$e^3forces$: Balancing strategic and Technical Concerns for Competitive *e*-Services

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Abstract. Various commercial *e*-services have emerged in the last years (eg. Google Ads). Besides requiring a solid technical foundation, these *e*-services must also be *profitable* in the long term. Such profits are achieved by creating *competitive advantage*. How to create competitive advantage is outlined in an organization's *business strategy*. For an organization to execute its business strategy, a consistent *strategic position* is needed. A strategic position is however dependent on the technologies chosen to enable the *e*-service. The problem is therefore, to find a strategic position in which an organization can offer an *e*-service with a sound technical foundation, *and* also can execute its business strategy. To this end we present the $e^3forces$ ontology as a model-based approach to find such a strategic position. $e^3forces$ determines whether a strategic position meets high-level *technical requirements* and *strategic requirements* (the business strategy) by analyzing - based on well known business theories - the impact of environmental business forces on the e-service offered. To demonstrate and test $e^3forces$ we have conducted a case study at a starting Internet company. *Keywords*: *e-service*, *business strategy*, *conceptual business model*, *competitive advantage*.

1 Introduction

Over the past few years, *e*-services such as Google Ads and Xbox's on-line gaming have emerged. Like normal services, these *e*-services are activities and deeds of a mostly intangible nature [5]. Yet, *e*-services are ordered *and* provisioned via the Internet. In this paper, 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 *e*-services is similar to the artifact studied in the realm of Service Science (see e.g. [12]).

e-Services are becoming increasingly complex (eg. due to security requirements), making it harder for a single organization to offer the service. To this end, organizations often prefer to *cooperate* with other organizations to jointly create *value* and satisfy complex customer needs [13]. Such a collaboration between organizations is often referred to as a *networked value constellation* [13].

Obviously, a sound technical implementation of an *e*-service is required (eg. reliable technologies and proper information system design), but the *e*-service

must also be *profitable* on the long term [4, 8]. An *e*-service can however only be profitable if *competitive advantage* is created [10]. Competitive advantage should be the result of executing a specific and chosen *business strategy* (eg. cost-leadership and differentiation) [6,10]. To execute a business strategy, and thereby creating competitive advantage, an organization needs a *strategic position*, which enables the execution of the chosen business strategy. The strategic position of an organization is the organization's position in regard to *environmental business forces* (eg. other organizations such as suppliers, buyers and competitors) which influence the *e*-service to be offered [6, 10]. For an organization participating in a networked value constellation, the environmental business forces are usually the other organizations in that constellation.

In this paper, we show that the chosen *technical implementation* of the e-service influences the *required* other organizations to form a networked value constellation, and therefore, the strategic position of the organization offering the *e*-service. For instance, consider the difference between (technology) suppliers, potential customers and, competitors when joining the HD-dvd or Blu-ray camp. The research problem is then *how* to find a strategic position in which an organization is able to offer an *e*-service with a sound technical implementation and, *at the same time*, allows for execution of the organization's chosen business strategy.

To this end we propose the $e^3forces$ ontology (see also [9]) as a model-based approach to find a suitable strategic position for an organization intending to 1) offer a specific *e*-service with a solid technical implementation and 2) execute a business strategy to create competitive advantage and generate profits. To determine whether a chosen strategic position results in a sound technical implementation of the *e*-service, we specify high-level *technical requirements*. For each strategic position, we subsequently analyze if *all* technical requirements are met, either by acquiring and utilizing existing technologies or to custom developed support for the technical requirements. To determine whether a strategic position allows for the execution of the chosen business strategy, we translate the chosen business strategy into *strategic requirements*. These strategic requirements state how environmental *business forces* are allowed to influence the *e*-service to be offered such that the chosen business strategy can be executed and profits can be generated. Subsequently we analyze for each strategic position the impact of environmental business forces on the *e*-service to be offered and determine their consistency with the specified strategic requirements. This analysis is based on well known business theories outlined in [10, 11]. Finally we choose the strategic position, which meets all technical requirements and sufficiently meets the strategic requirements. In sum, the contribution of this paper is that we introduce *business strategy* theories into to realm of *e*-service design, and do so in a model-based way, thereby closely resembling the way-of-working in Information System design.

We opt for a *model*-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 web-services. Parts of this methodology are already available (eg. e^3value [3]). Yet, to the best of our knowledge there is currently no model-based approach which validates the strategic positioning of an *e*-service. By looking at strategic dependencies and rationales of actors, *i* (eye-star)* does take strategic aspects into consideration [15]. However, *i**'s concepts are grounded in quite general *agent*-based theories and not in specific *business strategy* theories. Well known basic business strategy concepts are *not* considered (eg. strategic position, business strategy, etc). Other high-level business modeling approaches, such as BMO [8], REA [2] and, e^3value [3], focus only on the economic *value* of an *e*-service and do not consider strategic positioning explicitly.

To develop and test $e^3forces$, we have been involved in a starting Internet company, which was looking for a suitable strategic position in which they could offer their *e*-service. We have worked for over six months with this company to design and find a proper strategic position motivated by proper analyses based on accepted theories.

This paper is constructed as follows: first we will present $e^3forces$. Subsequently, we introduce the case study for which we searched a proper strategic position. Next we walk through the various strategic positions designed and utilize $e^3forces$ to analyze buyer and supplier influence on the actor under investigation. Finally we present conclusions and make suggestions for further research.

2 $e^3forces$

The $e^3forces$ ontology provides modeling constructs for representing and analyzing strategic related concepts, such as "business strategy", "strategic position" and, "business forces". The $e^3forces$ ontology enables practitioners to quantify business forces such that it is possible to analyze the "match" between an organization's strategic position and business strategy. In addition, $e^3forces$ provides a clear and compact graphical overview of an organization's strategic position and related environmental business forces. In an $e^3forces$ model business forces and their strength are explicitly stated and are related to actors (see Fig. 1 for example). These business forces, in this paper limited to supplier markets and buyer markets, are directly based on Porter's Five Forces framework [10, 11]. The $e^3forces$ technique uses the following constructs:

Actor

- *Description:* Actors are independent economic (and often also legal) entities [6]. 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 [13].
- *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 in its environment such that it creates competitive advantage [6, 10]. For an organization to successfully execute its business

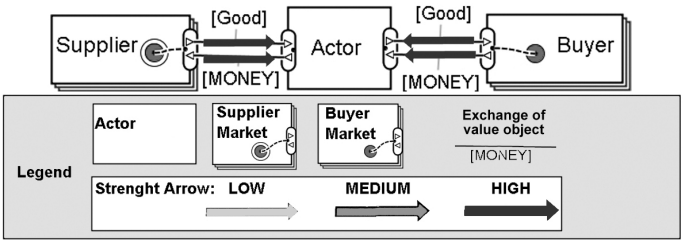

Fig. 1. Example $e^3forces$ model

strategy a matching strategic position must be chosen [11]. Three generic strategies are considered [6, 10]: 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 [6, 10].
- *Representation:* An actor is modeled as a square.

Business Force

- *Description:* 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 [10]. This abstraction simplifies the $e^3forces$ 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 [6,10]. 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 [10, 11].
- *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.
- *Types:* In this paper two types of business forces are considered [10]: 1) *buyer markets*, to who an actor offers value objects and, 2) *supplier markets*, from who an actor acquires value objects.
- *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.

– *Example:* Dell (the actor) acquires Windows Vista (the value object) from Microsoft (the business force). Microsoft is, due to its monopoly, a strong business force and therefore can easily influence (eg. alter) both price and configuration of Vista.

Strategic Position

– *Description:* The strategic position of an actor, or constellation, is the *environmental context* in which the actor operates from a business strategy perspective. The environmental context of an actor is the set of *business forces* which influence the value objects offered/acquired by an actor [6,10].
– *Relationship:* From a business perspective an actor should find a strategic position which enables it to execute its business strategy [10].

Value object

– *Description:* Markets and actors in a constellation exchange products and services which are, in generic terms, *value objects* [3]. 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 [3].
– *Properties:* A value object has two attributes [6, 10]: 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 [3], 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 actors in a networked value constellation. However, by sharing some concepts with e^3*value* , e^3*forces* and e^3*value* can be easily integrated.

2.1 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 [10, 11]. All this is at the expense of the profitability of actor under study [10,11]. Note that we, as described above, do not look at buyers independently, 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 [10] original buyer market analysis.

To analyze the influence of a buyer market on a value object, seven aspects need to be analyzed. These aspects are directly derived from the Five Force Model [10, 11]. To analyze these aspects we ask domain experts the following questions:

- Q1) *Is there a concentration of (dominant) buyers?* If a few large buyers acquire a vast amount of sales, then they are very important to actors in the constellation, which gives them more strength.
- Q2) *How many alternative suppliers are available?* A buyer market is stronger, if there is a wide range of suppliers from which the buyer market can chose.
- Q3) *Are there alternative resources of supply?* If the buyer market can chose between many alternative value objects then the buyer market is powerful.
- Q4) *Are the costs of changing supplier high?*. If costs are low, then buyers can easily choose another supplier, which gives the buyer market strength.
- Q5) *How important is the value object to the buyer?* If the value object is not important to the buyer market, it is harder for actors in the constellation to maintain an economic feasible relationship.
- Q6) *Are there low profits for the actors?* If the actors in the constellation have to sell large volumes to make profits, it gives the buyer market more bargaining power.
- Q7) *Is there a threat of taking over an actor in the constellation?* If a buyer is willing and *capable* to purchase an actor in the constellation, it threatens the position of the actor.

To be able to measure and compare the strength of buyer markets, each of the business aspects related to buyers - Q1 through Q7 - 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 [7]) and software architecture theories (eg. CBAM [1]). The score "5" indicates that the extent to which the buyer market 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 7 aspects ($\sum_j^7 \beta_j = 100$); more points indicate higher relevance. When the weighted expert scores are summed the "strength" of a buyer market in relationship to the exchanged value object is expressed. The strength of an buyer market indicates to what extent the buyer market is able to influence the value objects exchanged with the actor in the networked value constellation.

$$Strength_{buyer} = (\sum_{j}^{7} \beta_j * Q_j)/5$$

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 grey arrows) and, "76-100" indicates high strength (dark gray arrows).

As indicated, a value object has two attributes which can be altered: price and configuration [6, 10]. The influence of a buyer market can therefore be on the value object's *price* or *configuration* or *both*. So after determining a buyer market's strength, we must determine whether this influence will be relevant for the value object's price and/or configuration. Commonly the influence of a buyer market will be on both the value object's price and configuration, but if an actor for instance chooses to offer a value object for free the buyer market will logically not influence the price.

2.2 Business Forces: 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 [10]. All this is at the expense of the profitability of the actor under study [10, 11].

We deal with supplier markets in the same manner as with buyer markets, yet different aspects need to be analyzed to determine the (possible) impact of a supplier market on the value object provided to an actor [10]. Domain experts are asked the following questions to analyze the strength of a supplier market [10, 11]:

- Q1 *Is there a concentration of (dominant) suppliers?* Suppliers are able to exert more influence if they are with few and when buyers are fragmented.
- Q2 *To what extent is the supplied object essential?* If the value object is essential then the actors in the constellation can make less demands.
- Q3 *How important are the actors in the constellation to the suppliers?* If actors in the constellation are not the supplier market's main buyer, then the supplier is stronger.
- Q4 *Are the costs of changing suppliers high?* If the costs are high, then actors in the constellation are less likely to choose another supplier, which give the supplier more strength.
- Q5 *Is there a threat of taking over an actor in the constellation?* If a supplier plans, and is able, to take over an actor in the constellation it is a threat to the actor.

As was done for the buyer force, the aspects are weighted and scored on a five points scale with "5" indicating high possible impact and "1" indicating low possible impact. As with a buyer's score, a supplier's score is classified as low, medium or high for visual purposes. The formula to determine the strength of suppliers is:

$$Strength_{supplier} = (\sum_{j}^{4} \beta_j * Q_j)/5$$

3 Finding a sustainable strategic position for an *e*-service

3.1 Case Study: Mobzilli - Location Based Advertisement

Mobzilli, a starting Dutch "Internet" company, offers the *e*-service 'location based advertisement'. This service offers organizations the possibility to bound advertisements to geographical locations. Potential customers can request the advertisements 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.

For a period of over six months we have had intensive contact with the board of Mobzilli (www.mobzilli.com). 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 issues down to technical issues. In return, they provided us with feedback on $e^3forces$ (eg. what was clear and practicable and what was not).

3.2 Technical Requirements

The aim of our analysis is to find a strategic position for Mobzilli which 1) meets all technical requirements needed to offer the *e*-service and 2) best matches Mobzilli's chosen business strategy. To reach the first part of our goal we must first specify *high level technical requirements* for the *e*-service to be offered. These requirements state which functionalities are needed by Mobzilli's information systems to offer the *e*-service. Basically each strategic position must meet all technical requirements. The following technical requirements were found in collaboration with Mobzilli: (1) Organizations must be able to upload advertisements and bound them to geographical areas; (2) Customers, who have a specific location, must be able to receive the ads bound to their location; (3) There must be support for properly recording organization and customer information. Both data must also be analyzed to provide statistics and predict customer behavior. This leads to the following three technical requirements:

$$(TR1)AdsDatabaseSystem: \forall Merchants \forall AdsUPLOAD(Merchants, Ads) \wedge \forall Ads \exists LocationBOUNDTO(Ads, Location)$$

$$(TR2)LocationSystem: \forall Customers \exists Location \wedge \forall Locations \exists AdsBOUNDTO(ads, Location) \rightarrow \forall Customers \exists AdsRECEIVE(Customers, Ads)$$

$$(TR3)AnalyzeSystem: \forall ActionsRECORD(Actions) \wedge \forall ActionsANALYZE(Actions)$$

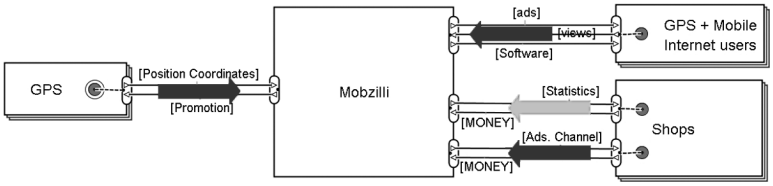

Fig. 2. $e^3forces$: Initial Idea

3.3 Business Strategy

To reach the second part of our goal - to find a strategic position which matches Mobzilli's business strategy - we first specify Mobzilli's *business strategy*. After we have specified Mobzilli's business strategy we can analyze various strategic positions and determine which strategic position matches Mobzilli's business strategy *and* meets all technical requirements. As stated before, an actor can choose between three business strategies: "cost-leadership", "differentiation" and, "focus". Mobzilli has chosen "differentiation" as their business strategy, which is to offer a value object with qualities (eg. a configuration) that differ from competitors. How Mobzilli's differs is not relevant for this paper. The business strategy chosen by Mobzilli implies that Mobzilli needs to find suppliers and buyers which (if necessary) influence the price of the service offered by Mobzilli, but certainly not the configuration. This is translated into the following *strategic requirements*:

$$(SR1) Suppliers_{Mobzilli} : Influence_{Service}(\neg configuration \vee price)$$

$$(SR2) Buyers_{Mobzilli} : Influence_{service}(\neg configuration \vee price)$$

3.4 Utilizing $e^3forces$

At this point we know what technical and strategic requirement each strategic positions must meet. To that end *four* strategic position are designed and analyzed. Each strategic position is financially feasible (which we checked with the aid of e^3value (see [3])), due to space limitations this analysis is however not included.

Initial strategic position In Mobzilli's initial strategic position GPS is used for the positioning of customers. Customers are required to have a mobile phone with GPS and mobile Internet to use the service. The *e*-service is however free for customers. In addition, the second group of buyers are merchants, which mainly are retail shops, who will pay a fee for each advertisement viewed by a customer.

Meeting Technical Requirements. All technical requirements are met. The first and third technical requirement are met because the systems are developed in house. The second technical requirements is met because Mobzilli uses GPS com ports to determine the location of "Customers".

Meeting Strategic Requirements. During the development of the initial idea Mobzilli had not taken their business strategy under consideration. When we asked them if this design matched their business strategy they had no answer. In consult with Mobzilli we developed an e^3*forces* model for their initial idea to provide insight into their strategic position (see Fig. 2). Together with Mobzilli we applied the buyer and supplier metrics described in sections 2.1, 2.2, and after a few iterations we found the final scores.

According to the supplier metric the score for the supplier market "GPS" is 90, indicating a strong influence on the value object "position coordinates" offered to Mobzilli [11]. The value object is however free, therefore the strong influences is on the configuration (eg. accuracy) of the value object and not on the price. This is in conflict with the first strategic requirement.

Furthermore, for "GPS" to provide the value object "position coordinates" (which is essential for Mobzilli's service) each user must have a GPS module. This however limits the size of possible users, resulting in a high score of 79 for "GPS + mobile Internet users". The strength of 'Shops' for "advertisement channel"is also high (87), yet not for "statistics" (46). Still, on the buyer side there are two strong forces which influence the configuration of the *e*-service [10]. This is in conflict with the second strategic requirement.

This analysis provided rationale for Mobzilli's feeling that this design would not match their chosen business strategy, even though all technical requirements would be met. The analysis showed Mobzilli that a specific localization technique (GPS) would result in a strategic position which is not suitable for their chosen business strategy. In addition, the analysis showed Mobzilli that choosing GPS 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 (see next sections).

Revised Strategic Position After analyzing the initial strategic position it was concluded to be undesirable; the strategic requirements were not sufficiently met. Revisions, on the supplier side, were made. This revised design, chosen by Mobzilli, was to use open source positioning software (unlike GPS this software works via triangulation of signal strengths of various GMS-antenna's). Furthermore, the *AnalyzeSystem* was to be open source and to be acquired from the same supplier as the positioning software. In addition, the *AdsDatabaseSystem* was to be developed in cooperation with an external software developer. In this design the buyers remain the same, except that customers no longer need to have GPS on their mobile phone. Again we analyzed, in consult with Mobzilli and with the aid of e^3*forces* , to what extent the requirements were met.

Meeting Technical Requirements. The new strategic position meets all technical requirements. The *AnalyzeSystem* (TR3) and *LocationSystem* (TR2) are acquired from suppliers via a free open-source license. The development of the *AdsDatabaseSystem* (TR1) is outsourced as is the integration of the various system into a single information system.

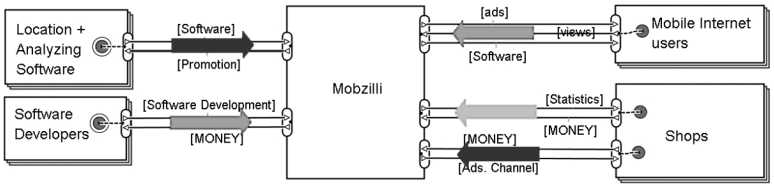

Fig. 3. $e^3forces$: Revised Idea - Supplier Revisions

Meeting Strategic Requirements. In consult with Mobzilli we developed an $e^3forces$ model for the revised design (see Fig. 3) and applied the supplier and buyer metrics described in sections 2.1, 2.2, and after a few iterations we found the final scores.

The score for the supplier market "Location + Analyze Software" is 83, although lower than GPS, this still indicates a strong influence on the value object "software" offered to Mobzilli. Since the value object is also free, the strong influences is on the configuration (eg. interfaces) and not on the price of the value objects. This is in conflict with the first specified strategic requirement ($Suppliers_{Mobzilli} : Influence_{Service}(\neg configuration \vee price)$. The score for the supplier market "Software Developers" is 60, indicating moderate strength. Yet more important, because Mobzilli can specify what this supplier market must deliver, the influence of this supplier market is on the price instead on the configuration of the value object acquired. Although this (probably) results in a higher price, this is not a problem for Mobzilli since the first strategic requirement is not violated.

Using the metric for buyer markets resulted in a score of 72 for "Mobile Internet Users", 46 for "Shops" on "statistics" and 87 on "advertisement channel". Note that the score for "Shops" has remained the same, but the score of "Mobile Internet Users" decreased. This is the result of a lower concentration of buyers (the market is bigger) and there are less alternatives for these customers. Therefore, there is only one strong force remaining ("Shops") which can make demands in regard to the configuration of Mobzilli's service [10]. However, this is still in conflict with the second specified strategic requirement.

Both strategic requirements are not completely met by all suppliers/buyers markets, the scores are however better than in the initial design. This indicates that the revised strategic position is better then the original strategic position. Note that although a different technology was chosen (triangulation instead of GPS) the *e*-service did not change, but the strategic position did improve. This notion was supported by Mobzilli. Furthermore, utilizing $e^3forces$ showed them that it is possible to find, analyze and compare various strategic positions while still meeting all technical requirements; this was found valuable. Mobzilli however wondered if an even better strategic environment could be found, so again revisions were made.

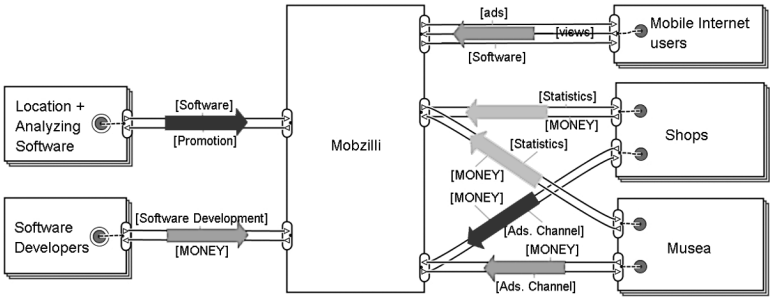

Fig. 4. $e^3forces$: Revised Idea - Buyer Revisions

2nd Revised Strategic Position After analyzing the initial and revised strategic position, it was concluded by Mobzilli that on the buyer side other options should be explored. Therefore an additional buyer market was added: "Museums". For this new environment we developed, in consult with Mobzilli, an $e^3forces$ model (Fig. 4) and performed corresponding calculations.

Meeting Technical Requirements. On the technical side there are no changes in regard to the previous design. All technical requirements are therefore still met.

Meeting strategic Requirements. In collaboration with Mobzilli, and after a few iterations, the following new scores for the buyer markets were found. As noted, on the suppliers side there were no changes, therefore the supplier market "Location + Analyze Software" still does not meet the first specified strategic requirement.

The new score for the buyer market "Mobile Internet Users" is 69. The score decreased because the market size increased ("shoppers" + "museum visitors"). The new scores for "Shops" are 42 on "statistics" and 78 on "advertisement channel". By adding a market ("Museums") more trading areas for Mobzilli are available and thereby the strength of "Shops" decreased [10]. For "Museums" the scores are 42 on "statistics" and 65 on "advertisement channel". The strength of "Museums" is less than that of "Shops" because less alternatives are at hand for this buyer market [10]. The revision of buyer markets has resulted in a strategic position in which the strength of the forces have decreased considerably and only one out of three forces is considered strong (although just barely). Therefore, it was concluded by Mobzilli that the proper buyer markets were chosen and the second strategic requirement ($BuyersMobzilli : Influence_{Service}(\neg configuration \vee price)$ is *sufficiently* met.

Final Strategic Position After the previous revision Mobzilli was not yet satisfied with the supplier markets. As stated in Sec. 3.4 the supplier market "Location + Analyze Software" is negatively related to the *AnalyzeSystem* and *LocationSystem*. Therefore the choice was made to develop the *AnalyzeSystem*

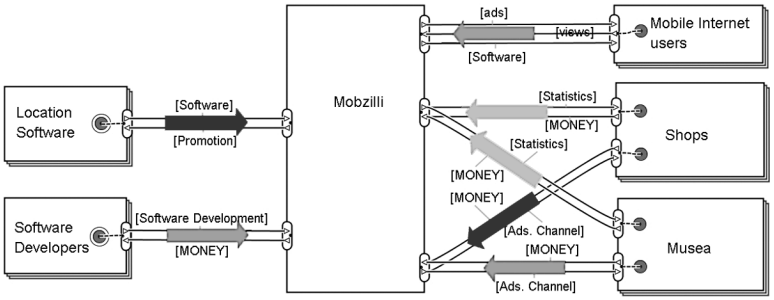

Fig. 5. $e^3forces$: Final Idea

in cooperation with "Software Developers" and only acquire the *LocationSystem*. The question was whether this improved the strategic position of Mobzilli.

Meeting Technical Requirements Because the *AdsDatabaseSystem* and *Analyze−System* are being developed in cooperation with external software developers the technical requirements TR1 and TR3 are met. The acquisition of a *LocationSystem* makes sure that TR2 is met.

Meeting Strategic Requirements For the final time the metrics were applied in consult with Mobzilli (see Fig. 5). According to the suppliers metric the score for "Software Developers" is 60. In addition the influence of this buyer market is more related to the price than the configuration of the value object, thereby meeting the first strategic requirement. The score for "Location Software" is 80, indicating a strong force, and again just for configuration and not price (the software is still free). This is in conflict with the first technical requirement. However, with this strategic position the supplier market "Location Software" influences only one technical requirement (TR2), in contrast to the previous strategic position were two technical requirements (TR2 and TR3) were influenced. Furthermore, the strength has decreased in regard to the previous strategic position. To this end, Mobzilli's conclusion was: although the first requirement is not fully met, it is sufficiently met.

On the buyer market side there were no revisions, therefore the score are the same as presented in sec. 3.4. But as indicated, Mobzilli concluded that the proper buyer markets were chosen and the second strategic requirement was *sufficiently* met.

Analysis Conclusion The final conclusion, in regard to the search of a suitable strategic position, is that the final design (Fig. 5) provides a strategic position which meets *all* technical requirements and sufficiently meets the strategic requirements. 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 *e*-service offered. In comparison

to the first strategic position the strength of suppliers has decreased with ±22 % and the strength of buyers with ±17 %. On a practitioners note; often the board of Mobzilli had a "feeling" about the legitimacy of various business strategy choices (eg. which suppliers/buyers), but with the aid of *e*^{3}*forces* we were able to provide Mobzilli theoretical rationale for the legitimacy of their choices. 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).

4 Related Work

The most relevant related work it that of Thevenet and Salinesi [14], which also strives for strategic alignment. 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 [14]. Furthermore, both the strategic and operational level are modeled within one single model. However, in contrast to *e*^{3}*forces* which its external view of organizations, the INSTAL methodology has an internal view on organizations. Furthermore, modeling both strategic and operations aspects within one model might cause confusion since both viewpoints highlight quite different aspects of organizations.

5 Conclusion

In this paper we have presented the *e*^{3}*forces* ontology with the aim to provide a model-based approach for finding a strategic position in which an organization is able to 1) offer a technical well founded *e*-service and 2) execute a business strategy to create competitive advantage. First *technical requirements* are specified for the *e*-service to be offered. Subsequently, it is analyzed if a strategic position meets *all* technical requirements. Second, the business strategy to be executed is translated into *strategic requirements*. Subsequently, it is analyzed - based on well accepted business theories - if the strategic position sufficiently meets the strategic requirements. The strategic position which meets all technical requirements and best supports the strategic requirements is considered the optimal strategic position for the organization offering the *e*-service.

To support our claims we conducted a case study at a starting Internet company. With the aid of *e*^{3}*forces* we were able to analyze the original strategic position and design a new strategic position in which supplier influence was reduced with ±22 % and buyer influence with ±17 %, thereby significantly improving the strategic position of the organization offering the *e*-service.

In this paper we have limited ourselves to two distinct business forces, yet other business forces exist: *Competitors*, *New Entrants* and *Substitutions*. These business forces should be integrated into the *e*^{3}*forces* ontology. The relationship

between these forces and an organization is however not direct since there is direct no exchange of value objects, therefore future research is needed.

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