Introduction to BASE Enterprise Architecture Framework for Holistic Strategic Alignment of the Complex Enterprise

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Abstract: There are many enterprise architecture frameworks on the market, but despite being heavily promoted with promises of their expected benefits, in practice they have not proved to deliver expected value. The main reason for this is IT-oriented controlled reductionist approach inapplicable for a complex enterprise. In parallel with IT-oriented enterprise architecture business architecture was developed to support business strategy. But, as a pure business discipline, business architecture also did not prove to deliver expected value because, in a complex enterprise with business, which is highly dependent on IT, it is impossible to decouple business from IT because your business is your IT. This paper will, therefore, introduce the new Business Architecture-based Strategy-driven Enterprise architecture framework (BASE) for improving holistic strategic alignment of the complex enterprise by supporting both formulation and implementation of the enterprise strategy. As foundation of the BASE framework, which will be further explored in future work, this paper will present a business architecture-based enterprise architecture model for managing the complex enterprise, based on business architecture also providing business-adjusted IT insights, and *holistic initiative footprinting* methodology which will illustrate how to leverage business architecture and proposed EA model to properly scope strategic initiatives already early in the process.

1 INTRODUCTION

According to Conant-Ashby Theorem, "every good regulator of a system must contain a model of that system" (Conant et al., 1970), meaning that our ability to manage situation or organisation depends directly on how good our model of that situation or organisation is. We are, therefore, not able to manage what we do not understand, except by luck (Hoverstadt et al., 2013). For small companies, this has never been an issue because it was possible for an individual, usually the owner or head of organisation, to be confident enough to say that he really understands how his business works. For many organisations this has changed. Over the years they grew and merged, becoming more and more complex, increasing complexity in people, processes, and IT. So, it became extremely problematic for business leaders to have a proper understandable model of their business on top of all underlying business and IT complexity. And, as mentioned before, without a proper model we can rely only on luck. In big organisations nowadays this often means making business and strategic decisions based just on gut

feeling without properly understanding the scope and the impact.

The hypothesis of this paper is that only enterprise architecture (EA) can provide the proper model of the complex enterprise to support the enterprise both in formulation and implementation of the new strategies and that EA with that model can help better estimate and execute strategic initiatives.

Accordingly, and in follow-up to the findings and recommendations for the future work of EA research from the 2018 study "Business strategy modelling based on enterprise architecture: A state of the art review" (Kitsios and Kamariotou) the objective of this paper is to answer the following research questions:

RQ1. "What support can EA provide within business strategy, and on what conception of business architecture is this based?" (Kitsios and Kamariotou, 2018).

RQ2. What kind of model should enterprise architecture provide to support business strategy in the complex enterprise?

RQ3. In the complex enterprise, how can enterprise architecture provide decision makers with better

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early scoping of strategic initiatives to know what to expect later in the implementation, get better estimates, and help avoid failed initiatives by validating strategic direction already early in the process?

This paper will be used to give introduction to Business Architecture-based Strategy-driven Enterprise architecture framework (BASE) with first two chapters explaining the concept and the background for the framework. As a foundation of the BASE framework, which will be further explored in future work, the paper will present a business architecture-based EA model for dealing with the complex enterprise. The paper will than propose *holistic initiative footprinting* methodology for early scoping of strategic initiatives. Strategic initiatives are initiatives through which an organisation translates into action its strategic direction (plans which need to be executed to progress towards companies' vision). The proposed methodology will illustrate how to leverage business architecture and the proposed EA model to enable early discovery of E2E dependencies of strategic initiatives and show how a proper early scoping can provide better estimates on effort, timeline, and money, and help to know what we can expect later in the implementation. And help validate strategic direction already early in the process to avoid failed initiatives.

2 ENTERPRISE ARCHITECTURE

Enterprise architecture with enterprise architecture frameworks (EAF) aroused in 80s and 90s to remedy chaotic situation caused by unplanned approach to information technology (IT) implementations on enterprise level (Kotusev, 2016). Although being upgraded in the later versions with gradually introducing "start with the business" approach, the foundation of the most EAFs are still systems and technology with focus on control of the enterprise IT. This implies a reductionist approach to the enterprise, treating it as a static enterprise-level IT system, whereas EAFs tend to break the enterprise down into its component parts, applying the theory that the parts must be understood to improve the whole (Bloomberg, 2014). According to McDowall (2019) this approach is not well-suited for the enterprise architecture in modern, agile organizations and the main reason why traditional EAFs do not deliver practical value (Kotusev,2021). Instead, McDowall (2019) proposes approaching an enterprise as a complex adaptive system (CAS). CAS is a system without a central management that consists of multiple interconnected

agents whose mutual interaction causes emergent system behaviour as adjustments to its environment. Examples of such systems are flock of birds or ant colony. Behaviour of CAS cannot be explained by understanding its components, but only by understanding system as a whole, i.e., holistically. Unlike centralised, controlled and reductionist system approach of traditional EAFs, McDowall´s EA, with enterprise treated as a CAS, better fits to complex, modern, agile organizations because it focuses on business needs and supporting system development by setting clear goals and leaving implementation details to the team. Kotusev (2018) proposes a similar approach comparing EA practice to city planning. Both organisations and cities cannot be perfectly planned in every detail, both are evolving without definite final state and are limited by their current structures.

However, a CAS system is defined as a system without central management which is the premise that cannot apply to a modern enterprise. This is because success or failure of a modern enterprise cannot depend solely on how well it fits or not to its environment because it also highly depends on its central strategic management. Therefore, along with the premise of the need for adaptability, holistic optimization, and goal-oriented management that fits to the CAS approach, this paper also aims to emphasize the importance of the centralized strategic management as the main anchor of the complex enterprise execution. Next chapter will elaborate on the notion *complex enterprise* which fits to this concept.

2.1 Complex Enterprise

In 1999 Dave Snowden created Cynefin framework for aiding leaders in decision making. Framework was initially developed in the context of knowledge management and organisational strategy. Cynefin offers decision makers "sense of place" from which they can assess their perceptions, understand the behaviour, and properly respond applying techniques applicable for the situational decision-making domain they are in. Cynefin is based on the notion that "*humans use patterns to establish order in the world and make sense of things in complex situations*" (O'Connorand and Lepmets, 2015). Framework therefore offers five situational domains defined by cause-and-effect relationships (as shown in figure 1). *Clear* and *complicated* domains are *ordered,* meaning that there exists a relationship between cause and effect which makes it applicable for the reductionist approach. *Clear* (*simple, obvious* in the previous

versions) domain is *domain of best practices* with clear and obvious cause-and-effect relationships. *Complicated* domain is *domain of experts* where those relationships exist but not obvious and require analysis. Left part of the framework includes *unordered complex* and *chaotic* domains where a reductionist approach is not applicable. *Complex* domain is the realm of "unknown unknowns" where right answers do not exist, and cause-and-effect relationship can only be deducted in retrospect. Decision model for this domain is *probe, sense, respond*, meaning that leaders must act to discover and gradually develop stable emergent patterns that can emerge by conducting easy-to-fail experiments. This is the domain of agile practices.
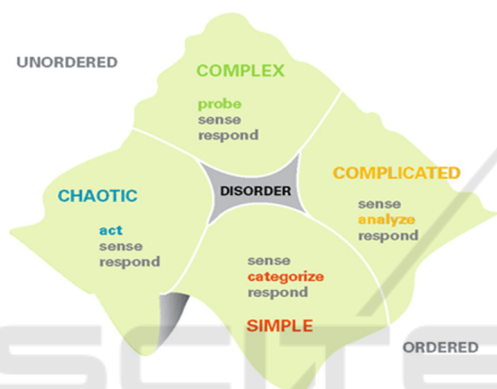

Figure 1: Cynefin framework (Snowden and Boone, 2007).

In a *chaotic* domain, without a cause-and-effect relationship whatsoever, the first task of leaders is to act urgently to stabilise the situation and then find a way to move the situation to the complex domain.

The domain in the centre is *confusion* (called *disorder* in the earlier versions). In *confusion* it is not clear which domains apply so the situation needs to be broken down into previous domains and then apply appropriate decision model for each domain (Snowden and Boone, 2007).

This paper is written for a complex enterprise, which is what most big organizations nowadays are. Enterprise complexity is caused by a variety of factors. Only in IT increasing complexity is a natural consequence of the software evolution. By Lehman´s "Increasing Complexity" law, as software evolves its complexity naturally increases unless work is done to prevent and reduce it (Lehman, 1980). And undertaking any actions to prevent this has rarely been a case, neither in the past or today. Other reasons for IT complexity are non-planned approach to IT implementation (no architecture) or unsuccessful consolidation projects motivated by complexity reduction, but often ending-up with more complexity

(e.g., adding the new target system together with a integration system for syncing its data flows with old unsuccessfully phased-out systems). And this is just IT. Big source of complexity is also on business side with its complex, non-standardized processes, complex product portfolio, people turnover with "silent knowledge" loss and business-IT misalignment. And with mergers and acquisitions (M&A) this all gets multiplied with proper consolidations never happening.

This all puts most of the typical enterprises in the complex domain of Cynefin framework where known reductionist rules do not apply. Meaning that´s impossible to understand the enterprise by understanding its parts. It´s also impossible to know all the details, because enterprise is too big, interconnectable, too changing and it wouldn´t even make sense because it´s a complex system. But it´s possible and mandatory to have a high-level understanding of the enterprise business to be able to manage it (because you cannot manage what you cannot understand, except by luck). How to achieve this with proposed EA model will be elaborated later in text.

Furthermore, a way to deal with enterprise complexity is to approach the enterprise holistically, i.e., viewing, understanding, and optimising enterprise, not as a collection of its parts, but as a whole. This fits to CAS holistic optimisation approach with accepting adaptability and goal-oriented management. But, unlike CAS, also with a central strategic management. Because complex enterprise doesn´t just evolve, it´s also driven by good strategy which is essential for the long-term business success of the company. (Rumelt, 2022) defines strategy as an exercise of power which presumes the use of power of company's leaders "to make part of the systems do things they would not do if left to themselves".

The definition of the complex enterprise is, therefore, an enterprise composed of highly interconnected, interacting, and changing parts that must be driven by business strategy and managed holistically with a high-level understanding of the enterprise business to succeed and excel in the rapidly changing market.

How to deal with a complex enterprise, including the role of EA, will be described below.

2.2 Ensuring Holistic Optimisation

The main focus of the lean management is to optimize value delivery by identifying and eliminating waste in the process (Womack and Jones, 1996). The value

which enterprise provides to its customers through its digital services or products is its primary purpose. To effectively optimize enterprise value delivery, there should be a shared consciousness of this sense of purpose and a common understanding of holistic value delivery (McChrystal et al., 2015). This includes all the steps a company must undertake to deliver a product or service starting from sales to billing. Figure 11 from the case study below shows example of the holistic delivery of a company from the payment industry which holistic value delivery consists of the following steps: *sell card acceptance*, *onboard customer*, *enable transaction acceptance*, *process payment transactions*, *settle merchant*, *provide reports*, *bill merchant* and *support merchant*.

In a complex enterprise, it is extremely important to holistically optimize enterprise delivery and avoid local optimization, as waste at one level can be important at another (Alahyari et al., 2019). This is not obvious in the large organizations because they are often organized in organizational silos. Organizational silos refer to business departments which operate undependably pursuing department goals instead of company goals. This often leads to local optimizations that optimise only part of the organization ignoring upstream and downstream effects, which doesn't necessarily improve the overall delivery of the customer value (Skelton and Pais, 2019). To change this, it is important to build team-like collaboration across silos, and to achieve this, someone must raise awareness of the purpose of the business and try to ensure that things are always covered holistically, both from business and IT world.

2.3 Business Architecture

In parallel with enterprise architecture, business architecture (BA) was developed to support strategic and business planning of the enterprise. Business architecture represents a holistic business blueprint of the enterprise that provides a common understanding of the enterprise, with the goal to holistically optimize enterprise value delivery and support business strategy (Simon and Schmidt, 2015). However, business architecture is only about business architecting of the enterprise, meaning that it ignores IT insights in supporting strategy and managing the enterprise. But, in a complex enterprise, with business which is highly dependent on IT, it´s impossible to decouple business decisions and strategy from IT because your business is your IT, and your business highly depends on what´s possible in your IT. Therefore, business architecture also did not prove to deliver the expected value.

The purpose of this paper is therefore to propose a business architecture-based enterprise architecture framework which is capable of effectively supporting strategy both with business and IT insights.

How this can be achieved will be explained below.

3 BASE FRAMEWORK FOR STRATEGIC ALIGNMENT OF THE ENTERPRISE
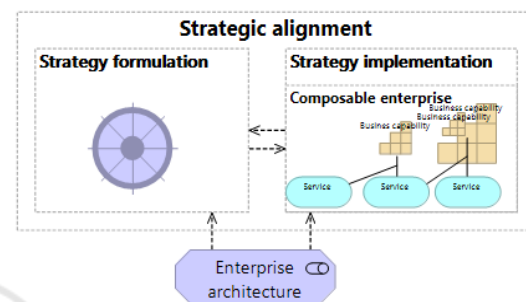

Figure 2: The role of EA in strategic alignment.

Rumelt (Rumelt, 2012) defines good strategy as "a coherent mix of policies and actions to address significant challenges". Kernel of every good strategy consists of three elements: diagnosis (diagnosing current situation and formulating the challenges), guiding policy (defining overarching approach for solving the challenges), and coherent action (defining a comprehensive cohesive plan to reach the goal). In other words, a good strategy must be formulated with a proper diagnosis and implemented first by setting guiding policy and then by executing coherent action. Enterprise ability to successfully formulate and implement good strategy is called *strategic alignment*. According to Aldea et al. (2018), strategic alignment is achieved when enterprise strategy is formulated taking into account the supporting structure of the company and when the operational objectives and actions are implemented in accordance with the overall strategy. The latter includes appropriate design that supports that implementation. Authors propose the use of EA to improve *strategic alignment* of the enterprise by support in both formulation and implementation of the new strategies. Accordingly, the purpose of proposed BASE enterprise architecture framework is to improve holistic strategic alignment of the complex enterprise by supporting both strategy formulation and strategy implementation through implementation of composable architecture (figure 2).

3.1 Supporting Strategy Formulation

In many organizations EA still shares the fate of many other businesses that aspire to be taken seriously and listened to by those leading the enterprise. However, in reality, a legitimate role that EA might or should have in strategic decision process (or strategy formulation) is limited to advising on opportunities and limitations of new technologies. Since only this fits the traditional EA, to the discipline perceived as IT-specific. Which again is a type of support which can easily be avoided. And, in reality, often is. It´s therefore not surprising that EA rarely has any role in strategy formulation, but typically only in its implementation. A different picture emerges when looked from the management science perspective which calls for an apprehensible model of the complex enterprise. According to Hoverstadt et al. (2013), a complex enterprise calls for a core "big picture" model of the organization and its operating environment, which should both help business leaders to understand how their business works and provide them relevant information for decision making. A need for a tool to deal with enterprise complexity had already been recognized as a serious business problem by a survey of 1,400 Global CEOs in 2005 where 77% assessed complexity as a high priority, 91% said they need special tools for it where only 5% claimed they have such a tool. According to Hoverstadt et al., only EA discipline can solve this problem by providing a proper EA model to support decision makers both in strategy formulation and strategy implementation. This paper will, therefore, present an EA model which can provide needed inputs about enterprise business for senior management to help them ensure that "strategy is developed while considering supporting structure" (Aldea et al., 2018) of the company, including both business and IT. Proposed EA model will provide a common language and enterprise-unified reference for all enterprise discussions and relevant inputs to decide where in enterprise makes sense to invest financial resources and validate strategic direction. This paper will demonstrate how EA, with use of proposed EA model and business architecture, can support strategy by early scoping of strategic initiatives which can help validate strategic direction already early in the process and help avoid failed initiatives. How to further leverage the proposed EA model and BASE framework for strategy formulation will be explored in future work.

3.2 Strategy Implementation with Composable Enterprise

Service composability design principle of service-oriented architecture (SOA) encourages the design of services that can be reused in multiple solutions where services themselves consist of composable services (Magedanz et al., 2008). Composable enterprise is an approach to enterprise design that embraces API economy and *service composability* embedding adaptability into design to help enterprise adapt to rapidly changing market demands and plan for uncertain futures. A composable enterprise is expected to deliver its products and services through assembly and combination of pluggable, scalable, and replaceable components. Business capabilities (packaged business capabilities in composable enterprise terminology) represent abilities that an enterprise possess or plans to build embedded in people, processes, and technology. Business capability model represents set of all enterprise capabilities (figure 5). Following *service composability* principle, packaged business capabilities (PBC) themselves consist of composable reusable PBCs or services on lower system levels. According to Bhatnagar (2022) composable enterprise is the latest generation of service-oriented architecture which leverages the latest technology (cloud, microservices and REST) in combination with such a service design which includes business architecture, technologies, and thinking. This means that *service composability* should also be applied by the business and applied on both enterprise and system design level. This presumes design of all enterprise components with joint holistic understanding of the enterprise business and its strategy direction. This approach is different from widely applied domain-driven design (DDD) approach which encourages splitting problem and solution domain and thus separating business and IT perspectives (Evans, 2003). By DDD, problem domain belongs to business which is in charge of business *domains* and *subdomains* (business capabilities in DDD terminology). IT is expected to separately deal with problem solution in its IT solution domain. Which means that IT has responsibility to design modular solutions applying *service composability* solely from the IT perspective (often with composability and reusability considered just inside a specific IT ecosystem). In contrast to this approach, the purpose of the BASE framework is to bring business and IT together with *service composability* applied on the whole enterprise level, starting with business capabilities. To achieve this,

there should be a shared consciousness of the purpose of the enterprise and a joint understanding of the enterprise's business.

Future work will elaborate on this idea by providing a methodology for building composable enterprise.

4 EA MODEL FOR DEALING WITH ENTERPRISE COMPLEXITY

Proposed EA model should support strategic alignment of the enterprise by providing abstraction and simplification of the enterprise complexity understandable by both strategic decision makers, business, and IT (figure 3). This chapter will elaborate on how this can be achieved.
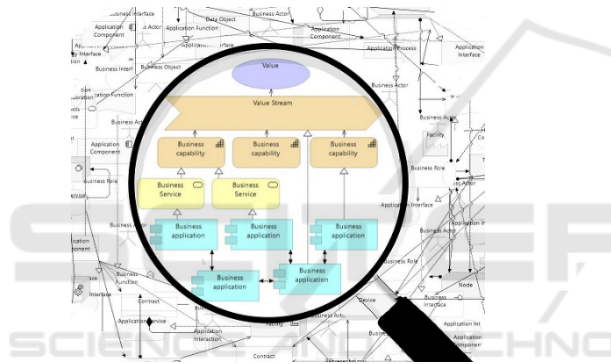
Figure 3: Dealing with enterprise complexity.

4.1 Metamodel

The proposed EA model is based on the ArchiMate standard. ArchiMate is an open and independent enterprise architecture modelling language that integrates business processes, information flows, organizational structures, information systems, and technical infrastructure (The Open Group, 2022). Figure 4 shows the metamodel of the proposed EA framework with definitions of the elements provided in table 1. The proposed EA model has two variants. In the *base* version business capability is decomposed to business services which then decompose to business applications. In *simplified* version value streams and business capabilities are directly decomposed to underlying business applications.

The future work will extend the model to support implementation of the composable enterprise.

The EA model currently consists only of the static elements. The proposed EA model might be extended
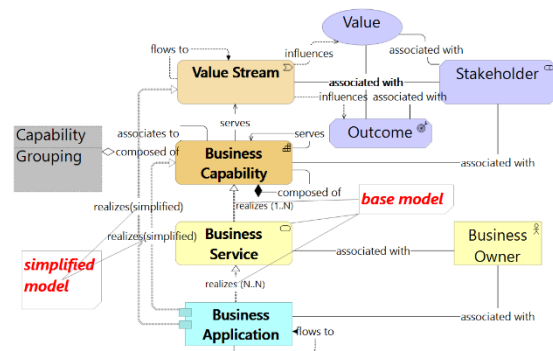
Figure 4: Metamodel of the proposed EA model.

Table 1: Definitions of the EA model elements.

Element	Definition	ArchiMate Notation
Business capability	Enterprise abilities for delivering value embedded in people, process, technology, and information.	Capability
Capability grouping	Business capabilities are divided into *core*, *supporting*, and *generic* or *enterprise* capabilities (Leonard, 1995).	Grouping
Value stream	Collection of E2E activities that create an overall result for the customer (stakeholder or end-user)	
Business service	Business services are different implementations of the same business capability.	Business service
Business owner	Person with business ownership for business application or business service.	Business role
Business application	Application known as a separate application from the business perspective, irrelevant of its implementation structure.	Application component
Outcome	Represents some expected end result.	Outcome
Stakeholder	Person, team, or organization with an interest in the outcome	Stakeholder
Value	Something customer is willing to pay for.	Value

in the future with the rest of ArchiMate´s strategy and motivation elements to support modelling strategy.

Next chapter will elaborate on the main building blocks of the proposed EA model.

4.2 Main Building Blocks

The main building blocks of the proposed EA model are:

- Business capability model (BCM) – the centre of the model providing a common language and enterprise-unified business reference point for all enterprise discussions.
- Value streams – simplified and generalized high-level business processes providing understanding on how business works or should work.
- Business-adjusted IT insights - providing high-level IT insights understandable by business.

These building blocks are described in detail below.

4.2.1 Business Capability Model (BCM)

In many organisations exists the gap between strategy formulation and its implementation by business processes and information systems supporting them (Keller, 2015). The purpose of the proposed EA model is to support both strategy formulation and implementation. To achieve this, EA model must bridge the gap between business and IT providing a common language and an enterprise-unified reference point for both decision makers, business, and IT. This can be achieved with business capability model (BCM). BCM represents a high-level view of the enterprise through collection of its business capabilities and their relationships. A business capability is a particular ability that a business may possess or exchange, embedded in people, processes, technology, and information, serving to achieve a specific purpose or an outcome (Homann, 2006). A business capability defines what a business does

without communicating or exposing where, why, or how (Ulrich and Rosen, 2014). BCM represents a strategic view of the enterprise, providing a stable, overarching view of what the enterprise does and what is important to the business (Swindell, 2014). As such BCM serves as a central business-oriented starting point of the proposed EA model. A thorough methodology for defining BCM together with the rest of the proposed EA model will be provided in the future work. Figure 5 shows the real industry example of an BCM.

4.2.2 Value Streams

In lean management value represents something, the customer is willing to pay for. While BCM defines what an enterprise does, value streams depict how enterprise delivers value to its customers. Value stream is a collection of end-to-end activities, or steps that an enterprise must undertake to deliver its value. Every step in the value stream adds an incremental value to the overall value delivered to the customer. Representing a simplified and generalized high-level metamodel of the underling business processes, value streams enable common high-level understanding of the business processes outside technology context or any "how" details. Due to their simple notation consisting only of value stream stage and *flow* relationship, value streams enforce simplified thinking. When used together with business capabilities (figure 13 in the use case below) they are an excellent technique for brainstorming and design of enterprise high-level business processes without
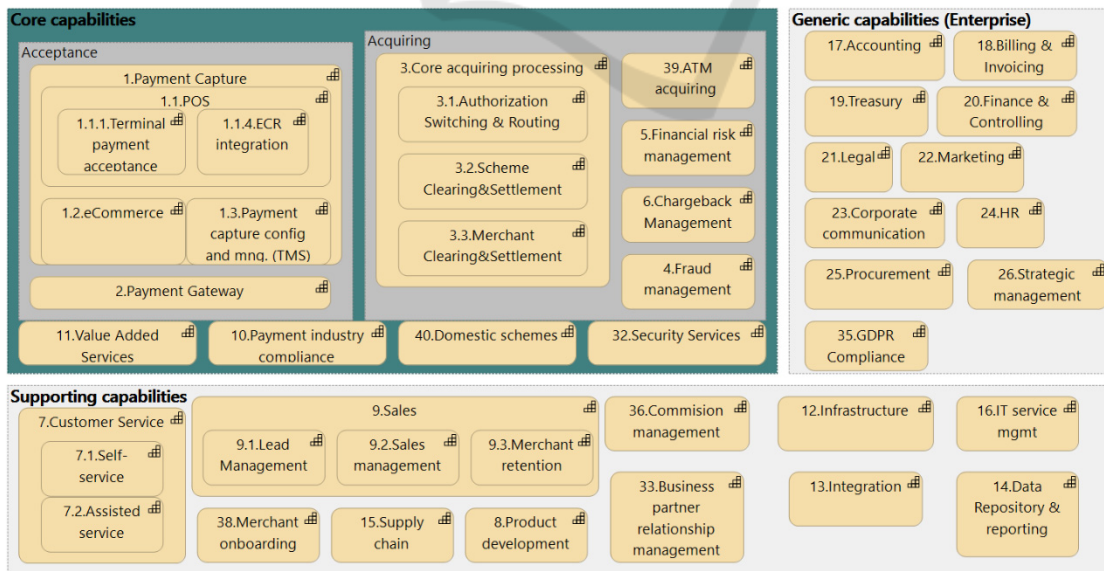

Figure 5 Real industry example of business capability model (BCM).

entangling with unnecessary system, process, or technology details. This will be demonstrated in the case study below.

4.2.3 Business-Adjusted IT Insights

As computing has become a core part of every industry and businesses highly dependent on their IT, software implementation is often the largest part of any investment. And also, the main reason why these investments often fail. A common reason for this is the fact that decision makers very easily fall into so-called *optimism bias* due to a lack of information about the state of IT. *Optimism bias* refers to a tendency of overestimating the likelihood of experiencing positive events and underestimating the likelihood of negative events (Kahneman, 2011). *Optimism bias* is about ignoring, underestimating, or inventing the work needed on something you do not understand and hoping for the best, even when that something is the core of your business (as IT is). This again leads to the Conant-Ashby theorem, which states that we are unable to cope with something we do not understand, except by luck. *Optimism bias* is nothing unusual, it´s just a pure human nature to deal with a complex situation. It's not easy to understand IT because it's cumbersome and complex, IT people speak a different, incomprehensible language, and there's simply no understandable IT information available to support decision-making. To change this, proposed EA model must provide decision makers IT insights which are understandable to them. As elaborated above, the center of proposed EA model is BCM, which, as collection of enterprise business capabilities, provides common language and starting business reference point for both business and IT. In the proposed model, each business capability from BCM is then decomposed to high-level business-adjusted IT perspective providing just enough accuracy needed. IT entities used in the model for providing IT insights are *business application* and *business service* (definitions in table 1 above). Decomposition of business capabilities to *business services* is a great tool for identifying IT harmonization potentials. E.g., figure 6 shows an example of the *base* model decomposition where four different business applications realize the *Billing & Invoicing* business capability. Figure 7 shows *simplified* model decomposition used by high level presentation purposes (demonstrated later). Since managers sometimes also want to drill down and have details at hand as required, model also supports simple *flow* relationships between business applications (figure 8). The knowledge graph-based

EA tool *Ardoq* with its component *Discover* provides ability for the end-users to dynamically explore the model and ad-hoc drill down from the selected business application in figure 6 or 7 to its IT system landscape in figure 8. This will be further elaborated in the future work in the paper on methodology for defining the EA model.
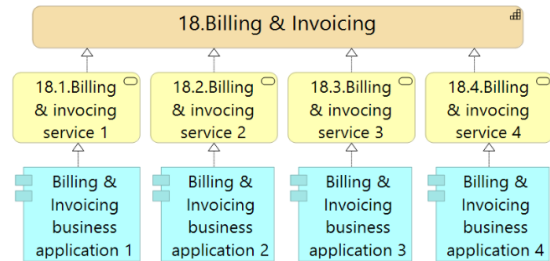

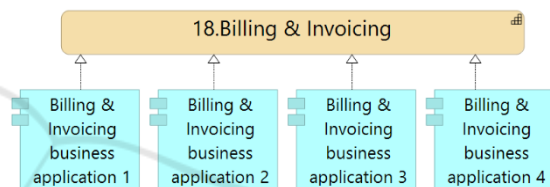Figure 6: Business capability decomposition (*base* model).

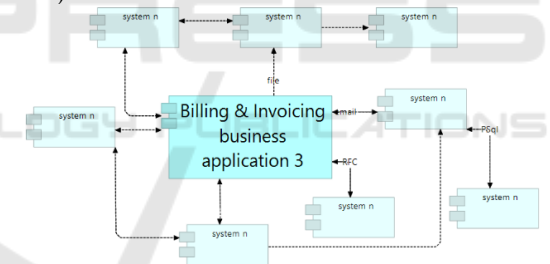Figure 7: Business capability decomposition (*simplified* model).

Figure 8: IT business application landscape.

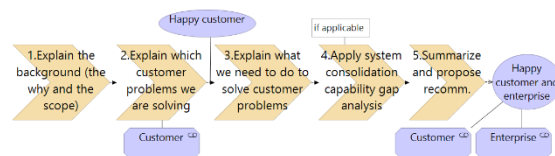## 5 HOLISTIC INITIATIVE FOOTPRINTING METHODOLOGY

Figure 9 Holistic initiative footprinting methodology

This chapter will introduce *holistic initiative footprinting* methodology to illustrate how to leverage the proposed EA model and business

architecture to properly scope strategic initiatives already early in the process. The purpose of the methodology is to enable early discovering of the E2E dependencies of strategic initiatives to already early in the process provide proper estimates on the scope, time and money and reveal what to expect later in the implementation.

The methodology uses *heatmapping* and *storytelling* techniques. *Heatmapping* is a technique for colouring model with using hot and cold colours to draw attention. Technique is usually used for capability management to support business leaders to decide where in the enterprise to best invest financial resources (Keller, 2015). *Storytelling* technique is about using stories to engage the audience. Denning (2006) recommends applying *storytelling* as strategic business narrative technique in huge organisations.

As shown in figure 9 *Holistic initiative footprinting* methodology consists of the following steps:

1. Explain the background (the why and the scope): explain why we want to start the initiative, what is the background, planned scope and what we as a company want to gain from this initiative.
2. Explain which customer problem we are solving:
   understand which customer problems we are solving, illustrate customer value stream (how does value stream look like from the customer´s point of view) and mark with red (the hottest colour) the steps of the customer value stream affected by this initiative.
3. Explain what we need to do to solve customer problems:
   understand what we need to do to solve customer problems with applying *storytelling* technique. *Storytelling* to explain holistic impact and the scope of the initiative should start with visualising holistic value delivery with building the narrative by gradually providing more information and gradually providing IT insights from the business perspective.
   This can be achieved by the following steps:
   3.1. Start with the holistic value delivery and mark affected value stream steps to understand what´s holistically effected (start with using red for marking the affected steps).
   3.2. Gradually provide information about business capabilities needed for delivering the value and then gradually provide information about underlying systems, i.e., business applications (mark affected with agreed *heatmapping* colouring).
   3.3. Gradually drill down to a separate value stream stage (e.g., onboarding) and visualise its value stream with business capabilities as

building blocks for delivering the value. To document this step brainstorming with the business owner should take place to design and visualise the target high-level process, or document the existing.
   3.4. Gradually provide information about the system landscape applying agreed *heatmapping* colouring. If needed show system capability decomposition (which capabilities a system has or is planned to have in the future).
4. Apply *system capability gap analysis* (if needed) following the steps:
   4.1. Identify target system capability decomposition.
   4.2. Identify source system capability decomposition.
   4.3. Map target system planned future capability decomposition.
   4.4. Identify capability gaps in the source system by comparing its capability decomposition to target system planned capability decomposition.
5. Summarize and propose recommendations.

Prerequisite of applying this methodology is to have some high-quality version of the EA model. Methodology should be executed by conducting interviews and performing brainstorming with the relevant business and IT stakeholders. The scoped initiative should preferably be delivered as a *PowerPoint* (or similar) document with animation capabilities for building the narrative (*storytelling*).

6 CASE STUDY

This section will demonstrate the usage of the proposed EA model for applying *holistic initiative footprintig* methodology on invented use case.
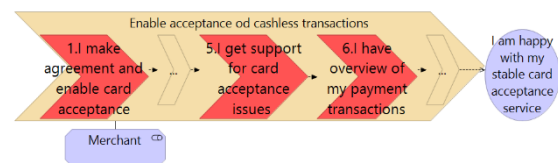

Figure 10 Customer value stream (step 3.1).

The EA tools chosen for performing case study are Archi and Ardoq. Archi will be used for static visualisations to visualise customer´s value delivery and holistic work needed to execute initiative (steps 2 and 3). Ardoq, as a knowledge graph-based EA tool, will be used to support interactive visual analysis in step 4 (system capability gap analysis). Initiative will
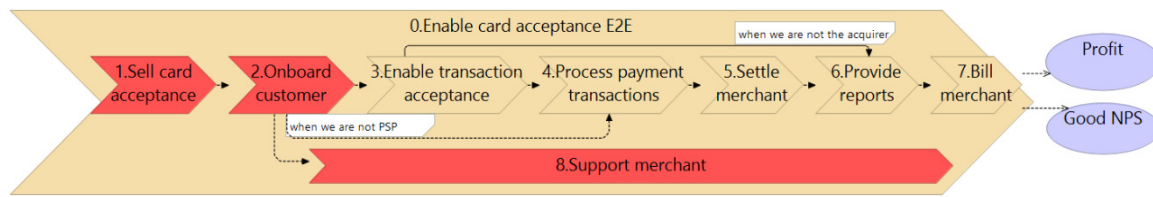
Figure 11 Holistic value stream with affected steps marked (step 3.2).

be delivered as *PowerPoint* document with animation used for *storytelling*.

After conducting interviews and performing brainstorming with stakeholders to collect all the information needed, EA delivered the following.

6.1 Performing *Holistic Initiative Footprinting*

Step 1: Explain the Background (the why and the scope).

A company is considering launching an initiative to optimize and digitize its sales, onboarding, and customer support business processes for small and medium-sized customers. These processes are currently covered by two customer relationship (CRM) systems *legacy CRM system* and *target CRM system* which causes a lot of redundant and manual paperwork with unacceptable long customer onboarding lead time. Additionally, total cost of ownership for both CRM is very high (huge licence and operating cost). Goal of this initiative is therefore to leverage target CRM system for all needed sales, onboarding and customer service capabilities and phase-out *legacy CRM system*. Business case was already done on initiative estimating budget needed and timeline of one year to complete the whole project.

Step 2: Explain which customer problem we are solving.

As shown in figure 10, this initiative aims to speed up process of enabling card acceptance in the merchant´s store, help customer (merchant) to get better support for his card acceptance issues, and reporting on his transactions via customer portal.

Step 3: Explain what we need to do to solve customer problem.

In step 3.1 enterprise E2E value delivery is visualised with marking value stream steps affected by this initiative. As figure 11 shows, this initiative is aiming to optimise sales, onboarding, and customer service (*support merchant*).

In step 3.2 deeper analysis is performed also with mapped business capabilities (figure 12).

Besides sales, onboarding and customer service, holistic visualisation also reveals the need to build integration with *payment capture*, *payment gateway* and *core transaction processing* business capabilities. These integration dependencies are marked yellow. Holistic delivery also reveals dependencies to business capabilities currently covered by separate initiatives: *data repository* and *reporting* and *billing & invoicing* (marked orange). In the near future this initiative will also need to cover adjustments and integration with new systems build by these initiatives. Holistic value delivery process in figure 12 also visualises the need for a new *business process orchestration* capability to enable order orchestration and integration between business capabilities in the
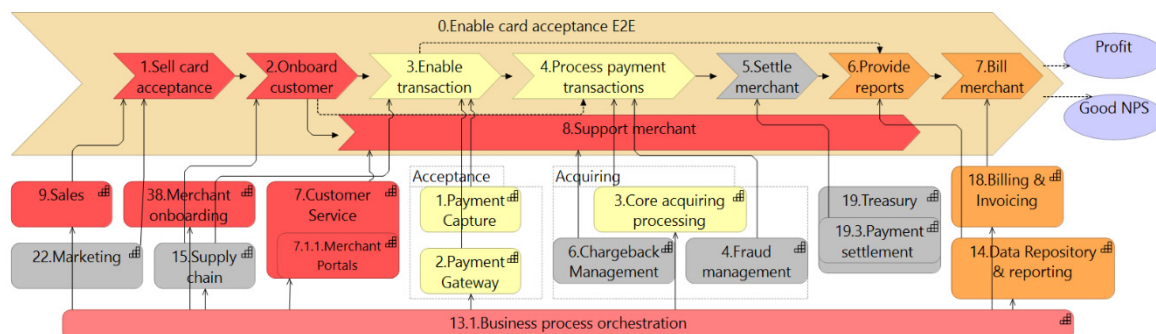

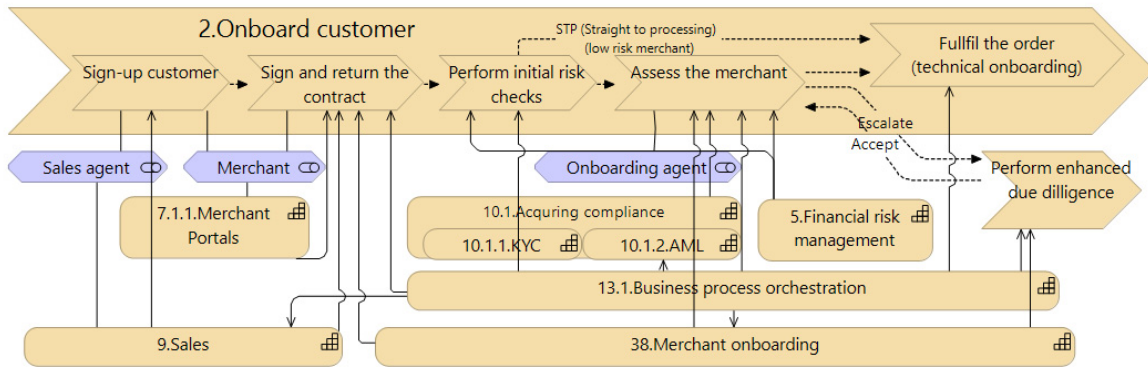Figure 12 Holistic value stream with business capabilities realising it with heatmapping (step 3.2).

Figure 13 Onboarding to-be (step 3.3).

figure. In the past company had bad experience with enterprise service bus (ESB) systems (single point of failure, high cost of licence and maintenance, complexity, need for ESB-vendor specific skills, etc.). EA therefore suggest a lightweight business orchestration tool also supporting BPMN standard to improve business-IT alignment and incident management (BPMN is already heavily used in the company by business analysts). *Business process orchestration* business capability is marked pink. Gray colour is used to mark not affected capabilities and value stream steps.

This is not visualised, but step 3.2. also provides information on which IT systems (business applications) are realising shown business capabilities (by applying *simplified* version of the EA model). *PowerPoint* animation capability is used to gradually provide information on these IT systems (again to build the narrative by *storytelling*).

In step 3.3 onboarding value stream is decomposed to lower value stream level visualising wished *to be* onboarding process (figure 13) since some business processes need to be optimised before undertaking digitalisation. This step is the result of brainstorming

of enterprise architect with business stakeholders. Figure 13 should be announced by marking with red *2.Onboard customer* in figure 11 (*storytelling*).

In step 3.4. *as is* IT system landscape is shown containing applications announced in step 3.2. Figure 14 shows two CRM systems (as a result of the previous unsuccessful consolidation initiative). *Target CRM system* is currently supporting *sales* capabilities with *legacy CRM system* supporting both *sales*, *onboarding,* and *customer service* capabilities. System landscape also shows *legacy portal system* (already announced in step 3.2) which is also high priority due to the planned enhancement of self-service and reporting capabilities. There is, as well, *CRM integration system* in place used just for synchronizing data flows between two CRM systems. This is also the result of the previous initiative with high licence and operating cost and would need to be phased out. The same agreed *heatmapping* is used to mark systems with which we would need to integrate now (in yellow) and in the near future (in orange).

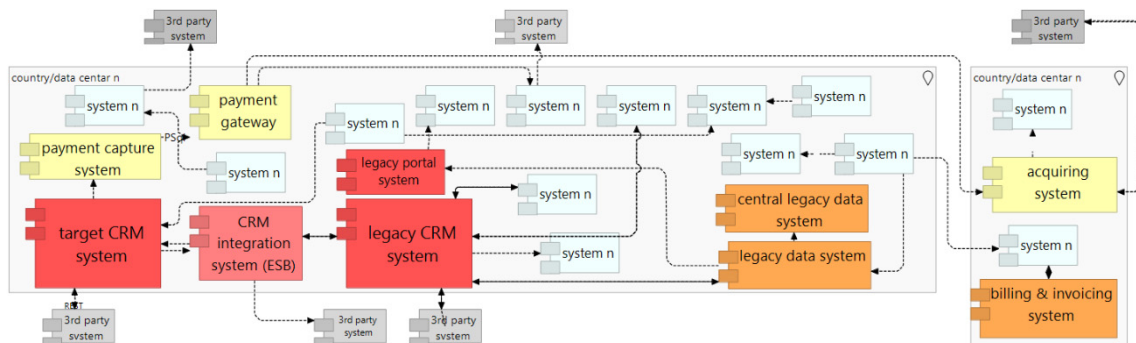Step 4: Appy System Consolidation Capability Gap Analysis.

Figure 14 IT system landscape (step 3.4).

Since the initiative aims to phase out the legacy CRM system and migrate its functionalities to the target CRM system, this step includes the analysis of the capability gaps between the two systems. For this step the *base* version of the model is used (figure 4). Graph-based EA tool Ardoq is used to generate visualizations in figure 15-18.

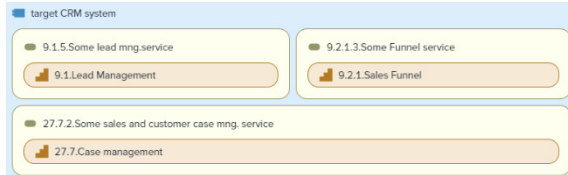Step 4.1: Figure 15 visualises which capabilities currently realises *target CRM system*.

Figure 15: Target CRM system *as is* (step 4.1).

Step 4.2: Figure 16 visualises which capabilities currently realises *legacy CRM system*.
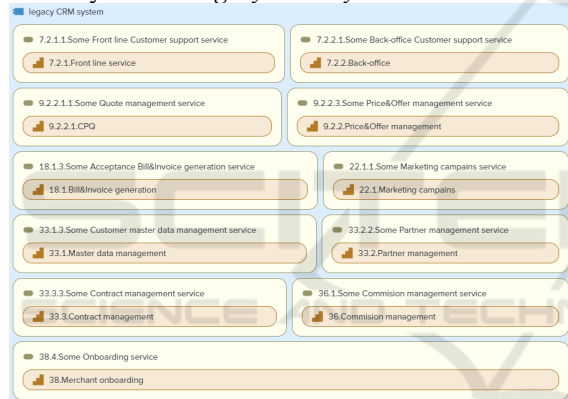
Figure 16: Legacy system *as is* capabilities (step 4.2).

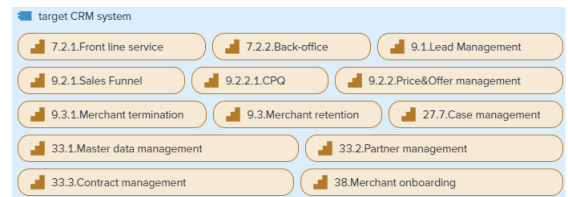Step 4.3: Figure 17 shows capabilities planned to be implemented in the future on *target CRM system*.

Figure 17: *Target CRM system to be* (step 4.3).

Step 4.4: Figure 18 visualises which capabilities from the *legacy CRM system* are not considered (marked red). As showed in the figure those are: *marketing campaigns*, *commission management* and *bill & invoice generation*. These three capabilities should be addressed to phase-out *legacy CRM system* as planned.
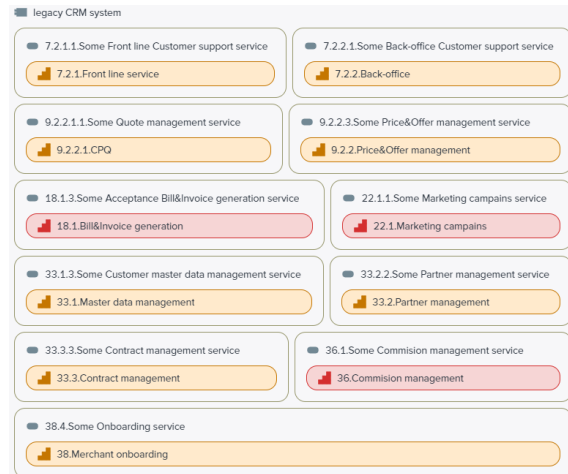
Figure 18: Capability gap (step 4.4).

Step 5: Summarize and propose recommendations.
Besides planned optimisation of *sales*, *customer service* and *onboarding* business capabilities, initiative should also cover the following:

- New integrations with business capabilities *payment capture, payment gateway* and *core transaction processing*.
- There are dependencies to ongoing separate, stream initiatives covering *data repository and reporting* and *billing & invoicing* business capabilities which will mean adjustments and new integrations in near future.
- *Onboarding* business process needs to be optimised as visualised in figure 13 before undertaking digitalisation.
- To phase-out the *legacy CRM system*, business capabilities *marketing campaigns*, *commission management* and *bill & invoice generation* should be addressed.
- New *business process orchestration* system should be set up to orchestrate CRM orders and provide integrations with other systems. EA recommendation is to use a lightweight business process management tool based on BPMN standard to improve business-IT alignment and incident management.

6.2 Case Study Conclusion

In the use case above, business case was created without any IT insights and gave unrealistic timeline and cost estimation. The case study has revealed that money, timeline, and scope for realising this initiative is much bigger than initially estimated. There are new integrations to be built, dependencies to separate initiatives that will require work in the near future,

some business processes have to be optimised before undertaking digitalisation and three more capabilities need to be taken into consideration to phase out *legacy CRM system*. Taking all presenting into consideration, business leaders might even decide to deprioritise this initiative and give priority to some other less complex and less costly one.

This case study has shown how is possible, by leveraging EA model and business architecture, to make early discovery of all E2E dependencies and ensure that all the steps of the holistic delivery are taken into consideration during scoping process. This kind of early holistic scoping can help us better validate strategic direction early in the process to avoid failed initiatives. Since the results of this analysis can help better estimate effort, timeline, money, and impact of the initiative, it should, ideally, be used as input for the business case.

The advantages of this methodology are manifold. It first offers to business leaders holistic business and IT inputs needed for decision making. Then it enables business-IT alignment since the document is readable by both business and IT and can be used both as input for the business case and as a starting point for the implementation. The advantage of methodology is also in enabling visualisations together with storytelling which gradually conveys information and provides clarification on the work needed in a way that demystifies IT world to business. And the last, but not least important, advantage of methodology is also that it offers visual technique for brainstorming on the business process and the work needed using just business architecture elements (value streams and business capability model).

7 CONCLUSIONS AND FUTURE WORK

As an introduction to the BASE enterprise architecture framework, this paper has proposed the EA model for dealing with complex enterprise and *holistic initiative footprinting* methodology for early scoping of strategic initiatives that uses the proposed EA model and business architecture.

Paper has answered research questions as follows:

RQ1. "What support can EA provide within business strategy, and on what conception of business architecture is this based?"
Answer: Proposed BASE enterprise architecture framework can provide support in improving holistic strategic alignment of the complex enterprise by supporting both strategy formulation and strategy implementation. That support should always start from business architecture with value streams emphasising importance of holistic value delivery and BCM providing common language and unified enterprise-wide reference points for all enterprise discussions.

RQ2. What kind of model should enterprise architecture provide to support business strategy in the complex enterprise?
Answer: The business-architecture EA model proposed in this paper aims to solve the problem with managing a complex enterprise by providing a simplification and abstraction of the enterprise that encompasses both business and IT insights serving as a common ground for both high-level understanding of the enterprise business and business-IT alignment.

RQ3. In the complex enterprise, how can enterprise architecture provide decision makers with better early scoping of strategic initiatives to know what to expect later in the implementation, get better estimates, and help avoid failed initiatives by validating strategic direction already early in the process?
The proposed *holistic initiative footprinting* methodology has demonstrated how EA, by leveraging business architecture and the proposed EA model, can enable early holistic scoping of strategic initiatives ensuring that all the steps of the holistic delivery are taken into consideration. This can already early in the process reveal what to expect later in the implementation, provide inputs for better estimates and help decision makers avoid failed initiatives by early validating strategic direction.

Future work will focus on extending BASE framework, first with a thorough methodology for building the proposed EA model and then with a methodology for implementing the composable architecture.

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