BENEFITS AND CHALLENGES IN ENTERPRISE ARCHITECTURE MANAGEMENT: A CASE STUDY OF THE NORWEGIAN LABOUR AND WELFARE ADMINISTRATION

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ABSTRACT

Enterprise Architecture is seen as instrumental to drive the digital transformation in enterprises. It is also important to achieve the benefits from innovative new business models and technologies. Many organisations have therefore undertaken extensive efforts to implement Enterprise Architecture (EA). It is, however, a challenging task to implement enterprise architecture in an organisation. There is also very limited research on this issue related to the public sector. This study explores the implementation of enterprise architecture (EA) in the Norwegian Labour and Welfare Administration - NAV. While the study revealed that NAV had not defined any clear benefits, we found 12 perceived potential benefits. We also uncovered 16 challenges that impeded the EA implementation.

Keywords: enterprise architecture, public sector, benefits, challenges, digital transformation

1. INTRODUCTION

There is a strong need for modern enterprises to constantly transform themselves to provide relevant products and services (Rouse, 2005). Enterprise Architecture (EA) Management (EAM) has become an important approach to drive enterprise transformations (Lange, Mendling, & Recker, 2012; Tamm, Seddon, Shanks, & Reynolds, 2011). EAM provides a high-level and holistic perspective on an organization’s business processes and IT systems – and how they should be integrated (Boh & Yellin, 2006; Ross, Weill, & Robertson, 2006). EAM can therefore be instrumental for converting the business strategy into concrete processes and systems, and therefore to increase organizational agility (Fallmyr & Bygstad, 2011), and drive the digital transformation.

Many organizations have implemented EAM to facilitate the digital transformation, and create agile processes and systems. Examples are public sector organizations implementing EAM to become more agile, to provide more timely services to the public. As the demographics of modern societies change, so do also the citizens service needs; and as information technology develops – so do opportunities for service innovation and service automation in public sector enterprises.

The benefits and related challenges are yet to be extensively researched (Jusuf & Kurnia, 2017; Lange et al., 2012). However, it is quite evident that achieving the potential benefits form EAM is a big and challenging task. Studies in Norwegian public sector organizations has shown that EA benefits are poorly defined and difficult to attain (Nygård & Olsen, 2016; Olsen & Trelsgård, 2016). This study focuses on one of the major public enterprises in Norway, The Norwegian Labour and Welfare organization (NAV). It is dominating the public sector in Norway, and administers one third of the national budget. It has been through several unsuccessful EA efforts, and has spent billions of NOK on external consultants to improve their information systems. The size, complexity and the leading role NAV plays in the Norwegian public sector – and the welfare state – makes it a very interesting and important case. We have therefore posed the following research question:

What are the potential benefits related to the Enterprise Architecture effort?

We also looked at the challenges that hamper the ability to attain the benefits:

What are the challenges related to realizing the potential benefits form EAM?

The rest of this paper is organized as follows: The next sections present related work, the research method, the results and the discussion. Finally, we present the conclusion.

2. RELATED WORK

EA was first introduced in 1987 by Zachman (1987), but there is not yet a generally accepted definition (Niemi & Pekkola, 2017). There are many definitions of EA from a number of angles (Hope, 2015; Ross et al., 2006; Simon, Fischbach, & Schoder, 2013). Simon et al. (2013, p. 3) has defined it as “a structured and aligned collection of plans for the integrated representation of the business and information technology landscape of the enterprise, in past, current, and future states”. Gartner group puts a stronger emphasis on EA as a tool for enterprise change: «The process of translating business vision and strategy into effective enterprise change by creating, communicating and improving the key principles and models that describe the enterprise's future state and enable its evolution» (Lapkin, 2007, p. 4). We therefore view EA as a tool developing and transforming the organisation. Also it should be noted that: “EA implementation is a multidisciplinary, complicated and endless process” (Tambouris, Zotou, Kalampokis, & Tarabanis, 2012). We should therefore expect that large organizations, with complex IT environments, and with extensive need for standardization and integration will benefit most from an EA (Tamm et al., 2011).

Enterprise architecture management (EAM) is the management activities conducted to install, maintain and develop the EA in an organisation (Aier, Gleichauf, & Winter, 2011). There are several approaches to EAM (Kotusev, Singh, & Storey, 2015). The traditional approach (Spewak & Steven, 1993) is a four-step sequential process (Kotusev et al., 2015): Document the current state, develop the desired future state, develop the migration plan, and implement the plan and repeat the process all over again. In contrast, the MIT approach (Ross et al., 2006) emphasizes the development of a long-term architecture vision at the enterprise level. However, EAM in practice usually combines various elements from different methods (Kotusev et al., 2015).

Only a few studies have focused on EA benefits (Jusuf & Kurnia, 2017). Jusuf and Kurnia (2017) provided an extensive list of 40 potential benefits and 36 success factors from a literature review supplemented by interviews with EA experts. However, this study does not specify which benefits and factors would be most important in a given context.

Many organisations struggle to achieve the potential of EA. The literature estimates that perhaps only five percent of EA efforts succeed (Hope, 2015). EA has been used in the public sector context in more than 20 countries, and has faced a number of challenges (Dang & Pekkola, 2016; Ramos & de Sousa Júniör, 2015). The challenges organizations face are related to problems such as lack of governance structures and insufficient resources (Seppänen, Heikkilä, & Liimatainen, 2009), limited modelling tools (Kaisler, Armour, & Valivullah, 2005), rigid bureaucracy and a lack of coordination of information systems (Weerakkody, Janssen, & Hjort-Madsen, 2007), deficient implementation ability and challenging organizational governance and structure (Isomaki & Liimatainen, 2008), unclear roles and responsibilities (Lucke, Krell, & Lechner, 2010), discontinuity of planning and short-lived top management commitment (Kim & Everest, 1994), and lack of EAM acceptance in the (IT) organization and difficulties to enforce EA policies and standards (Löhe & Legner, 2014). A review by Hauder, Roth, Schulz, and Matthes (2013) identified the following factors: ad hoc EAM demands, unclear business goals, lack of experienced architects on the job market, demands unclear for EAM team, and the enterprise environment that is changing too quickly. A substantial part of the obstruction seems to be the ambiguity of the EA concept, and that a common understanding and methodological consistency are still lacking (Simon et al., 2013). Several articles have pointed out that EA must become better entrenched at the executive level to reach its potential as an enabler of strategic planning and business transformation (Aier, Riege, & Winter, 2008; Buckl, Ernst, Lankes, Matthes, & Schweda, 2009; Langenberg & Wegmann, 2004; Simon et al., 2013).
3. SETTING AND RESEARCH METHOD

3.1 Research setting

This case study was performed in The Norwegian Labour and Welfare Administration (NAV). NAV was created in 2006 through a fusion of the Employment and National Insurance administrations and combined with better integration with the municipal social services administration. The reform aimed to make the administration more efficient, more holistic more and client-friendly.

NAV administers a third of the national budget, and is responsible for such schemes as unemployment benefit, work assessment allowance, pensions, sick benefits and child benefits. NAV employs around 19,000 people, whereof approximately 14,000 are employed by the central government, and approximately 5,000 are employed by the local authorities. There are local NAV front line offices and more than one hundred special units, that perform centralized duties.

NAV's main goals are:

- More people active and in work, fewer people on benefits
- A well-functioning job market
- To provide the right services and benefits at the right time
- To provide good services tailored to the clients' needs and circumstances
- Comprehensive and efficient labour and welfare administration

The organization consists of seven departments. Each department is led by a director, who has the overall responsibility for the department and its sections. Three of the departments, Accounting, Labour and Service and Benefits Administration are further organized into NAV management office, County offices and local offices in the counties and municipalities.

The development and innovation in NAV’s services is performed in programs and projects. The project portfolio consists of the proposed, approved and ongoing programs and projects. NAV has established a section for Enterprise Architecture to align the programs and projects with NAV’s long term goals. NAV has created a document to outline the EA effort, “Virksomhetsarkitektur i NAV” (EA in NAV). EA is here described as a tool for understanding the relationships between competence, work processes, available information, ICT systems and governance. The purpose of this document is to achieve a common understanding of NAV’s EA effort. This effort is formally sanctioned by the top management.

An Architecture council has been established, with a broad representation from the various departments. The EA program in NAV has been organized into six architectural areas: Business architecture, Information architecture, Application architecture, Technological architecture and Governance and security architecture.

3.2 Research Method

This case study has followed the interpretive case study approach (Walsham, 2006). Interpretive research focuses on the complexity of human sense as the situation emerges (Klein & Myers, 1999). It is necessary to understand the context of the IS in information systems (IS) research, as well as the interaction between the system and the context (Klein & Myers, 1999; Walsham, 1995). Interpretive design permits a flexibility that facilitates discoveries of new and unanticipated empirical results and for increasing sophistication. This provides the researcher with an iterative design and the option of improvisation and flexibility in the research process.

Sixteen open-ended and semi-structured interviews were conducted with informants at various levels in NAV. The informants were identified by using the contact person in NAV to identify appropriate informants in the various units. The informants’ roles are presented in table 1. The analysis was performed in the following steps based on Oates (2006). First, the interviews were recorded and transcribed in NVivo. One informant did not allow recording the interview – and this interview was
recorded by taking notes and disseminating it with the informant afterwards to verify the content. The transcripts were sent out to the informants for any adjustment and clarifications.

Secondly, we used NVivo to analyse the interview data. We found relationships that were categorized into various nodes, which are presented in the results section. Based on Oates (2006), we classified the data into three categories: non-related information, general information and directly related information. The first two categories were used to categorize data that either was not related to the study or general. The non-related was not used further, while the general data was used as a supplement to the directly related data. By combining deductive and inductive approaches, two subcategories were defined - Benefits and Challenges. Benefits were further categorised based on Giaglis, Mylonopoulos, and Doukidis (1999) model for categorizing information systems benefits. Challenges were further categorized based on the categorizations in Banaejahromi and Smolander (2016) and Lucke et al. (2010)

<table>
<thead>
<tr>
<th>Role</th>
<th>Line/ project</th>
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<tbody>
<tr>
<td>Director A</td>
<td>Line</td>
<td>Section leader A</td>
<td>Line</td>
<td>Architect A</td>
<td>Project</td>
<td>Architect E</td>
<td>Line</td>
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<tr>
<td>Director B</td>
<td>Line</td>
<td>Section leader B</td>
<td>Line</td>
<td>Architect B</td>
<td>Line</td>
<td>Architect F</td>
<td>Project</td>
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<tr>
<td>Director C</td>
<td>Line</td>
<td>Section leader C</td>
<td>Line</td>
<td>Architect C</td>
<td>Line</td>
<td>Architect G</td>
<td>Project</td>
</tr>
<tr>
<td>Director D</td>
<td>Line</td>
<td>Section leader D</td>
<td>Line</td>
<td>Architect D</td>
<td>Line</td>
<td>Project leader A</td>
<td>Project</td>
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*Table 1. The informants’ roles*

4. RESULTS

This chapter presents the results of the interviews. We will first present the findings about the perceived potential benefits, and then go into the perceived challenges.

There had been several EA efforts in NAV. Architect B noted that “It is the third time they are attempting to establish Enterprise Architecture. So, the last initiative is quite new. [...] after the modernisation did not work well, we received criticism on architecture governance – so this is the focus in the new creation.” Architect C commented that the new effort will “move away from being a control function and a planning function [...] to being an activity where one works in parallel with the ones who are going to do something; with the projects, with the initiatives – as a service provider that contributes to good choices all the time.” Thus, in the new effort NAV would focus more on de facto architecture governance, rather than documentation and models.

Despite the fact that NAV has attempted to introduce EA several times in the organization, they had not achieved a common understanding of the term. Informants either had difficulty in presenting a good definition, or emphasized different focus areas of the Enterprise Architecture. Architect F remarked that everyone understood the term differently, "You've probably received as many answers to exactly what it is as you've had interview objects."

4.1 Benefits

The interviews revealed a lack of focus on benefits. All informants believed that there had not been defined any clear benefits. We found 12 potential benefits, which will be presented below. Some of the benefits are similar and have some overlap. We found that the benefits corresponded to Giaglis et al. (1999)’s model, and we decided to use it for our categorization. Table 2 gives an overview over the perceived potential benefits.

**Indirect benefits**

The informants perceived three indirect benefits: reduced complexity, increased effectiveness and increased client focus. Firstly, the ability to reduce the complexity was perceived as very important. NAV is a very complex organization, and most of the informants saw this as a major challenge. Many of the informants believed that EA would be important to reduce this complexity. Architect C noted that “The benefits come from making solutions that are not more complicated than they need to be. And then you
need to understand "a whole" to be able to do it." Director D corroborated this view, and asserted that "Enterprise architecture is something that promotes NAV's development, but it is clear that if you are very eager and would like to get [EA adopted] quickly, it can be seen as even more requirements and criteria you should meet. […] And precisely because we are such a complex organization it will be very dangerous to cut corners and choose simple solutions."

<table>
<thead>
<tr>
<th>Weakly Attributable to EA</th>
<th>Indirect</th>
<th>Strategic</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Reduced complexity</td>
<td>Common understanding of the organization</td>
</tr>
<tr>
<td></td>
<td>Increased effectiveness and efficiency</td>
<td>Set direction</td>
</tr>
<tr>
<td></td>
<td>Increased client focus</td>
<td>Operationalize the strategy</td>
</tr>
<tr>
<td>Strongly Attributable to EA</td>
<td>Increased integration and standardization</td>
<td>Better project management</td>
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<td></td>
<td></td>
<td>Change management ability</td>
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Table 2. Overview of perceived potential benefits, adapted from Giaglis et al. (1999).

Secondly, the informants perceived that EA would be an important tool to achieve increased effectiveness and efficiency in the organization. This is illustrated by Section leader A who explained that “Enterprise architecture contributes to realize NAV’s main goals faster and more efficient – provided one is able to deal with it.” He further added that if one is not able to deal with the EA, it rapidly can lead to chaos.

Thirdly, the informants also proposed that increased client focus was an important benefit. We saw in the research context that client focus is essential to realize NAV’s four main goals, and many of the informants commented upon client focus during the interviews. It was evident that this was an important topic for NAV, and many informants noted that EA can contribute to increased client focus. Section leader C elaborated: “Our ambition is to make [the communication with the clients] more systematic and have a permanent holistic responsibility for the clients – beyond what each department already has. Client orientation across departments is the most important contribution from architecture.”

### Strategic benefits

Like indirect benefits, strategic benefits cannot be perceived to be directly related to EA – but contrary to the indirect benefits, these are difficult to measure. These are benefits that would give positive benefits over time, and usually as a result of several influencing factors.

Firstly, the informants perceived that EA would contribute to a better common understanding of the organization. Architect noted that EA is a “fundament to understand the entirety.” Section leader D stressed the importance of a collective understanding, but noted that not all people share this view: “[…] simply discussing models give something in terms of understanding the organisation. […] but of course, not everyone are equally patient in such processes.” Architect E believed that a collective understanding would contribute to a common view of the organization, goals and priorities, which then again can contribute to improved cooperation between the departments.

Secondly, the interviews revealed that most informants saw EA as a tool to achieve long term benefits. This is also about setting the organization’s direction by focusing on the future. Director B used an allegory: “[…] it is not that one uses it like a bible. Does the Enterprise architecture here tell you what to do? No, it doesn’t – but it gives direction. And it is this direction that you need to relate to. Enterprise architecture in a way is like a compass course.” Director D corroborated this: “I think it will increase the quality of our development work, and that it will contribute to clarify some value chains across the [department] lines, and clarify responsibility for various target groups in the different [departments].”
Thirdly, while virtually all informants noted that EA is something quite abstract, and largely a theoretical phenomenon, several of them still thought that EA can be used as a tool for operationalizing the organization’s strategy. Several informants also emphasized the need for more operationalization. Section leader D noted that: “I intensely want the link between the [organization’s main goals] and the projects […] we should prioritize. I see that EA can be a very powerful tool to convert strategy to action.” Director D corroborated this, and pointed out that this partly is the main goal of the EA effort: “[…] this will make it easier to fulfil NAV’s mission – or NAV’s strategy. In many ways it is the main objective – as a tool to operationalize the strategy, actually.”

Fourthly, it was evident from the interviews that new systems development is rolled out in projects. The projects are large and comprehensive, and is such a vital part of NAV’s organizational innovation that it is important to have control over them. Several of the informants pointed out that better projects management is a much-needed benefit from the EA effort. Section leader C noted that “It is a clear expectation that we [can govern] our projects. That it is we who govern them – not the consultants. This is perhaps the most visible benefit.”

Several of the informants talked about a culture for hiring external consultants, but that lately there had been a stronger focus on internalizing knowledge. It was therefore a desire to have internal project leaders and participants. Architect F explained that “Therefore, we must have internal employees as continuity carriers, […] and make sure that it is documented, and so on.” Section leader B underlined this benefit: “It is in a way such qualitative benefits as I experience it – better projects, more correct projects.”

Finally, based on the responses, it may seem that NAV’s culture makes the organization static. This is unfortunate, and makes it difficult to be agile and proactive. Several of the informants perceived that EA may make the organization more agile. Among them is Architect E, who compared NAV with a building where EA constitutes the building’s floor plan: “[…] you only have an ability to change if you know which pillar to remove. I would say that EA can improve the ability to change, and will be an important tool for us to spend our money in a wise manner.”

**Hard benefits**

This category deals with benefits that are both quantifiable, and can be directly related to the EA effort. The informants did not focus very much on hard benefits. Most of the informants firmly believed that the potential benefits were not quantifiable, and thus hard to measure – and that they did not expect to see any results on the bottom line from the effort. The interviews did however reveal one quantifiable potential benefit directly related to EA: Increased integration and standardization. Director A noted: “[…] I view this in relation to the sourcing strategy – what should we do ourselves, and what should we get others to do for us? And if we should get others to do it for us, then it must be integrated in a seamless way. So, this is about getting the individual parts to connect and focus the energy in an effective way on what you are about.” This informant is alluding to EA making the integration and standardization with suppliers possible. In contrast, Director B pointed out that this can influence the organization inwards: “[…] the purpose is to get services and processes that support our mandate, and makes it visible how things are connected. It is about making things as simple as possible once, and not in several places.” Thus, the director believes that EA can lead to better integration and standardization of processes and services.

**Intangible benefits**

These are benefits that are perceived to be direct effects from EA, but are difficult to measure. Firstly, all informants mentioned better definition of targets in one form or another, and it was evident that this was a term they were familiar with. Architect E described it: “[…] we need to make a [definition] of it, how things really are connected and work together, for us to do this well. To understand the relationships, understand the importance and the timing to make a roadmap over the development – what is needed?” Architect C held that definition of targets is important, and that EA has been helpful: “The business side has become much better at making definitions of targets for various areas, so it is a very good result of the enterprise architecture.” Director C drew a parallel between goal definition and a collective understanding, and stressed the importance of a common target definition: “[…] it means that it is easier
to see what we are here for. [...] if everyone [make goal definitions] only from their perspective - then it will be almost impossible to see the dependencies and connections.”

Secondly, the informants held that EA would create a more holistic view of the organization. Many of the informants talked about the utility of seeing relationships and map dependencies in the organization, to facilitate a business-driven development. This quote from Architect E is illustrative: “We are not always able to see the consequences of decisions – or plan for good actions – when we don’t understand the implications it will have in the long term. And we should really do this both in the short and long term in the same mindset. We lack the framework that we need to do this effectively. This framework is enterprise architecture.”

Finally, better decision making was seen as a result of the two previous benefits, definition of targets and holistic view. Several of the informants noted that a large organization, such as NAV, definitely has a lot to gain from better decision making. Architect E described how definitions of targets and holistic view can lead to better decision making: “[…] someone will need to [make an overview] that make us able to make decisions for who does what in the future. What do we need to invest in now? What do we need to develop now to really make it sustainable and effective? And this is a task not so many [at the business side] have not done – so far.” Section leader B noted that “[…] it makes us not take the same discussions over and over, and that one accepts that a decision has been made.”

4.2 Challenges

The interviews revealed 16 challenges related to the EA effort. Our findings corresponded well with Banaeianjahromi and Smolander (2016)’s categories, but not completely. We therefore added the semantical challenges category from Lucke et al. (2010). We have displayed the findings in table 3.

<table>
<thead>
<tr>
<th>Environmental</th>
<th>Technical</th>
<th>Managerial</th>
<th>Semantical</th>
<th>Organizational</th>
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<tbody>
<tr>
<td>Political control</td>
<td>EA Frameworks</td>
<td>Lack of commitment and ownership</td>
<td>Lack of common understanding of EA</td>
<td>Lack of matrix view</td>
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<tr>
<td>Previously failed EA initiatives</td>
<td>Old infrastructure</td>
<td>Extent of EA</td>
<td>Communication</td>
<td>Conflicting interest</td>
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<tr>
<td>Late into projects</td>
<td>Structure and professionalisation</td>
<td>Decision-making</td>
<td>Insufficient resources</td>
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</tbody>
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Table 3. Enterprise Architecture challenges in NAV (adapted from Banaeianjahromi and Smolander (2016))

Environmental challenges

These challenges are mainly about inter- and intraorganizational challenges, such as organizational culture and EA project management. Firstly, we saw that NAV has a strong political control from the Ministry, and that this is a limiting factor for EA management in the organization. Architect G noted that: "A major challenge that NAV actually have, is that it is politically controlled. [NAV cannot] manage the enterprise architecture on its own.” The architect emphasizes the regulatory authority in NAV's political environment, and stressed how restrictive this can be for NAV's EA. Project Manager A described how this political direction works in practice: "Having a mindset where we only work for enterprise architecture, is just nonsense. We [are directed] by the Ministry, we have political leadership and we have portfolio management. In other words, we have initiatives [from] many places.” We get a sense of how complex the organizational context is, not only internally but also externally. When new laws are passed, NAV need to adjust, and this may have implications for the enterprise architecture.

Secondly, we saw that EA efforts had failed to several times in the organization. Architect E saw this as a reason why the new effort had not gained momentum: "I think enterprise architecture initiatives have [waned] previously because they have not received the needed backing. [...] it was largely controlled by external consultants, because the architecture topic was not very "hot" in the regular operating context. In other words, it has previously received very little ownership from NAV.” The use of external consultants has been a problem for anchoring the previous EA initiatives in NAV. Section leader D emphasized this: "[...] enterprise architecture has over the years had very different approaches, which makes people get
very tired when the approaches change." We see that previously unsuccessful EA initiatives have led to a lack of stakeholder ownership, which has continued after the new management function was created internally in NAV – regardless of the focus of the new initiative.

Thirdly, we saw that all NAV's projects are, in principle, going through the Architecture Council before they get the go-ahead signal. This is to assure that the projects are based on the architecture's target definitions. Several of the informants pointed out the challenges of this, and Architect E commented that "the projects were established before the enterprise architect came in. They have been working on analyses for four years to create what they are developing now. So, it may be that the poor enterprise architects come a little late into the "loop" here, and pose some untimely questions [about issues] that have already been decided. So, the business architects don't have an easy job right now. Going back trying to change some of it is difficult, but of course also useful, sometimes it is required."

Finally, NAV was a result of a fusion of several independent government agencies. Several informants noted that this led to several challenges. The line organizations still function as autonomous silos. This creates a challenge in anchoring enterprise architecture in the organization. Architect F commented that challenges occur when "you attempt to lead the organization in a particular direction. They are not used to being led from the outside – from the old days, from the time when everyone had their own subject areas. And I believe that the silo mentality is still firmly rooted. It is definitely resistance there." EA not only seeks to change the way they work, but also the mindset of employees. Architect B therefore pointed out that "the most important challenge today is to get enough good target definitions and anchoring for them - so that we actually can manage from them. We need anchoring because the lines are very strong and if they do not agree with the target image, in practice they do as they please."

**Technical challenges**

This category relates to challenges associated with infrastructure and use of EA framework. Firstly, NAV has decided that they will follow the TOGAF framework. This has however led to some challenges. Section leader A stated that: "We are still not in a position where we have [full] control on [TOGAF]. We have worked very, very much with the theoretical foundation. The major challenge is to make it happen in practice." This was corroborated by Director B, who commented that the challenge with EA was the operationalization. NAV finds it challenging to use the TOGAF framework in practice. Section leader B believed that this could be due to the abstract foundation of the framework: "The disadvantage is that it's a craft. [...] [frameworks such as ] TOGAF says something about that you should do something that makes sense, and then there is really nothing more. It's very little concrete for practical purposes."

Secondly, several informants were concerned about the costs related to technical and functional debt. These include maintenance costs of IT systems and the costs associated with developing new functionality. Director A noted that NAV has "a few decades of accumulated maintenance lag." Section leader C described the challenges in practice: "Some systems are used in one department only, while other systems are shared by many departments - which makes it difficult to manage these systems across departments, because the money follows the department." Some of the systems still in use in NAV originate from the time before the merger in 2006. In other words, these systems were initially developed for individual agencies and not for NAV of today. This naturally creates management costs of old systems that are not optimized for today's situation.

**Managerial challenges**

This category concerns challenges related to management, governance, project management and the organizational goals in relation to enterprise architecture. Firstly, many informants thought the initiative was well anchored, at least formally. NAV’s top management had decided to implement EA. This is illustrated by Director D, who commented that: "The commitment is well anchored. It has been thoroughly discussed in senior management and [my] unit. The mandates and roles are firmly rooted in senior management. That said, it's not obvious that everybody in top management understands what they have [decided]. So, even if it's thoroughly grounded, I'd like to say that ownership is a bit varied. To some, this is very obvious, while for others, it's certainly necessary to understand more and see concrete results before they feel commitment and ownership." Obtaining concrete results is important for top
management ownership and commitment. It seems that the initiative is not as well understood by everyone in senior management, and that it has not yet shown results in terms of organizational benefits.

Secondly, several informants noted that the lack of a defined scope and content of the EA was a challenge. Architect G asked the following questions: "What of the things I am dealing with is actually within the scope of enterprise architecture? [...] what of the totality is part of EA - that can be a little hard to see sometimes." There is an uncertainty in the organization about what exactly the EA should include. The document "Enterprise Architecture in NAV" describes the scope of EA: "Scope and detail are limited to what is required to be a good management tool." It does not specify what should be included.

Thirdly, the interviews showed that it is difficult to make good decisions about the projects. Communication sketches and target definitions are not fully developed, and in some areas even non-existent. A quote from Architect B illustrates this: "The enterprise architects have a vital role in managing digitalization and transformation in the organization, and I feel they've come quite a bit. But to actually get the right communication sketches and target definitions in a number of areas - there's still a way to go. And to be able to use it structured in decision making processes on project selection, and follow-up of projects - there's also a [quite some] way to go." Since the target definitions and communication sketches are absent, this leads to conflicts between enterprise architecture management and the projects, since the various parties have different views of the future.

Finally, several informants told us that the need for business architecture is not quite comprehensible to all stakeholders, and that it is therefore challenging to make everyone follow these principles. Architect G emphasized the importance of making it understandable to everyone, saying, "[...] If I do not see the benefits in my work, or where I can contribute, I will perhaps not give it top priority." Section leader D supported this by saying: "I think that if it becomes very visible what value the business architecture gives, then the understanding will come by itself." Section leader B noted that the understanding of business architecture among employees is poor presently: “The [enterprise architects] do not manage to convey what it will be used for, what to model or what to consider - what value does the enterprise architecture give.”

Semantical challenges

The semantical challenges deal with the interpersonal understanding of EA, how it is shared and the challenges it creates. Firstly, the terms architect and architecture are difficult to understand for many employees. Architect C highlighted this as follows: "I think architecture is a term we should abolish. [...] the term is so wide and therefore quickly becomes fuzzy. People are putting very different meanings into it. Therefore it can be a bit alienating." It is difficult to achieve a concrete understanding of what the enterprise architect role is about. Section leader B corroborated this: "The disadvantage is that it quickly becomes abstract. [...] the term is poorly understood, both among architects and others.” This suggests that it may be hard to know what an EA should contain - also for business architects.

EA also brings a new set of concepts that are challenging to grasp for stakeholders. Director C remarked that: "The challenge arises if one has established one’s own language and perspective that no one understands." This director remarked that a shared conceptual apparatus is required as a precursor to a mutual understanding – for the EA effort to gain momentum. Adopting a new conceptual tool is challenging. Director D argued that it may alienate the employees: "It is always alienating no matter what you are talking about, if you bring out a lot of professional expressions that people are not familiar with." In contrast, Architect E pointed out the importance of stakeholders learning this conceptual apparatus: "I think it is one of the success criteria, that there is a common language, and that we must understand how important it is with a term, conceptual understanding and a definition.

We saw that introducing new conceptual devices is not a particular challenge for EA. Section leader A explained that this problem arises in most cases where new concepts are introduced: "We have had the same process [when] establishing the portfolio management. [...] [it] is a maturation process.” This illustrates the complexity of the challenge; not only is it difficult to introduce a new conceptual device into a large and complex organization, but it becomes even more difficult when the organization already has many conceptual devices to relate to.
Secondly, several of the informants raised the issue of communication within the organization. There are very many highly competent employees that have a lot of knowledge about their areas of expertise, but this is poorly communicated throughout all of NAV. Architect C stated that "[...] a lot of good work is done in many places, but sharing good experiences, and really bad too, is the biggest challenge. [...] There are people who are incredibly skilled in their areas, but if they are unable to share [their knowledge] properly, no one else knows." We found that communication and experience sharing are good within the individual departments, but not optimal between departments. This is exemplified by Architect C: "[...] the [communication] is mostly on the IT side, and then we will have to see how the business side is brought in, when it's needed. [...] sharing experiences across business and IT can be better." Architect A corroborated this, saying that communication between business architects and other departments in NAV is inadequate.

Organizational challenges

This category deals with organizational challenges related to EA efforts. Firstly, many of the interviews indicated that there was a lacking mindset about cooperation between departments. In practice, the different departments function as autonomous entities - and offer few thoughts about their impact on the rest of the organization. Section leader C considered this an area of great potential improvement: "One of the things we deal with to work across the departments, is to not always look at each other as a customer/supplier. We must become much more interdisciplinary in the way we work." Architect B also experienced NAV as an organization where the departments work independently, without much interaction between them: "NAV is a strong line organization, very little matrix focus. A [horizontal perspective] has very little authority and power in practice, and the hierarchy in government organizations reinforces this." The current control lines are largely vertical, contrary to the mindset in EA. Section leader A noted: "When it comes to architecture governance, you move in different structures than you do in the line structure. So sometimes the management structures are a bit incompatible."

Secondly, the autonomy in NAV’s line organizations implied some conflicting interest. Several informants pointed out that the autonomy could create conflicts between stakeholders and groups of stakeholders. Director D conjectured that conflicts of interest are to be expected when introducing management structures that break with the old and known. From the lines, a business-driven development is desired, to meet the current client needs - something that is not necessarily optimal to meet future client needs. Architect E pointed out that it is important to see the organization from several perspectives and not just your own or your own department’s perspective, and that this also applies to enterprise architects.

Thirdly, we saw that NAV consists of several governing bodies responsible for different areas. The problems arise when the areas of responsibility overlap. Project leader A viewed this from a project perspective: "[...] there are two parallel silos here in NAV. It is the portfolio management and the enterprise architecture management. And as a project one must relate to both." This may indicate that the interaction between EAM and portfolio management has been poor until now. Section leader D pointed out that this has consequences at the operational project level: "The EA wants the projects to assess different dimensions in relation to the architectural requirements. They have [not been good enough] at coordinating with the project method, so that they inhibit the projects with different templates asking for almost the same thing. And [this leads to] frustration." Architect D corroborated this view, and stated that the lack of interaction between enterprise architecture and portfolio management creates frustration in the projects: "The enterprise architects have a little more overview of the long-term goals, while the projects have their scope and try to hit the golden middle way. [...] it's tiresome if they constantly have to provide updated project descriptions and descriptions of everything, instead of creating what gives immediate value." The lack of interaction creates "noise" in the projects and this will limit the projects’ progress.

Finally, several informants pointed out that the number of employees in the EA function was too few to exercise the role optimally. Architect C had his thoughts about the appropriate number: "I think they should have been a few more. They are very vulnerable when they are few, so it's a too bad that they are not a big [group]." This was supported by Section leader D: "Sad to say, but there is something about resources. There have always been very few people and it is demanding to recruit, because you often have [to offer quite high salaries] to get good enterprise architects. NAV have perhaps had one or two [of these], which is a bit too few for such a big business. We've never had the personnel we should have had.
to make this [become successful]." Not everyone agrees that there should necessarily be more employees in the enterprise architecture function. Director D noted that "[...] it is better to make yourself appreciated, and employ people when you see that this is [well-grounded] in the organization." In other words, the director believes that more people should also be employed in EA at a later stage, when the stakeholders have improved their understanding of what EA actually is about.

5. **DISCUSSION**

This study explores the implementation of enterprise architecture (EA) in the Norwegian Labour and Welfare Administration (NAV). While NAV had not defined any clear benefits a priori, the informants perceived 12 benefits when queried about potential benefits. We identified 16 challenges that the informants believed impeded the EA implementation.

We saw in the result chapter that NAV had a lack of focus on benefits, and no clear anticipated benefits had been defined prior to the implementation effort started. This is very unfortunate, but not surprising. The literature shows that the benefits first appear after the EA effort has been going on for a while (Kaisler et al., 2005; Lucke et al., 2010; Ylimäki, 2008). The literature has demonstrated that clearly defined benefits is important for IT implementation projects (Jusuf & Kurnia, 2017). Clearly defined benefits are very important to create commitment to a change program, and build the necessary support and momentum to overcome the resistance. We therefore propose that challenges would have been more appropriately addressed and alleviated if the anticipated benefits had been clearly defined and communicated to the organisation. We find that the lack of defined – and communicated – anticipated benefits partly contributed to the most significant challenges they faced, such as lack of commitment and ownership, hard to sell in, communication and insufficient resources.

The various benefits perceived to be most important for NAV are consistent with Jusuf and Kurnia’s (2017) literature review and expert perspectives. We found that these five benefits were most important to NAV based on the informants’ judgments: Common understanding of the organization; Better target definitions; Reduced complexity; Better decision making and Operationalization of the strategy.

We found that most of the challenges were associated with non-technical aspects such as environmental, managerial and organizational aspects. This is consistent with the literature, which has demonstrated that the challenges are rarely technical, but on the contrary, linked to organizational policy, project management and other organizational factors (Kaisler et al., 2005). We categorized only two of the 16 challenges as technical. We unveiled four environmental challenges that are not explicit among the success factors in the literature review in Jusuf and Kurnia (2017): Political control, Previously failed EA initiatives, Late into projects and Structure and professionalism. We propose that Political control and Structure and professionalism are interesting factors that warrants further investigation.

We asserted that four of the challenges were perceived as particularly significant: Lack of commitment and ownership, Structure and professionalisation, Conflicting interests, and Communication. We will therefore discuss these further.

*Lack of commitment and ownership* was as an important challenge. The literature emphasizes a strong commitment and ownership in the top management as well as throughout the organization (Jusuf & Kurnia, 2017; Lucke et al., 2010; Ylimäki, 2008). The EA effort in NAV is formally sanctioned by the top management, but the interviews revealed that the ownership is could be stronger both in the organization and in top management. This is a common problem in EA management, and is due to a lacking understanding of the EA concept, the value of it, and how to manage this value (Jusuf & Kurnia, 2017). Top management commitment is crucial – but a commitment to the effort throughout the organization is imperative for the effort to gain momentum and impact (Bernard, 2012; Jusuf & Kurnia, 2017; Lucke et al., 2010; Ylimäki, 2008). We found that this was challenging, and EA is yet not well institutionalized in NAV. NAV had not defined clear benefits to be achieved from the EA effort and the scope of the effort. In addition, stakeholders tend to lose commitment when benefits fail to materialize, while benefits from EA can only be expected in the long term (Fallmyr & Bygstad, 2014; Kaisler et al., 2005; Lucke et al., 2010; Ylimäki, 2008). We conjecture that this contributed to the lack of commitment.
Structure and professionalisation makes the line organizations operate as independent silos. It seems that the mindset from the time they were independent government agencies still prevails. If the line organizations do not agree with the definition of EA targets, they can in practice do as they please. A horizontal focus has very little power, and the hierarchical structure in government organizations reinforces this (Dang & Pekkola, 2016; Isomaki & Liimatainen, 2008). This silo mindset is a significant barrier to successful EA implementation (Ylimäki, 2008). It is therefore imperative that the EA effort is adapted to the organizational structural context (Isomaki & Liimatainen, 2008). The effort must also adapt to the stakeholders’ values and norms. Organizational cultures can last for generations – and can be difficult to change. The EA effort therefore need to build upon the strengths of the organizational culture (Smith, Watson, & Sullivan, 2012). This is also crucial for whether the various stakeholders will commit to the effort (Jusuf & Kurnia, 2017). This challenges also leads to the next one, Conflicting interests.

Conflicting interests between EA management and the line organisation and with portfolio management was a key challenge. EA management has a long-term focus on NAV’s future needs. Many of informants pointed out that this is in contrast with the line organizations’ short-term focus on clients’ requirements. In addition, the informants perceived that there was a problem with the coordination between the EA management and the portfolio management, where some of the participants perceived these two functions as separate silos, and their requirements either conflicting or overlapping. These findings are consistent with the literature (Dreyfus, 2007; Lucke et al., 2010; Weiss, Aier, & Winter, 2013).

Communication challenges was a major impediment to the EA progress. This challenge has also been reported in the literature (Banaeianjahromi & Smolander, 2016; Haki, Legner, & Ahlemann, 2012; Lucke et al., 2010). The literature demonstrates that poor communication can lead to active resistance towards a new initiative in an organization (Bernard, 2012). To facilitate the communication across the organization, it is important that all stakeholders are familiar with the concepts and language that is used. It is therefore important that the enterprise architects understand the various stakeholders’ lingo and are able to convey the EA message in their terms, and gradually develop the dialogue (Dreyfus, 2007; Lange et al., 2012). Research has demonstrated that the EA role is different from the previous perception of the role, where architects were seen as technically competent people – but not necessarily having business understanding or good communication and social skills (Smith et al., 2012). Several informants noted that the enterprise architect role in NAV had evolved – and now also incorporates good understanding of the business side and good interpersonal skills.

The abstract nature of EA makes it quite challenging to define the EA scope (Lucke et al., 2010; Ylimäki, 2008). Nevertheless, defining the scope has been found to be a critical success factor (Ylimäki, 2008). The EA scope definition is quite vague in NAV’s EA documents. We propose that the abstract nature of EA is a major reason for this. Several of the informants noted that EA should permeate the organization. Based on the inability to define the scope, one can question how realistic this is.

6. CONCLUSION

We have studied Enterprise Architecture Management in The Norwegian Labour and Welfare Administration (NAV). The ability to implement and manage EA successfully is important for NAV’s ability to innovate its services. It is therefore crucial for the digital transformation of this large government organization – and thus for the Norwegian public sector.

NAV had not created visions of the benefits to be reached through the EA effort, and had not been able to create enough commitment and momentum. The EA implementation was a quite challenging task, and has faced some serious challenges. The implementation of EA was hampered by several organizational challenges, most notably related to Structure and professionalisation, Conflicting interests, Communication, and lack of commitment and ownership.

Our research was exploratory and performed in one specific government organization. It has therefore limited generalizability, providing possibilities for future research. This research can serve as input for subsequent studies of EA implementation other public sector enterprises. It would be interesting to see if our findings are generalizable to such settings. Even if we cannot generalize the findings, the study and the findings should serve to enlighten government enterprises about the challenges related to enterprise architecture management.
7. REFERENCES


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