End-to-end thinking and process management leads to increased value

We first discuss the findings related to factors that need more attention. These are the lack of end-to-end thinking and value creation. Many lightweight IT solutions improve processes, activities, and tasks by eliminating them completely or freeing up capacity to re-allocate resources for more significant purposes (Lacity & Willcocks, 2016). This way, lightweight IT influences how BM can be conducted. Lightweight IT solutions should therefore not be regarded as just a tool for improving a process or task, but the enabler of changing processes. Heavyweight IT solutions, on the other hand, are often large-scale projects. These need to be implemented gradually, which can take several years, and the phases are often based on the implementation of technical components, and not the business benefits (Ward & Daniel, 2006).

The purpose of problem-based interventions is to identify the most cost effective and lowest risk combination of IT and business changes that will achieve explicit quantified improvements, meaning they are mainly ends-driven (Peppard et al., 2007). InnoBank has partly been ends-driven by emphasizing cost-reduction as a primary focus (section 5.2). However, by implementing RPAS and regarding it as a problem-based intervention only allows InnoBank to see how it solves the controllers' problem of managing its digital workforce. Then, BM will at its best show that they have limited their downside by focusing on cost-cutting and savings.

RPAS can instead be regarded as an innovation-based intervention by emphasizing how the software can enhance value. This can for instance be through providing enhanced organizational capabilities to support BM. This will enable more benefits to be realized, since RPAS is instead regarded as a tool that can free up time for employees so that additional value-enhancing tasks can be carried out or re-allocated. An innovation-based intervention focuses on how technology can offer opportunities to create advantages and not just relieve problems (Peppard et al., 2007). With such an approach, potential and unrealized benefits can be identified, such as increased customer and employee satisfaction. Having such an approach enables the organizations to capitalize on the advantages from new lightweight solutions.

With lightweight IT in general, these solutions probe new questions of how to do things in organizations. It gives potential to emphasize which value is created. In light of the innovation-based and problem-based interventions, it seems that lightweight IT with its easy-to-use and

cheap technology releases more capacity and can enable organizations to rethink how they create value.

Conclusively, redefining work processes and looking for added value is an important implication of lightweight IT on BM.

Implication 2: The focus on qualitative benefits is a management issue

The emergence of lightweight IT solutions challenges the traditional way of conducting BM because it has been based on investment appraisal methods in which management favors financial documents to prove a good business case. Such approaches often ignore or omit potential qualitative benefits. Therefore, many unrealized benefits are not taken into account. This is discussed as a challenge in step 1 of the Cranfield method, however the implication of this concerns the managements' choice of appraisal method. As discussed in our analysis, it might be fatal if management only focuses on NPV or ROI and overlooks the other benefits like more satisfied employees or customers. For this reason, management needs to direct their attention to the qualitative benefits in addition to the quantitative ones, as suggested in step 1.

Conclusively, to what degree managers focus on qualitative benefits will have implications for the benefits that are extracted from a lightweight IT solution.

Implication 3: The agile nature of lightweight IT is culture dependent

A culture that fosters innovation-based interventions seems to give rise to added benefits for an organization (Peppard et al., 2007). This allows for fast implementation and "trial and error", which goes hand in hand with an agile approach and risk-taking. By taking risk with lightweight IT, one does not necessarily always yield the expected benefits. However, taking this risk with lightweight IT might potentially lead to a larger upside, extracting more value from lightweight IT solutions. Taking a "trial and error" approach makes the process of conducting BM more iterative than what is explained in existing BM literature. Fostering an innovation-based culture therefore has important implications for extracting the full benefits of lightweight IT. This is especially the case for lightweight solutions as they are rather cheap to implement. The risk of failing is therefore not as high compared to the risk of failing with costly heavyweight solutions.

Conclusively, the type of culture you have will determine to what degree you extract the value of lightweight IT. For instance, an innovation-based culture enables one to extract the full value from a lightweight IT solution.

Implication 4: The degree of conducting BM depends on the organizational size

It is evident from our findings that the size of the organization can influence to what degree BM is conducted. This is because the larger the organization, the more extensive the BM process will be, regardless if it is lightweight IT or heavyweight IT. The traditional BM process is already lengthy and extensive, so going through these steps in a large organization is one explanation to the low uptake of BM (Turner & Ledwith, 2016). For lightweight IT solutions specifically, scaling the solution will be an important implication. Our findings point out that scaling, one of the generative mechanisms (Bygstad, 2016), is challenging for lightweight IT due to the poor replicability to other environments. Therefore, the bigger the organization the more lightweight IT solutions are likely to be scattered around in the company. This will make it challenging to scale the solutions and thus conduct BM.

Conclusively, it seems that BM of lightweight IT works in favor of smaller organizations as there is little bureaucracy and less extensive processes to go through.

Implication 5: The type of governance model for lightweight IT influences how easy or hard it is to conduct BM

It has been a debated topic on which department who should govern lightweight IT solutions (Willcocks et al., 2015). This depends on which governance model for lightweight IT the organization has. Therefore, it is necessary to adopt the BM framework to the beneficiaries as they are the ones who should conduct BM. It is important to take into consideration who the receiver of the benefit is. This has implications for which business unit should conduct BM.

Not all departments have the knowledge or are capable to conduct BM (Terlizzi et al., 2017). Respondent 11 explained how the HR department not necessarily has the resources and knowledge required to conduct BM. A revised BM framework for lightweight IT therefore has to be easy enough to use so that measuring the benefits is made easy, especially the qualitative benefits. For the HR department to be able to conduct BM on lightweight IT solutions, support from the IT department might be necessary. This collaboration applies not only to HR, but to other business units as well. Literature on governance models for lightweight IT states that

collaboration between the IT department and the business units is beneficial for utilizing each other's strengths (Bygstad, 2016). For RPA solutions, the literature suggests that the automation tool should be implemented in the business units, but with the support of the IT-department (Lacity & Willcocks, 2016). This favors a bimodal governance model for RPA. Which governance model that is better for BM of lightweight IT solutions in general is, however, not clear from our research. Some findings related to this emerged during our interviews, but it was not the focus of our study. Despite the little research on the topic, our data material still reveals some interesting patterns regarding which governance model that might be favored for BM of lightweight IT.

Conducting BM of lightweight IT in a laissez-faire model seems to be the most straightforward as there is no involvement from the IT-department. This will make it easier to realize benefits from lightweight IT solutions since the business unit will not be limited to which solutions they can implement. As explained, the business units might lack the resources and knowledge needed to conduct BM on their own, which is a challenge with this model. A bimodal model can however solve this problem by getting the support needed by collaborating with the IT department. The bimodal model can therefore be favorable, but it then has to be accounted for in project management, as stated in our findings. The most challenging model to conduct BM of lightweight IT in will be the central control model simply because there are no lightweight IT solutions in this model. Lastly, the platform model might make it more challenging to conduct BM as the lightweight solutions are loosely coupled. Therefore, it is reasonable to believe that it is difficult to realize the benefits from this model.

Conclusively, the relationship between the IT department and the business units in regard to governing lightweight IT influences how easy or difficult it is to conduct BM.

Implication 6: Practitioner-tools provide organizational capabilities to support BM
Documentation and data analysis have both been mentioned to be important enablers for conducting BM of lightweight IT. As lightweight IT will allow for more data to be visualized in a user-friendly matter, this will provide employees with added information regarding the benefits of a lightweight solution. If one is able to utilize documentation and data analysis to collect both qualitative and quantitative benefits, this can potentially make it easier to justify innovation-based interventions.

As stated in section 6.1, documentation and data analysis will also provide awareness to which activities to focus on by uncovering patterns in the collected data. This awareness lets you know who the organization's most valuable customers are, so time can be spent on them rather than those that are not providing the organization any value. This will allow for better decision-making, which in turn will give rise to added value for the organization.

Conclusively, if organizations are not taking advantage of data analysis and utilize its strengths, this will make it challenging to realize the full benefits from a lightweight IT solution. This is a significant implication as it poses challenges for conducting BM in terms of measurement, evaluation and possibilities for future improvements. By utilizing data analysis, this will also enable deeper insight to how the lightweight solutions are performing, which in turn makes it easier to prioritize goals and activities that contribute to enhanced value creation.

6.3 Adoption rate of BM

Despite the many frameworks and methods that have been made for BM, there has still been a low uptake in businesses (Terlizzi et al., 2017). Several of these barriers are addressed in detail throughout this paper, but the main barrier seems to be the extensiveness and complexity of the BM process, hence our propositions to a revised approach to the Cranfield method. As we suggest making the BM framework for lightweight IT less extensive and formal, we wonder if a changed emphasis in the Cranfield method will increase the adoption rate of BM in general. Some barriers that lightweight IT poses on BM is also addressed in the following.

By putting less emphasis on planning in the Cranfield method, we argue that BM might become more appealing for businesses to use as less resources are required. However, as our findings reveal, the adoption rate of BM relies on management focusing on BM. If they are not interested in conducting BM, it does not matter if the framework is less extensive. If the management becomes aware of the qualitative benefits that might arise from lightweight solutions, this might be a way to get them involved in BM. This way they see the added benefits they can get from the solution.

Less formal BM practices hopefully lead to higher adoption of BM frameworks. We suggested several ways of measuring benefits in a simple manner, for instance by simply tracking the

process informally with post-its, or Love et al. (2005)'s suggestion of using a checklist during evaluation. Further, in relation to our discussion on agile BM, we argue that BM needs to attract more attention among businesses with the emergence of lightweight solutions. This is because lightweight IT allows for more "trial and error" and will make reviewing and conducting BM more important to see how the solutions are performing. Despite our suggestion to make BM of lightweight IT less extensive, one should however not underestimate the importance behind the steps in the Cranfield method.

However, there are some characteristics of lightweight IT that might hinder the adoption rate of BM. Since new lightweight IT solutions are implemented at such a high pace, it can become overwhelming to conduct BM on several solutions. It might also be that the importance of conducting BM is underestimated, as the investment cost of lightweight solutions are relatively low.

Conclusively, a less extensive BM framework for lightweight IT might lead to a higher adoption rate of BM as fewer resources are required. However, organizations need to be aware of how many lightweight IT solutions they implement if one is to be successful with BM.

7. Conclusion

There is extensive literature on how to conduct BM of heavyweight IT, however there is little found on lightweight IT. This is due to the fact that lightweight IT is a relatively new concept in literature. However, lightweight IT has become more appealing to organizations due to its characteristics of user-centricity, rapid deployment and low cost of implementation (Bygstad, 2016). Therefore, we sought to contribute to the gap in the academic literature by investigating the implications of lightweight IT on BM. The purpose of our master thesis has been to understand these implications through conducting a case study of BM on a lightweight IT solution, RPA Supervisor, in InnoBank, with supplement interviews of professors and consultants. We answered this by first investigating if conducting BM of lightweight IT differs from conducting BM of heavyweight IT. Second, we discussed if this would lead to the need for a new BM framework for lightweight IT. Lastly, we looked at what this could mean for the adoption rate of BM.

7.1 Implications for lightweight IT on BM

1. BM of lightweight IT differs from BM of heavyweight IT
Through our case study findings, we found that BM of lightweight IT differs from BM of heavyweight IT in several ways. They differ because the low cost of implementation can lead to more immediate benefits, as opposed to heavyweight IT in which the benefits might not arrive before several years later. Moreover, if lightweight IT allows for "failing fast", it can enable a more agile approach to BM by being able to adapt more quickly to market changes. User-centricity often leads to easier measurement and identification of benefits, as one can easily ask customers directly. This feature of lightweight IT also makes utilization easier and can be used by non-IT professionals. Practitioner-tools from the lightweight IT solutions makes benefits more accessible and eases the review and evaluation towards identifying areas for improvement. Measurement and identification of benefits are more challenging with heavyweight IT due to the complex systems and processes. However, the characteristics of lightweight IT makes scaling difficult, and reliability issues can cause disbenefits.

2. No need for a new framework and why
Although BM of lightweight IT might differ from BM of heavyweight IT, our empirical findings indicate that the Cranfield method is still relevant for BM of lightweight IT. There

does not seem to be a need for a new framework for lightweight IT that differs from the ones that already exist. What does seem to change, however, is which benefits and steps in the Cranfield method are emphasized. First, identifying and structuring the benefits are important. However, qualitative benefits of the IT investment should have more significance, taking into consideration the added value in a human perspective, which is also requested from Hesselmann and Mohan (2014) in BM literature. Second, as lightweight IT often has a low investment cost and can be implemented relatively fast, it can enable an agile and experimental approach to BM. Therefore, the extensive planning might not be as necessary for lightweight IT solutions. Third, to understand why and how benefits were achieved or not and to provide lessons for future improvements, practitioner-tools for BM support such as documentation and data analysis need more emphasis in evaluation. Lastly, a holistic end-to-end thinking also needs more attention in the last step of establishing potential for further improvement, such that technology is not only regarded as a tool but as an enabler to improve processes and work practices. All in all, frameworks that are presented in literature already are more suited for large heavyweight IT-systems, making the BM process too extensive and lengthy for smaller lightweight IT solutions. Therefore, simpler and less frameworks ought to be developed.

The changed emphasis in the existing Cranfield method raises implications for organizational factors, governance structures and the practitioner-oriented tools. In regard to the organizational aspects, management, culture and size of the organization, are factors that influence the impact lightweight IT has on BM.

First, the emphasis on more qualitative benefits is a management issue. The traditional investment appraisal methods that management choose to use often ignore or omit potential qualitative benefits, because they are difficult to modify in a financial measure. Therefore, many unrealized benefits are not taken into account. With this, to what degree managers focus on qualitative benefits will have implications for the benefits that are extracted from a lightweight IT solution.

Second, the impact of lightweight IT on BM is dependent upon organizational culture. The low-cost and fast implementation on lightweight IT might make it easier for organizations to take a "trial and error" approach, increasing the risk. With bigger risk comes greater benefits because the magnitude of loss is limited due to low cost of implementation. However, it will not necessarily enable agile BM if one does not foster an innovation-based culture. Such

culture goes hand in hand with an orientation towards agility. Lightweight IT is therefore a critical capability to support value-creation in an innovation-based culture if one is to extract the full value from a lightweight IT solution.

Third, it became evident that the size of the organization can influence to what degree BM of lightweight is conducted. The bigger the organization, the more lightweight IT solutions are likely to be scattered around in the company. This will make it hard to scale the solutions and thus conducting BM becomes challenging. Smaller organizations seem to work in BM of lightweight IT's favor as there is little bureaucracy and less extensive processes.

Fourth, practitioner-tools such as documentation and data analysis give organizational capabilities to support BM of lightweight IT. If documentation of qualitative benefits is collected in addition to the quantitative ones, this information can make it easier to justify innovation-based intervention. Documentation and data analysis will also provide awareness to which activities to focus on by uncovering patterns in the collected data, enabling better decision-making. Thus, they can be seen as important prerequisites for conducting BM of lightweight IT.

Last, the type of lightweight IT governance model determines to what degree BM of lightweight IT occurs and how benefits realization takes place. Conducting BM of lightweight IT in a laissez-faire model is the most straight-forward, as it will make it easier to realize benefits from lightweight IT solutions since the business unit will not be limited to which solutions they can implement. The most challenging model to conduct BM of lightweight IT in, is the central control model simply because there are no lightweight solutions in this governance model. The relationship between the IT department and the business units in regard to governing lightweight IT thus influences how easy or difficult it is to conduct BM of lightweight IT.

All in all, this might influence the adoption rate of BM in general. A less extensive BM framework for lightweight IT might lead to a higher adoption rate of BM as less resources are required. Organizations, however, need to be aware of how many lightweight IT solutions they implement if one is to be successful with BM.

7.2 Further research and limitations

Governance models for lightweight IT emerged to be an interesting topic in our research, but it was not the most important implication for our case study. We believe it could be interesting to dedicate a separate study on the effects governance models of lightweight IT have on BM. Additionally, our study did not go into details on how qualitative benefits could be measured in light of BM. This can be regarded as a limitation of our study as we highly emphasize the importance of measuring qualitative benefits, but do not necessarily put much emphasis on how it can be done. Another limitation arises with choosing a case, RPAS, which is new on the market. This makes it hard to account for all the implications this lightweight IT solution has on BM. Although we included several supporting interview objects, choosing a single-case study comes with limitations on the ability to replicate the study. Our findings from RPAS and InnoBank does not necessarily transfer to another lightweight IT solution or bank. However, we are confident that we have chosen a suitable case for our study as it is a good representation of a lightweight IT tool and makes an interesting case due to its newness.

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Appendix 1: Interview guide

This is an example of an interview guide we used for respondents in InnoBank.

NHH

Intervjuguide

Innledning:

Ettersom lettvekts-IT løsninger slik som RPA og RPA Superivsor er relativt nytt, ønsker vi å se på hvordan bedrifter driver med gevinstrealisering av lettvekts-IT. Lettvekts-IT går ut på å bruke teknologi til å understøtte og forbedre arbeidsflyt og prosesser. Til sammenligning har tungvekts-IT mer fokus på back-end løsninger, mens lettvekts-IT ofte representerer andre front-end løsninger. Vår definisjon av gevinstrealisering handler om å sørge for at de gevinstene som var forventet av et prosjekt faktisk blir realisert.

Innledende spørsmål:
- Kan du fortelle litt om bakgrunnen din?
- Hvilken avdeling jobber du i?
- Hvilken rolle har du i BN Bank?
    - Hvor lenge har du jobbet her?

RPA Supervisor:
- Kan du forklare kort hvordan du forstår RPAS fungerer?
- Hva er deres erfaringer med RPAS?
    - Hvordan jobber du med RPAS?
    - Er RPAS knyttet til noen overordnede mål?
    - Etter din mening/ basert på hva du vet, hva var hensikten med å innføre RPAS?
    - Hva løser RPAS for dere?
- På hvilken måte merker dere effektene av implementeringen av RPAS?
    - Har dere møtt på noen utfordringer i forbindelse med RPAS?
    - Hvordan føler dere oppfølgingsarbeidet har endret seg ved innføring av RPAS

NHH

Over til å forstå litt mer av det tekniske:

- Hvilke rapporter får dere fra RPAS?
- Ligger alle RPA-lisensene deres under RPAS?
    - Hvordan har dere gått frem for å teste/ implementere RPAS? Har dere tatt det stegvis, eller ble alt lagt under RPAS med en gang?
- Hvordan har RPAS fungert i den eksisterende IT-infrastrukturen, og har dere måtte gjøre endringer? (Har dere behov for ytterligere investeringer)

Gevinstrealisering:
- Har dere noen fokus på gevinstrealisering idag?
- Har dere en måte å måle gevinster av RPA Supervisor/ IT prosjekter i dag?
    - Hvis Ja: Hvordan måler dere gevinstrealisering i dag?
    - Hvis nei: Hva ville dere hatt i et rammeverk for å måle gevinstene? Hvorfor?
    - Hvordan ville dere målt / hvilke parametere ville dere brukt for å måle gevinster?
- Hva fokuserer dere på når dere skal måle gevinster RPA Supervisor?
    - Hva/ hvorfor fungerer godt?
    - Hva kan gjøres annerledes?
    - Er det noe som ikke måles i dag men som dere tenker er viktig å måle?
- Har dere opplevd noen gevinster ved innføringen av RPAS?
- Til IT: Hvordan måler dere gevinstene av IT prosjekter?
- Hva ser dere på som de største utfordringene rundt gevinstrealisering av RPAS?

RPA
- Hva var grunnene til at dere innførte RPA?
- Hvor mange prosesser har dere automatisert gjennom RPA?

Avsluttende spørsmål:
- Ønsker dere å legge til noe?

Appendix 2: Information letter

NHH

Informasjonsskriv

Kjære deltaker,

Som en del av mastergraden ved Norges Handelshøyskole (NHH) er vi to studenter som skriver masteroppgave om "Gevinstrealisering av lettvekts-IT" – et casestudie av et RPA styringsverktøy.

Som et ledd i dette ønsker vi å intervjue sentrale personer i BN Bank som har kjennskap til RPA Supervisor.

Intervjuet vil være semi-strukturert i den forstand at vi ønsker å stille åpne spørsmål. Vi ønsker å vite mer om deres erfaringene rundt RPA Supervisor og hvordan dere forstår gevinstrealisering av RPA Supervisor og RPA generelt.

Lengden på intervjuet er estimert til 1 time.

Vi ønsker også å ta lydopptak av intervjuet, og slik sikre at vi fanger opp all relevant informasjon korrekt. I all videre bruk av informasjonen vi samler inn vil du som deltaker være anonym og ha rett til å se over eller mulighet til å trekke intervjumaterialet. Intervjuene vil transkriberes i sin helhet. Lydopptakene vil bli slettet på en sikker måte i etterkant av analysearbeidet.

På forhånd, tusen takk for din hjelp!

Med vennlig hilsen,

Judith Marie Wetteland og Johanne Regine Gustavsen

Appendix 3: Consent form

NHH

Samtykkeerklæring

Samtykkeerklæring for intervju om "Gevinstrealisering av lettvekts-IT"- et casestudie av et RPA styringsverktøy, høsten 2019.

Forskere: Judith Marie Wetteland og Johanne Regine Gustavsen

Veileder: Andreas Ulfsten

Samtykke: Jeg bekrefter herved å ha lest informasjonsbrevet "Informasjonsskriv" fra Judith Marie Wetteland og Johanne Regine Gustavsen. Jeg gir med dette mitt samtykke til datainnsamling i forbindelse med masteroppgaven ved Norges Handelshøyskole:

- Lydopptak av intervjuet
- Transkribering av intervjuet i sin helhet
- Lydopptak slettes umiddelbart etter transkribering
- At forskerne i studien og veileder har tilgang til transkripsjonen i sin helhet etter transkribering
- Sitering i anonymisert form (stilling/rolle) til bruk i masteroppgaven

Jeg bekrefter med dette min frivillige deltakelse i studien, og at jeg er informert om at jeg kan trekke meg fra deltakelse ved opplevd ubehag under intervjuet.

Intervjuet blir gjennomført av Judith Marie Wetteland og Johanne Regine Gustavsen.

Sted og dato: Signatur intervjuobjekt:

……………………….   …………………………...

Appendix 4: Overview of benefits from RPAS

This is a summary of the qualitative and quantitative benefits we found from RPAS in InnoBank.

Qualitative benefits	Quantitative benefits
The life as an RPA controller has changed to the better	FTE reduction
Stable operations	Improved efficiency - Reduction of sessions
Better queue systems	Cost reduction
Reduced follow-up maintenance work	More effective use of capacity and available resources
More time to RPA development	Improved compliance
More user-friendly and easier to keep track	Overtime reduction
Overview of troubleshooting and analysis	Reduced variation on response times
More concentration at work	Reduction of troubleshooting errors
Increased predictability of response times	Reduction of downtime
Reduced stress and worries for controllers	Increased customer base
Facilitate multi-disciplinary teams	Faster customer service
Less annoyance and requests from process owners	Automation of administrative tasks
Better response to customer demands	Improved employee satisfaction