

ICT Portfolio: Mapping Business and ICT Services

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Abstract: This paper presents a research project of University of Pavia that has been implemented by Business Integration Partners (BIP). The project concerns a Knowledge Base on Business and IT Processes. The Knowledge Base maps Business and related IT Processes and stores knowledge structures in different forms, such as diagrams, text, multimedia. The analyst can navigate stored information and create new processes by using a design methodology, that includes the definition of process structure, the association of performances to process structures and the design of a individual process performances by using inheritance methods. The Knowledge Base was successfully implemented in a large telecommunication organization.

1. Introduction

The portfolio of IT applications of a typical large organization can account hundreds of titles. Additionally, individual Business Process uses multiple applications – e.g. mortgage delivery process uses front end applications, credit check and credit delivery applications. Furthermore, organizations operate hundreds of Business Processes. Most Business Processes are service chains that cross multiple functions in one organization or several organizations [1] [2]. Finally service organizations offer hundreds of services to their customers and, last not least, other hundreds of services to their internal employees - such as information. In short, current organizations have an intensive and extensive use of Information Technology (IT). The knowledge on IT application portfolio, Business Processes, information technology map and their relations is, therefore, a key element for an informed and effective innovation.

2. From Business Process Knowledge to ICT Management

Our project moves from an initial research that led University of Pavia to design a Knowledge Base on Business Process. Our ancestors are Business Processes Reference Models such as MIT Process Handbook [3] that defines a universal taxonomy (including SCOR model) and uses Software Engineering principles (aggregation, specialization and reuse).

Other frameworks propose a structured approach to information strategy, such as the Shared Information Data (SID) Model [4] that is included in eTOM framework [5]. The model is based on the concepts of Business Entities (a generic logic entity of interest for the business) and Attributes (facts that describe the logic entities).

From an extension and generalization of the SID method, we have developed a more general framework called Aggregated Business Entity (ABE) [6], which models relationships between Business Processes and IT Application/Structures with the aim of correlate the application portfolio (ERP, CRM, BI etc.) with processes and their structure in order to evaluate the distribution of the information on the technological infrastructures.

ABE and the work on the Business Process Knowledge Base provide the foundations of the ICT Governance model we discuss here. The model considers and links three logical levels:

1. *Service*, i.e. the end-to-end service provided to the customer (for instance order fulfilment)
2. *Business Process*, i.e. the company activities performed by the organizational functions to supply the service.
3. *IT Process*, i.e. the activities performed by the IT Systems to support Business Processes.

Each level is described by two kinds of elements, namely the structure of the elements that make the layers and their respective performance measures. We here focus on the structural elements, particularly Business Processes (Business Processes mapping) and IT Processes (analysis of the Company's IT Architecture), as shown in figure 1.

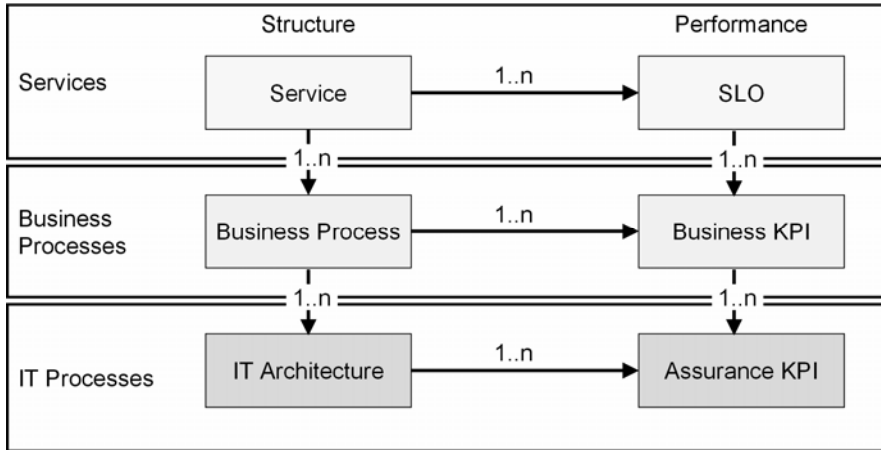


Fig. 1. The proposed framework

Elements of the models are in a many to many relations. A service supply involves a collection of Business Processes and Business Process uses many IT Architecture elements.

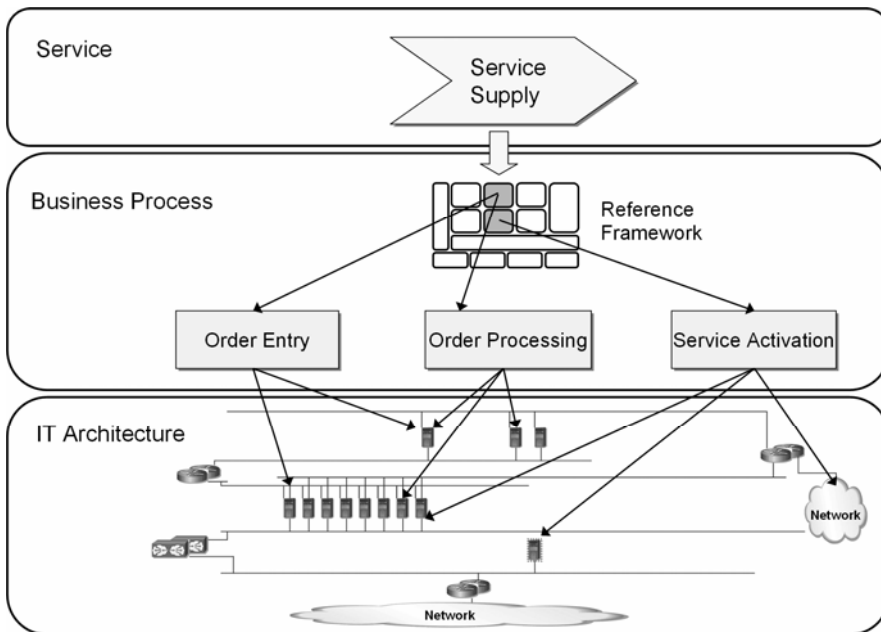


Fig. 2. Relations between the elements of the model

3. The Meta-Model of the ICT Knowledge Base

The starting point of the meta-model of the ICT Knowledge Base is a simple framework that associates the concepts of Business Process, Systems and Infrastructure.

A Business Process is a sequence of activities. As we have seen, a Business Process involves one or more Systems. On the other hand, the self-relationship of Business Process entity indicates that Business Process structure is alike a bill of materials, with decomposition and specialization relationships.

A System is a platform, functionally and technologically homogenous, that relies on Infrastructures, namely processing and communications resources such as servers and other physical devices. Of course, Systems are grouped in Clusters (for example a Cluster can group the Systems used for Business Intelligence).

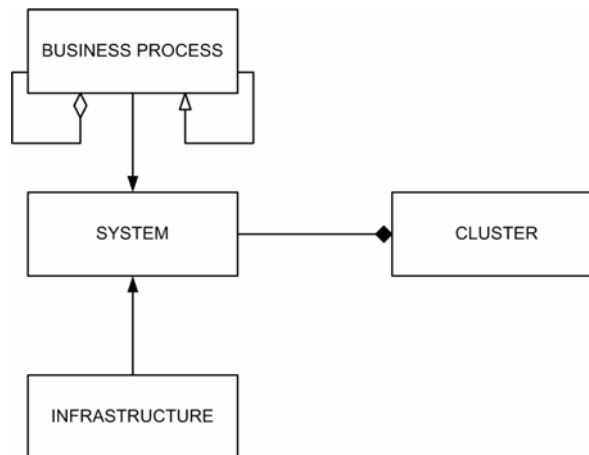


Fig. 3. The initial meta-model

A schema (shown in figure 3) represents a relationship between Business Process and Systems that shows the usage of the Systems in corporate processes. This usage can be:

1. A System performs a Functionality within a Business Process.
2. A System exchanges information flows. Such Macro-flow is described by a source System, a target System and an exchanged entity.

These entities represent aggregation of data at a logic level with variable granularity (i.e. “Customer Master Data” and “Order Code” can be both considered logical entities).

The concept of Macro-flow allows information tracking within the ICT Systems without complications, but may result too aggregated for users who want a higher

detail (developers are interested in the detailed flows). Therefore we use other additional meta-entities, such as Detailed Flows and Sequence Diagram.

Finally, we have introduced the meta-entity “Initiative”, that represents projects affecting IT Architecture (i.e. creation of new information flows, development of new Systems) or involving a new Business Process. An Initiative is described by a set of Requirements. By the framework we intend to map the impact of these Requirements on the Business Process or IT Architecture. In short the knowledge base allows to visualize:

- the coverage of an individual Requirement
- all data of a new System under development
- new Macro-flows and related Detailed Flows
- new Business Processes affected by an Initiative

The overall meta-model is shown in figure 4.

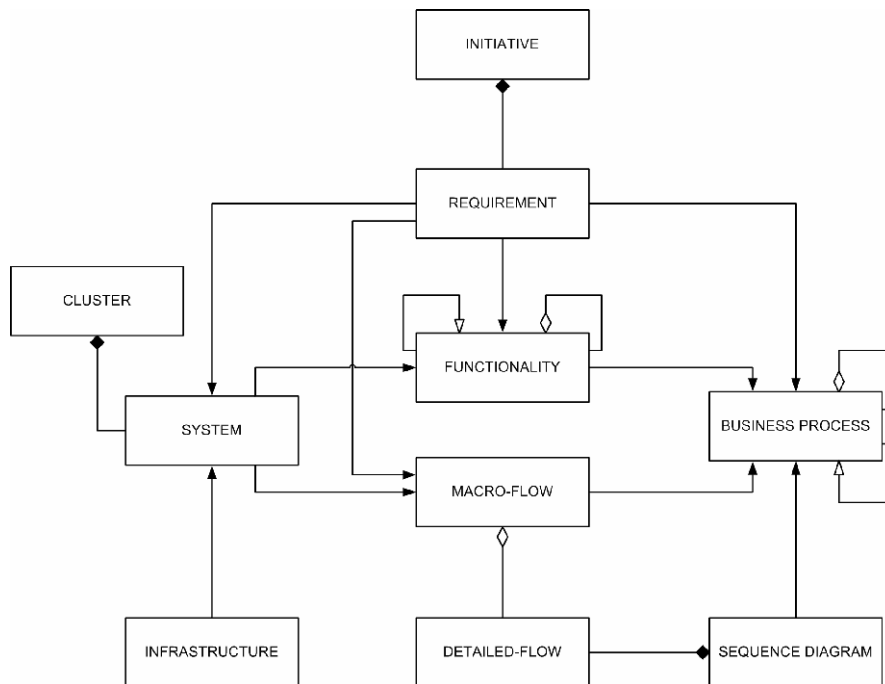


Fig. 4. The overall meta-model

4. The Model in the Real World: a Case Study

ADSL is a telecommunications company that delivers a wide range of services, such as wireline and wireless, internet and television. As it happens in telecommunication industry, ICT is playing a critical role in product innovation and overall competitiveness. No new product is feasible without IT support and, moreover, a new product implies a new Business Process. Therefore the equation *new service = new business process = new IT process* is dramatically actual; foreseeing and evaluating the impact of new or modified Requirements is not a wishful thinking but a survival need.

Phase 1 – Design and Implementation

The project was intended to design a governance map and was carried on with the cooperation of Business Integration Partners. The first step was to gather architectural information (Systems, Infrastructures, Flows and Functionalities). The subsequent step mapped Business Processes and particularly the role of IT Architecture.

The implementation of the knowledge base has followed these steps:

The first step defined the perimeter of Architecture and information relevant for the classes of users. We also decided to use the eTOM framework, since it is a reference model in TELCO.

The subsequent step was dedicated to interviews, where we collected the information for the construction of the Functional Framework, obtained from the standard eTOM model and shown in Figure 5.

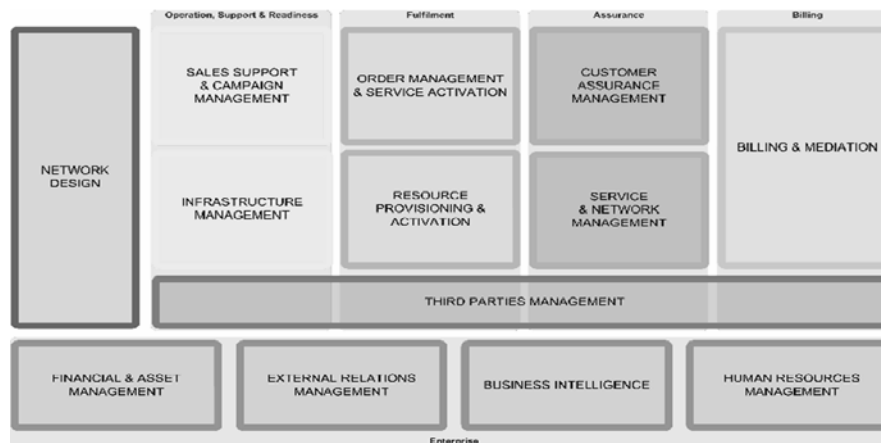


Fig. 5. Functional Framework of ADSL case study

Each Cluster was detailed by mapping the Functionalities of the company IT Architecture. The Functionalities were structured in a three levels grid, following the subdivision proposed in the eTOM framework. Level 1 and 2 Functionalities

are the same as in the standard framework, while Level 3 has been added or modified to reflect the specific context of ADSL. Thanks to data collected, we determined the features of Level 3 provided by individual Systems, and completed the Application Framework (figure 6).

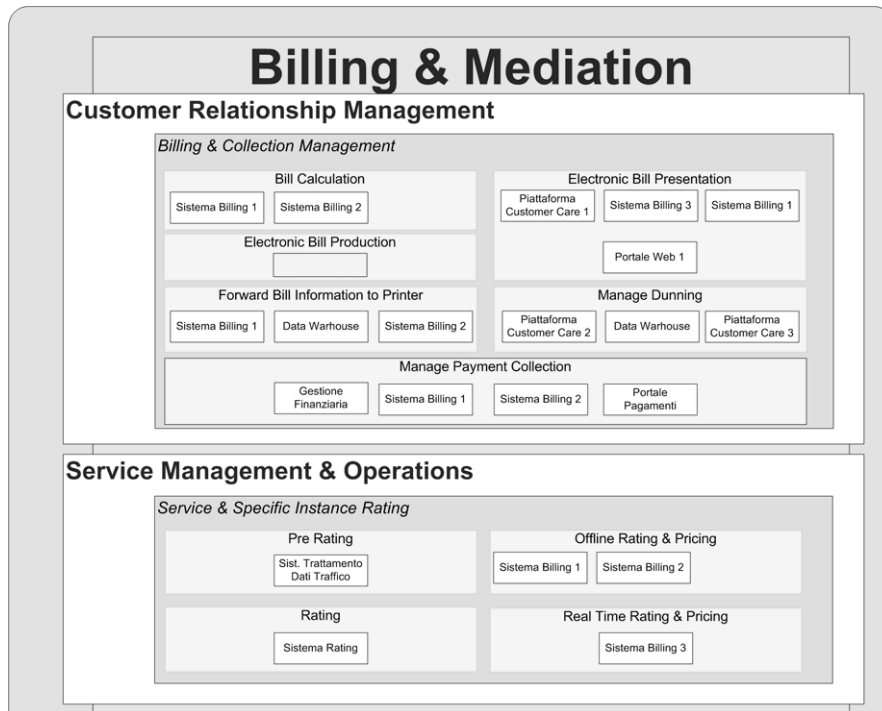


Fig. 6. Example of Billing Area Application Framework

From an analysis of the Application Framework, you can have a first idea on the role played by IT Systems in Business Processes. The remaining information on Business Processes were taken from company documents (e.g. feasibility analysis). The data on Systems and Infrastructure, the Functionalities provided and the main logical Macro-flows were validated by the leaders of the Systems and incorporated in the database. At this point we had to deal with some new issues:

- Leaders of IT Systems and managers of Infrastructure technology use different taxonomies. Different names are part of corporate culture, and a common standard didn't look feasible. It was therefore agreed to have two entries in the Knowledge Base.
- Interviewees gave a different interpretation of "Functionality" and logical "Macro-flow". Therefore we reworked the data obtained by the leaders of Systems before populating the Knowledge Base.

- Process Owner did not exist for some core processes and in these cases gathering information on Business Processes was rather hardier.
- Documentation was often incomplete and not updated.

Phase 2 – Information Refinement and Updating

After the end of the first phase the Knowledge Base was increasingly used to support or replace the company documentation on architectures.

This also enabled user involvement, who were having the opportunity of spotting inaccuracies / outdates by a special web-tool.

At the same time, a new phase begun, aimed to define a common template for new Initiatives. Actually the impact of Business Requirements on IT Architecture was analyzed by the Systems Managers, each one using a different formalism. Therefore, it was hard, if not impossible, updating mapping between the changes made (or to be made) on Architecture and Requirements that required the changes. The addition Initiatives undertaken completed the Knowledge Base.

Phase 3 - Usage

With the gradual increase of the Knowledge Base (and query tool) in the business context, we expect a reduction of the workload for the analyst, and an ever greater autonomy for users in updating / maintaining the information base.

5. Conclusions

We have illustrated a framework that links services with IT and Business Processes. The framework is based on a meta-model focused on the structural dimension of ICT, that includes:

- IT Systems;
- Functional Framework and Application Framework;
- Business Processes.

The use in a real company (ADSL) has been a success. The project has not only validated the concepts but also developed a tool for the navigation of the models. Without a structured Knowledge Base:

- a structured control over the development of the ICT Systems is almost impossible;
- allocating investments is very hard since it is almost impossible to visualize easily the different coverage of services.

With the Architecture mapped, it is easy to assess the impact of the Requirements of projects on the Architecture itself; furthermore, with the analysis of the Application Framework, you can highlight the Business Processes not adequately supported, and hence where to invest.

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