A BUSINESS PROCESS MODEL FOR PUBLIC HEALTH INFORMATION SYSTEMS: A GOVERNMENTAL PERSPECTIVE

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Abstract: The business process models available for the telecom industry have, in the recent past, made significant developments and reached leading-edge maturity levels. The 1997-2000 technology bubble has injected significant amounts of cash in the market, which has allowed a quick maturing of both the process models and its supporting software applications and integration tools. In its turn, the health industry, in what concerns to technology and associate processes has been maturing more slowly, with lower levels of integration and process models more "institution oriented" than "client oriented". In this paper it is proposed a process model for the health industry, derived from the enhanced Telecom Operations Model (eTOM), from which is derived a functional architecture that intends to support applications that respond to the current technological, political and economical challenges of the Portuguese national health service.

1 INTRODUCTION

The Portuguese national health service, (from now on designated as the SNS), is constituted of 364 primary care health centres and 205 secondary care hospitals, of which 34 are in the process of becoming "private" entities, wholly state owned (*Sociedades Anónimas de Capitais Públicos*) (Law, 2002).

2 THE SNS STRUCTURE

The national health policy is defined by the Health Ministry and is administratively organized in 5 health regions (one per each NUTS II region). In the Autonomous regions, the health policy is defined by each of the regional governments.

The SNS is financed by the Portuguese state budget, although the service providers can charge some minimal fees for some special services or in order to regulate the access to some services. Currently the Health Ministry takes 7.565.000.000 €, which is 5,6% of the GNP, with 98,6% dedicated to the SNS.

3 THE DUALITY TELECOM-HEALTH

As it was mentioned previously, the main argument of this paper is based on the fact that the health industry, when properly automated, is an information intensive industry that can be compared to the telecom industry, in what concerns to the information management

In fact, the volume of information handled by the telecommunication systems can be compared with the volume of information handled by the health information systems.

Another item that makes the telecommunication service provider and the health service provisioning dual is the fact that both are, at least potentially, information intensive, demanding similar management processes and supporting information systems (Collen, 1999), (McDonald, 1997).

The health care industry did not give to Business Process models the same attention that its telecom counterparts have offered to it. There are no currently integrated approach that allows mapping easily government policies into health information systems and vice-versa. This is the result of development of the business models in the

telecommunications sector, due to the 1997-2000 investment bubble, provided the sector with much more mature models that can now be reused for other purposes.

3.1 Defining the concepts

Making a duality with the provision of health services, the following comparisons can be made.

The customer of a telecom service provider can be compared to the customer of the SNS, as "the customer buys products and services from the enterprise or receives free offers or services" (TeleManagement Forum TM Forum Glossary [online]).

The supplier of a telecom service provider can be compared to the supplier of the SNS as "suppliers interact with the enterprise in providing goods and services, which are assembled by the enterprise in order to deliver its products and services to the customer." (TeleManagement Forum TM Forum Glossary [online]).

The intermediaries of a telecom service provider can be compared to the intermediary of the SNS as "intermediaries provide products and services that the enterprise either cannot provide itself or chooses not to due to cost and quality considerations." (TeleManagement Forum TM Forum Glossary [online]).

The complementary provider of a telecom service provider can be compared to a complementary provider of the SNS since "the complementary provider provides additional products and services to extend the attractiveness of an enterprise's products and services and scope of the value network." (TeleManagement Forum TM Forum Glossary [online]).

It should be noted that it is understood as value network "[...] the collaboration of the enterprise, its suppliers, complementors and intermediaries with the customer to deliver value to the customer and provide benefit to all the players." (TeleManagement Forum TM Forum Glossary [online]).

3.2.1 The structure

As such, and keeping the duality with the TeleManagement Forum eTOM Business Process Framework, it can be said that the SNS business process framework represents the whole SNS environment and is composed of the following three major areas of process (Figure 1) (TeleManagement Forum, 2002):

- Strategy, Infrastructure & Product - covering planning and lifecycle management.
- Operations - covering the core of operational management.
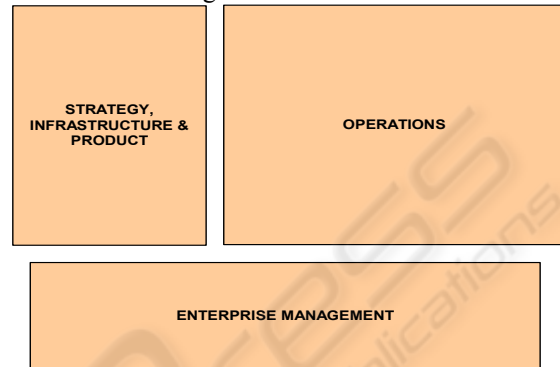- Enterprise Management – covering support or business support management.

Figure 1: eTOM in SNS major areas

These three areas are composed of the following macro processes [5]:

- Market and Product processes.
- Services processes.
- Resources processes.
- Suppliers/Partners processes.
- Enterprise Management processes.

Additionally, it must be added the major entities with which the SNS interacts, such as the:

- Customers, to whom service is provided.
- Suppliers, who provide products or resources used by the SNS.
- Partners, with whom the SNS co-operates in a shared area.
- Employees, who work for the SNS.

From here, it is possible to derive the Business Process Framework Conceptual Structure as shown in Figure 2: .
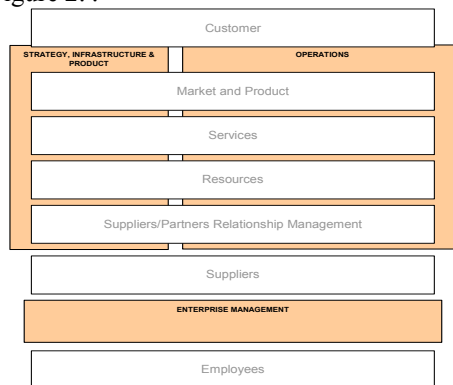

Figure 2: Business Process Framework Conceptual Structure

4 DERIVING A FUNCTIONAL ARCHITECTURE

The Functional Architecture derived from the previously presented Business Process Framework Conceptual Structure is presented next.

In order to obtain a system that makes the described processes operational, it will be necessary to implement a Functional Architecture such as the one described in Figure 3.

This architecture aggregates the processes by functions performed using information systems. As such, it is necessary to identify the components that make up the whole information system.

4.1 CRM

It is a functional domain that allows the interaction with the user from an integrated point of view, integrating its lifecycle management. As such, it is possible to have a holistic knowledge of the user

lifecycle in the SNS, allowing the integration of the clinical process in the administrative process and, in an integrated and structured approach, support the customer in its relationship with the SNS.

4.2 Billing

Is a functional domain that includes all the functions that stretches from the entrance of the service to be rated and billed to the billing and collection of the customer and the account management with the customer and/or business partners.

4.3 Business Support System

Is a domain that includes all the functions required to manage the SNS. It supports the measurement activities of the organization against its plans and objectives.
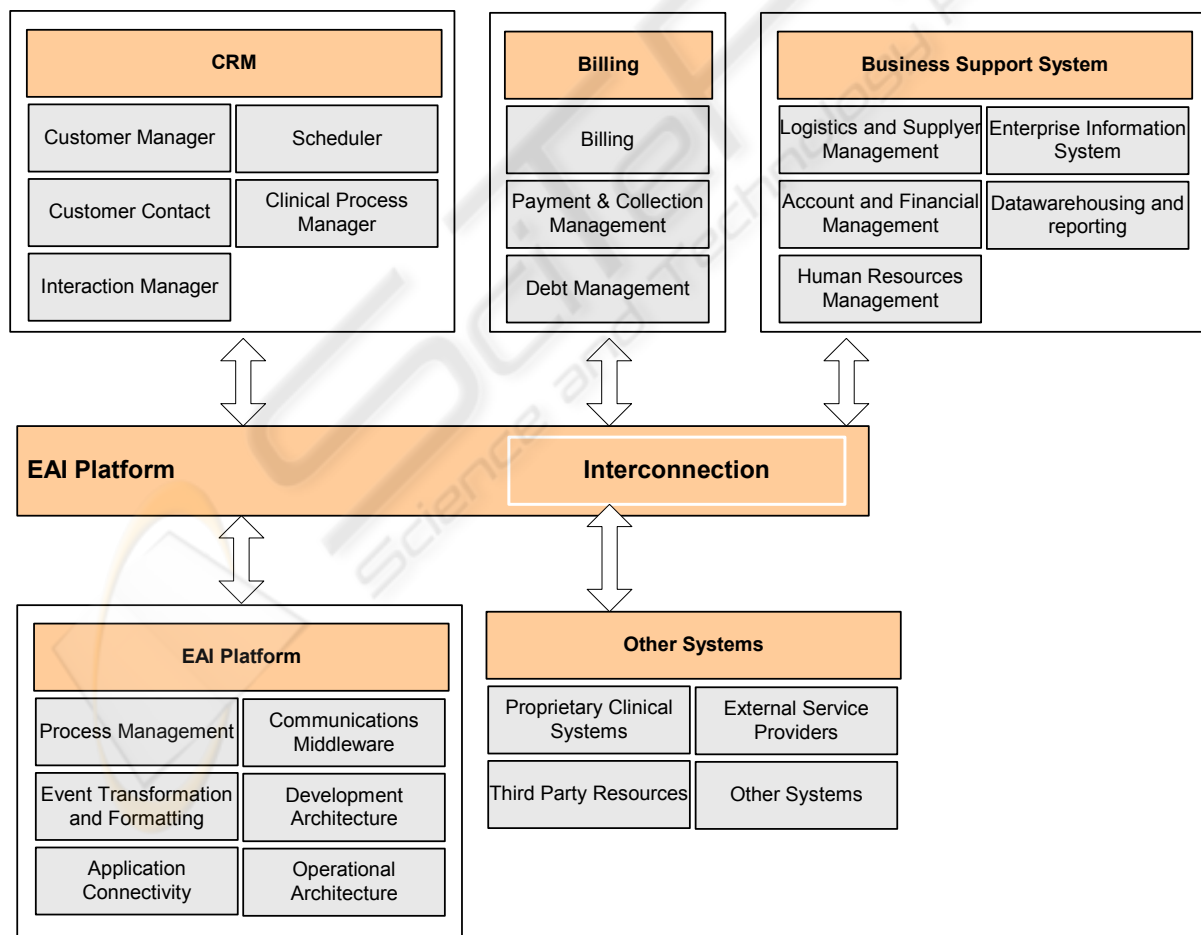

Figure 3 - Functional Architecture

Based in the defined strategy, the Key Performance Indicators will be defined and monitored in real time by the top level decision makers, through the integration of the information systems.

4.4 Enterprise Application Integration

This platform integrates all the software that supports all the functional areas previously mentioned.

The Enterprise Application Integration Platform (EAI) is a combination of technologies and processes that enable custom-built and/or packaged business applications to exchange business-level information in formats and contexts that each understands.

4.5 Interconnection

This platform will allow the interface of the system with other external systems such as:

- Proprietary Clinical systems, owned by third companies and in operation in institutions of the SNS.
- External Service Providers.
- The ability to integrate resources and services from third parties in the planning, provisioning and activation of workflows.

This platform is the "entry (and exit) door" to the framework, i.e. the interconnection with the external service providers of the SNS. It is also the "glue" that holds together the open and proprietary systems, namely the clinical systems, that exist throughout the whole SNS.

4.6 Global view of the functional architecture

Assuming that the previously presented system is capable of performing all the operations of information retrieval and transformation in real time, and that all the information systems in the different institutions are compatible among each other, it is now possible to create a "tableau de bord", based in the processes and on the Critical Success Factors indicated previously that can respond to the need indicated in the initial problem.

5 CONCLUSION

This paper replicates a "leading edge" process model for the telecom industry and tries to innovate it, adapting it to the health industry through an "information intensive" analogy.

It develops an approach that allows the leverage of existing assets such as the existing telecom infrastructure of the Portuguese national health system and the re-use of the on-going quality accreditation efforts on its units, through the adoption of compatible standards.

It also proposes a functional architecture that allows the integration of the knowledge owned by all the information systems of the national health system and re-assembles it in a single repository, thus providing the top-level decision makers with a "one touch real-time application" that allows the creation of reports with Key Performance Indicators aligned with the management processes.

The functional architecture is also flexible enough in order to provide the intermediate-level decision makers with generic views of the performance of several sub-units in what concerns to payments and collections to partners/suppliers in order to develop new "deal-making" strategies and/or renegotiating contracts.

With the adoption of this functional architecture it will be possible to respond to the clinical, economical and political challenges that the Portuguese national health service faces nowadays.

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