A METHOD FOR BUSINESS CAPABILITY DEPENDENCY ANALYSIS

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Abstract: Business capabilities are a key element of a modern Enterprise Architecture Management (EAM) approach. They are the core component of a business architecture and essential for communication between business and IT. There is an enormous interest among academics and practitioners reflected in a growing number of publications on definition, use cases, and experiences from case studies. However, due to the innovative character of business capability approaches, many issues have not been subject to structured research yet. One topic that has not been addressed so far, is the analysis of dependencies between business capabilities, which is a crucial aspect for the integration of new business capabilities. This paper presents a three-phase method to systematically identify dependences between business capabilities and to other elements of the Enterprise Architecture (EA). We built this method on the assignment of the business entities to business capabilities. Based on existing visualizations, we developed a business entity map and an information ownership map to support the analysis. We applied a design science approach to develop the method which has been tested during application in the three companies. Additionally, we illustrate the method with a case study from the telecommunication industry.

1 INTRODUCTION

Business capabilities are an essential element of a modern Enterprise Architecture Management (EAM) approach. In the last years, they are the core component of business architecture and are essential for communication between business and IT (Barroero et al., 2010; Scott et al., 2010). The concept and application of *business capabilities* is addressed by numerous publications originating from different sources, for example analyst reports, conference proceedings, consultants, EA practitioners, as well as from academics.

Business capabilities focus on the enterprise's ability to perform activities from a functional perspective, for example conduct "customer management" or "direct sales". Supplementary, *business entities* are the corresponding elements of the business architecture that represent the information needed to implement a business model. Examples are a "customer contract" or a "sales offer". The combination of both concepts provides a common terminology for business and IT stakeholder.

Business capabilities are applied in a large variety of EAM tasks which include architecture description (e.g. as-is landscape, SOA modeling), architecture analysis (e.g. business strategy support, dependencies between elements, identification of functional redundancies, data quality analysis, business process analysis), architecture planning (e.g. investment, target architecture, SOA modeling), preparation of decisions (e.g. sourcing, selection of solutions or technologies), as well as for communication and visualization activities (e.g. demand management, change management) (Brits et al., 2007; Barroero et al., 2010; Keller, 2009; Klinkmüller et al., 2010; König et al., 2005; Weber and Schmidtmann, 2008).

The majority of the use cases mentioned above depends on the availability of information about relations between single elements of the enterprise architecture (EA). For example the capability-based documentation of the as-is landscape requires knowl-

edge about the relation between a *business capability* and applications. The single elements and their relationships are represented in an enterprise's EA model (Barroero et al., 2010; Buckl et al., 2011).

Innovation is an especially important aspect in EAM and management of *business capabilities* (Brits et al., 2007; Cullen et al., 2006). The directions for innovation are defined in an enterprise's business strategy and considered the corresponding business model. Both determine the need for new *business capabilities* that are required to support innovative products, services or technologies and therefore need to be reflected entirely in the enterprise's *business capability* model. Consequently, the model has to include *business capabilities* needed in future that have to be planned and established, as well as those that are implemented today. For example, a future "direct sales" capability can be the result of a growth strategy that builds on modern information and communication technologies (ICT).

New *business capabilities* have to be integrated seamlessly into the existing landscape. The establishment of a "direct sales" capability, for example will have requirements concerning other *business capabilities*, e.g. regarding "customer management" and requirements concerning the availability of information, e.g. the *business entity* "customer contract". This applies equally to the case of internal development and to an external acquisition.

Therefore, when establishing new *business capabilities*, a dependency analysis for *business capabilities* has to deliver transparency about related *business capabilities* and *business entities*. Additionally, the analysis has to consider other related architecture elements, e.g. applications, databases, or infrastructure. Even though they do not belong to the business architecture, their relations can result in a dependency between *business capabilities* and *business entities*. Using the example of establishing a future "direct sales" capability, the availability of customer management solution (application architecture) or connectivity (communication infrastructure) can result in strong dependencies to the "customer management" capability or the business entity "customer contract".

A comprehensive literature analysis performed by the research group revealed, that a concrete method to analyze dependencies between *business capabilities* is missing. As a possible starting point, the relationships between the single elements in an EA model show that *business capabilities* are directly and indirectly connected to other architecture elements (Buckl et al., 2011). Therefore, we build on the potential of an EA model to support a dependency analysis in our research. An architecture viewpoint is a graphical representations of the overall EA model that are meaningful to stakeholders to enable communication and common understanding (Buckl et al., 2011; International Organization For Standardization, 2007). However, the visualization of the relationship between *business capabilities* and *business entities* on a business architecture level has not been addressed so far.

In this paper, a method for analysis of dependencies between *business capabilities* is presented. The method is based on an EA model and the *business capability map*, an existing architecture viewpoint. Additionally, the authors introduce the *business entity map* and the *information ownership map* as corresponding new architecture viewpoints.

The remainder of this paper is structured as follows: Section 2 gives a short summary on the research approach applied. Section 3 provides an overview on existing EA-related *business capability* and *business entity* literature. Section 4 introduces a method for analyzing *business capability* dependencies, as well as architecture viewpoints for *business capabilities* and *business entities* which have been applied successfully in the real-world business environment. Finally, section 5 concludes by summarizing the article and outlining further fields of research.

2 RESEARCH APPROACH

The authors followed a design science approach in order to contribute to the identified area of research through the building and evaluation of innovative artifacts designed to meet identified business needs (Hevner et al., 2004). According to (March and Smith, 1995), an artifact refers to all innovations attempting to create utility for an organization: constructs, models, methods, and instantiations.

The research activities to develop the contributions presented in this paper follow (Hevner et al., 2004)'s guidelines for understanding, executing and evaluating the research.

- Design as an artifact
  The presented method to analyze dependencies of *business capability* is a viable artifact. It is described comprehensively enough to be further applied to solve real world issues.
- Problem relevance
  The artifact addresses the problem of identifying and analyzing dependencies of *business capabilities*, which are necessary for numerous use cases. This relevance arises from the findings from a profound literature study as well as practitioner's experiences.

- Design evaluation
  The artifact as been evaluated in the business environment (observational evaluation).
- Research contributions
  In this work, we present a method for analysis of dependencies of business capabilities, which has not been published so far.
- Research rigor
  During three construction and evaluation phases, applicability and generalizability of the artifact has been ensured.
- Design as a search process
  The artifact has been designed iteratively, incorporating feedback collected in the real-world business environment.
- Communication of research
  The artifact is published in this paper to make it available to both, management and technology audiences.

According to (March and Smith, 1995) and (Hevner et al., 2004), design science research comprises two phases "build" and "evaluate", which are processed cyclically. After building the initial version of the artifact, it was applied in the context of a real-world case study in the telecommunications industry. After a first refinement incorporating lessons learned, a second iteration was conducted by application in two projects in the energy and insurance industry. Consequently, the method presented in this paper is the outcome of three iterations.

Prior to the first building phase, the authors conducted a profound literature analysis for capability resources according to proven guidelines (Webster and Watson, 2002) to provide the baseline of existing knowledge and identify existing gaps. A short overview on publications relevant to the findings presented in this paper is given in the following section.

3 RELATED WORK

3.1 Literature Analysis

We conducted a thorough analysis of existing publications regarding the concept and application of *business capabilities* and *business entities*. Our team investigated the following sources of EA and EA-related resources: EA literature reviews, our research group's EA literature database, and online search. Due to the limited space available in this publication, only a summary of these findings is presented. The related literature is structured as follows

- Enterprise Architecture Management (books and frameworks)
- Concept of *business capabilities*, definitions, and visualizations
- Concept of *business entities*, definitions, and visualizations
- EA model: Relation of *business capabilities* and *business entities*

In 2008, Aier (Aier et al., 2008) and Schöenherr (Schöenherr, 2009) published their work on EA literature and a survey on the common EA practice. One of Aier's (Aier et al., 2008) finding from an empirical survey among EA practitioners is a list of typical elements of an EA model, which does include data elements and information flows, but does not contain capabilities. The same applies to the majority of EA books, published between 2005 and 2010, e.g. (Bernard, 2005; Engels et al., 2008; Keller, 2006; Niemann, 2008). The authors implicitly or explicitly address *business entities* or similar architecture elements. But they neither include *business capabilities* explicitly in the EA model, nor provide concrete methods for using them. However, there are a few EA books that address *business capabilities*. The book of Ross, Weill and Robertson "Enterprise Architecture as Strategy" (Ross et al., 2006) is an exception in this case. They apply *business capabilities* as an instrument for business and IT planning. However, the authors seem to presume a common understanding of *business capabilities* and thus do not provide an explicit definition.

A well recognized standard for EAM, The Open Group Architecture Framework (TOGAF) (The Open Group, 2009) comprises a method for planning, engineering, and delivery of strategic *business capabilities* to the enterprise ("capability-based planning"). *Business capabilities* in TOGAF consist of three dimensions: people (training and professional development), process (concepts, business processes, information management), and material (infrastructure, information technology, equipment) (The Open Group, 2009). Furthermore, TOGAF differentiates between horizontal and vertical capabilities. Additionally, it introduces the concept of capability increments to structure the advancement of capabilities by planning and measuring the development of the single dimensions with key performance indicators (KPI). From an information perspective, TOGAF differentiates between logical and physical data assets as well as data management resources. Nevertheless, information is not explicitly represented in the business architecture, but part of the information systems architecture.

A few authors released dedicated publications for the topic of *business capabilities*. Barroero, Motta and Pignatelli (Barroero et al., 2010) state, that the *"current TOGAF version recognizes the business component requirements but misses how to bridge those requirements with a data, application and technology architecture"*. The authors propose an extension to TOGAF to link business changes to data, application and technology architecture. Brits, Botha and Herselman (Brits et al., 2007) introduce a conceptual framework for business capability modeling consisting of a matrix for analysis and feedback loops for development. Their work includes a listing of definitions for different types of capabilities and a compilation of relevant approaches from strategic thinking, innovation to operations and information modeling discipline. Furthermore, Keller (Keller, 2009) explains the basic idea of capability-based modeling and provides a set of examples for the use of capabilities in EAM. Klinkmüller et al.(Klinkmüller et al., 2010) identify a need for visualization of *business capabilities* in the context of business analysis. They introduce a three-dimensional visualization which illustrates vertical (logical composition) and horizontal (dependencies) relations between *business capabilities*. König et al. (König et al., 2005) in turn introduce a novel concept for modeling and analysis of business processes, called "*capability map*". It has been developed on the basis of resource-based Theory (RBT) and competence-based Theory (CBT). The practical applicability and potential benefits are illustrated in their paper with an example from the banking industry. In the German EA community,[1] several additional publications are available by academics, consultants, and practitioners (e.g. (Berneaud, 2009; Freitag and Helbig, 2009)), which address different fields of application for business capabilities. Additional related literature can be found in the following research domains: service-oriented enterprise (Cherbakov et al., 2005), service-oriented architectures (often referring to technical capabilities and web services) (Homann, 2006), business component modeling (often referring to application component development) (McDavid, 1999), as well as commercial publications describing consultancy services offerings or EA tool capabilities (BOC-Group, 2009; Bredemeyer et al., 2003).

Regarding the concept of business entities, we performed a search for the terms "information architecture", "business entities", "business information", and "business data". Evernden and Evernden (Evernden and Evernden, 2003) give a comprehensive overview on information architecture and its development over time. While the first generation in the 1980s focused on developing standalone applications, the second generation around the 1990s applied these ideas at an enterprise level across multiple applications. The current, third generation, focuses on business information rather than technology. Additionally, the authors motivate the need for structuring information by means of a map and the need for a business-oriented language to describe the relevant entities. Several publications on business process modeling (BPM) and information systems modeling (ISM) motivate the need to take an informational perspective into consideration (Giaglis, 2001; White, 2004). The modeled elements itself either refer to systems architecture or represent granular entities that are used for business process analysis. The same applies for analyzed literature on information architecture is related to data structures in a system (e.g. information grouping and applied terminology) (Barker, 2005) or the interaction between system and user (Toms, 2002).

Matthes et al. have developed an EA model consisting of horizontal architecture layers and vertical cross-cutting aspects (Lankes et al., 2005; Matthes et al., 2008), which has recently been enhanced with abstraction layers (Buckl et al., 2011). Cross-cutting aspects cover concepts that are not directly part of the EA structure itself but may be linked to any element in a layer in different ways (e.g. linking goals or KPIs, a linkage subjecting EA concepts to standardization, or defining a project scope). Architectural layers comprise the company's EA structure, ranging from business & organization level, over application & information level to infrastructure & data level. Abstraction layers complement the architectural layers by describing the EA concepts on the corresponding architectural layer on a logical level. Hence, they focus on the functionalities provided, whereas details of the actual realization of the functionalities are hidden. Figure 1 shows the latest version of the model with business capabilities. A recognized EA model is also included in TOGAF ("TOGAF Content Meta-

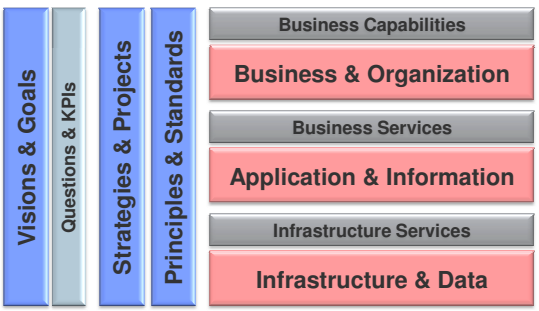

Figure 1: EA Model (following (Buckl et al., 2011)).

[1]German translation for capability: "Geschäftsfähigkeit"

model") and also contains capabilities and business entities (The Open Group, 2009).

3.2 Definitions

A *business capability* is an element of the business architecture layer (Barroero et al., 2010). Based on the analyzed literature, a *business capability* can be defined as *a functional building block of the business which supports the business models and the business strategy, i.e. it defines the organization's capacity to successfully perform a unique business activity.* A *business capability* fulfills the following characteristics:

- stability: independent from the organizational model, technologies, and vendor solutions
- horizontal structure: complete and non overlapping decomposition of the enterprise
- vertical hierarchy: can be broken down into more granular capabilities
- encapsulate and abstract from resources

Business capabilities should be defined at least by a unique and comprehensive name and a description. Example instances of business capabilities are "customer contract management", "campaign management", or "inquiry handling".

A *business entity* streamlines the information necessary to deliver the *business capabilities*. Thus they have to be comprehensive for business stakeholders and should be defined in a business language. At the same time they need to be rigorous enough to be used as a requirement basis for development of concrete data models, e.g. for a specific application. Consequently, they should be considered as a part of the business architecture since they reflect the business point of view on the information and are associated with *business capabilities* which are a part of this layer too. Currently, comparable architecture elements are often modeled as an element of lower architecture layers (see exemplary sebis EA model, figure 1).

Available literature sources do not include a definition of the business entities in the sense considered here. Therefore, we derive a definition and their characteristics from the definition of *business capabilities*:

- stability: independent from the organizational model, technologies, and vendor solutions
- horizontal view: complete and non-overlapping representation of the business information needs of the enterprise necessary to realize a given business model
- vertical view: can be broken down into more granular entities
- encapsulate and abstract from resources

In order to capture the sense of a *business entity* it is obligatory to formulate its name and description. Examples of *business entities* are "'customer"', "'contract"', or "'incident"'.

3.3 Viewpoints

A popular architecture viewpoint for visualization of *business capabilities* is a *business capability map* (Keller, 2009; Klinkmüller et al., 2010; König et al., 2005; Weber and Schmidtmann, 2008). It is a visual representation of the main functions in the enterprise which are necessary to support the company's business model and which reflect the company's strategic direction. Usually, a *business capability map* is illustrated as a set of capabilities which can be gradually detailed forming hierarchies. Figure 2 shows an exemplary capability map.

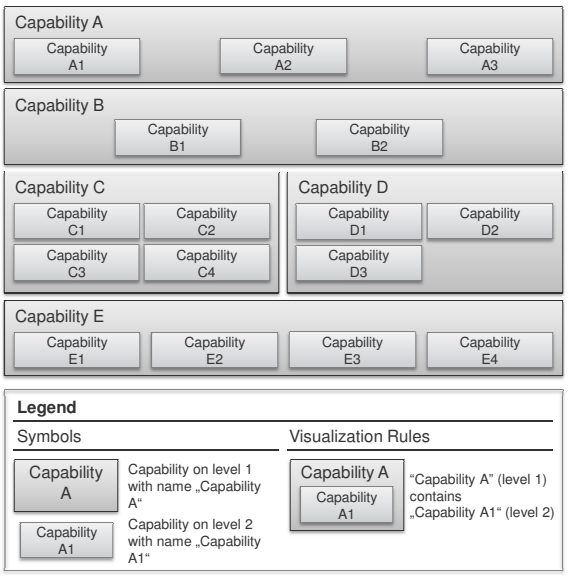

Figure 2: Capability Map.

Barroero at al. (Barroero et al., 2010) analyzed a few approaches in search for a method to link and visualize the business capabilities and extracted among other approaches the enhanced Telecom Application Map (eTOM) which decomposes the enterprise into generic business processes representing the main functions down to level five. The authors point out that such a representation can be applied e.g. to define the functional scope to deliver a given service to the customer and therefore it may be used as

a comprehensive requirements model for the service design.

4 CONTRIBUTION

4.1 Overview

The goal of the presented method is the identification and analysis of dependencies of *business capabilities*. Figure 3 gives an overview on the method consisting of three phases, which are described in this section. The gray boxes indicate the architecture viewpoints used in phase one and two and the use of the EA model in phase three.

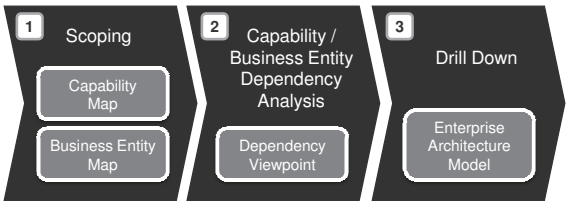

Figure 3: Capability Dependency Analysis Method.

4.2 Dependency Analysis

4.2.1 Phase 1: Scoping on Business Architecture Level

The goal of the first phase is scoping of a given problem statement using the *business capability map* and *business entity map*. The necessary input to this step is a definition of the problem which is supposed to be analyzed using the capabilities dependency analysis method. Furthermore, the documented respective maps - as a common understanding of the business model and the necessary information - are compulsory in order to conduct this investigation.

A *business entity map* has not been considered in available publications so far. In analogy to the *business capability map*, a *business entity map* visualizes the information necessary to deliver the *business capabilities*. A basic *business entity map* comprises a set of *business entities* which gradually detail one another forming hierarchies. Figure 4 shows the architecture viewpoint *business entity map*.

As a first step, the scope of the considered problem is projected on the *business capability map*. In the next step, a similar activity is conducted with respect to the *business entity map*. Dependent on the considered problem statement, the order of these two steps

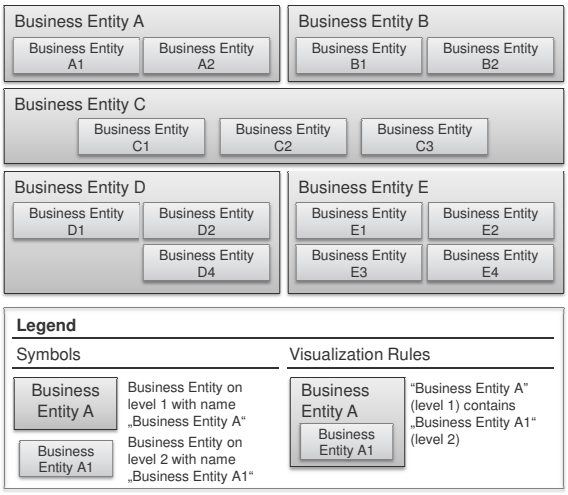

Figure 4: Business Entity Map.

may differ. In cases which are strongly data centric, it may be more comfortable to start with the *business entity map* analysis since the stakeholders can then usually define the relevant information more easily as supposed to work with the functional view directly. On the other hand, in the process management environment, starting with the functional scoping will be more beneficial. Dependent on the required level of detail of the considered problem, scoping by drilling down different levels of capabilities or business entities may be required. The steps referred here are thus to be performed iteratively leading to development of a complete view on the referred problem. Finally, the results of the problem scoping based on the both maps need to be documented, for example in form of a so called ”heat map” pointing out relevant business capabilities and business entities by color coding (Buckl et al., 2011). The results of this phase are both or one of the maps on the relevant level of detail with the problem scoping marked as a ”heat map”.

4.2.2 Phase 2: Dependencies on Business Architecture Level

The subsequent phase aims to refine the scope definition by identification of dependent *business capabilities* based on the known assignment of the *business entities*. The analysis of dependencies in this phase can be considered twofold:

- in terms of relationships of business capabilities to the *business entities*, e.g. to answer the question which information is necessary to be provided / exchanged to/by the business capability
- in terms of relationships between business capa-

bilities.

For each of the above cases, an *information ownership map* is an indispensable input. The *information ownership map* is a viewpoint which visualizes the assignment of *business entities* to *business capabilities* based on the ownership principle. The assignment of information ownership defines formal accountability for a *business entity*, which implies a number of rights and responsibilities (Dama International, 2009; Data Governance Institute, 2010). Besides others, these include assurance of availability and quality of information, as well as provision of information to its users while guaranteeing appropriate use, as well as adherence to security and compliance demands. The *information ownership map* informs if a given *business entity* is owned by a *business capability*, i.e. it is owned by it or of the business entity is only used by the capability but owned by a different *business capability*. Figure 5 shows the architecture viewpoint.

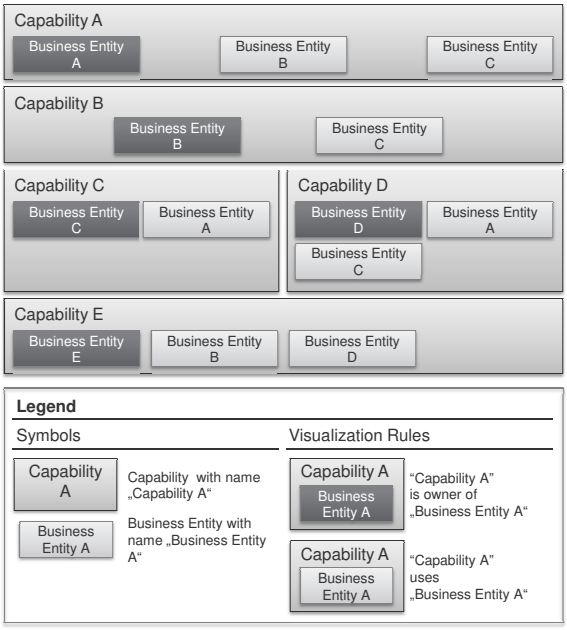

Figure 5: Information Ownership Map.

In order to develop a complete picture of the dependencies of the considered *business capabilities*, one can proceed as follows. First, the *business entities* which are used by the *business capability* are considered in search of those which own them. The dependencies discovered in this way inform about sources of information used in the given *business capability*. In the second step the *business entities* which are owned by the given *business capability* are the subject of analysis. Learning about the relations of these *business entities* to other *business capabilities* (which have them assigned as used) is significant information on the destination in which the information needs to be delivered. Conducting these steps iteratively will lead to a gradual enrichment of the preliminarily performed scoping. In the last step, it needs to be documented on the available maps. An output if this phase is therefore a refined problem scoping based on the *business capability map* and *business entity map*.

4.2.3 Phase 3: Dependencies across Enterprise Architecture Layers

In the last phase the scope of the problem is finally refined by identification of relevant architecture elements from other layers of the EA model. Consequently, the EA model with relations between the contained architecture elements (for instance in the sense of an architecture repository) is a required input here[2]. The first step in this phase relies in analysis of business capabilities along of the EA model, i.e. across various architecture layers relevant for the considered problem. In the course of this extensive analysis some gaps in the availability of quality of the available information about architecture elements may be discovered. In this case, a further optional step, may take place which aims at identification of the necessary additional data to be collected. This top-down dependency analysis may be followed by a bottom-up identification of further dependencies which complete the scope definition. Finally, the documentation produced until now - *business capability map* and *business entity map* with dependencies to each other and to other architecture elements - is updated and represents the result of the third phase.

4.3 Case Study

The business capability dependency analysis approach presented in this paper was applied in a multinational telecommunication company. Due to dynamics and saturation of the telecommunication market, the pressure to offer convergent products, i.e. fixed line telephone, mobile, and internet has increased in the last years. In order to be able to address this trend and to optimally fulfill the customers' needs the considered company decided to merge two main strategic business units - fixed and mobile business units - and establish a better understanding between the business and IT. A significant imperative in order to enable a common product offering was development of common language for the merged companies.

[2]We assume the availability of the information about elements of the EA model, including their interrelations

Consequently, it was decided to develop a capability map which reflected the consolidated business model and the strategic direction of the merged business units - to ensure delivery of convergent products and services (e.g. one bill for all products). This merger - with a particular customer-focus - implied a challenge in the area of management of customer data. It was necessary to ensure data harmonization and a common understanding of the main business objects like customer, contract or product as a foundation for a successful integration. These premises resulted in a common framework including a *business capability map*, a *business entity map* and an *information ownership map* which delivered a functional and data view on the enterprise and were later a basis for development of a common CRM system which enabled offering of convergent products by both business units.

The method described in this paper was applied to define the scope of the target CRM system and its possible impact on the overall architecture. The mentioned viewpoints were used to define the scope of this system. In the first phase, the *business capabilities* were considered which were supposed to be provided by the target CRM system. It should be noticed that using *business capabilities* as opposed to IT functions (in the sense of functionalities of applications) to create a target architecture vision is a very innovative approach, which has not been applied in this company by then. Since the customer data plays a key role in the CRM area, also the main *business entities* were identified which were supposed to be relevant in this context. This scoping of the relevant *business capabilities* and *business entities* was documented as a heat map showing the scope of the target CRM system. This heat map turned out to be a very successful project-overarching communication instrument and a very appropriate scope illustration which proved much understood by the business which often accelerated agreement.

In the considered context it was crucial not only to define the scope of the core CRM system, but foremost to reliably identify its dependencies to other systems (in the sense of dependencies of the *business capabilities* in the area of CRM to other *business capabilities*). The clarity about these relationships was seen as an essential element of the requirements definition in particular in the architecture transition phase when parts the current CRM systems in each business units were to be shut-down and replaced by the new CRM. A novel approach to analyze dependencies based on the *information ownership map* was applied. For each of the *business capabilities* on level two and three which were declared in scope in the first phase, the used and then owned *business entities* were examined. This analysis resulted in extension of the scope definition by definition of dependencies to some *business capabilities* in the area of billing, product lifecycle management, and service management. The heat map was refined by marking of *business capabilities* and *business entities* which have relations to the initially defined core *business capabilities* and *business entities*.

The goal of the last phase was to define the dependencies to other elements of the EA model which was well documented on the meta model level. Since there was no information about the complete EA model available, it was decided to capture the necessary information, however only within the scope defined so far. As a result, the process landscape, as well as applications and standard platforms were documented which were supposed to be impacted by the developed CRM system. These findings were integrated in the scope definition and extended the created heat map in the top-down direction.

The approach applied in this project proved to be very successful and was recognized as very innovative. For the first time the *business capability map* and *business entities map* and foremost the knowledge about the dependencies between then was applied in the context of development of the target system. The knowledge about dependencies allowed conducting a reliable analysis of the interfaces of the target system to other systems but as well defining the impact of the implementation of this system on the business processes and the infrastructure. Finally, the architecture viewpoints used within the projects for the scope definition were very well perceived by the involved stakeholder both from the business and IT and they established a strong foundation for the subsequent CRM system design phase.

5 CONCLUSIONS

In this paper, we presented a method for analyzing *business capability* dependencies. *Business capabilities* are a core element of the business architecture with high relevance for communication between business and IT. Additionally, they are applied in the majority of EAM use cases, such as architecture description, architecture analysis, or decision making in the sourcing context. *Business capabilities* are especially relevant to support strategic planning and innovation. The establishment of new *business capabilities* which contribute to growth implies a necessity to integrate them seamlessly into the existing landscape. The latter implies the availability of knowledge about the de-

pendencies of the *business capabilities* to one another as well as to other elements of the enterprise architecture.

The developed method builds on existing resources available in the literature and regularly applied in practice: the EA model and the *business capability map* viewpoint. On this basis, the authors derived a *business entity map* illustrating the information necessary for the *business capabilities* as well as the *information ownership map* illustrating the dependencies between the functional and the data view and being the basis for the method introduced here.

As a foundation for the developed artifact, we performed a profound literature analysis and provided a short overview on existing EA-related *business capability* and *business entity* resources. Following a design science approach, we examined the developed artifact in practice. It has been successfully applied in the real-world business environment and lessons learned have been integrated to refine method and architecture viewpoints. The resulting three-phase method to identify the dependencies of *business capabilities* was illustrated by a case study from a telecommunication industry.

This paper is of course subject to some limitations. The developed method was validated in three companies and one of these cases was described here. There is surely a potential to illustrate further cases of application of the method developed here extending the list of possible scenarios and contributing to specific extensions and variations. Interestingly enough would be to show which limitations this method may have if applied for small and medium-sized companies and if it is applicable at all. Some practitioners may certainly be interested in the details of application of the described method in the mentioned companies - the generalized method description provided here may not be sufficient for those who want to apply it in practice. Last but not least, we assumed the availability of certain artifacts in the enterprise while willing to apply the presented dependency method. This may not reflect the reality in many companies - there may be support needed - e.g. in form of guidelines - to fulfill the requirements to apply this method. They are: development of the *business capability map* and its anchoring in the EA model in terms of the dependencies to other architecture elements. Finally, the dependency analysis method requires further evaluation and justification in order to prove its general applicability and relevance.

Next to addressing the possible limitations of this paper elaborated on above, there are further research potentials which may be derived from this paper. One of our ideas refers to the issue of the tool support for the analysis described here. Obviously, multiple *business capabilities* and *business entities* may result in hundreds of relationships. Their analysis may be very exhaustive if performed without support of any software. It would be interesting to examine the existing tools (not only in the area of EAM) to find out to which extend are they able to support this method and subsequently to define the elements of the tool meta model, functionalities, views and workflows which are required by this approach and which would be accepted by the business and IT.

Since the method to identify dependencies of *business capabilities* is based here on *business entities*, it would be interesting to make a study on further EA elements which may be used in the dependency analysis of *business capabilities* like products, processes or technology elements and in the same time defining the cases in which these methods may be preferred. Referring to use cases - also mentioned in the previous paragraph, it would be finally attention-catching to define the method extensions applicable for the defined set of use cases, e.g. acquisition of a business capability, out-souring, or pattern-based strategy.

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