Business strategy-IT alignment in a multi-actor setting A mobile e-service case

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ABSTRACT

In this paper we present a framework and methodology for aligning the *business strategy* and *IT/IS* for an organization offering an e-service in a *multi-organizational* setting. We explore three perspectives on the e-service to be offered: 1) The *business strategy* perspective, in terms of the organization's *strategic position*; 2) The *value creation* perspective, in terms of a networked value constellation enabling value creation; 3) The *IT/IS* perspective, in terms of an *IT architecture* enabling the provision of the e-service. We explore these three perspective and modify them, until we find a situation in which 1) the designed IT architecture enables the provision of the e-service and can be implemented in a profitable way by the networked value constellation, and 2) the enterprise under study is positioned in the networked value constellation such that the enterprise can execute its business strategy. We have tested our approach on a starting enterprise offering a mobile e-service.

1. INTRODUCTION

Over the past few years, e-services such as Google Ads and Xbox's on-line gaming have emerged. We consider e-services first as *commercial* services along the line of service marketing literature [9]; here a service is seen as an activity or deed of a mostly intangible nature. Additionally, *e*-services are ordered *and* provisioned via the Internet. Therefore, the notion of "e-service" also has information technology aspects. Consequently, we understand "e-service" as a comprehensive construct; requiring web-service technology as a *technical* implementation platform, executing a *process* for provisioning the e-service, and creating *economic value* for the actor consuming the e-service. In sum, our interpretation of services is similar to the artifact studied in the realm of Service Science (see e.g. [19]). Because e-services are becoming increasingly complex, it is harder for an organization to offer an e-service completely by itself. For instance, an on-line game is not an independent software program; in contrast, it requires a gaming platform (eg. Microsoft's X-box) and nowadays even ads, which are shown to the player while playing. To address such complexity, organizations often prefer to *cooperate* with other organizations to share services and technologies to jointly create value; such a collaboration is often referred to as a *networked value constellation* [20].

To develop an e-service, as offered by a networked value constellation, multiple perspectives on the same phenomenon (the e-service at hand) must be properly analyzed to put the e-service into operation [5]. Considering multiple perspectives to deal with complex problems is well known from Requirements Engineering [14]. A multiple perspective approach helps to separate concerns of different kinds of stakeholders, thereby clarifying stakeholder discussions and facilitating decision making. In our alignment framework, we consider four perspective for analyzing e-services: "Business Strategy", "Value Creation", "Processes" and "IT/IS" (see also figure 1). Taking multiple perspectives comes however with a price, as it implies that these perspectives should be properly *aligned*. In our work, we distinguish *intra*-enterprise alignment (e.g. alignment of processes with IT *within* a single enterprise), but also *inter*-enterprise alignment (e.g. interoperability of multi-enterprise information systems) [5].

In this paper, we specifically focus on a specific alignment issue; namely aligning the business strategy of an enterprise with the required information technology needed to enable the e-service in a networked value constellation setting. We do so, since this kind of alignment is considered as a key factor for successful enterprises [2, 13]. To this end, various high level frameworks for business strategy - IT/IS alignment have been developed (eg. [2, 10, 13]). Yet, these frameworks discuss alignment on a fairly high abstract level and only consider alignment problems *within* a single organization. Our contribution is therefore not to only present an alignment framework for a *multi-organizational* setting, but also to provide an alignment methodology to be used while *designing* an e-service.

To align an organization's business strategy and IT/IS, we consider in this paper three of the four earlier identified perspectives on the e-service at hand: 1) The business strategy perspective, in terms of the organization's strategic position; 2) The value creation perspective, in terms of the networked value constellation enabling value creation; 3) The IT/IS perspective, in terms of an IT architecture enabling

the provision of the e-service. We assume alignment to exist between these three perspectives if we have 1) an IT architecture, which enables the provision of the e-service, and which can be implemented in a *profitable* networked value constellation, and 2) the organization's strategic position in the constellation, resulting from executing the e-service at hand, allows for the execution of the organization's business strategy.

Note that we neglect the "processes" perspective to achieve alignment between an organization's business strategy and IT/IS. This does however not mean that process perspective is irrelevant for all other alignment issues. We simply do not need it for this specific alignment issue. Furthermore, since a business strategy states how an organization should *position* itself in a competitive world [11], we expresses an organization business strategy in terms of *strategic positioning*. The strategic position of an organization is the organization's position in regard to other organizations which influence the e-service to be offered [11, 17]. The case study on a mobile e-service, as discussed in this paper, illustrates that the selection of a specific IS/IT architecture may influence this positioning significantly.

In addition to considering multi-perspectives, we take a *conceptual modeling*-based approach to ultimately arrive at a comprehensive and well-integrated methodology that is capable of supporting the process of e-service design: from strategic positioning, via the design of the networked value constellation, to ultimately implementation and deployment in terms of IT technologies. The benefit of utilizing various modeling techniques is that we can create shared understanding over various aspects of an e-service [4]. In addition, we can trace changes over the three perspectives to better understand the consequences of design choices within one of the perspectives. Finally, by choosing this model-based approach, we closely resemble the way-of-working in information system design, so the models we develop provide a suitable starting point for further designing and implementing the information systems needed for the the e-service at hand.

To develop and test our alignment methodology, we have performed case studies in the Dutch aviation sector [15] and the European electricity sector [8, 16]. In addition, we have been involved in a starting Internet company, who offers a mobile location-based e-service. It is that project, which we will report about in this paper. We have worked for over six months with this company to design and align their IT/IS with their business strategy, motivated by proper analysis based on accepted theories.

This paper is organized as follows: First we discuss our multi-perspective alignment framework to position the business strategy - IT alignment problem we deal with in this paper. In section 3 we review the required modeling techniques for each perspective taken on the e-service to be offered. In section 4 we explain how these techniques can be used, in an integrated way to reason about business-IT alignment. Subsequently we present the case study and apply our alignment approach to the case study. Finally, sections 6, 7 and 8 reflect on using our approach, and present related work and conclusions respectively.

2. ALIGNMENT FRAMEWORK

To explore the provision of an e-service at least *four* different perspectives should be taken into consideration: 1) the *Business Strategy* perspective, which considers long term goals to create competitive advantage with the e-service; 2) the *Value Creation* perspective, which considers how value is created by the e-service; 3) the *Processes* perspective, which considers the activities needed to provision the e-service and thereby create value; 4) the *IT/IS* perspective, which considers the IT/IS that supports or enables the processes and therefore the e-service. Although each perspective takes a different viewpoint, they all view the same phenomenon: the *e-service* to be provisioned [5].

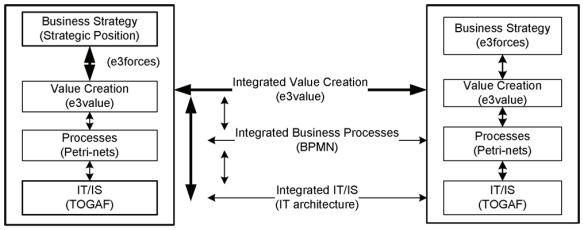

Figure 1: Inter-organizational alignment model [5]

In contrast to other alignment models (eg. [2, 10, 13]) our alignment model also take a *network* perspective into consideration. Since various e-services are enabled by intensive collaborations between various organizations (eg. networked value constellations), alignment should not only be created within an organization, alignment should also be created *between* organizations [5]. Therefore, when exploring an e-service provisioned by a collaboration of organizations it should be analyzed 1) if there is shared understanding on how value is created and if every organization is able to be profitable, 2) if inter-organizational processes are coordinated properly, and 3) if there is alignment between the IT/IS of various organizations to enable the inter-organizational processes and value creation.

The identified perspectives result in various types of alignment decisions: 1) intra-organizational alignment which considers alignment decisions between perspectives *within* a single organization, 2) inter-organizational alignment *within* a perspective, which considers alignment decisions per perspective *between* multiple organizations, 3) inter-organizational alignment between perspectives, which considers alignment decisions *between* perspectives and *between* organizations. In an ideal situation, there would always be complete alignment within an organization and between organizations.

A naive way to reason about alignment, is to use a kind of top-down or "waterfall" approach as known from Software Engineering. Each perspective would be developed sequentially, and in a top-down way. We argue that this is not a realistic approach. For instance, enterprises have substantial legacy in processes and information systems, which has to be dealt with in a quite early phase. Also, the world (including the competition) is continuous and fast moving in terms of enterprises, services, and technologies. So, we consider alignment to be a continuous and iterative "tuning" between the four perspectives within an organization *and* between organizations.

If an opportunity for an innovative e-service occurs, a basic question is which of the four mentioned perspectives to explore first. In case studies we have performed, we learned that an idea for a new e-service explained by stakeholders initially has a bias to one of the four mentioned perspectives. Often, this bias is grounded in the stakeholders themselves. We use this biased perspective as the starting point for the exploration of the e-service at hand, as stakeholders are familiar with this perspective, and therefore can provide the most information about it. For example, in the case study that we present in section 5, the idea for the e-service, as expressed by the stakeholders, is biased toward the "IT/IS" perspective. So, in this case study, we start with exploring the IT/IS perspective.

Due to space limitations, the scope of alignment is limited in this paper to the following alignment issues (bold arrows): 1) Alignment between an organization's business strategy, expressed in terms of its strategic position and the value creation of a single organization in an inter-organizational setting, and 2) Alignment between the organization's value creation and the supporting IT, expressed in terms of an IT architecture. We focus on these two alignment issues, because alignment of an organization's business strategy and IT/IS is one of the key factors for creating a successful and profitable organization [2, 13].

3. MODELING TECHNIQUES

Current alignment frameworks offer fairly abstract and informal facilities to reason about business-IT alignment (eg [2, 10]. *How* to concretely address such alignment during the design of an (e)-service is not very clear. For this reason, we take a model-based approach. Not only does it better resemble the way of working in Service Sciences, it enables practitioners a method to proper elicit each of the four perspectives and allows for traceability of changes in one perspective onto another perspective [14]. Moreover, constructed models can be used for further and more detailed e-service design.

3.1 IT/IS Perspective

There is a substantial amount of literature on modeling information system architectures (see eg. [3]). In terms of languages there is the UML [23] as an industry standard. In addition, design approaches such as TOGAF [22] are becoming increasingly popular. The aforementioned approaches are however rather comprehensive and therefore time consuming to apply during initial exploration of an e-service.

Therefore, we aim at a notation which is easy and tractable. Specifically, we are interested in identifying three specific aspects: 1) what key technologies are needed for the e-service at hand, 2) similarly, which information systems are required, and 3) how do the information systems interact with their environment. These three aspects show the big picture of how the e-service can be technically realized. Furthermore, based on our field experience, if one of these three aspects of the IT/IS architecture changes, chances are high that the value creation and strategic position will also change.

So for the actor under investigation we model the information systems and data stores required with squares and rounded squares. Subsequently, we model, via simple arrows, which information is exchanged between the actor under investigation and other organizations in the networked value constellation (an example can be found in figure 5). For these actors we also model which (sub)-information systems and data stores they require to interact with the actor under investigation. Technologies needed to enable the e-services are also included (textual), since the selected components reflect important technology choices. For instance in our case study the choice for a GPS or GSM based positioning system had to be made. As we will see, such choices influence the strategic position of an organization.

3.2 Value creation perspective

To model the value perspective of an e-service in a multi-organizational setting we use the e^3value modeling technique. Because the e^3value technique has been widely discussed (eg. [6,7]) we only briefly discuss the technique. The e^3value approach provides modeling constructs for representing and analyzing a network of enterprises, exchanging things of economic value with each other. The methodology is ontologically well founded and has been expressed as UML classes, Prolog code, RDF/S, and a Java-based graphical e^3value editor. This editor can used to determine the financial feasibility of constellation by determining the Net Present Value (eg. profits) for each of the organization in the organization. If the Net Present Value is positive for each of the organization, then the constellation is considered financially feasible. We use an educational example (see figure 2) to explain the model constructs.

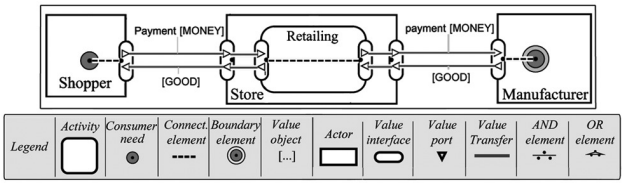

Figure 2: Educational example

Actors (often enterprises or final customers) are perceived by their environment as economically independent entities, meaning that actors can take economic decisions on their own. The Store and Manufacturer are examples of actors. *Value objects* are services, goods, money, or information, which are of economic value for at least one of the actors. Value objects are exchanged by actors. *Value ports* are used by actors to provide or request value objects to or from other actors. *Value interfaces*, owned by actors, group value ports and show economic reciprocity. Actors are only willing to offer objects to someone else, if they receive adequate compensation in return. Either all ports in a value interface each precisely exchange one value object or none at all. So, in the example, Goods can only be obtained for Money and vice versa. *Value transfers* are used to connect two value ports with each other. It represents one or more potential trades of value objects. In the example, the transfer of a Good or a Payment are both examples of value transfers. *Value transactions* group all value transfers that should happen, or none should happen at all. In most cases, value transactions can be derived from how value transfers connect ports in interfaces. *Value activities* are performed by actors. These activ-

ities are assumed to yield profits. In the example, the value activity of the Store is Retailing. *Dependency paths* are used to reason about the number of value transfers as well as their economic values. A path consists of *consumer needs*, *connections*, *dependency elements* and *dependency boundaries*. A consumer need is satisfied by exchanging value objects (via one or more interfaces). A connection relates a consumer need to a value interface, or relates various value interfaces of a same actor internally. A path can take complex forms, using AND/OR dependency elements. In the example, by following the path we can see that, to satisfy the need of the Shopper, the Manufacturer ultimately has to provide Goods.

3.3 Business strategy perspective

We use e^3*forces* (see [15]) to model the business strategy perspective on a service offering by an organization in terms of the organization's "*strategic position*" in a networked value constellation. As there is to the best of our knowledge no model-based approach which analyzes the strategic positioning of an e-service in relation to selected information technology, the utilization of e^3*forces* to do so is an important contribution of this paper. Part of being able to execute a business strategy, and thereby creating competitive advantage, is to find a *strategic position* which enables the execution of the chosen business strategy [17]. The strategic position of an organization is the organization's position in regard to *environmental business forces* such as suppliers, buyers and competitors, which influence the service/product to be offered [11, 17].

The e^3*forces* technique provides modeling constructs for representing and analyzing strategic related concepts, such as "strategic position" and "business forces". It enables practitioners to analyze the strategic position of an organization by analyzing the influence of environmental business forces on a product/service offered by the actor under investigation. In the case of an organization participating in a networked value constellation, the other organizations in the constellation are considered environmental business forces. An e^3*forces* model is based on a corresponding e^3*value* model. Instead of focusing on a complete networked value constellation as e^3*value* does, e^3*forces* focuses on the impact of environmental business forces on a *single value offering* of the actor under investigation. The business forces analyzed are directly based on Porter's Five Forces framework [17, 18]. In an e^3*forces* model business forces and their strength are explicitly stated and are related to actors (see figure 3 for example). Furthermore, e^3*forces* enables practitioners to quantify business forces' strength such that it is possible to compare various alternative strategic positions. Finally, e^3*forces* provides a clear and compact graphical overview of an organization's strategic position and related environmental business forces. The e^3*forces* technique uses the following constructs:

Actor. Actors are independent economic (and often also legal) entities [11]. Actors operate independent or are part of a constellation, which is a coherent set of two or more actors who cooperate to create value to their environment [20]. *Properties:* An actor has a pre-determined *business strategy*. The business strategy of an organization is the direction and scope of the organization's configuration and position

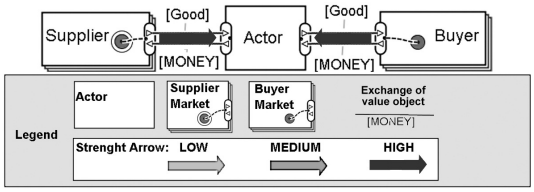

Figure 3: Example e^3*forces* model

in its environment such that it creates competitive advantage [11, 17]. For an organization to successfully execute its business strategy a matching strategic position must be chosen [18]. Three generic strategies are considered [11, 17]: 1) *cost-leadership*, which is trying to offer value objects with similar quality as competitors but against a lower price; 2) *differentiation*, which is to offer value objects with qualities that are unique or differ from competitors; 3) *focus*, which is focusing on a specific (small) buyer market. *Relationships:* An actor, or constellation, acquires and offers value objects from and to an environment consisting of business forces [11, 17]. *Representation:* An actor is modeled as a square.

Business Force. Business forces are those organizations that operate in the *environment* of the actor under study. From a modeling perspective, a business forces is not an independent organization but a set of organizations, called *market*. These external organizations are grouped in markets because by considering sets of organizations we abstract away from the individual and limited influence of many single organizations [17]. This abstraction simplifies the e^3*forces* models to be made, and suffices for the business forces analysis we conduct. Therefore, we consider relationships between actors and specific markets in the actor's environment, rather than the many relationships between actors and each individual organization in the actor's environment. *Relationship:* Business forces *influence* the price and/or configuration of value objects which they acquire from or offer to actors [11, 17]. They are able to do so because they negotiate different prices, bargain for higher quality, alter specifications or, try to play competitors against each other [17,18]. *Properties:* A business force, or market, has a certain *strength*. The strength of a force indicates to what extent that specific force can *influence* the price and/or configuration of a value object offered to or acquired from an actor. *Representation:* A business force or market is modeled as a layered square. The strength of a business force is expressed by a "strength" arrow. A strength arrow is graphically bundled with the exchange of a value object and points from the business force toward the actor.

Types of Business Forces. *Buyer Markets.* Buyers markets are sets of organizations which are part of the environment of an actor and acquire value objects from the actor under study. Buyer markets can influence value objects because they negotiate down prices, bargain for higher quality and, desire different specifications [17, 18]. All this is at the expense of the profitability of actor under study [17,18]. Note that we, as described above, do not look at buyers in-

dependently, instead we analyze the buyer *market* of which the individual buyer is part. After eliciting buyer markets, the next step is determining the strength of buyer markets. To determine the strength of buyer markets we have developed a metric based on Porter's [17] original buyer market analysis.

Supplier Markets. Supplier markets, the second business force, are those organizations which provide value objects to actors in the constellation. Suppliers influence value objects provided to actors in a constellation by threatening to alter the configuration of value objects, to increase the price or to limit availability of value objects [17]. All this is at the expense of the profitability of the actor under study [17,18].

Competitors. An additional force is exercised by *competitors*; actors that operate in the same industry as the constellation and try to satisfy the same needs of buyers by offering the same value objects to buyer markets as the constellation does [11]. Competitors are a threat for actors because they try to increase their own market share, influence prices and profits and influence customer needs; in short: they create competitive rivalry [17,18]. Due to space limitations we consider "substitutes" and "New Entries" as competitors, which is motivated by the fact that they also try to satisfy the same customer needs.

Determining business force's strength. To analyze the influence of a business force on a value object, n different aspects need to be analyzed depending on the business force [15, 17]. For buyer markets 7 aspects need to be analyzed, for supplier markets 5 aspects need to be analyzed and for competitor markets 7 aspects need to be analyzed. These aspects are directly derived from the Five Force Model (see [15, 18]). To be able to measure and compare the strength of the business force, each of the business aspects related to the business force is scored on a five points scale. The scoring of business aspects is performed with the aid of *domain experts*. This method of scoring is based on grounded business theories (eg. Balanced Score Cards [12]) and software architecture theories (eg. CBAM [1]). The score "5" indicates that the extent to which the business force can influence the value object exchanged is high and "1" indicates that it is low. Because the relevance of the aspects can vary per value object exchanged, domain experts give each aspect a *weight factor* (β_j), as done in CBAM [1]. The domain expert have to divide 100 points over the n aspects ($\sum_j^n \beta_j = 100$); more points indicate higher relevance. When the weighted expert scores are summed the "strength" of a business force in relationship to the exchanged value object is expressed. The strength of a business force indicates to what extent the business force is able to influence the value objects exchanged with the actor in the networked value constellation.

$$Strength_{businessforce} = (\sum_{j}^{n} \beta_j * Q_j)/5$$

The total sum is divided by 5 to range buyer market's strength from a maximum "100" to a minimum of "20". For *visual* purposes a score in the range of "20-48" indicates low strength (light gray arrows), "48-76" indicates medium strength (medium gray arrows) and, "76-100" indicates high strength (dark gray arrows).

Value object. Markets and actors in a constellation exchange products and services which are, in generic terms, *value objects* [7]. A value object has economic value for an actor when the actor can use the object to satisfy a need or when the actor can use the object for transfer with another object [7]. *Properties:* A value object has two attributes [11, 17]: 1) the *configuration* consisting of the qualities the object offers and, 2) a *price* which is expressed in terms of another value object, wanted in return by the provider of the original value object (the price to be paid is usually money, although not obligatory). *Relationships:* The price and/or configuration of value objects acquired/offered by an actor from buyer and supplier markets are influenced by environmental business forces.

Although the e^3*forces* modeling technique shares a few concepts with the e^3*value* modeling technique [7], they are fundamentally different. The main focus of the e^3*value* modeling technique is on economical feasibility of a networked value constellation, while the e^3*forces* technique main focus is on the strategic position of a single actor. However, by sharing some concepts with e^3*value* , e^3*forces* and e^3*value* can be easily integrated.

4. ALIGNING BUSINESS STRATEGY WITH IT

In the previous sections we have discussed which modeling techniques we utilize to achieve alignment between an organization's business strategy and IT/IS. In this section we will discuss how we use these techniques, and in what order, in the context of the alignment framework presented in section 2.

1. Determine an initial perspective. Exploration of an e-service assumes a first rough idea about the service to be offered. To start-off the exploration process, the first step is to determine which perspective to explore first, given the rough idea. To our experience, stakeholders initially present such an idea with a bias to one of the perspectives described in section 2, eg. in terms of technologies or value creation. The starting point for exploring and eliciting the e-service idea is then be this "biased" perspective, since stakeholders can provide (initially) the most information about that perspective.

2. Explore the initial perspective. Let us now assume, for a specific e-service idea, that the idea is mainly articulated from a "value creation" point of view. The next step is then to explore this idea with the aid of e^3*value* . The aim is to elicit what of *value* is exchanged between organizations and if the idea is *financially feasible* for the organization offering the service *and* for the organizations participating in the networked value constellation (see [6] on how to do so). We assume that the organization needs to collaborate

with other organizations to offer the e-service. If the service cannot be provisioned financially feasible there is no point in going further

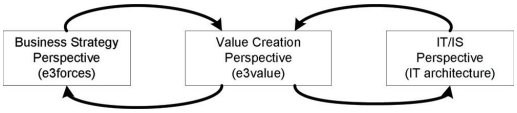

Figure 4: Order of perspectives

3. Explore the other perspectives. Figure 4 explores the order of exploring the remaining perspectives. Each arrow represents a next possible perspective for exploration. For instance, after exploring the value creation perspective, either the business strategy perspective or IT/IS perspective can be explored. Selection of the perspective to explore next is done similar to step 2; we continue with perspective the stakeholders are most familiar with. There is however one additional guideline: If we have explored the IT/IS perspective or business strategy perspective, the value creation always has to be explored next. This is because the value creation perspective is needed to "translate" strategic design choices, or IT/IS design choices, into the other perspective. In other words: The value creation perspective bridges the IT/IS perspective and the strategy perspective.

Stakeholders are explained that selecting a particular order of perspective exploration implies choice about how the design space for the e-service is constrained. For instance, if we first consider the value creation perspective, and thereafter the IT/IS perspective, the design space for the IT/IS perspective is bound by the value creation perspective.

4. Aligning the explored perspectives. We have now explored two perspectives, next we assess whether these perspectives are aligned. For instance, we consider the value creation and IT/IS perspective to be aligned, if we find an IT/IS architecture which allows for the offering of the e-service and can be implemented by the networked value constellation. If this is not the case, then the IT-architecture or networked value constellation has to be redesigned, after which we perform step 2 to 4 again. These steps are repeated until the value creation and IT/IS perspective are aligned.

5. Exploring the final perspective. Only after alignment has been achieved as mentioned in step 4, we proceed with exploring the remaining perspective. For instance, if we have aligned the value creation and IT/IS perspective, we then explore the business strategy perspective. For this perspective we analyze the strategic position of the organization offering the e-service, to determine if the strategic position matches the chosen business strategy of this organization. If the strategic position does not allow for the execution of the organization's business strategy, then we have to design a new strategic position, which in practice means that we have to redesign the constellation. Again these steps are repeated until a strategic position is found in a networked value constellation which allows for the execution of the chosen business.

6. Back to the first perspective. It is plausible that step 5 requires that the value constellation should be modified. As a result, the design space for the IT/IS architecture has changed, which could mean that the IT architecture can no longer be implemented by the constellation; in other words there is no alignment anymore. Therefore we start over with the process. Basically we "tune" the three perspectives, until we find a strategic position for the enterprise under study within a financially feasible networked value constellation *and* an IT/IS architecture, which can be implemented by the networked value constellation.

Other roads to alignment. In the steps described above we have started with the value creation perspective, then the IT/IS perspective and ended with the business strategy perspective. As Fig. 4 shows we could have taken other roads. What road should be taken is case dependent and can be best determined by practitioners and the (tacit) knowledge of the actor under investigation.

5. ALIGNMENT CASE STUDY: MOBZILLI

For a period of over six months we have had intensive contact with the founders of Mobzilli (www.mobzilli.com), a starting Dutch "Internet" company. During these contacts we were not only able to gather information about Mobzilli and its environment but we were able to take an active part in the development of Mobzilli. We consulted the board during various meetings on aspects ranging from strategic issues via marketing down to technical issues. In return, they provided us with feedback on our alignment methodology proposed and the e^3*forces* technique (eg. what was clear and practicable and what was not).

Idea for an e-service. The founders of Mobzilli have the idea to offer the e-service "Location Based Advertisements". The service consists of two dependent parts. First, organizations (such as merchants) are offered a new advertisement channel by bounding their advertisements to geographical locations. Furthermore, these advertisements can be viewed by potential customers on mobile phones. Second, potential customers can receive ads from organizations that are in their vicinity by utilizing a small application on their mobile phone. So if a customer would be in a shopping center s/he would be able to request the advertisements of the shops in her/his vicinity using her mobile phone. Mobzilli intended to use satellite positioning to determine the position of customers, in which case customers are required to have a mobile phone with GPS and mobile Internet. For customers, the service is free. Yet, "Merchants" who use Mobzilli's advertisement channel, must pay a small fee each time an advertisement is watched. An extra service is that "Merchants" can acquire statistics about the use of their advertisement.

Business Strategy. Porter [18] distinguishes three kinds of strategies: 'cost-leadership", "differentiation" and, "focus".

Mobzilli has chosen "differentiation" as their business strategy, since Mobzilli long term strategy is to offer innovative and different services to the market. The business strategy "differentiation" states that an organization competes with competitors on the quality/configuration offered by the value object and not on the price related to the value object. Price competition occurs in case of well known and accepted community products, whereas "differentiation" is more appropriate for innovative products (customers have to pay a premium for innovation). Note that we take the business strategy as a given, we do not evaluate if this is the *proper* strategy to choose. We only intend to find an IT architecture for the e-service at hand, which, via a value constellation, enables the execution of the chosen business strategy.

5.1 Aligning Business Strategy and IT/IS

For the Mobzilli case, we now execute the steps as introduced in section 4.

1. Determine the initial perspective. Mobzilli is a start-up company, which is mainly technical driven due to the technical background of its founders. In other words, Mobzilli has a rather technical bias to describing their idea for an e-service (eg. GPS, Java programming, etc.). To this end we start with first exploring the IT/IS perspective on the e-service to be offered.

2. Explore the IT/IS perspective. After a series of interviews with Mobzilli's executives, we elicited the IT/IS architecture in figure 5. This IT/IS architecture expresses the initial idea of Mobzilli for their e-service in terms of technologies and information systems required. The architecture shows on a high level which (sub)-systems each actor needs and how these systems interact (eg. what information they exchange). In this specific case, the architecture shows that a customer's coordinates are retrieved by calling the GPS device on the mobile phone of the customers. In return, advertisements are sent to the customer's mobile phone's web browser. The ads are retrieved from a central database, which is filled by merchants. The architecture shows also that Mobzilli needs three information systems: 1) a central advertisement database, 2) a system for generating and sending advertisement to customers, 3) an analyzing system to provide merchants with statistical information.

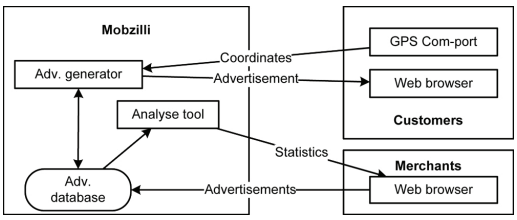

Figure 5: ICT Architecture: initial design

3. Explore the value creation perspective. To realize the e-service in terms of the designed IT architecture, Mobzilli choses to create all the systems needed internally. This limits the number of other organization in the networked value constellation, as expressed by the e^3value model. While designing the e^3value model, corresponding to the selected IT architecture, the main question we asked to Mobzilli is: "*Which* things of *value* are exchanged with *which* other actors/organizations?". Based on the IS/IT architecture, we can derive the following actors and transfers: 1) "Merchants", which acquire the value objects "Adv. Channel" and "Statistics" from Mobzilli, both in exchange for money and, 2) "Customers", which acquire "Ads" from Mobzilli in exchange for "Views". A number of other actors are necessary to enable the use of GPS technology: "Satellite Positioning", which provides the technology for the positioning of customers, and "Phone Manufacturer" which are added to indicate that "Customers" need a mobile phone with GPS. Furthermore, because "Customers" receive the advertisements on their mobile phone they need to have mobile Internet access, to this end "Telecom Providers" are added. To complete the e^3value model, value exchanges between "Merchants" and "Customers" are added to show that advertisement will (hopefully) lead to a sale increase. This all leads to the networked constellation modeled with e^3value in figure 6. The e^3value model designed allows for the implementation of the IT architecture designed in the previous step.

The next step after modeling the constellation is to analyze if the constellation is financial feasible [6]. Even though the constellation's design allows for the implementation of the IT/IS architecture, if the constellation is not financially feasible the other actors are probably not willing to cooperate and the e-service cannot be offered. The condition for the constellation to be financially feasible is that all actors have a positive Net Present Value - basically each actor makes a profit -, except for the customers since they ultimately acquire value objects in return for money [6]. Calculations, supported by the e^3value tool, showed that the constellation is indeed financially feasible.

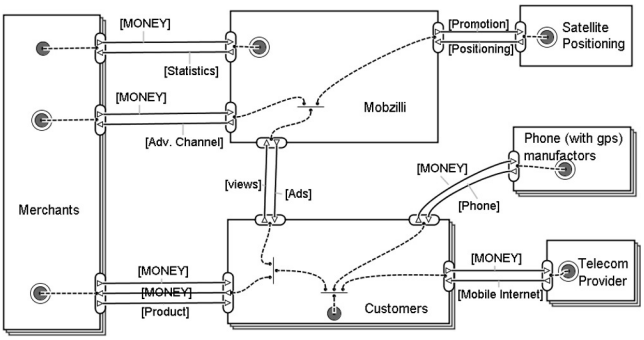

Figure 6: e^3value model: initial design

4. Explore the business strategy perspective. To analyze the strategic position of Mobzilli we utilize the $e^3forces$ technique [15]. This techniques enables users to analyze the strategic position of an organization by modeling and evaluating the impact of business forces on the service/product offered [15]. During the development of the initial idea, Mobzilli had not taken their business strategy under consideration. When we asked them if their IT/IS architecture design matched their business strategy they had no answer. In

cooperation with Mobzilli, we developed an e^3*forces* model for their initial idea to provide insight into their strategic position. The e^3*forces* model (figure 7) is based on the e^3*value* model. Mobzilli is again the actor under investigation. Actors or market segments not directly related to Mobzilli are removed. The remaining actors are placed in corresponding markets segments, where these market segments can facilitate the specific value transfer between Mobzilli and the actor (as discussed in section 3.3). Furthermore we include the competitor market which offers similar services and affects both the service provided to Merchants and Customers.

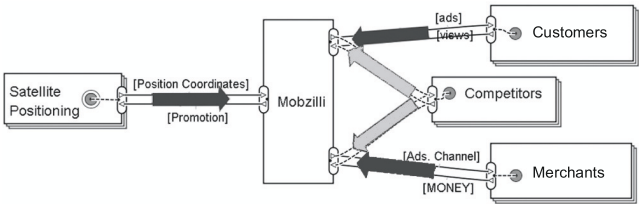

Figure 7: e^3*forces* model: initial design

Together with Mobzilli we applied the buyer, supplier and competitor metrics described in section 3.3, and after a few iterations we found the final scores, we all agreed upon. According to the supplier metric the score for the supplier market "Satellite Positioning" is 90, mainly due to an imbalance in the market (GPS dominates). This indicates a strong influence on the value object "position coordinates" offered to Mobzilli [18]. The value object is however free, therefore the strong influences is on the configuration of the value object(eg. accuracy) and not on the price. Since each customer must have a mobile phone with satellite positioning, which in the Netherlands is a very small market, this market segment has the high score of 79. The strength of Merchants for "advertisement channel" is also high (87), since the value object offered is not important for this market segment. Finally, since the service is relative new there is not (yet) much competition, the strength of the competition is considered as low.

Overall, Mobzilli has one supplier with a strong influence on the configuration of its e-service offered (eg. accuracy, but also requires mobile phones with GPS). In addition, Mobzilli has two strong forces on the buyer side which also influence the configuration of the service. This analysis provided rationale for Mobzilli's feeling that this design would not match their chosen business strategy, even though the IT/IS architecture can provision the service successfully. The analysis showed Mobzilli that a specific localization technique (Satellite positioning) would result in a strategic position which is not suitable for their chosen business strategy. In addition, the analysis showed Mobzilli that choosing satellite technology resulted not only in a strong supplier, but also affected the strength of a buyer market. These insights motivated them to make some revisions.

5. Modify perspectives to arrive at better alignment.

So, after analyzing the initial networked value constellation's design, it was concluded not to be a desirable design; the strategic position would not enable the execution of the chosen business strategy. To this end other options were explored. Other technologies were considered as well as using other supplier or offering the service to other buyer markets. In reality this happened with a number of iterations, due to space limitations we however only provide the final design.

To deal with the strong supplier "Satellite Positioning", the choice was made to use open source positioning software (unlike GPS this software works via triangulation of signal strengths of various GSM-antenna's, making it an entirely different technical solution). Because more organizations are active in this market, compared to the satellite positioning market, the influence of this market was hoped to be less (we demonstrate this to be true later). A side-effect is that external software developers are needed to integrate the positioning software into the other systems. This results in a second supplier market and an additional actor in the networked value constellation.

To deal with the strong buyer market "Customers", the choice to use GSM triangulation technology is also beneficial. Since now "Customers" only need to use mobile Internet the market is significant larger. To deal with the other strong buyer market, "Merchants", it was chosen to target a second buyer market: "Cultural Organizations" (eg. musea). As a result the dependency on "Merchants" would be less, reducing their strength. Furthermore, "Cultural Organizations" have less alternatives to target (foreign) customers, therefore their strength was predicted to be lower than the strength of "Merchants". Because a buyer market was added, an additional market segment had to be included in the networked value constellation.

To determine if this technical design, corresponding networked value constellation and strategic position are properly aligned we again explore the various perspective. To show that there is no fixed order in the perspectives, we start now with value creation perspective.

6. Re-exploring the value creation perspective.

The new networked value constellation's design in presented in figure 8. As can be seen there are three new entities: the actors "Software Developers" and "Positioning Software" offering their services/products to Mobzilli, and the Market segment "Cultural Organizations" which also acquires the "adv. channel" from Mobzilli. Calculations with the e^3*value* tool showed again that the constellation is financially feasible.

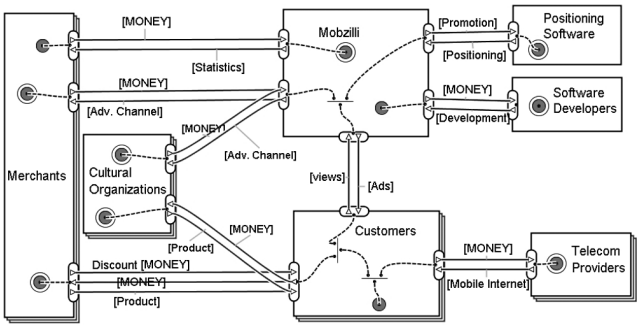

Figure 8: e^3*value* model: final design

7. Re-exploring the business strategy perspective. The e^3*forces* model for the final design is presented in figure 9. The model was made in close cooperation with Mobzilli, as were the metrics. After a few iterations the final scores were found.

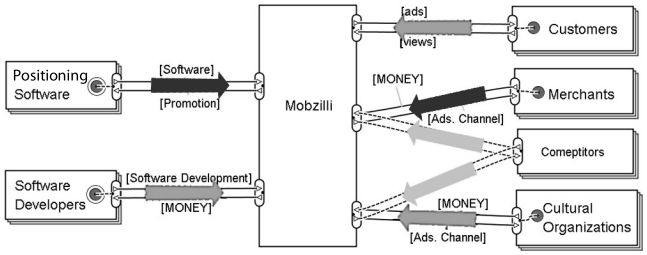

Figure 9: e^3*forces* model: final design

According to the suppliers metric the score for "Software Developers" is 60, this is considered medium and is such because of the large number of "software Developers" present. In addition the influence of this buyer market is more related to the price than the configuration of the value object, thereby better enabling the execution of the chosen business strategy. The score for "Positioning Software" is 80, indicating a strong force, although less then for "Satellite Positioning". Furthermore, the influence is again on configuration and not price (the software is still free) of the value object provided. Although this still does support the chosen business strategy, Mobzilli considered this situation better than the previous design. Using the metric for buyer markets resulted in a score of 69 for 'Customers", the score decreased due to the larger population. The new score for "Merchants" is 78. By adding a market more trading areas for Mobzilli are available and thereby the strength of "Merchants" decreased [17]. For "Cultural organizations" the scores is 65. The strength of "Cultural Organizations" is less than that of "Merchants" because less alternatives are at hand for this buyer market. With this new design only one strong forces remains. Since the service is still new, also for the new buyer market, the influence of competitors is still low and therefore not relevant.

The final conclusion, in regard to the search of a suitable strategic position, is that the final design (figure 9) provides a strategic position which enables the execution of the chosen business strategy. This notion was supported by Mobzilli. By carefully choosing suppliers and buyers a strategic position was found were the environment has minimal as possible influence on the configuration of the service offered. In comparison to the first strategic position the strength of suppliers has decreased with ± 13 % and the strength of buyers with ± 17 %.

8. Re-exploring IT/IS perspective. The new constellation's design also meant a redesign of the IT/IS architecture. figure 10 shows the new IT/IS architecture. The architecture is based on the new constellation, because different value objects (eg. technologies and services) are provided to Mobzilli, different technologies are used in the architecture.

GPS is no longer used. This is a direct result from business strategy choice to provide the service to a larger customer market and not depending on GPS. Instead the GSM module is called to provide the signal strength of different GSM antenna, which is used to determine the location of the customer. The choice for triangulation requires an extra component to be added to Mobzilli's IS; positioning module, since the position for each "Customer" now has to be calculated. This is a specific design choice made, since the computation could also occur within the Java applet already required on the mobile phone. Basically it is a question of centralizing the computation to Mobzilli's server (greater server load) or decentralizing the computation (modifications more difficult). The answer to this question is however beyond the scope of our paper since both options do not influence the strategic position of Mobzilli in its networked value constellation (eg. no new technologies or other organizations required).

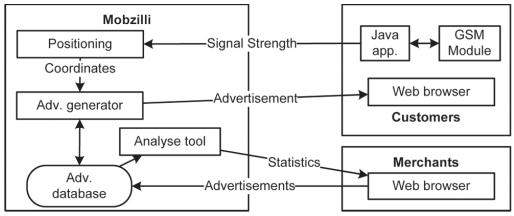

Figure 10: ICT architecture: final design

Mobzilli's IT architecture (figure 10) for the e-service to be offered can be implemented within the context of the value constellation of which Mobzilli is part (figure 8). Furthermore, Mobzilli's strategic position within the value constellation allows for the execution of the desired business strategy. To this end it was considered by Mobzilli that alignment is achieved between their business strategy and IT/IS.

6. REFLECTIVE LEARNING

On a practitioners note; often Mobzilli had had a feeling about the legitimacy of various choices made regarding their IT design and business strategy. They however had difficulties properly motivating them. But with the aid our methodology we were able to provide Mobzilli theoretical rationale for the legitimacy of their choices. It showed Mobzilli how specific design choices (eg. technologies used) affected value creation and their strategic position.

In addition, utilizing e^3*forces* enabled Mobzilli to think and create understanding of their business strategy and strategic position. Thus, e^3*forces* aided them in exploring, analyzing and comparing various strategic positions based on a theoretical founded analysis (eg. Porter's buyer and supplier analysis), which they were unable to do so far.

7. RELATED WORK

The most relevant related work it that of Thevenet and Salinesi [21], which also strives for strategic alignment during design-time of information systems. Their method, INtenional STrategic Alignment (INSTAL), analyzes organizations at two levels: the strategic level and the operational level. Using documentation from both levels a third level is created where the synergy between both levels is documented [21]. Furthermore, both the strategic and opera-

tional level are modeled within one single model. However, in contrast our approach with its multi-organization view, the INSTAL methodology has an internal view on organizations. Furthermore, modeling both strategic and operational aspects within one model might cause confusion since both viewpoints highlight quite different aspects of an organization.

8. CONCLUSION

The aim of this paper was to provide a methodology for alignment of an organization's business strategy and the organization's IT/IS within a network setting. Our methodology takes three different perspectives into account: 1) the business strategy perspective, expressed in terms of the organization's strategic position; 2) the value creation perspective, expressed in terms of the networked value constellation of which the organization is part; and 3) the IT/IS perspective, in terms of an IT architecture which enables the provision of an e-service. The application of our methodology in a real-life setting showed that we are able to design an IT architecture for an e-service within the context of a *profitable* networked value constellation, such that the strategic position within the constellation allowed for the execution of the organization's business strategy.

We have focused on two specific alignment decisions in this paper. However, in our alignment model various other alignment decisions are identified. This leads to two areas of future research: 1) how should the other alignment decisions be resolved, and 2) how should this methodology be integrated with approaches for the other alignment decisions?

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