

# Business architecture: A new paradigm to relate business strategy to ICT

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**Abstract** In this paper we address the concept of business architecture. We explain the concept and, based on a case study, discuss its relevance, operation, relationship with strategy and business models, and value for an organization. We also shortly discuss the approach that was taken to create the business architecture; how it was based on and derived from the business strategy. Business architectures contribute to clarify the complexity within an organization and form a useful starting point from which to develop subsequent functional, information, process and application architectures. We clarify these relationships through an architecture linkage model. Having an explicit business architecture also helps to structure the responsibilities within an organization, and to shape outsourcing activities, within the primary process as well as with regard to ICT-support. Business architectures contribute to an adequate ICT-governance in order to orchestrate the resources for critical business activities and how to manage the development and support for e-business efficiently.

**Keywords** Business architecture · e-business · Information systems · Shared service centers · Architecture linkage model · Architecture framework · Demand organization · Outsourcing · Business strategy

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## 1. Introduction

Organizations are hampered in their response to changes in the environment due to the existence of organizational stove-pipes and legacy systems. There are many reasons why the tendency to think in terms of architectures showed a marked increase in the period when the Internet emerged as a disruptive technology. The Internet makes a number of new business models possible (Timmers, 1999; Bouwman and Van den Ham, 2003). The limited life span of these models implicates that organization, information and IT have to be flexible in order to respond quickly to changing circumstances and to adapt the business model if necessary. Business strategies that utilize the possibilities offered by Internet and ICT to the fullest are hard to implement however. A critical assessment of the internal processes in many organizations shows a substantial level of redundancy and rigidity, while business processes are usually organized in (often product-oriented) stove-pipes (Van Diepen, 2000). Due to this rigid organization, companies are unable to meet customer demands, coordinate processes and offer the painfully needed transparency. This leads to the redesign of processes (Hammer and Champy, 1993). Due to the failing connection between the new customer-oriented business processes and information and the existing rigid product-oriented processes and information, companies find it extremely difficult or impossible to implement Customer Relationship Management (CRM).

In combination with path dependencies, current (legacy) information systems often make it hard to realize changes in the business processes. Companies are limited in their response to changing market circumstances caused by a lack of flexibility and adaptability. It is often a slow and difficult process to translate adaptations in the strategy to the ICT-domain (Maes et al., 2000). Strategic considerations therefore force us to break open information systems and reduce

their complexity, using a more modular approach. However, such an approach affects the way these modules (for instance web services) are defined, combined and/or reused, as well as their scalability and the extent to which they can be used in a distributed environment (Turban, McLean and Wetherbe, 2002). We believe that business architectures are important tools in dealing with the issues above.

In recent years there is an increasing interest in business, information and technical architectures, albeit without a common and clear definition of the architecture-concept. Business architecture receives the least attention, which in our view is unjustified as it can play a significant role in translating the business strategy to the ICT-domain as well as to the design of the organization. We often see that when architectures are considered attention is mainly focused on the information and technical architecture, while hardly any attempt is made to establish a connection between business and ICT-architectures. Therefore, the central questions in this paper are: (1) *what is meant by the concept of business architecture*, (2) *what are the required elements of a business architecture model*, (3) *what are the advantages and the practical use of such a model*, and (4) *how can a model for a business architecture be developed in a concrete case*.

To answer these questions we will start by discussing the concept in more detail, elaborate on insights provided by theory and present our model. Next we will analyze the model in a case study focusing on the usability of the model, and end by reflecting on the proposed model and the case. This article presents our view on the concept of business architecture and positions it in relation to other architectures. Although we do present a case description to illustrate the use of the concept, it is not possible to present the case-study in every detail, due to confidentiality and size limitations.

## 2. The concept of business architecture

Although the term “Business Architecture” is used in numerous publications, the concept is not defined unambiguously. The concept is used within modeling approaches (IEEE 1471, ISO 15704, Rensburg, 1997), in classification frameworks (Zachman, 1987; Mathora, 1996), or used by software suppliers or consultancy organizations (IBM, Cap Gemini Ernst and Young, see also Arbab et al., 2002). It is more common in many organizations to go straight to the technical specifications of information or technical architectures instead of using some form of business architecture. Differences between approaches can be found in the degree of specification as well as the layers (business, information, technology) and approaches (logical, physical) that are being distinguished. Research into-business architecture is scarce. There are a few case studies of Enterprise Architecture available (Besson et al., 2002; Chandra and Kumar,

2001; Richardson, Jackson and Pages, 1990; Veasey, 2001; Wolfenden and Welch, 2000). The application of business architecture is not limited to organizations, it is also possible to analyze supply chain integration using an architecture point of view (Chandra and Kumar, 2001). Many of these studies emphasize the conceptual level (Zachman, 1987; Malthora, 1996; McDavid, 1999) or the modeling aspects (Bernes and Nemes, 1996; Arbab et al., 2002).

The link between business and IT, strategy and operations, is also made in strategic alignment approaches (Henderson and Vankatraman, 1993). More, and increasingly large scale, studies have been conducted in this domain (Cragg, King and Hussin, 2002) shifting from case studies towards more encompassing surveys (Teo and Ang, 1999). In addition to a link to strategic alignment there is also a link to business model literature. According to Hedman and Kalling (2003) the business model concept and strategy are increasingly interchangeable. Instead of formulating a strategy, companies are designing a business model. Rensburg (1997) sees business models as building blocks for architecture: “Good business architecture consists of business models which allow the modeling of any organizational entity together with its multi-dimensional organizational views”. In our view, business strategy as well as generic or specifically used business models, are important inputs for business architecture. Wolfenden and Welch (2000) also use “business architecture” as the connecting link between strategies on the one hand, and business processes, roles, behavior and information on the other. Others (Veasey, 2001) adopt a more holistic approach to realize changes in strategy and the redesign of the organization.

We use the concept of “Business Architecture” to structure the responsibility over business activities prior to any further effort to structure individual aspects (processes, data, functions, organization, etc.). The business architecture arranges the responsibilities around the most important business activities (for instance production, distribution, marketing, et cetera) and/or economic activities (for instance manufacturing, assembly, transport, wholesale, et cetera) into domains. We distinguish the concept of Business Architecture from the concept of Enterprise Architecture. We look at enterprise architectures as any “architecture at the enterprise level” (McGovern et al., 2004), where “enterprise” is used to indicate the scope of the architecture being enterprise-wide. Business Architecture in contrast is an architecture that is specifically meant to structure responsibility over economic activities by multiple organizations (supply chain level), by one organization (enterprise level) or by part of an organization (business unit level).

Main elements of the Business Architecture are what we call “business domains”. They can best be looked at as “areas of accountability”. Within the business architecture a high level description is provided of how the business processes

are dealt with by these domains and which domain is responsible for specified business functions or objects. Thus: the main elements of a business architecture are “business domains”, which are clusters of coherent business functions and objects (concepts), over which meaningful responsibility can be taken in business processes. So we look at business architecture as: “the grouping of business functions and related business objects into clusters (business domains) over which meaningful accountability can be taken as depicted in the high level description of the related business processes”. Note that these domains are consciously decoupled from the organizational graph itself and therefore decoupled from current managerial position and interests. Assigning the business domains to specific directors and business units is a subsequent activity (i.e. after the creation and acceptance of the business architecture). In our view the business architecture contains:

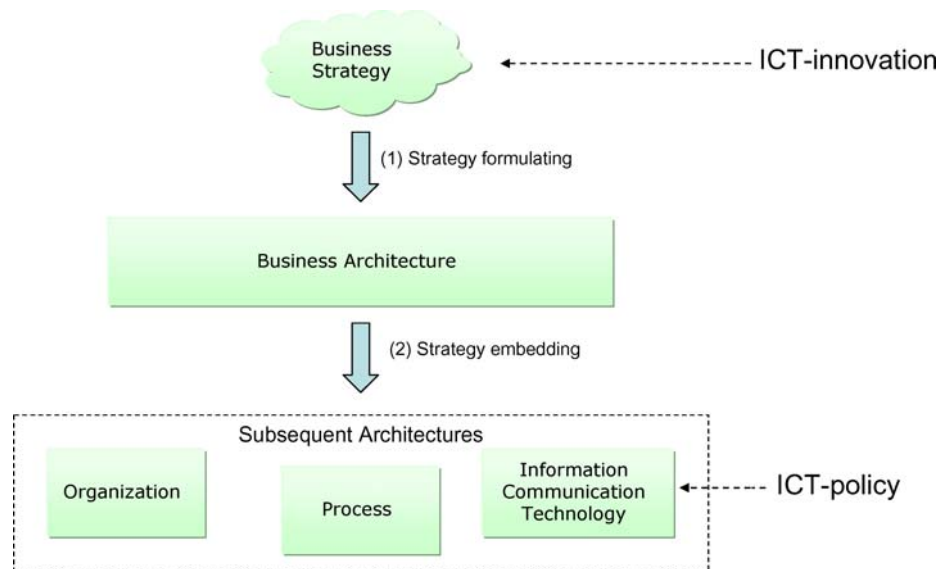
- A lay-out of business domains (including their occurrences on various levels) and their assigned business activities and added value (“business case”).
- Business functions and business concepts (high-level data descriptions), that these business domains need (and are responsible for) to perform their assigned business activity.
- High level business processes, which show how these domains work together to achieve the organizational goals and strategies.

Such a business architecture shows higher level management how their strategy will be implemented in their organization. Business architecture is directly based on business strategy (see Fig. 1). This business architecture is the foundation for subsequent architectures (strategy embedding),

where it is detailed into its various aspects and disciplines. The business strategy can consist of elements like strategy statements, organizational goals and objectives, generic business models and/or applied business models (business cases), etc. Statements formulated by top management (or its strategic planning department) can be strategic, tactical and sometimes even operational in nature and may include a number of applied business models. Often the strategic statements also include the description of the “business case,” i.e. the specific application of a business model. ICT-innovations open up new possibilities for the industry, organization or business unit. In our model, new possibilities offered by ICT-innovations are required to be specifically included in the strategy statements, where they (if operationalized correctly) lead to the most effective usage. Note that this differs from using them directly when setting up ICT-architectures.

Looking at the creation of a business architecture we depart from this business strategy (Fig. 1: (1) Strategy formulation). The strategic statements are analyzed and arranged hierarchically, through techniques like qualitative hierarchical cluster analysis (Miles and Huberman, 1984). The top level statements that are the most inclusive (e.g. for an enterprise level business architecture: company-wide scope, industry positioning) are placed at the top of the hierarchy. These top level statements are often mission-like in nature or based on industry-wide agreements. Lower level statements are more limited in scope and have less far-reaching consequences. They are specific in nature and are often based on (or implicitly stated in) higher level statements. Based on this strategy hierarchy and starting from the top the business architecture is drawn-up, using general organizational structuring methods and business administration theories. Examples are

**Fig. 1** Relation between business strategy, business architecture and subsequent architectures



theories on assets and resources (Kay, 1993; Quinn, 1992; Prahalad, 1990 and others) and theories on structuring economic activity (Chandler, 1990; Powell, 1990; Child and Faulkner, 1998; Best, 1990 and others). Although architectures are mainly the realm of the ICT-organization (or at least often initiated by ICT), the business architecture can better be created by more business oriented architects (e.g. with a MBA-background). The business architecture should also be owned and maintained by the business rather than ICT. Often it is heard in larger organizations that the ICT-department is not backed up by a poorly involved business. Amongst others this is caused by the technical character of ICT-architectures. The creation of the business architecture by the business itself gives the business a (non-technical and therefore understandable) tool to influence the subsequent ICT-architecture, whilst ICT is helped with a involved business that has formulated and structured their business requirements. Having a business architecture benefits both parties, business as well as ICT.

Setting up the business architecture, the company gains insight into the consequences of the individual statements as well as the way they are related to one another. Supported by interaction with relevant management and by applying lower strategy statements, the business architecture will get more and more detail, levels will be introduced, occurrences of business domains will be determined and specified. During the process the strategy and its consequences will become increasingly clear. The end result is a better understanding of the strategy itself and the consequences of the interference between various statements as well as the consequences for the implementation of that strategy in the organization.

During the creation of the business architecture all design decision are clearly stated and directly related to strategy elements and/or general business construction principles. This makes the business architecture more than “yet another picture”. It helps people using the architecture to steer change to understand why it is important to maintain the business domains and the depicted clustering of business functions, data and processes. The fact that the business architecture clusters activities into sensible units of accountability (business domains) is a strong facilitator towards future implementation of the subsequent organization, processes and IT. Managers now have specific areas that they can take control over in either the demand organization or the supply organization (to be addressed later on in this section).

Based on the business architecture the construction of the organization can now take shape (Fig. 1: (2) strategy embedding). Due to the fact that during strategy formulation and the creation of the business architecture the business strategy gets better formulated and understood as well as made more internally consistent, the business architecture forms a far better basis for subsequent architectures than the

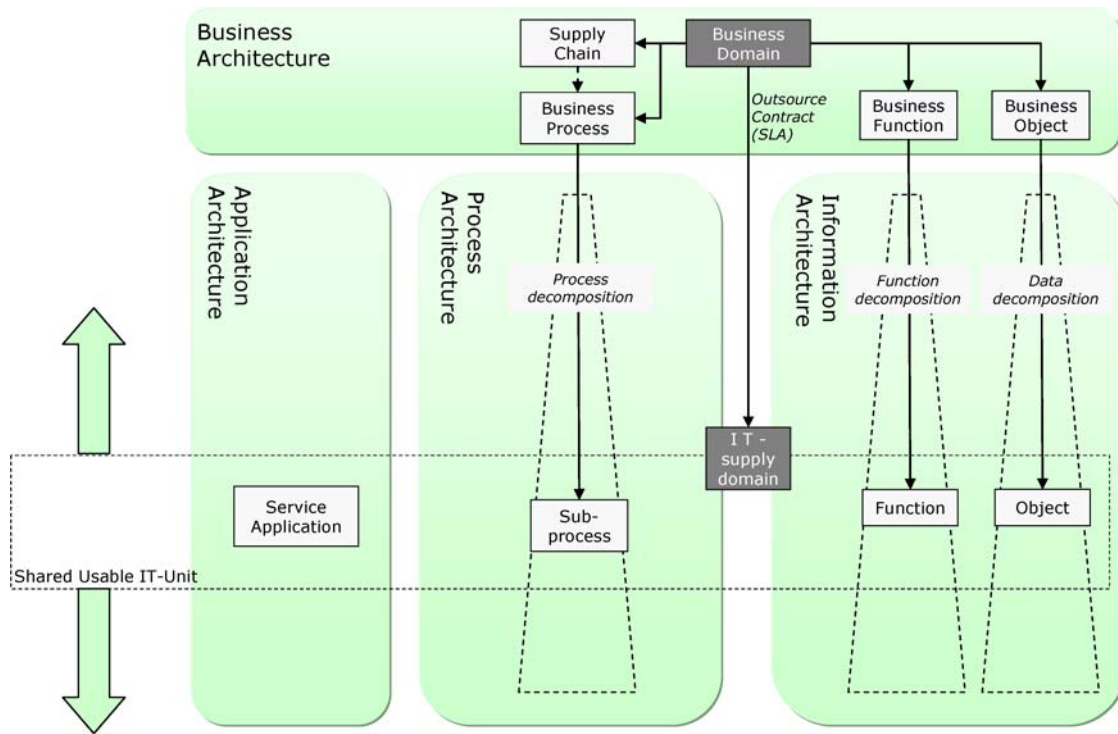
individual statements themselves. This business architecture also forms a common basis for each of the subsequent architecture, which adds to the internal consistency of these architectures.

The business architecture gives direction to organizational aspects, such as the organizational structuring (in which the responsibilities of the business domains are assigned to individuals and/or business units in the organization chart or where a fresh organization chart is drawn) and the administrative organization (describing for instance the financial reconciliation mechanisms between business domains). Assigning the various business domains to their owners (directors) also helps the further development of other architectures, because now the managers or directors of these domains can be involved in their part with a specific assigned responsibility. The specific assignment will increase the involvement of top-level management in a structured way, where all directors are well aware of their role. It is also possible to draw up subsequent architectures for specific business domains first, based on the effort and support of the domain-owners involved. This is also why we believe that the business architecture is a very helpful pre-structuring device for the development, acceptance and implementation of subsequent architectures.

Next to the organizational aspects, the organization is set up from various points of view. These perspectives have been used in the thinking on architecture for years: information architecture, technical architecture, process architecture, organizational structure (Zachman, 1987). In this paper we focus on process, information and application architecture. The various parts (functions, data and processes) of the business architecture function as an compulsory starting point for the different subsequent architectures, it in fact pre-structures the other architectures. It is a new approach to use business architecture in a pre-structuring way towards the other architectures.

The division and use of the coarse business processes that are described in the business architecture forms the starting point for the more detailed process architecture, in which the relevant processes are further decomposed, specified and analyzed. The business architecture also pre-structures the top-level business functions and business objects. Both provide the same guidance to the data decomposition and the functional decomposition, which make up the information architecture.

In the basic architecture linkage model (Fig. 2), we show the pre-structuring function of the business architecture towards other aspect architectures as well as the relationships between the various architectures. Starting with the coarse structuring of business functions and objects in the business architecture, the further functional decomposition leads to an information architecture that includes the following elements:



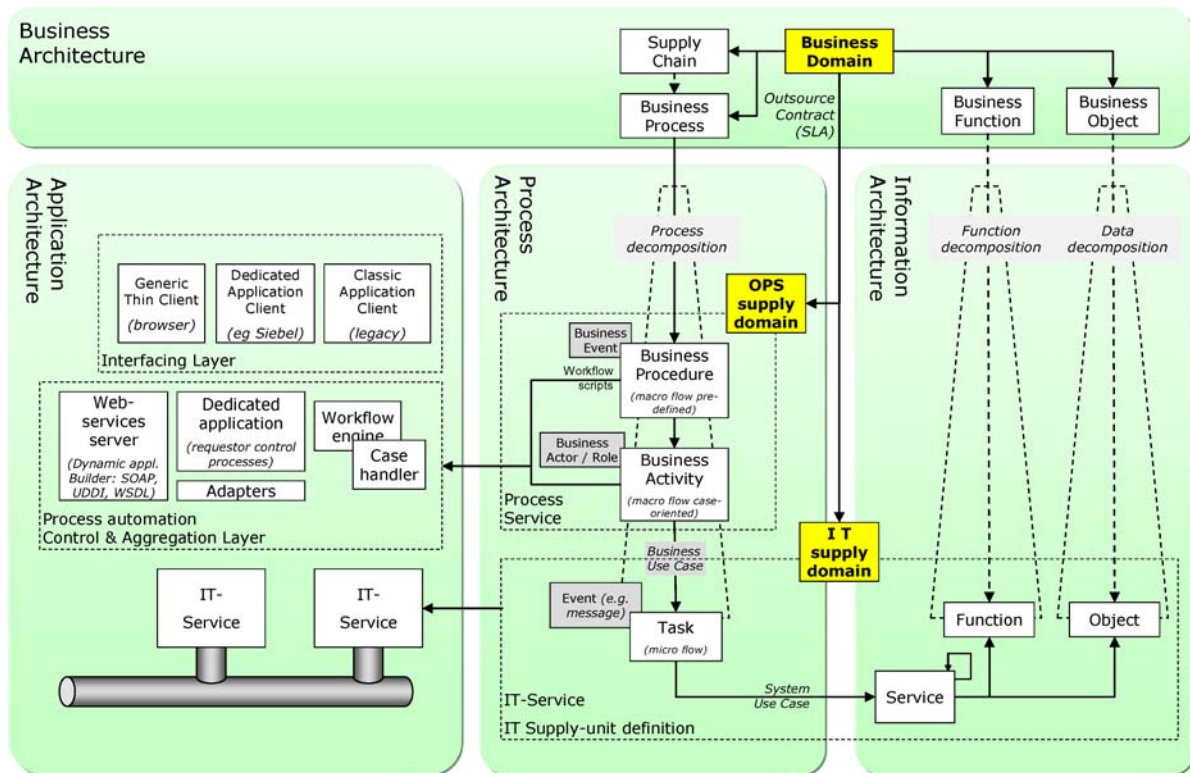
**Fig. 2** Basic architecture linkage model

- *IT-functions (functional modeling)*, such as registering an order, handling a customer contact, generate a lead, determine sales-targets for a channel, register a customer or an agreement, and
- *Data, objects (data modeling)*, like agreements, customers, orders and credit risk.

IT-functions and data can be grouped at an intermediary level into ICT-supply domains. Because the functional decomposition is started, based on the business domains, this also aligns the ICT-supply domains better to the business requirements. We now have the means to organize demand and supply of ICT. De business domains in conjunction with the organizational mapping forms the demand-organization. These domain-owners are responsible for the decision to “outsource” ICT to a ICT-supply domain and for the definition of their functional and non-functional requirements. The grouping of IT-functions and data into ICT-supply domain in the Information Architecture shows the ICT-supply organization. Some of the ICT-supply domains can specifically address certain business domains (e.g. ICT to support CRM, Channels or Production), others can address more generic ICT-functions (e.g. ICT to support Product Development, Finance or Business Intelligence). Directors can be assigned to these ICT-domains, who are responsible for the supply of ICT to essentially any business domain (the demand organization). The creation of these ICT-supply domains is mainly based on the functional decomposition and is strongly related

to the functional starting point of the business architecture. The business domains have their own added value (business case), therefore they also cluster business requirements in a coherent way and because the functional decomposition is started from the business architecture, the ICT-supply domains are in a way already related (aligned) with these logical clusters of business requirements reflected in the business domains.

In the basic architecture linkage model (Fig. 2) we also see the linkage between the three “pillars”. Groups of IT-functions and data (Information Architecture) are used by the business process (Process Architecture) in the form of some sort of realized “application” (Application Architecture). We base this linkage on the concept of “shared usable units of IT” (e.g. IT-services). These “units” are supplied by the ICT-supply domains. ICT-functionality and data are related to parts of the business process leading to the definition of an IT-unit, which is used by the business domains (demand) on the basis of an (outsourcing) contract. Other business domains can also acquire these services from these ICT-suppliers (service centers). The level at which the process is linked to the IT-functions/data in order to define a jointly usable ICT-supply is different for each organization and usually dictated by company ICT-policy. A low-level linkage implies that a narrow IT-function is linked to a single process task. The result is a large number of small-scale delivery units (for instance, ‘IT-functions’ or ‘Objects’). Although joint usage at a very fine granular level increases flexibility



**Fig. 3** Example of detailed architecture linkage model for “services”

(the ICT-delivery is useful for all kinds of processes) it is difficult to manage the resulting plethora of IT-units. Remember for instance the re-use frustrations of a company-wide object model. A higher-level implies broader delivery units with a wider scope: more IT-functions and data are combined (examples of broad delivery units are: ‘Component’, ‘Service’ and ‘E-Service’). Nowadays many organizations work with ‘Services’, combining several functions and objects together with a part of the business process into a ‘Service’. The shared service can be addressed through ‘business messages. The E-service is seen as the broadest (least granular) delivery unit. It has such a broad delivery of functions, objects and subprocesses that they actually constitute a service with an independent business context. It has meaning for external parties or customers.

Combining more functions and data into one shared IT-unit, i.e. broadening the scope of the delivery unit, implies that a larger part of the business process is being frozen into that specific delivery unit. Defining and sharing ICT at a higher level, reduces the number of delivery units. Although this adds to manageability of the ICT-supply it has the disadvantage that parts of the business process are frozen in the delivery unit (which can be seen as less flexible). Here is where the business architecture plays a helpful role as well. Because the functional decomposition of the information architecture as well as the process decomposition are based on

the same starting point (the business domains of the business architecture), these decompositions are already mainly in line with each other. This greatly supports the linkage of process and ICT on a higher level.

Although we consider it outside of the scope of this article to present the more detailed architecture linkage model, we have included Fig. 3 (example of detailed architecture linkage model for services) where we show the more relevant parts for linkage of the architectures based on “services” or what we nowadays call service oriented architectures. The linkage at that level of decomposition enables us to share ICT in the form of “services”. ICT-functions, associated data and incorporated business process, are defined as an ICT-service and offered as a service application. The service concept creates the link between the information (functions and data), process and application architectures. The application architecture defines the way that defined ICT-services are built into applications, offered to the end-user. Because of the purpose of this article we will not go into the details of the application architecture pillar. This detailed model can also be applied to other levels of ICT-sharing, i.e. objects, components and E-services. The principle of connecting the process and information architecture through IT-unit definition and the link to the application architecture based on realization of these units in actual applications, remains the same.

Summarized the architecture linkage model shows the connections:

- between business architecture on the one hand, and information, process and application architecture on the other (shown in the pre-structuring effect of:—the business functions to the functional decomposition,— the business objects to the data decomposition and—the business processes to the process decomposition),
- between information, process and application architecture based on shareable ICT-supply units (shown in the dotted box where supply units are defined (being clusters of IT-functions, related data and frozen process, referred to as micro-flow) and the arrow that is indicating the realization of these units in applications as well as the linkage between the business process using these IT-units that steers the process automation of these applications on a higher level),
- between supply and demand responsibilities to ensure that outsourcing relationships and ICT-governance are clearly defined, shown in the relationship between business domains (being the demand-organization), the supply of standardized processes (OPS supply domains) and the supply of ICT (IT-supply domains),
- between types of shared ICT-delivery units (i.e. “service”) and types of applications building (i.e. “web-services”) as shown in the application architecture pillar, where the services are connected to n-tier application building.

The model positions business architecture in a structuring role with regard to the organization of the company by clearly indicating what the perspectives and business domains are, and at the same time defining responsibilities, and supply-and-demand relationships. In addition to this organizational structuring, the basic model (Fig. 1) clarifies the function of strategic statements and the business models that are used for the business architecture. Business architecture models shed light on the scantily elaborated relationships between business strategy and business design. We will illustrate the value of business architectures in a case study.

### 3. Research methodology

This article is based on research that we are performing in the field of business architecture. Based on size restrictions and the practical approach of this article we have not included the theoretical context and propositions. This section shortly explains our research approach. In the remainder of this paper we present an explorative case study. We use a case study as an ‘empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident’ (Yin, 1994, p.13). In this case we look

at the way the business architecture model translates in practice into (1) an elaboration of business strategy in functional, information, process application architectures, and (2) into the way ICT-governance is shaped. Our research has characteristics of both a descriptive and an exploratory study, but also contains design characteristics. The case information was acquired through active involvement in the design and development of a company-wide business architecture of a large financial organization, during a two-year period (2000–2001). We do not pretend to provide conclusions of a generalizing nature on the basis of our case study, and are well aware that the case in itself cannot be considered to be representative. This case describes a development process based on the previously described model in which a business architecture was developed. Since this paper does not focus on the exact content of the business architecture, but rather on the way it was developed, and in light of the confidential nature of the business strategy and strategic statements, we have decided to present the case in an anonymous manner. The aspects that are not relevant to this paper have been changed, and sensitive, less relevant details have been omitted, without affecting in any way the overall picture of what a business architecture may look like.

### 4. Case

The research object is a large, internationally operating financial service provider. On the one hand the company is an example of the kind of large and complex international organizations that are traditionally highly product-oriented, leading to a painful implementation of customer orientation (often aimed for in CRM-projects). On the other hand the organization is a fine example of a company where mergers and acquisitions have led to a growing collection of organizations that operate largely independently under an umbrella of financial consolidation but without genuine operational integration. In practice this means that the operational costs are too high, which offers a poor basis for increased profits. In anticipation of market improvements better economies of scale have to be realized by removing redundancies in business activities and realizing a shared usage of the main operational processes. In addition, the company wants to find a way to obtain greater insight into the joint customer portfolio.

The direct reason for the company to develop a business architecture were the problems that arose when the information architecture that had earlier been developed for a limited number of business units, was to be implemented on an enterprise-wide basis. To tackle this problem thoroughly, the company decided to first develop an enterprise-wide business architecture that was acceptable to all parties concerned and then translate its consequences into the information architecture. Below we describe the approach used to set up this

business architecture. The person responsible for the company's Operations and ICT at an European level had selected a small core group from the main business sections to set up the business architecture. They report to and coordinate with a support group consisting of three executive managers. The steps of the process that was followed to draw up the business architecture were:

- *Inventory strategy statements.* As a first step the strategy statements of the three largest business units of the company were collected. First the ones formulated by the company's board, followed by those from the various business units. Duplications were removed, leading to approximately 45 statements that were subsequently validated by BU-management.
- *Analysis and structuring of the strategy statements.* In joint sessions the statements were analyzed in order to place them in a hierarchy, making use of qualitative hierarchical cluster analysis. This not only required examining the statements in terms of their operational area and scope, it was also necessary to investigate mutual relationships and interdependencies between various statements. The hierarchy was limited to three layers: the highest level contained the enterprise positioning statements and company-wide strategy statements, the second level included statements that concerned the (construction of the) supply chain, customer-orientation and market segmentation, and the third level consisted of statements that had to do with the internal construction of the various parts of the enterprise.
- *Setting up the basic design.* The basic design was developed on the basis of the top-level strategy statements. It was approached as a top-down process: the most important statements had the biggest impact on the design. Each design decision was registered and it was documented on which strategy statements it was based. The basic design provided an overall definition of the primary business domains. In this case three business domains had been identified: (1) product responsibility (the production tier), and the commercial tier, divided into responsibility for (2) sales/marketing and (3) distribution. When the main statements were analyzed, conflicting statements occurred as well as some missing ones.
- *Extrapolating the basic design.* The choices made, were extrapolated consistently into the design, based on general organizational principles and on the lower-level strategy statements. Relevant questions concerned the added value of the production tier, the fundamental drivers that were important to the domains to accommodate for conflicting strategy statements by facilitating multiple value drivers (Treacy and Wiersema, 1995), the business activities that should be assigned to the various domains and the elements required to complete the responsibility for the domain.
- *First meeting with the board.* As a next step, the support group and company's board discussed the basic design. The board assessed the design mainly from the perspective of their own responsibilities, making it hard to achieve an organization-independent design (where the responsibilities have been determined but not yet assigned to persons in the organizational hierarchy). An important factor in obtaining the board's approval was the ability to show the link between strategy statements (and business models) and the design. Based on these initial consultations the basic design was, to some extent, modified.
- *Setting up extended design.* The core group set up an extended design by expanding the basic design. The various occurrences of the main business domains were determined. For instance, the business domain of the 'Marketing and Sales organization' has several occurrences related to the marketing and sales departments of daughter organizations. Another example is the business domain of the 'Distribution channel', where a classification of distribution concepts was set up to facilitate various forms of external distribution. Other business domains were added for responsibilities that had to be assigned in a broader sense, for example distinguishing the responsibility for a national 'Marketing and Sales' domain next to the various commercial sales-organizations (labels) within one country.
- *Assessment of the extended design.* In a second round of consultations the support team discussed the extended design with relevant board members and company management. Generally speaking this was done bilaterally. This second round also led to a number of modifications.
- *Adoption of the business architecture.* After modification an abbreviated (less detailed) version was written which, referring to the more detailed version, was adopted explicitly by the plenary company board as the desired business architecture. This concluded the work of the support and core groups.

The basic design was based on the most important strategic statements. These relate to cost reduction: synergy through horizontal integration; customer centricity: synergy through sharing customer information; sharing the industry, giving third parties access to the supply chain: synergy through sharing resources within the sector; and multi-channel approaches. The basic design closely resembled the industry supply chain. It structured the economic activities in main domains and identified the value drivers within each of the domains. In this model the traditionally vertically integrated sector is divided into a production tier with production domains and a commercial tier with sales and marketing and distribution domains. The result is a business architecture with three distinct business domains with their own organization and business case.



- The case for the production domain is based on the development and production of standardized high-quality white-labeled products with a large volume and low profit margin. The value driver *operational excellence* plays an important role here (Treacy and Wiersema, 1995). With regard to the overall company, the strategy aimed at creating synergy between its various parts can take shape, duplications in production activities are removed to increase economies of scale and to be able to provide high-quality service at a small margin. Horizontal integration is captured on the basis of the commoditizing patterns of the various financial products and geography leading to further occurrences of more specific production business domains.
- The case for the marketing and sales domains is aimed at customer centricity and focus, based on the value driver *customer intimacy*. In this tier, horizontal integration of the current business parts will take place based on customer group, brand or market, leading to more specific occurrences of the sales business domains. In the basic model a sharp distinction has been drawn between the production tier and the commercial tier, and within the latter between marketing and sales and distribution, in order to disconnect potentially conflicting value drivers and to facilitate various distribution concepts.
- The final case is distribution, where a scope that goes beyond the financial sector is not unlikely: leading to distribution through other channels than the ones that are normally used within the sector. The focus is aimed especially on access for and to customers, and on facilities for providing services to customers. Business domains are organized on the basis of business channel type and geography, leading to more specific occurrences of the distribution business domains.

The main motivations for the basic three-tier structure were the three most important top-level strategy statements. On the one hand *share the industry*, for which explicit cuts have been placed in the supply chain based on organizational structuring theories. E.g. vertical disintegration, in order to create an open business architecture that allowed for outsourcing and third parties in the financial supply chain., and networked (Powell, 1990; Thompson et al., 1991) and virtual organizations (Child and Faulkner, 1998). On the other hand the two above-mentioned potentially conflicting strategy statements (value drivers) had to be covered.

Using this basic design brings about a number of consequences that have to be dealt with. The division between production and commercial tier, for instance, has a number of consequences. Both production and commercial tiers will have to maintain their own financial products, based on radically different definitions. Production supplies white-labeled standardized products to the commercial tier, which will use them as building blocks. Allowing third parties in the

supply chain and stressing the importance of white-labeled technical products versus labeled commercial products were motivations to duplicate the product-development business functions over both domains. This also led to the distinction between two kinds of agreements: technical and commercial product agreements (showing that high-level functional concepts can lead to “duplicate” objects from an ICT-perspective). It is also necessary to apply some sort of supply chain management mechanisms. Because of the fact that sales and service processes for both wholesale and retail customers needed to be supported, we decided to incorporate two forms of supply chain management (sales-driven SCM and marketing-driven SCM) into the more detailed design.

On the basis of consultation with the support group additional important choices were made in the design, especially based on company-political motives. The most important problem in this respect is the tendency on the part of managers to prematurely map their department onto the business architecture. In the business architecture, organizational changes were also indicated. Consequently, managers immediately started demarcating their responsibilities. The production tier, for example, was renamed ‘Operations’ at an early stage, anticipating future organizational embedding. This led to less pure (organization independent) business structures. After all it is the business architecture that in the final analysis should lead to the organization’s design or at least the assignment of responsibilities to existing organizational structures.

After an initial round of revisions the modified basic design is further elaborated on the basis of the more detailed strategic statements. This resulted in the business architecture example presented in Fig. 4. It shows all of the types of business domains that have been recognized (but leaves out the majority of occurrences of these domains). It shows which domain is responsible for which business functions and also shows business domains and related responsibilities on country-level, European level and world level. More details have been added to the commercial tier. It now includes all the new domains, the main structure per country containing a division into Retail, Wholesale and Financial Markets. The main domains in the national commercial tier have been further divided into sales organizations (also called labels) and a domain for managing market segments. In the design the sales organization each have their own responsibility with regard to the profits of their contracts, while the responsibility for the customer-related profits lie at the domain segment management level. Distribution channels have been made directly dependent on the sales organization domains, to which channel management was assigned as a business function. Third parties can be allowed to take on the distribution role. On the basis of an extensive analysis and classification of distribution concepts business functions have been divided into a channel organization and a sales organization.

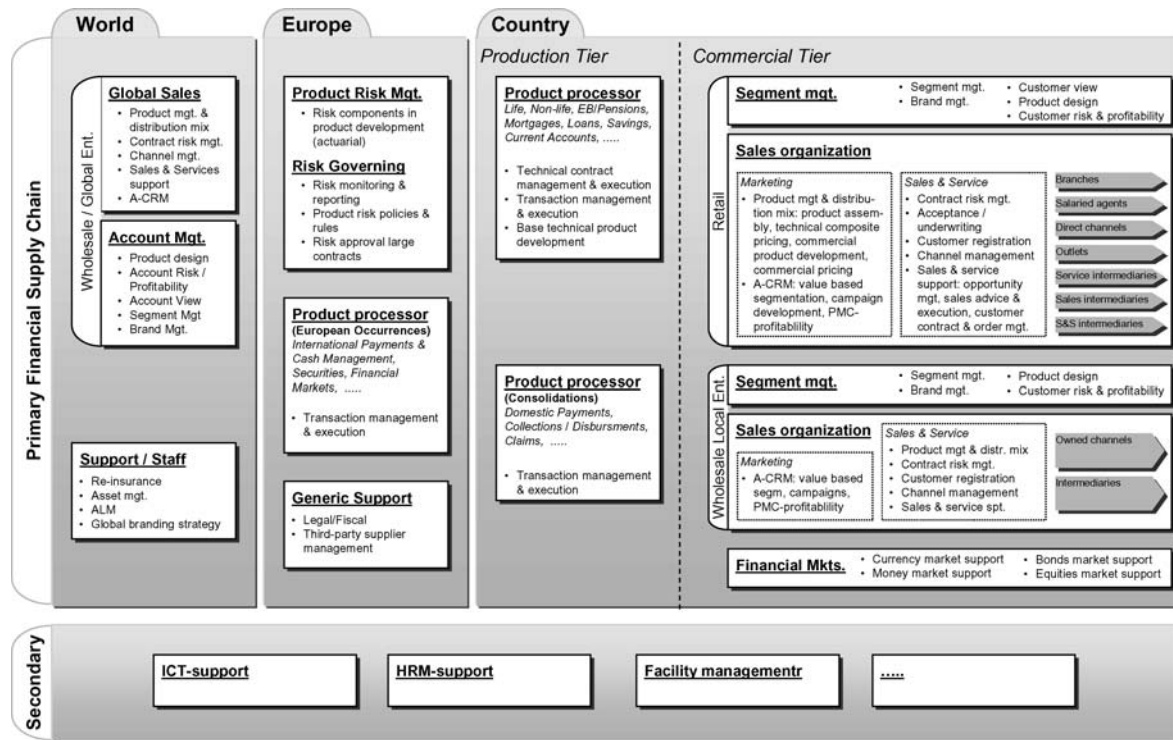


Fig. 4 Final business architecture

The production tier (operations) has more detail. Two types of product centers have been identified: product centers that operate as cost centers without financial risk and product centers that operate as profit centers supplying financial products with a certain risk margin. Furthermore, occurrences have been determined. Production depends on the right scale. The minimum economic scale is a relative concept that above all depends on the possible operational area of a financial product. If the operational area were to expand from a local to a European scale, the minimally required economic scale increases immediately. Since the various financial products have different timing with regard to this scaling process, we had to design the possibility to set up separate domains for product types (occurrences) in the production tier. Another example of a further elaboration of the design is the recognition of a separate tier for product risks, assigning responsibilities for supply chain management and responsibilities at a national, continental or global level, etc. During the second round of consultations with the board of the company a fourth tier surrounding support and staff was added. In the ICT-layer the services have been identified, varying from channel and CRM-services to support services for the fourth support and staff tier.

Ultimately, these considerations and decisions led to a fully elaborated business architecture including rough business process layouts and high level business objects

(concepts) per domain (this is not shown). Finally, the business architecture was adopted and is now in the process of being implemented. The business domains are seen as the ‘demand’ domains where the responsibility for the demand for shared process services and ICT-services is found.

### 5. Conclusion and discussion

Looking at the case that was researched, we found that designing a business architecture helped to clarify the relationship between the strategy of an organization and the way it is organized, both in terms of business processes, business domains, and business functions. The business architecture provided a far sturdier framework to design the organization than individual strategic statements that lack structure, coherence and balance. This made it simpler to validate the subsequent enterprise-wide information architecture. In addition, business architecture helped to shed light on the structure of, and overlap between various business domains, making it possible to identify the value chain within the organization more clearly and to re-assign responsibilities within the organization accordingly. Furthermore, a business architecture helped to distinguish activities within an organization related to technical support by ICT, production-related and commercial activities and management activities. This distinction made it possible for the organization to use other coordination

mechanisms, for instance by incorporating internal and external market mechanisms, both within the primary value chain (white label products and distribution by third parties) and with regard to supporting ICT-processes (supply and demand, outsourcing of activities). In addition, sub-responsibilities (risk management, segment management) could be assigned to other levels. As a result, the relationship between the various sub-domains became explicit. It showed that a business architecture is an important tool to gain insight into the complexity and coherence of an organization. Elements of a business model, like scope, organization and arrangements (the structure of the network organization), and technical architecture are included, albeit at a highly operational level. The business processes as well as functional and information architecture received a great deal of attention. The strategic element, in particular the resources and capabilities that contribute to long-term innovation, are not directly included in the business architecture. Resources and capabilities were approached from a product innovation perspective with an outlook of two to five years. Business models focusing more on the possibilities offered by new technologies appeared to play a less explicit role. This can partly be inherent to the nature of the case's organization. Technologies as such, did not appear to be a value driver. Supply and demand within the organization, both in the primary process and in terms of ICT-support, became explicit. This helped the organization in using shared service centers and setting up the corresponding demand/supply-procedures. It became apparent that the relationship between the commercial tier and the production tier was very different from the relationships between the demand organization and the shared service centers providing process and ICT-services. We also saw all kinds of outsourcing possibilities emerge. The question whether this will lead to accountability can as yet not be answered. Although it is to be expected that accountability will increase thanks to clearer responsibility relationships and identification of profit responsibility, it is too early to tell whether this will result in improved performance.

This brings us to the limitation of our analysis, which is based on a single case where the business architecture is being implemented as we speak. Although it functioned well in this case, we based the development of the business architecture on strategy analysis in a more or less straight-forward waterfall approach. Possible other approaches would be interesting to use in additional cases. Furthermore, the focus has been on the design of the business architecture rather than performance. If we want to have a better idea as to how that performance will develop, we need to examine a larger number of cases, as well as look at the organizational performance before and after implementation of the business architectures. This is complicated by the fact that we will be dealing with real-life cases, where all kinds of other circumstances and effects will interfere with the research design.

Although we cannot assess performance improvements for the time being, we can say that business architecture increased our knowledge of the complex relationships between the business, information and ICT-domains and proved to be a valuable (missing) link between business strategy and architecture.

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