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Nuanced Responses to Enterprise Architecture Management: Loyalty, Voice, and Exit

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ABSTRACT: Enterprise Architecture Management (EAM) aims to deal with the complexities of information technology (IT) solutions and to achieve more organizational agility. EAM is a holistic approach to IT architecture, but the results of the approach have been variable. An under-researched aspect of EAM is how different organizational units respond to the call for a holistic approach. In this study, we investigate how different stakeholders in a large governmental agency connected to three on-going projects and their response to EAM initiatives. With a qualitative approach, we identify three options of response to EAM initiatives: (1) active compliance with the EAM strategy, (2) loyal but passive response, and (3) rebel solutions. We argue for the need of a more nuanced repertoire of actions for dealing with EAM and show how these responses are useful for understanding and managing successful EAM.

KEY WORDS AND PHRASES: Enterprise Architecture Management, IT architecture, organizational agility.
Introduction

In a broad study of success factors for Enterprise Architecture Management (EAM), Lange et al. [26] identified a set of factors and measures. In particular, they found that organizational anchoring, which is defined as the characteristics and conditions through which EAM is embedded in the organization to enable, drive, and influence an organization’s performance, was a core issue [26].

Organizational anchoring denotes the human and cultural aspects that are important in organizational change processes, but are not part of formal approaches such as EAM. For instance, while clear (oral and written) communication is considered an important factor in EAM, there is much less attention to the fact that employees may respond quite differently to the basically top-down logic of EAM. External factors have also been highlighted as an important factor to consider when working with EAM. This is necessary in order for the enterprise architecture (EA) to be developed with the internal as well as the external environment in mind. [37]. Yet, since EAM’s introduction in the beginning of the 1990s, EAM has been hailed as a holistic and feasible approach for organizations with complex and fragmented IT portfolios [5, 15, 35, 47]. It has also been proposed as a means to increase organizational agility [38, 40] and emphasis on organizational aspects has been highlighted [6, 26, 33].

However, the results have been less compelling. While there are some documented successes [3, 41], many EAM initiatives have been disappointments; they are not necessarily outright failures, but they seem to go on forever, without concrete results [14]. Limited understanding or lack of resources in EAM projects are often perceived as root causes to problems [12]. However, in 2014 Jason Bloomberg asked in Forbes: “Is Enterprise Architecture Completely Broken?” and commented;

Enterprise Architects have used various frameworks and other tools to document how their organization operates, often with meticulous detail. But to what end? (…). Common to most definitions is the notion that such architects must drive business transformation in their organizations. But the practice of EAM has become all about documentation rather than effecting business change. (…) The field of Enterprise Architecture must itself transform into a new, Agile Architecture in order to drive digital transformation effectively in today’s increasingly wired world [4].

Is the idea of EAM wrong, or is it the practical application of it that is the problem? One core issue, we think, is that most organizations are not “architected”; rather they grow and change organically as they adapt to outer and inner pressures and changes [27, 46]. Information technology (IT) architecture should be a means to enable this process, not hindering it; it should be flexible enough to include change, but stable enough to work as a foundation [22, 34]. This is easier said than done, in particular because most large organizations have hundreds of IT systems that form the backbone of the business processes.
Novel approaches have been proposed, in the form of new frameworks, such as “Agile Architecture” [2] and “Software Architecture for Developers” [8]. But architectural design has an uneasy relationship with agile practices; unlike system functionality, it cannot be divided into separate components or user stories. Systems overlap each other and are imbricated, which means different components are dependent on each other as well as influence each other [27].

Two aspects are lacking in these discourses. First, much of the EAM literature assumes that EAM is primarily about building new solutions, while in reality most organizations already have too many IT systems. The important architectural decisions of these existing systems were taken years ago and are difficult to change due to path-dependency [18]. Second, there is lack of an organizational perspective; after all, an organization is about the actions of its members. In order to improve EAM it is not enough to discuss frameworks and technological solutions, but we must also understand the social practices of EAM. Most of the normative literature assumes that organizational responses to EAM is about being “compliant” (i.e., loyal) or “not compliant” (i.e., disloyal or incompetent) to plans and architecture [35]. We believe that this perspective is too limited, because there are many ways to respond to an architectural initiative [13]. We therefor call for a more nuanced understanding of compliance. To develop our argument we build loosely on Hirschman’s [19] terms loyalty, voice, and exit. Hirschman’s concepts represent different ways of responding to change. In the case used in this study, the change is connected to Enterprise Architecture initiatives.

As a first step to limit this gap in EAM research, we set out to investigate the interaction between EAM and organizational responses. While EAM governance necessarily is a centralized activity [5], the practical response to the holistic schemes is done in departments and projects. The practical response is not only the actual changes in systems and processes, but also the feedback of experiences and new insights. While everybody would agree that it is essential for organizations to learn from their experiences, researchers such as Van Der Raadt and Van Vliet [44] have found that effective upward feedback is rare in EAM initiatives. To further advance the understanding of EAM as a phenomenon, and continue on Van Der Raadt and Van Vliet’s insights regarding communication and feedback connected to EAM initiatives, we aim to answer the following question: how do stakeholders, such as projects and other organizational units, respond to central EAM initiatives, and what options do they have?

In this paper we adopt a practice lens [36] and conduct an in-depth investigation of EAM and responses in a large organization. Using Hirschman’s [19] terms of loyalty, voice, and exit as sensitizing concepts [7], we identify three different strategies for response and discuss their significance for improving the iterative learning process connected to EAM development. A theoretical implication of this study is that the EAM research needs a more nuanced repertoire of actions for dealing with, and learning from, local responses. As for the practitioners, we
suggest that feedback from stakeholders should be more actively nurtured and considered in EAM initiatives.

Brief Overview of Enterprise Architecture Research

Usually the foundation of EAM is attributed to Zachman’s [47] paper, where he called for a holistic approach, while others point out the value of central transformation governance [5, 39]. The scope of the frameworks has increased significantly during the years; at the start a key objective for EAM was to clean up the IT infrastructure, while business issues gradually have become more important. Accordingly, research was mainly normative the first years, but in the later years we have seen more empirical and critical contributions. There are a large number of frameworks, but we deal with only three of them [35, 40, 47] in this paper. As shown in Table 1 we have identified four research streams in the EAM research, relevant for our research.

The frameworks stream consists mainly of contributions from key actors, such as Zachman and the Open Group. While Zachman’s [47] framework primarily was ontology oriented and focused on classification, the Open Group’s The Open Group Architecture Framework (TOGAF) quickly became the dominant framework, partly because it provided a full process for implementation and use. The current version is 9.1 and a significant number of the world’s largest corporations are users. An influential contribution was the framework of Ross et al. [40], Enterprise Architecture as Strategy, which focused more on business perspectives and established the operating model as a foundation.

The improvement stream consists of actors that are part of the academic EAM community, and usually more empirically oriented, for instance Kappelman et al. [23]. Tamm et al. [42] found that EAM creates value through four factors; organizational alignment, information availability, resource portfolio optimization, and resource complementarity. In the same line, Foorthuis et al. [15] showed that EA and EA practices do not deliver benefits directly, but through intermediate results, such as compliance with EA, and architectural insight.

<table>
<thead>
<tr>
<th>Research Stream</th>
<th>Key insights</th>
<th>Important contributions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frameworks</td>
<td>A holistic approach for IT resources is necessary</td>
<td>[47], [40], [35]</td>
</tr>
<tr>
<td>Improvement</td>
<td>The recipes of the EAM frameworks should be supplemented with other factors</td>
<td>[28], [42], [17], [26], [15], [6], [33]</td>
</tr>
<tr>
<td>Agile</td>
<td>We need new, agile frameworks</td>
<td>[38], [2], [21]</td>
</tr>
<tr>
<td>Critical</td>
<td>There are unresolved contradictions in the basic assumptions of EAM</td>
<td>[24], [30]</td>
</tr>
</tbody>
</table>
Recent insights by Röglinger et al. [39] emphasize the importance of preparation before implementation. It has been highlighted that EAM provides too little decision support [28] and Graves [17] argued that the strong focus on structure should be complemented with a narrative perspective. Niemi and Pekkola [33] identified EA process quality as a key enabler of EAM benefits realization.

The term agile EAM has been introduced as an alternative to the often slow and formal processes of AE and recent call for papers stress the importance of agility in relation to EAM [21]. However, by 2013, Bloomberg [2] argued that EAM should learn from the agile thinking of modern project management and practices. An example was reported in Forbes in 2014, where the IT designer of Netflix, Adrian Cockcroft explained their development strategy: “Our architecture was changing faster than you can draw it,” he pointed out. “As a result, it wasn’t useful to try to draw it” [3].

The critical stream has focused on more fundamental problems with EAM. Martin [30] found that implementation of EAM is indeed challenging. In federated organizational structures, architectural principles tend to lose against short-term business concerns and are thus basically ineffective. A deeper critique was voiced by Kemp and McManus [24], who found two fundamental problems. First, EAM is based on a top-down strategy that assumes that it is analytically and managerially possible to control everything at the operative level. Considering the overall complexity of current IT portfolios, this is not a realistic assumption. Second, the long-term view of EAM is incompatible with a rapidly changing world.

Communication in EAM Initiatives

EAM is supposed to facilitate communication between all affected resources, including external resources [22]. However, EAM initiatives are usually run in a top-down manner; a central team of enterprise architects run the process of developing and implementing the architecture, in co-operation with business managers and IT specialists [40]. In other words, EAM as a product and process is a mean for communication for everyone involved and affected. However, it is often a homogenous central group of managers and architects developing the EAM governance mechanisms (guidelines, principles, policies, etc.). Consequently, it is important for the EAM team to communicate with all stakeholders to understand the context and requirements of the EAM. Nevertheless, the normative EAM literature assumes loyalty by all stakeholders. For instance, TOGAF recommends Project Impact Assessments and Architecture Compliance reviews to ensure compliance [35].

An interpretation of this is that the central team involved in the development of EAM has a functional perspective of EAM, while the resources using EAM have a constructional perspective of EAM. They may be regarded as complementary since the centralized team asks “what is the architecture supposed to do” from
a management perspective while the users ask “how do we use the architecture” from a practical perspective [20]. Therefore, both the team developing the governance mechanisms and the people applying the mechanisms need to be involved in EAM initiatives.

The main mediating mechanism in an EAM initiative is considered to be communication [35, 40, 42] that connects EAM initiatives and guidelines. However, EAM communication is often described as a top-down, one-way communication where representatives of EAM command and control how, why, and what should be done. In particular, the normative framework, such as TOGAF [35] deals only superficially with the learning aspects of EAM initiatives.

According to Crossan et al. [11], a successful organizational change initiative is dependent on establishing an organizational learning cycle, that is, a process where strategic initiatives are fed downward in the organization, and experiences are fed upward again, in order to facilitate learning. However, the learning cycle of downward and upward feedback is difficult in an EAM context for two reasons. First, the link between the EAM team and the projects is often thin, vague, and vulnerable; a project has some key economic or organizational objectives, and EAM compliance is not necessarily a priority [9, 30]. Second, the meaning of “architecture” is quite different at EAM and project level; at EAM level architecture means a high-level view of the processes and technology of the whole enterprise. At the project level, however, architecture is about design choices related to systems and applications. Thus, the meaning of EAM may be difficult to understand for projects, and the relevance of project experiences, accordingly, may be difficult to assess for the central EAM team. Consequently, effective upward feedback is rare in EAM initiatives [44].

Analytical Lens: Loyalty, Voice, and Exit

Our theoretical lens for developing a more nuanced understanding on how to improve EAM initiatives is Hirschman’s work on loyalty, voice, and exit. Hirschman’s research contexts were firms and their relations to customers and members. In this context, customers and members have three options when responding to change, (i.e., higher price or reduced quality), namely loyalty, voice, and exit. Depending on the changes, a stakeholder can “make an attempt at changing the practices, policies, and outputs” [19, p. 30].

The three-response options Hirschman defined were Voice, Exit, and Loyalty. The voice option is defined as “any attempt at all to change, rather than to escape from … with the intention of forcing a change in management” [19, p. 30]. This can be manifested in different ways, for example raising the voice and articulating the opinion about the change. While the voice option requires communication from both sides, the exit option can be considered as an answer to one-sided communication. The result of the exit option can be “revenues drop, membership declines, and management is impelled to search for ways and means to correct whatever faults have led to exit” [19,
A person may delay the exit option if she feels that the voice option is likely to be successful. A result of the exit option is that management deciding the change never gets information about the reason of why people exit. The third option, loyalty, “can serve the socially useful purpose of preventing deterioration from becoming cumulative” says Hirschman [19, p. 30] and can be defined as passively waiting for conditions to improve.

Hirschman’s believed that the three responses influence, and are dependent on, each other in different ways. For example, he argues that “loyalty holds exit at bay and activates voice” [19, p. 30] and that “the presence of loyalty makes exit less likely” [19, p. 4]. These complex interactions and relations between exit, voice and loyalty are not applied in this study. Since our context is different we use Hirschman’s terms mainly as a sensitizing device [7]. In doing so, we make two assumptions.

First, we take loyalty, voice, and exit to be generic types of responses in situations characterized by difficult choices in organizations, regardless of context. For example, in an EAM context loyalty means to comply with the EAM policies and blueprints, voice means to actively oppose or challenge the policies, and exit means to ignore it or even go against EAM. If employees are loyal to an initiative, for example an EAM initiative, the implementation of the initiative can be done with little resistance and fuzz. However, if employees prefer to raise a voice and start a dialogue with EAM, the implementation requires more work. The exit option means that no communication exists between the initiative and the people that are affected by the initiative. An exit also means that less is learned for all parties because “the exit option is ineffective in alerting management to its failings” [19, p. 78] and the employees remain uninformed about what is going on.

Second, we take all three responses to be legitimate, that is, they are rational and sensible choices, depending on the individual’s situation and options. While the normative EAM literature [35, 40] is focusing on compliance (and deviances from it), we believe that voice and exit are frequently happening in many organizations, and that the governance and EAM literature needs to deal with these phenomena, not just trying to outlaw them. Moreover, we argue that dealing constructively with voice and exit might be exactly what the EAM field needs to overcome its current crisis expressed by, for example, Bloomberg [4].

Method

The study was conducted at a governmental agency (hereafter referred to as the Agency) being accountable for long-term planning and operations of a national transport system, including responsibility for the national railway system and the state road network. Historically, the Agency has been responsible the country’s roads and rails since mid-19th century, including all physical structures connected to them. The responsibility of the Agency is clearly seen in the organizational structure of the Agency where one division is responsible for planning the physical
infrastructure, one division is planning traffic on the physical infrastructure and one is responsible for maintaining the physical infrastructure. These different silos had worked more or less autonomous since the establishment of the Agency. However, lately the Agency’s responsibility has broadened to include digital infrastructures connected to the country’s transportation systems and with this, a large number of different IT solutions and systems has been developed, established and used. With the increased digitalization, it became obvious that the different groupings no longer could work isolated from each other, but instead were much more dependent and intertwined with each other.

Digitization of the transportation system and the digitalization of the Agency, in general, have grown to be a major concern, that is, tasks such as collecting, manipulating, and distributing data to a diverse set of internal and external stakeholders have become central activities for the Agency. In addition, stakeholders, such as end-users of trains and cars in cities and countryside as well as big logistic and transportation companies, both need, want and require new types of digital information and services due to digitalization.

Data Collection

During an initial meeting with people involved in the EA initiative we, that is, the researchers and key people from the EA imitative, identified three projects that had different characteristics (see Table 2); one project was big both in size and importance (Facility), another was small and rather isolated with only a few people involved (API), and the third affected people from all different organizational silos because it handled billing from the Agency to their different customers (Billing). The EA initiative was involved more or less in each project. The involvement will be described in the empirical findings.

The data collection rests on three collecting methods and triangulation [14]: semi-structured interviews, focus group discussions, and written documentation [25, 32]. In the period 2013-2015 we conducted 8 interviews and 10 focus group sessions (See table 3). Each interview lasted approximately 60 minutes, while the focus

<table>
<thead>
<tr>
<th>Focus on involved structures</th>
<th>API</th>
<th>Facility</th>
<th>Billing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usage</td>
<td>Digital</td>
<td>Digital and social</td>
<td>Digital and social</td>
</tr>
<tr>
<td>Main stakeholder</td>
<td>External</td>
<td>Internal/External</td>
<td>Internal</td>
</tr>
<tr>
<td>Project size</td>
<td>Third party</td>
<td>Supplier</td>
<td>Customer</td>
</tr>
<tr>
<td>Organizational owner of the project</td>
<td>Small</td>
<td>Big</td>
<td>Limited</td>
</tr>
<tr>
<td></td>
<td>Planning traffic on the physical infrastructure</td>
<td>Maintaining the physical infrastructure</td>
<td>Planning the physical infrastructure</td>
</tr>
</tbody>
</table>
group sessions were two hours long. Participants in the focus groups and interview respondents were connected to either the EAM initiative or to one of the three projects we studied.

The semi-structured interviews mainly focused on the central EAM’s relation with the three different projects, but also on how the agency handled information technology from a more general perspective. We could also draw on more detailed information from the interviews about each project since all respondents were involved in at least one of the projects and knew about social and technical details connected to the different projects. Having the focus group discussions improved our understanding of each project and its connection to other projects as well as to the Agency in general. The discussions also gave us insights and new perspectives of the projects and about the overall EAM initiative at the Agency. The focus groups were all recorded and summaries of the discussions were documented. The EAM initiative and the three different projects that are included in the study were well documented. Hence, relevant project plans, PowerPoint presentations and reports connected to the projects were collected continuously throughout the data collection phase.

### Table 3. Overview of Informants and Focus Groups

<table>
<thead>
<tr>
<th>Role of respondents</th>
<th>Organizational unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT strategist</td>
<td>IT organization/EAM</td>
</tr>
<tr>
<td>IT strategist</td>
<td>Maintenance</td>
</tr>
<tr>
<td>Main architect in project</td>
<td>Maintenance</td>
</tr>
<tr>
<td>System engineer</td>
<td>Traffic management</td>
</tr>
<tr>
<td>Enterprise architect</td>
<td>IT organization/EAM</td>
</tr>
<tr>
<td>Enterprise architect</td>
<td>IT organization/EAM</td>
</tr>
<tr>
<td>Enterprise architect</td>
<td>Maintenance</td>
</tr>
<tr>
<td>Group manager</td>
<td>Traffic management</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Themes for focus group discussions</th>
<th>Number of attendees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enterprise architecture</td>
<td>7</td>
</tr>
<tr>
<td>Enterprise architecture</td>
<td>&gt;10</td>
</tr>
<tr>
<td>Facility project</td>
<td>4</td>
</tr>
<tr>
<td>Billing project</td>
<td>3</td>
</tr>
<tr>
<td>API project</td>
<td>2</td>
</tr>
<tr>
<td>Enterprise architecture</td>
<td>2</td>
</tr>
<tr>
<td>Enterprise architecture</td>
<td>10</td>
</tr>
<tr>
<td>Billing project</td>
<td>3</td>
</tr>
<tr>
<td>API project</td>
<td>6</td>
</tr>
<tr>
<td>Facility project</td>
<td>5</td>
</tr>
</tbody>
</table>
Modes of Analysis of the Empirical Data

Our analysis was based on abduction [29] and was inspired by a grounded approach [10], where we iteratively searched for patterns in the empirical data together with using different theories as sensitizing devices [7]. The analysis started with establishing a chronology and identifying the main themes and trends [31] for each of the three projects included in the study. This assisted us in getting a better understanding of the context we studied. For example, when analyzing the transcriptions, we used open coding when noticing problems the project teams faced. For example, our first phase of coding included codes like “lack of information” or “fuzzy guidelines.” We also recognized what the different projects wanted to accomplish (i.e., more “open innovation possibilities” or “process implementation”), acknowledged a project’s position (i.e., “high risk project” or “periphery project”), and reputation within the Agency (“well-known project” or “unknown project”), and distinguished current topics under discussion in the project (i.e., “struggles of recognition,” “establishing relations with external stakeholders”). When recognizing these struggles, accomplishments and relevant details, we turned to the literature in order to be sensitive to the empirical data in relation relevant research [29]. For example, we used Baldwin and Clark’s [1] theory regarding mirroring and fundamental isomorphism in order to better understand the organizational structure and its responsibilities.

The semi-structured interviews assisted us with details, the workshop discussions gave us an overview, and the documentation often confirmed our interpretations of the interviews and discussions, or gave us more detailed information [14]. All the details were written down in a table in order to keep track of everything. We continued our analysis by developing data displays [31] to find patterns in the empirical data. When iteratively analyzing the empirical data and reading relevant research [45] we identified “golden nuggets” [16] that drew our attention and that we decided to focus on more in detail. These “nuggets” concerned how and why the different projects responded to the EAM initiative.

Drawing on the first analysis, it was possible to identify different responses to the EAM initiative. Each response was analyzed in depth; we mapped how the downward communication was conducted, how the project team interpreted and their response. We also tracked whether the response was registered by the EAM group.

Continuously cycling between the empirical and conceptual [45], we realized that Hirschman’s theory about Exist, Voice, and Loyalty [19] fitted well when trying to understand and explain the empirical data.

Empirical Findings

Our findings describe and analyze the interplay between the central EAM initiative and the three projects.
EAM Initiative

For a long time the silo-based organization had developed different IT solutions for each need that emerged, leading to a complex portfolio of systems. To overcome the situation the EAM initiative, established 2010, aimed at developing an enterprise architecture that would help the Agency’s capability to “create IT-solutions that support the organization and the efficiency challenges, to steer so that different groups and projects within the agency pull together, create IT-solutions that enable better management of common requirements, to manage information and data in an efficient way, to use common and recyclable solutions rather than local solutions, to discourage overlapping initiatives that limit the challenge to achieve set economical goals for usage of IT” (Citation taken from EA initiative documentation). This initiative aimed at overcoming problems with existing systems that overlapped in functionality and/or output, lacked in consistency or had poor data quality.

Previously, there had been no overall plan for the development of IT solutions. Several goals were therefore set for the EAM initiative, including the most important goals of moving focus “from product- and application to agency- and information, when procurement of IT solution should recycling and standardization be pursued, information should be treated as one strategic resource and should therefore be managed as a valuable resource, IT solutions should have a low grade of unnecessary duplication, the focus should be on integration and information management with high accessibility and reliability.”(Citation taken from EA initiative documentation).

To fulfil set goals, a gap analysis was conducted and action plans were developed. The EAM team began by asking certain stakeholders the strategic questions of how to continue the development of different IT solutions, instead of telling people what to do. This slowly improved the awareness of the situation within the organization and made people more open to listen to their messages. It became clear after a while that the EAM project was more than a project with a definite deadline. An EAM group was therefore established and included in the central unit of IT. The group worked with short- and long-term strategies. For one, some of the suppliers they had to work with will supply the Agency with IT systems that will be used until 2030. It was, therefore, essential that guidelines and directions were open enough for the unknown future but at the same time specific enough to be used as guidance in on-going projects. The EAM group developed documentation that supported and guided the Agency and the different on-going IT projects. With much energy and focus, the group aimed at guiding the Agency in its digitalization journey by reaching out in the organization and communicating their developed guidelines and directions.
Project 1: Facility

The Facility project aimed to structure and manage facility information, that is, information on all physical objects included in the national road and rail infrastructure. There was a large number of stakeholders, both internally in the organization as well as external partners, who needed this type of information to be able to plan for current and future traffic. One identified challenge was that there were often one IT solution for each kind of information, type of facility, area of interest, geographical position, and more. In other words, there were many separate systems, each developed for a specific purpose for a specific group of people. A scanning counted to more than 40 different solutions included in the IT architecture for planning traffic using the Agency’s facilities, and none of them were considered as the owner of master data. In addition, the necessity to combine information expressed in different ways, from different IT solutions, to be able to plan, was yet another factor to manage. As an attempt to get an overview of all the different systems and how they were dependent and intertwined, they developed a system map that they referred to as the “migraine map” because when looking at it, you got a migraine (see Figure 1).

Consequently, there was a need to get an overview and organize all the different solutions to (i) being able to deal with facility information in a structured way, (ii) to find a way to manage information in a unified way of working instead of silo oriented, and (iii) to enable all (known) stakeholders to acquire information when

Figure 1. Migraine map - an overview of how different IT systems within the Agency were dependent and intertwined on each other
needed. The challenges were not limited to the silo structures; the quality of the information was also questionable, in many cases information was missing or incomplete.

Another challenge was that the project was supposed to implement changes simultaneously as all systems were in use 24/7. As expressed by an IT architect involved in the Facility project; “We need to rebuild the factory while the factory is running.” Different organizational units within the Agency were dependent on the information included in the Facility project along with different dependencies between other system solutions. Consequently, changes in one IT system may have effects in other IT systems or on the information required for planning a certain traffic situation.

Since the general EAM initiative was still in its early stages, there was minimal support from overall strategies, and it was unclear which guidelines to follow within the project. One manager with the responsibility for the overall architecture of the project started to look for documentation that would guide him on how to proceed. He found some documentation but he also established a direct contact with the EAM group and got a person from EAM assigned to the project and started a dialogue. The manager explained:

The project needed technical competence and I can work as a sounding board to them, plus that I have the responsibility to ensure that the whole is held together in terms of architecture. I am the contact towards enterprise architecture, so we have a person at the EAM office and one in the project that keeps in contact.

Providing information regarding their situation to EAM group helped the EAM architects in developing guidelines. In this way, the project complied with EAM strategies and aligned with guidelines provided from the EAM group. This meant that the outcome of the Facility project was not only an IT solution for this specific project, but became also an example of the organization’s EAM strategy in general. The newly established communication channel between the Facility project and the EAM group in terms of dedicated people focusing on both the project as well as the EAM initiative fed the organization with helpful information. More specifically, as an outcome of the co-operation and dialogue with the EAM group, a decision was taken to develop an integration platform that could facilitate information exchange between different systems and stakeholders.

Project 2: Billing

The Billing project had two goals: (i) to invoice the railway companies using the national network and, thus, finance parts of the Agency; and (ii) to be used as a means to influence on the behavior of the railway companies through pricing policies.

When trains use the rail and the connected infrastructure, the train companies pay a fee dependent on different factors. These factors include the train itself, how
much it weighs, how long it is, how old it is, how the rail is used, from where the train is going to where, the time of the day it is going, the areas it is passing through, and so forth.

The process to calculate the fee and then send out the invoice and receive payments affected different organizational units within the Agency. Each organizational silo had IT systems with some elements required for billing. But since the various IT systems were not developed for the billing process, but had other main purposes, this caused problems. For example, the data entered into a system was designated for the specific purpose of collecting data regarding dangerous goods transported on the rail and not for the billing process. Consequently, the systems included in the billing process could have incomplete or incorrect data required for fee calculation. Also, the people working with the systems were not always aware that the data they entered were being used in the billing process. This sometimes resulted in errors and problems for the billing process, because the billing team was excluded from the information loop when the different systems, or data in the systems, were changed. This was problematic because the organization had to, by law, follow regulations for billing, and if the fee was wrong the Agency broke the law.

Since the billing process included several organizational units, there was no natural owner of the process and the people working with the billing project had to be innovative. A participant of the project expressed it as:

This is a new area to work with. Because there is so much going on we see the possibility to use this opportunity to think different.

The project team working on establishing a process for the billing had limited power to influence what was being done to a specific system used by another organizational group since the system was designed for other purposes but billing. This was frustrating, because they had no power to make any technological adjustments on any systems included in the billing process.

Yet, although the project had limited possibilities to influence different systems and people, the team followed the provided EAM guidelines when working with the billing process. They focused on negotiating on how to improve the process without intruding on someone else’s space too much, and at the same time implementing EAM guidelines and directives. The project was dependent on other employees’ goodwill to help the project by doing adjustments in different required systems and assist with necessary support. Innovative thinking, negotiation, and positive feedback were the “currency” they could use when trying to discuss possible changes to a system that were included in the billing process and at the same time stay loyal to the EAM guidelines. The billing project had no budget for anything but themselves as a project group. The project’s position, as distanced from the different IT systems and groups across the organization and with no budget to pay for either resources or technical adjustments, resulted in a rather isolated response both toward the people involved in the process but
also to the EAM initiative. The loyalty from the project to both sides, the EAM and the people involved in the billing process, was not recognized even though the project was successfully implemented.

Project 3: API

The main goal of the API (Application Programming Interface) project was to make data available for external stakeholders and third-party developers who want to develop apps based on open data provided by the Agency. The origin of the project was that third-party developers asked for traffic data for mobile apps that could solve customer needs. However, there was no possibility for these developers to access these data except for “scraping” existing official websites displaying the data. The problem was that if the website changed, the application would not work anymore. At one time, an application caused fatal errors on one of the Agency’s website because of an endless loop of requests to the website from the application.

As a result of these problems a new project was initiated. The API project was a small project run by a 3-5 enthusiasts with scarce resources. The involved people were young compared to the rest of the employees at the Agency, and were less interested in the physical transport system as such, but instead focused on utilizing what digitalization enabled. It started out as a test, as the Agency tried to understand what kind of data was needed, how to provide the data and with what means. In December of 2012 it was decided that API’s should be developed and openly published for any external stakeholder to use.

The API solution was open-ended and had no specific information or systems connected to it, it simply permitted developers to ask for specific information available in different systems. The solution allowed for flexibility from the Agency perspective, as well as from the developers’ perspective. The basic logic of the solution followed an ETL (Extract, Transfer, and Load) process. That is, it extracted data from different sources within the Agency, these data were transformed into a proper format that complied with the API and was then downloaded into an object-oriented database. The solution developed was constructed so the Agency did not have to consider if a certain API belonged to a specific system and the developers could use the API to ask for specific data since the API was not pre-specified.

However, the API project required some technological solutions that were not available within the Agency. Also, the solutions were not included in the pre-specified solution lists provided by the EAM group. Instead of discussing this with the EAM, the project simply acquired the technology they needed from external resources. The technology they used were often based on open source solutions and well established in the open innovation community. The small project worked independently and more or less in isolation, having no change requirements on existing systems or getting any information from the EAM team. One developer commented:
No, we haven’t received any information (from the EAM team) or an assigned (EAM) architect. We have had that role as well. … It is often very difficult to affect someone else’s project. They have done it their way and then we have to adjust instead.

They could continue their work because they adjusted their solution to existing solutions, not involving or communicating with people inside the Agency more than necessary. Instead, they had much communication with third party developers to understand their needs and requirements. The API team was not well known within the Agency because they did not make much noise about how and what they did. Instead, they continued their work in their own way like rebels. They acquired the software they needed, communicated with third party developers and the open source community and developed API’s according to their own experience and knowledge, not asking for, or receiving, advice from the EAM initiative.

Summary of Findings

Although the three projects were expected to comply with the EAM initiative we can see three different types of responses to the initiative. The Facility project cooperated with the EAM group, by having a dedicated EAM person involved in the project and together co-developing EAM guidelines. Oppositely, the API project was not paying much attention to EAM guidelines and directives. Instead, the project was making its own rules based on the open data community and using open source solutions not included in the EAM directives. The Billing project followed existing guidelines loyally even though they did not make any technological changes, but established a cross-organizational process. Table 4 shows an overview of the different projects and how the communication worked for each project.

What we can see are different mechanisms mediating between top-down and bottom-up projects connected to the EAM initiative. Mechanisms mediating a top-down project (Facility) are based on communication and include alignment, control, and holistic perspective and responds with further development of EAM. There was a two-way communication between the EAM’s and the Facility project, and they

<table>
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<th>Project</th>
<th>Downward governance</th>
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</tr>
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<tbody>
<tr>
<td>Facility</td>
<td>Frequent communication</td>
<td>Frequent</td>
<td>Critical compliance</td>
<td>Voice</td>
</tr>
<tr>
<td>Billing</td>
<td>One-way communication</td>
<td>None</td>
<td>Loyal, but isolated</td>
<td>Loyal</td>
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<tr>
<td>API</td>
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<td>None</td>
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have a common goal of reducing complexity and dependencies by developing new solutions, for example an integration platform.

The bottom-up project (API) remained independent, flexible and agile with little influence on, and from, EAM. Instead they relied on the open innovation community that existed outside of the Agency. The API project could work this way because their solution was based on extraction of data, and had no consequences for other systems. There was limited communication between the EAM initiative and the project, because the API project was small and did not affect other systems. Mediating mechanisms were non-existent.

The “in-between” project, the Billing project, was loyal but with little influence in either direction. In other words, it was one-way communication where the Billing project loyally applied the directives the best they could, but gave little feedback. The mediating mechanism that makes the project accomplish its commitment was the establishment of new social structures throughout the silo-based organization. The Billing-project was dependent on the relations to people responsible for, or working with, the different systems that were included in the billing process and their good will of making necessary adjustments.

Discussion

The three projects highlight the organizational anchoring problem of EAM [26]. We return to our return question; how do stakeholders, such as projects and other organizational groupings, respond to central EAM initiatives, and what options do they have?

In this section we discuss the results in the light of Hirschman’s terms of loyalty, voice and exit, offering three alternative responses to EAM initiatives. First, a project can choose to be loyal to the EAM initiative, that is, to follow the EAM guidelines, assuming that they are sensible and helpful. Second, a project can, if its members are not satisfied with implications of the EAM guidelines, choose to voice a protest, that is, to engage in an internal discussion on the principles or implementation. Or, third, a project can ignore the EAM initiative (“exit”), and design solutions that are independent of, or in conflict with, EAM. Our position is not to regard the three different responses as problems to be solved, but rather to identify them as opportunities offered to the EAM team, and to EAM research. Our argument is summarized in Table 5.

Voice and Co-Developed Strategies

The response in the Facility project is characterized by critical compliance; that is, the project team accepts the EAM authority and overall policy, but disagrees in several specific matters that are important for the project.

As we observed in the Facility project, they perceived the guidelines as being too vague and not sufficiently specific. Facility was expected to integrate a number of
existing systems, and many questions arose that were not dealt with by the policies. Fortunately, the EAM team responded wisely to this critique by two measures: they made one enterprise architect a permanent part of the project team, and they decided to use the project as a learning arena. With continuous two-way communication, listening to each other, discussing and negotiating, new EAM directives were developed. Although this can be a slow process, especially if many people are involved, it is well controlled and the outcome is holistic.

Overall, this solution worked well, and illustrates a salient point. The recommended TOGAF governance mechanisms, such as Project Impact Assessments and Architecture Compliance reviews to ensure compliance, tend to be mostly top-down and focused on control. However, the organizational learning cycle of which a successful EAM initiative depends on requires frequent feedback from the on-going projects. That is, we recognize how bottom-up communication, listening and communicating with on-going projects, is valuable when developing EAM strategies for an organization.

One aspect of having an architect included in the project team deserves a comment, because the architect may feel somewhat trapped between being loyal to the EAM group or the project manager. Van Der Raadt [43] argued that “In order to perform their tasks properly, architects should not be subordinate to project managers who have to defend the planning and budget of individual solution development projects” (p. 22). However, in practice this is incongruent with the way projects are usually run, and most project managers would protest, arguing that a project needs to balance various requirements [19].

**Loyal and Understanding Local Innovation**

The normative EAM literature assumes compliance with central policies, without going into depth of the necessary learning cycle [35]. This sentiment is usually shared by the EAM group, who is often busy with the complex task of putting all the pieces together and assessing new project initiatives. As a result, from the view of the EAM group a project that is loyal to EAM policies is just perfect. However,
one problematic issue with the loyalty approach is the lack of upward feedback to the EAM group, since the loyal project often will comply with the policies and quietly solves its business and technical needs without much communication. The Billing project was an example of this response, where the project team worked in relative isolation.

What the EAM Group misses in this case is the opportunity to understand how the project team deals with these policies. For example, in the Billing project we observed how the team found innovative solutions within the prescribed architecture. The Billing project worked hard to establish relations to people required to be included in the billing process. This highlights the necessity of connecting different groupings, more or less, connected and/or dependent to EAM initiatives. This ought to be interesting input to the EAM group, not only to widen the horizon for the EAM and get input from different groupings within the company, but also because it is important for the success of an EAM initiative that the architecture allows for local innovation. The project also illustrates how much can be done with minimal change in the technical architecture, but instead focusing on establishing new processes and changing social structures.

Exit and Development of Generic/Standardized Interfaces

The API project chose to ignore the EAM policies, and instead solved its needs by designing solutions that may conflict with them. There may be various reasons for this; for example, the project might feel that the EAM policies are not relevant, that external stakeholders, such as third-party developers from the open innovation community, was neglected, or that there are organizational priorities that simply overrule the EAM guidelines.

In this project, we observed that the project chose to ignore the EAM guidelines, and designed a quite innovative solution by implementing new technology (object-oriented database) and bypassing existing systems. In their development, they looked at the open innovation community, learning and being inspired from how and what they do. The EAM team chose to ignore the project, maybe not intentionally, but still, there was no interest in the project and no communication between the EAM group and the API project. This was, in our opinion, a pity. The potential learning opportunity for the EAM group was considerable: first, they could have learned how an innovative team used new technology, and second, the EAM people could look more outside of the agency and learn from external resources, as in this case, the open innovation community (an unconventional yet successful community). Third, they could have generalized their experience into developing guidelines, or designing, more general solutions, such as a platform for API interfaces.

Bloomberg [3] argued that future agile EAM is dependent on more loosely coupled components and services, because nobody can predict the needs of the future, and local designers should be allowed to recombine elements innovatively. Thus, the rebel, but competent initiatives should be considered integrated in the
overall EAM efforts. This is not to say that anything goes, but that the EAM group should focus on learning, not control.

Contribution and Limitations

Our investigation identified three generic response strategies to Enterprise Architecture initiatives; loyal (complying with EAM guidelines); voice (accepting EAM authority, but communication disagreement on some aspects); and exit (ignoring the EAM guidelines). We believe that the three responses discussed here are not necessarily problems, but constructive inputs to a discipline in crisis. As Bloomberg [3, 4] argued, a key problem of EAM is a general overemphasis on analysis and models and a lack of agility and learning. We argue that this insight has both theoretical and practical implications.

The theoretical contribution of this study is a response to the call for deeper organizational understanding of EAM [26, 33, 44]. We follow the argument of Kemp and McManus [24], that EAM is based on the assumption that it is analytically and managerially possible to control everything at the operative level. Particularly in a turbulent environment it is clear that this is too ambitious and may even harmful to innovation. Therefore, the key to successful EAM is not necessarily compliance, but flexibility. Our findings highlight that the EAM frameworks (i.e., TOGAF and the others) need to be supplemented with the insight that successful socio-technical change is the result of not only top-down implementation, but also of continuous learning and adjustment. For the EAM process this means to accept friction, compromise, and, in particular cases, even rebellion. This is not a defense for anarchy, rather it highlights that EAM is a means, not an end, and should be wisely managed.

The practical contribution is the advice for EA managers to extend their managerial repertoire, in line with Bloomberg’s [3] argument that iterative learning and frequent feedback is a prerequisite for a successful EAM initiative. While most of the EAM frameworks emphasize compliance as a success factor, our study highlights that other responses should not only be tolerated, but also be leveraged as opportunities for learning. The three response types should not be seen as resistance to be overcome, but should serve as input to a discipline which is in need of renewal. Thus, we have chosen to explore the three responses as opportunities for the EAM team to rethink their implementation approach. We suggest that EAM initiatives actively take into account feedback from stakeholders and consider local responses as learning opportunities in the development of EAM. The central EAM team should be ambidextrous, exploiting and exploring, and learn from project responses, instead of trying to control them. For managers, the importance of mediating mechanisms that enable more communication is important in order to achieve this.
Conclusion

Bloomberg [4] described EAM as a discipline in crisis. This may be somewhat overstated, but it can be argued that EAM, both academically and practically, needs an overhaul.

Our contribution to the IS discipline is a request for a deeper organizational understanding of the EAM process. Current literature is too one dimensional with a top down perspective. It is of essence that everyone involved in EA projects understand the importance and necessity of a broader repertoire of managerial responses to EA initiatives. That is, it is not only a top down process, but processes that requires communication both ways in order to prosper and succeed. We claim that establishing possibilities for two-way communication, and constant learning for everyone involved and effected, will empower the project. We emphasize that EAM is as much about people as it is about technology.

Also, we want to bring light to agile development in EAM research and practice. EAM needs to leave its obsession with compliance, and embrace modern agile approaches to management. This means that iterative learning and frequent feedback is a prerequisite for a successful EAM initiative. It also means listening to, and learning from, external resources, including informal groupings such as the open innovation community. It should not, however, leave its holistic view of the organization and the IT resources, but strive for a better balance between exploiting and exploring.

Note

We did not aim for a complete overview of the EAM research, but to identify the key contributions relevant for our research. The four streams were identified as follows. Using Google Scholar we systematically charted the citations of the EAM framework publications. From this we constructed citation trees, and grouped the most cited and relevant publications into the four streams.

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