FACULDADE DE ENGENHARIA DA UNIVERSIDADE DO PORTO

Information Systems Strategic Planning –

A Case Study in the Public Sector

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Dissertation Report
Mestrado Integrado em Engenharia Informática e Computação

Dissertation developed under the supervision of João Pascoal Faria (Professor)

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Abstract

Organizations have a growing dependency on increasingly complex Information Systems (IS), with large amounts of information to process in their daily work coming from growing sources. Heading such organizations IS is a task of immense responsibility, particularly when the team responsible for planning, acquiring, maintaining and managing the software is more often reduced to a very small team and all development is done by outsourcing to different suppliers in a climate of rapid and continual change. All this outsourcing to different suppliers poses challenges, as hardly any of them has the whole picture of the organization and its IS, which makes it a difficult challenge to develop medium-long-term plans in a consistent, integrated and innovative way. One of the reasons suppliers focus on short- or medium-term plans is that often the client buys their services for development of IS solutions by mostly looking to the price criteria. That means buying the cheapest solution, even if sometimes to find later that it lacks quality, is inefficient, not integrated or interoperable. There is a risk in buying the cheapest, trying to have the maximum quality and still wanting it to fit into a rich set of applications if we don't have a defined and clear Information Systems Strategic Plan (ISSP).

The goals of this dissertation are to:

• Identify an ISSP methodology for the type of organizations such as that identified above, to be followed and adapted as a systematic approach to give guidance on the development of an effective IS strategic plan that addresses the organization.

• Apply the ISSP methodology to a case study – Entidade Reguladora da Saúde (ERS) - by defining an ISSP for incremental improvements to the organization IS to support the organization in furthering the accomplishment of its goals in an effective and efficient way.

The proposed methodology integrates elements from Three stages of IS planning [Bowman 1983] and Multidimensional Earl approach [Earl 1989]. It comprises the following phases: 1 - Organization Context analysis; 2 - Analysis of Business and Technological Environment; 3 - Organization Strategic Analysis; 4 - Strategy tracks for the organization; 5 - Characterization of the Organization Information Systems; 6 - Applications portfolio analysis and scheduling; – Verification of the ISSP; and 8 – Validation of the ISSP.

The defined ISSP plan is ready to be implemented in a way that gives time for the organization to prepare for future scenarios. By following the different phases of the defined methodology, in articulation, we conclude that this plan has all the conditions to fulfill its goals, and to make ERS IS a reference, as well as to reposition itself in the health sector in a way that it can keep the leadership in terms of the sector evolution.

Keywords: Information Systems Strategic Planning Business Modeling and acquisition

Resumo

As organizações modernas têm uma crescente dependência em sistemas de informação, tendo em conta as grandes quantidades de informação que tem de processar diariamente de um número de crescente de fontes. Gerir os Sistemas de Informação de tais organizações é uma tarefa de grande responsabilidade, tendo em conta que a equipa responsável pelo planeamento, aquisição, manutenção e gestão de software é muitas vezes reduzida, donde, todo o desenvolvimento é feito em outsourcing e diferentes fornecedores num clima de rápida e constante mudança.

Todo este desenvolvimento de diferentes fornecedores traz desafios, dado que dificilmente algum tem a visão holística da ERS e dos seus SI, o que torna difícil o desafio de desenvolvimento de planos médio e longo prazo de forma consistente, integrada e inovadora. Uma das razões para os fornecedores se focarem no curto e médio prazo é que frequentemente o cliente compra a solução mais barata, por vezes para mais tarde descobrir que falta qualidade, é ineficiente, não está integrada ou não é interoperável. Existe um risco ao comprar a solução mais barata, tentando ter a máxima qualidade e querendo encaixar com um rico conjunto de aplicações caso não tenhamos um plano de PESI (Planeamento Estratégico de Sistemas de Informação) definido e claro.

Os objectivos desta dissertação são:

• Identificar a metodologia de PESI a seguir para este tipo de organizações, tal como acima identificado, com uma abordagem sistemática para dar apoio no desenvolvimento de um plano de PESI dividido em fases simples, para ajudar a organização a obter um plano de PESI alinhado com os seus objectivos.

Aplicar a metodologia a um caso de estudo, através da definição de um plano de PESI incremental para os SI da organização – a Entidade Reguladora da Saúde (ERS) – pela definição de um plano de PESI incremental para os SI da organização para suportar a organização a ir ao encontro do cumprimento s seus objectivos de uma forma clara e eficaz.

Conclusões: O plano de PESI definido está pronto a ser implementado de forma a dar tempo à organização de se preparar para cenários futuros, com vista, a esta se poder posicionar no mercado e no seu ecossistema.

Após a elaboração do plano de PESI de acordo com as diferentes fases da metodologia definida, em forte articulação entre si, concluímos que este plano tem todas as condições para atingir os seus objectivos, de tornar os SI da ERS numa referência, bem como de se posicionar no sector da saúde de forma a manter-se na liderança da evolução do sector.

Palavras-chave: Planeamento Estratégico de Sistemas de Informação, Modelação de Negócio e Aquisição

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The author

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Pedro Castro Henriques

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Abbreviations and Symbols

BSC	Balanced scorecard
CMMI	Capability Maturity Model Integration
CSF	Critical Success Factors
DAC	Departamento de Acompanhamento do Sistema de Saúde e Defesa do Acesso e da Concorrência
DGI	Departamento de Gestão Interna
DGS	Portuguese Directorate-General of Health
DIJ	Departamento de Supervisão e Intervenção Jurídica
DPQ	Departamento de Protecção da Qualidade e Direitos dos Cidadãos
ERS	Entidade Reguladora da Saúde – Portuguese health regulation entity
INE	Instituto Nacional de Estatísticas (Statistics Portugal bureau)
IS	Information Systems
ISSP	Information System Strategic Plan
KPI	Key performance indicator
MCDT	Diagnostic and treatment services
OECD	Organization for Economic co-operation and development
RFP	Request for proposal
SNS	Portuguese Public National Health Service
SWOT	Strategic planning method used to evaluate the Strengths, Weaknesses, Opportunities and Threats
WHO	World Health Organization
DAR	Decision analysis and resolution (acquisition process)
UML	Unified Modeling Language

1.Introduction

This chapter's goal is to present the context, motivation of the work done and to identify and define the problems that the dissertation deals with. Here we summarize the methodologies used in the work and we give a brief resume of the following chapters.

1.1 Context and motivation

This section outlines the area where the work fits in and presents a brief description of the ERS organization that is our case study.

This work is in the field of information system strategic planning using concepts and techniques from business strategy, business analysis, information system modeling, software engineering, acquisition and software quality. The work's special focus was in methodologies for Strategic Planning for Information Systems, namely in techniques for business and information system analysis.

This work is the result of the application of bibliographic revisions of ISSP to consolidate the empirical knowledge that was gained in-loco working in the organization as IS responsible, dealing with planning, acquiring, managing a nationwide information system in a Portuguese government entity - ERS.

About ERS

ERS is a regulatory entity responsible for the regulation and supervision of the Portuguese health sector. For this reason ERS needs and has to manage large quantities of information with its scarce resources, which represents a challenge for it and it's Information Systems (IS). Another challenge it faces is the youth of the organization, together with the difficulty to identify and define its own processes, given the large universe of the health sector. To improve the information system is an opportunity for the organization to reposition and fight these problems in an integrated way.

At ERS IS (information systems) are critical but still it's not of its core business to develop IS solutions so ERS outsources all development for having low fix costs and a light IS structure. All this outsource to different suppliers poses challenges, as none has the whole picture, which

makes it a challenge to develop medium-long term plans in a consistent, integrated and innovative way. The IS suppliers goals are to keep a good relation to its clients and to be profitable, so they need to sell more and to have profitable clients (for instance ERS), they are not so concerned about the long term problems of the clients. One of the reasons suppliers focus on short, medium term is that often the client buy their development services by mostly looking to the price criteria. That means to buy the cheapest solution, even if it lacks quality, is inefficient, not interoperable and with bad maintenance. There is a risk in buying cheap, trying to have the maximum quality and still wanting it to fit into a rich set of applications if we don't have a clear ISSP plan.

This work goal is to see the holistic picture, by analyzing the context and strategy, to define a wanted scenario, a strategy to get to the intended scenario and characterize the IS. After analyzing the portfolio of existing applications we see which have to be changed or which new applications have to be developed and we define a time plan for incremental improvement of the IS, divided into short, medium and long term.

About the work

The job at ERS, required a pragmatic approach with need for very diverse knowledge and type of daily tasks, combined with the ability to deal with suppliers, building partnerships and capacity to think in long terms, being constantly challenged to trade off (sacrificing) between this long term goals with short terms needs and urgent matters. These questions are related to strategy planning and an information system manager having little support or experience finds himself often as the only technical person in the (non-technical) organization and must solve these problems.

The context of this work at ERS gives a good input to think through the main issues and effort to putting up an ISSP plan. To combine these issues that are part of the work of an information system manager in an organization that the core activity depends on powerful information system yet information systems which the development is not part of the core business and so its outsourced to a number of suppliers.

1.2 Goals

In this section are identified the goals for the work done with a resume of the methodologies used to achieve these goals.

The goal of this work is to identify a ISSP methodology that help organizations by first understanding where they stand in terms of organization context, to do a strategic analysis to the organization and its IS, to define where the organization wants to get to, detailing the current IS and choosing a strategic path and a plan to go there by defining a plan of improvements and applications development.

Dissertation goals are the following:

1. **Define an ISSP methodology and a set of guidelines adapted to fit organizations that:**

-Need to have an integrated IS strategic plan
-Have a small internal IS team – maybe of just one or two persons
-Deal with large quantities of information from different sources
-Do outsourcing of all IS development, to a number of specialized suppliers, to have low fix costs
-Are in a climate of rapid and continual organizational and technological change

2. Apply ISSP methodology to a study case by defining an ISSP plan for Incremental improvements to the organization so the organization can go further in accomplishing its goals:

In other words apply the ISSP methodology to ERS. Define an ISSP plan for Incremental improvements to ERS IS, so ERS can take its goals of regulation and supervision of the activity of the health care providers further, by:

-Securing the rights of the health care users

-Guarantying the accomplishment of the legal and contractual rights of the regulated entities in terms of access of the users to the health care services

-Observation of the quality levels of the health care services

This work proposes to draw an ERS ISSP plan, in the shape of a more integrated and solid system defining, adding applications and important decisions for ERS IS and to ERS business.

1.3 Assumptions, dependencies and restrictions

This plan has a strong input from ERS yearly plan called “Plano de Actividades da ERS” and its yearly reports called “Relatório de Actividades da ERS”.

This plan is being made after the time I was working at ERS in a retrospective way. It does not take in account possible recent changes that have happened and that I am not updated with.

1.4 Scope of ERS ISSP

We have chosen a methodology that fits our intended approach methodology *three stages of IS planning* with some adaptation. We believe ISSP planning requires deep knowledge of the organization and its business context. For this reason we start by looking in detail to the organization context. Then we do a strategic analysis to the sector, we at to forecasts, trends and scenarios, and using a group of business analysis techniques, such as PEST analysis, Porter Five Forces analysis, SWOT analysis, Value Network, Critical Success Factors and the Balanced scorecard we identify a group of important improvements/innovations for the organization IS and for the ISSP plan.

Following the business context analysis we define clear IS strategy choices for reaching an *ideal scenario*. Then we do an analysis of the characterization of the IS, by looking at which are the organization processes, to its information requirements, how IS supports its processes and we identify the main concepts of organization business. On the application portfolio analysis we identify our applications and categorize them into business critical, strategic, high potential and support applications. Then we take into account all collected information to identify changes to the actual applications and to the development of new applications. Following that we do prioritization and scheduling of these applications in terms of short, medium and long term. We set these into incremental ISSP plan and provide a set of recommendations. Afterwards there was a verification to help us see if we were doing the job right (verification) and if the produced artifacts were according to the ISSP project scope/goals. Finally the validation phase is where we will need to check if we doing the right job (validation) and we compare ISSP plan with stakeholder´s needs. At that point we will have to ensure that the stakeholder needs are fulfilled in the ISSP and if it’s possible to move on to an implementation phase, after an approval by the most relevant stakeholders.

In Figure 1 is a mind map that shows how ISSP document is divided into main sections and subsections – this map is made having the back thought of keeping it as abstract as possible so it can be reused and applied to other organizations.

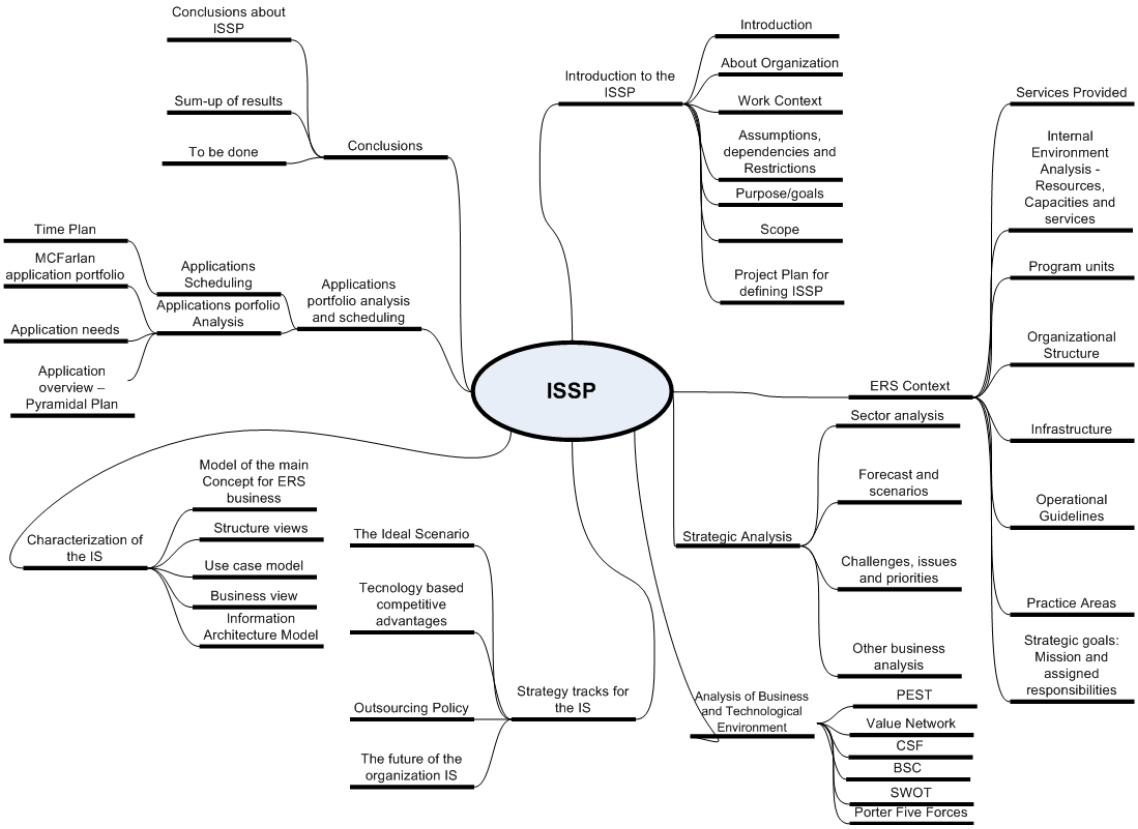


Figure 1 - Mind map of the ERS ISSP

This work goal was to achieve the following results in the ISSP:

-Analyses the organization context

-Analysis of business and technological environment - the sect sector, forecasts, trends, scenarios

-Strategic analysis of the organization business

-Strategic path for an ideal scenario

-Identification and characterization of the existing IS:

- Identification information requirements

- Identification the Organization Processes

- Identification the portfolio of applications

-Classification applications into strategic, high-potential, critical and support

- Identification a small set of strategic applications to develop in the short term for creating competitive differentiation

-Scheduling of the applications development

-Scheduling of applications in a plan separated into short, medium and long term, with final importance (taking in mind priority, cost and impact)

- Identification IS information architecture.

This tasks goal was to guaranty an integrated ISSP and focused on the different stakeholders and users, by following the proposed vision and by planning the identified new tools

According to the portuguese *business newspaper* (Jornal de Negócios - 29-02-08):

“"Entre os aspectos mais positivos que o Tribunal Contas reconhece no trabalho da ERS está o funcionamento do sistema de informação aos utentes. O Tribunal de Contas lembra que a ERS dispõe de um site na Internet, com todos os dados relevantes, e que esse mesmo site permite aos utentes pesquisar todas as entidades prestadoras de cuidados de saúde registadas na ERS, sendo intenção desta entidade implementar um sistema de reclamações através do site. "O Tribunal de Contas, sem deixar de incentivar a ERS a melhorar o seu sistema de informação, reconhece que o mesmo revela já grandes potencialidades", comentam os autores do relatório. “

In short what this text means is that *Tribunal de Contas* (the Portuguese Court Of Auditors) recognizes in ERS a very positive work in its IS, namely in what the citizens can see and search in terms of information of health care providers. It also says that ERS IS has great potential and it encourage ERS to keep on improving its IS.

I was head of IS at ERS, responsible for building the foundations of ERS complex information system which was a role of big responsibility, including the definition of a system to manage thousand of health care supplier’s registration, their related information and payment, which handled over several million euros. All this information was vital for ERS regulation and supervision.

One of the goals is to take the actual ISSP and its current potential, to the definition of a set of applications and services that serve ERS and its most relevant stakeholders, namely the regulated entities and the citizens.

1.5 Project plan for ERS ISSP

This ERS ISSP project definition plan is shown in Figure 2. Before the kickoff the Project and work to be done where defined. Following the project kickoff there was phase 1 where the context analysis is done, starting with the organization strategic goals in terms of mission and responsibilities, as well as the practice areas of the organization, its operational guidelines and existing infrastructure. The organization, its units are also presented and there is an internal environment analysis in terms of resources, capabilities and services.
On phase 2 there is a strategic Analysis to describe the health sector, some forecast and alternative scenarios for the future in terms of the sector, as well its challenges, issues and priorities. On phase 3 several business analysis are made in terms of the context where the organization works (PEST, Porter, SWOT), its relations to the other organizations - partners, competitors and clients - (value network) as well as the critical success factors are identified.
In Phase 4 we identify alternative future scenario, and choose the one that we find most realistic and interesting for the organization – the wanted scenario, then we identify how technology can be used by the organization to gain competitive advantages and to achieve the pretended scenario. Here is also identified the wanted future for ERS.
It’s in phase 5 that is identified the organization information architecture model, the organization business view and structure views, together with the use case model for the high level added value functionalities identification. It’s also in phase 5 that is analyzed the application portfolio in terms of critical for the business, strategic, high potential and support applications. This information is one of the most important bases for the evolution plan.
In phase 6 are identified the time plan for implementation/outsourcing of the applications, together with some conclusions about the ISSP, as well as results and things to be done in the future.

The verification phase we look into inconsistencies or other non-conformities and fix them. Before passing to an implementation plan, the plan must be validated by ERS as approved.

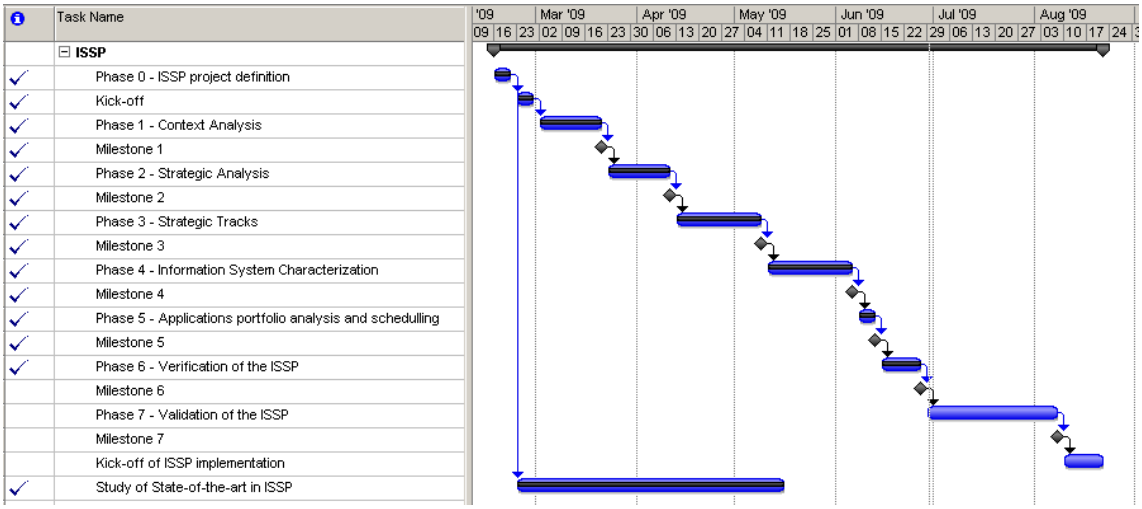


Figure 2 - Schedule for definition of ERS ISSP

1.6 Deliverables

In Figure 3 are shown the main deliverables for the milestone at the end of each phase. It's important to take note that was not a waterfall process, but an iterative one, but still there were strong efforts in trying to produce a quality deliverable at the end of the milestones. At each milestone documents were reviewed and the ISSP as a whole had to be updated and reviewed in order to form an integrated and useful document. As ISSP uses a set of different methods and tools it's important to integrate them all together with the common goal of supporting the goals defined for this ISSP.

Phases	Milestone	Milestone deliverables
Phase 1 - Context: analysis and project definition: -Introduction -Context Analysis	M1	Introduction, About ERS, Work Context Assumptions, dependencies and Restrictions Purpose/goals, Scope Project Plan for defining ISSP Strategic goals, Practice Areas, Operational Guidelines Infrastructure, Organizational Structure Internal Environment Analysis - Resources, Capacities and services; Services Provided
Phase 2 - Analysis of Business and Technological Environment	M2	Sector analysis; Forecast and scenarios; Egovernemtn Challenges, issues and priorities
Phase 3 - Organization Strategic Analysis	M3	PEST Analysis Porter Five Forces analysis SWOT - Strategic Analysis of ERS Value Network Critical Success Factors
Phase 4 - Strategy tracks for ERS	M4	Ideal scenario Evolution path Facilitators and blockers Technology based competitive advantages Technology boosting organization evolution Outsourcing strategy
Phase 5 - Information Architecture	M5	Model of the main Concept for ERS business Information Architecture Model Business view Structure views Use case model
Phase 6 - Applications Portfolio Analysis & Scheduling	M6	MCFarlan application portfolio Application needs Application overview – Pyramidal Plan Applications Analysis Time Plan
Phase 7 – Verification of the ISSP	M7	Baseline of the ISSP Version 1.0
Phase 8 – Validation of the ISSP	M8	Approved version of the organization ISSP

Figure 3 - Milestones and deliverables of the ISSP definition project for ERS

1.7 Structure of the dissertation

This ERS information system strategic plan is divided in the main elements shown in Figure 2 that are distributed in several chapters in this Dissertation.

Chapter 1 contains the introduction, including the Project definition and the definition of the organization ISSP plan goals.

In chapter 2 is presented the theory behind ISSP and the methodology that was chosen and applied to ERS case study.

Chapter 3 is where the organization context analysis is done, the organization strategic goals in terms of mission and responsibilities are identified, as well as the practice areas of the organization, its operational guidelines and existing infrastructure. The organization, its units are also presented here, also there is an internal environment analysis in terms of resources, capabilities and services.

On chapter 4 there is an analysis of the business and technological environment that describes the organization sector - the health sector - some forecast and alternative scenarios for the future, as well e-government challenges, issues and priorities.

Several business analysis are made in chapter 5 in terms of the context where the organization works (PEST, Porter, SWOT analyses), its relations to the other organizations - partners, competitors and clients (value network analysis) and the critical success factors are identified.

In chapter 6 we identify alternative future scenarios, and choose the ones that we find most realistic and interesting for the organization – the ideal scenario; then we identify how technology can be used by the organization to achieve the pretended scenario and to gain competitive advantages. Here is also identified the wanted future for ERS IS.

It’s in chapter 7, that is done a characterization of the IS, by looking at which are the organization processes, to its information requirements, how IS supports its processes, we identify the main concepts of the organization business and the information architecture model.

In chapter 8 the application portfolio is identified in terms of critical for the business, strategic, high potential and support applications. These applications implementation is planned in a time plan, together with some conclusions about the ISSP, as well as results and things to be done in the future.

In chapter 9 are presented the conclusions and ideas about the future work.

2.Bibliographical revision

In this chapter are presented some of the main concepts related to strategy and strategic planning together with different strategic implementation approaches.
After presenting these concepts, some methodologies and tools for strategic planning in Information Systems and for business analysis are identified (such as *PEST analysis*, *Porter Five Forces analysis*, *SWOT analysis*, *Value Network*, *Critical Success Factors* and the *Balanced scorecard*.), including *Three stages of IS planning* [Bowman 1983] and *Multidimensional Earl approach* [Earl 1989]. We also look at the *model of most relevant realities* [Amaral 1994].

Here we explain why we choose to adapt the *three stages of IS planning* in order to have a (1) in depth strategical planning; followed by (2) analysis of organization information requirements and of the (3) detailed IS incremental development plans. We divided this approach into a similar methodology divided in seven phases, as shown in figure 10.

Our problem was to define a ISSP methodology adapted to fit organizations, like ERS, that have a small internal IS team, deal with large quantities of information from different sources; do outsourcing of all IS development to a number of suppliers and intend to have low fix costs.

2.1 Introduction - strategy related concepts

Here are presented some concepts, such as, strategy, strategic planning and the evolution of strategic management in brief.

2.1.1 What is strategy?

"Strategy is the direction and scope of an organization over the long-term: which achieves advantage for the organization through its configuration of resources within a challenging environment, to meet the needs of markets and to fulfill stakeholder expectations" [Johnson & scholes 2002].

In other words an organization strategy refers to choosing a path, a direction to follow for going from where the organization stands at a given point, and where the organization wants to be in a point in the future. So to choose this direction it's needed to take in account things as:

long term goals, the actual context, its challenges and opportunities in terms of markets, competition, together with expected future scenarios that are responding to the stakeholder needs. During the time where the path is being followed, adaptations will be done to adjust to the changing environment.

The strategic path is not a “mathematical/technical path”, it’s a management path that combines a set of tools and mechanisms for analysis, but also relies on a capacity to foresee the future, to envision a pretended, achievable and often ambitious set of goals. To draw a strategy one has to be able to foresee which resources to put in place in a competitive setting.

What is business strategy?

The essence of business strategy lies in creating future competitive advantages faster than the competitors.

2.1.2 The evolution of strategic management maturity

The model “Evolution of Strategic Management Maturity”, presented by Gluck et al (as described by John Ward) shown in Figure 4 shows the evolution of organizations in terms of strategy and strategic planning. It shows 4 phases of how the organizations can raise their maturity in strategic planning, showing the core issues at each level of maturity.

The first phase focuses on the organization meeting its budget, which is calculated merely looking at an internal perspective. Looking at each department and how much it has spent lately by looking at historical data that is collected. Then the department budget for the short periods forward is estimated based on these historic values and simple techniques. All the departments budgets combined come in to an organization budget, which is then the base for the year financial plans.

The whole focus for the organization is in managing the cash flow and meeting its budget – that is the main financial issue at this stage.

The second phase focus on predicting the future, elaborating and planning forecast of the evolution in medium terms, such as sales and market growth, and seeing how that affects the balance sheet. The forecast is achieved by looking through historical performance, looking at internal perspective of evolution, together with looking at external information such as analysis of market data and economic indicators. With sales and market prediction, it’s possible to see how the income and expenses will be affected. There is a gap analysis perspective on seeing what effort is necessary in terms of resources to achieve the pretended targeted position.

In the third phase, the orientation of the planning is turn to external factors by thinking strategically. By also looking externally to the nature of the competition, and of the industry, it is possible to identify opportunities and threats. There is a conscious evaluation of the alternatives to achieve competitive advantages, by looking at the options available, analyzing them and their advantages and disadvantages in a holist way. In this phase the allocation of resources is done in a dynamic way. Product portfolio can be changed, features of the products/services can be enhanced, costs can be reduced, all adjustments taking in account achieving attractive market sectors and facing competition.

Phase number 4, there is an organization focus on strategic management to build its business environment by its innovation drive to control its own destiny. The organization is focused on strategy; its capacity to act and react is spread inside the organization and is reinforced by strong organization values and well defined processes so it can be in a leading position in the industry.

It requires a well defined framework to respond in a consistent way with new competitive products and with increasing competitiveness. The innovation is based on its constantly evolving knowledge and competencies.

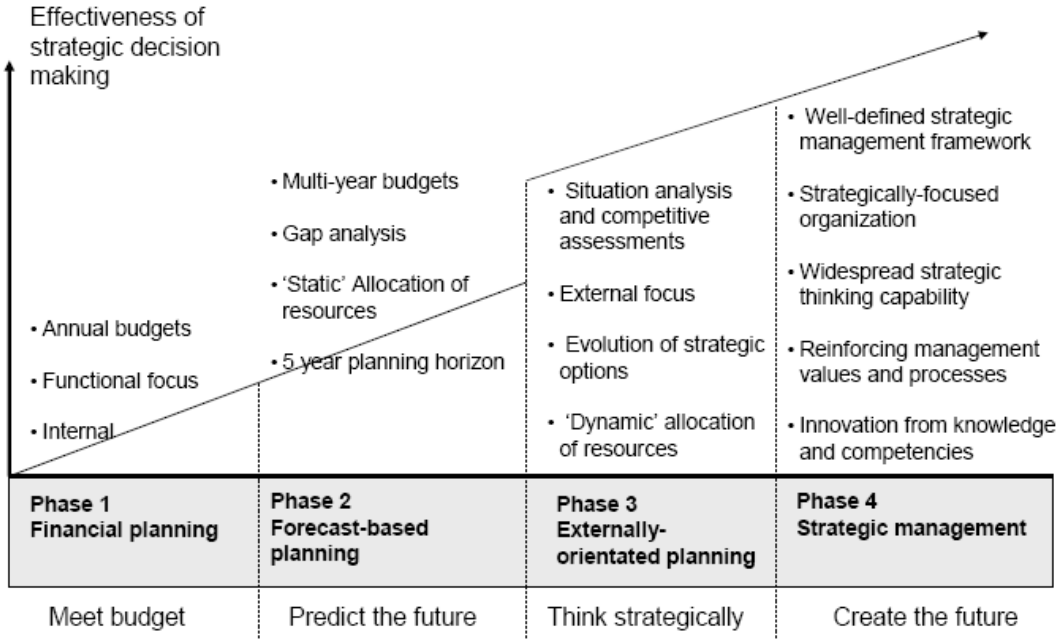


Figure 4 - Model present Gluck [Gluck 1980]– Evolution of strategic Management Maturity

For organizations to be at phase 3 or 4, phase 1 and 2 have to be already covered for being able to translate the strategic thinking into financial results.
Organizations in the 3rd or 4th phase in terms of business, don't necessarily are a 3 or 4 level in terms of strategic planning of Information Systems, they could actually be just at the level 1, controlling the budget and focusing in internal terms only.
The goal of this work is to focus on higher levels of maturity presented in this model on the IS strategic planning scene.

2.1.3 What is strategic planning?

Strategic planning is the process used by an organization to define its strategy/direction, including decisions it needs to take in terms of allocating its resources to pursue this strategy, including its people and capital.

According to C. Copeman [C. Copeman 2008], the strategic planning cycle shown in Figure 5, has six stages:

-Get the direction right

Is your organization on the right track? Does it meet the needs of service users, clients, and other stakeholders?

-Analyze the internal and external environment

Planning requires looking at the operating environment within and outside your organization.

-Refine options and choices

Once analysis of the operating environment is complete, your organization is faced with a number of options how to carry out its mission.
Thinking through the options presented by an external strategic analysis is covered in Assess Drivers.
These options need to be assessed so that an informed decision can be made. This isn't just about choice, but it is also about priority, feasibility and risk assessment.

-Plan
Detailed planning starts now. Options and choices are brought into reality.
One way of doing this is to develop some goals and targets, capture the strategy in some kind of written document and think about the resources required to deliver the plan.

-Implement
If the organization fails to implement the decisions made, all the work is for nothing.
It is one of the most frequent concerns that staffs have about planning. After putting masses of effort into developing a strategy, nothing happens. Planning does take time and resources, and to ensure that the hard work and good ideas are not wasted, it is vital to ensure that the plan is fully implemented.

-Evaluate
Evaluating the outcomes and impact of the strategic plan marks the end of the journey for the planning cycle.
Once the strategic plan is firmly embedded throughout the organization, it is time to take stock and evaluate what works well, and just as importantly, what doesn't work as well"

Figure 5 – Strategic Planning six stages [C. Copeman 2008]

2.2 Business analysis techniques

Here are presented a group of business analysis techniques, such as PEST analysis, Porter Five Forces analysis, SWOT analysis, Value Network, Critical Success Factors and the Balance scorecard.

Before looking into the techniques that are applicable to ISSP one needs to understand the context, its challenges, its opportunities and the factors that will influence this planning.

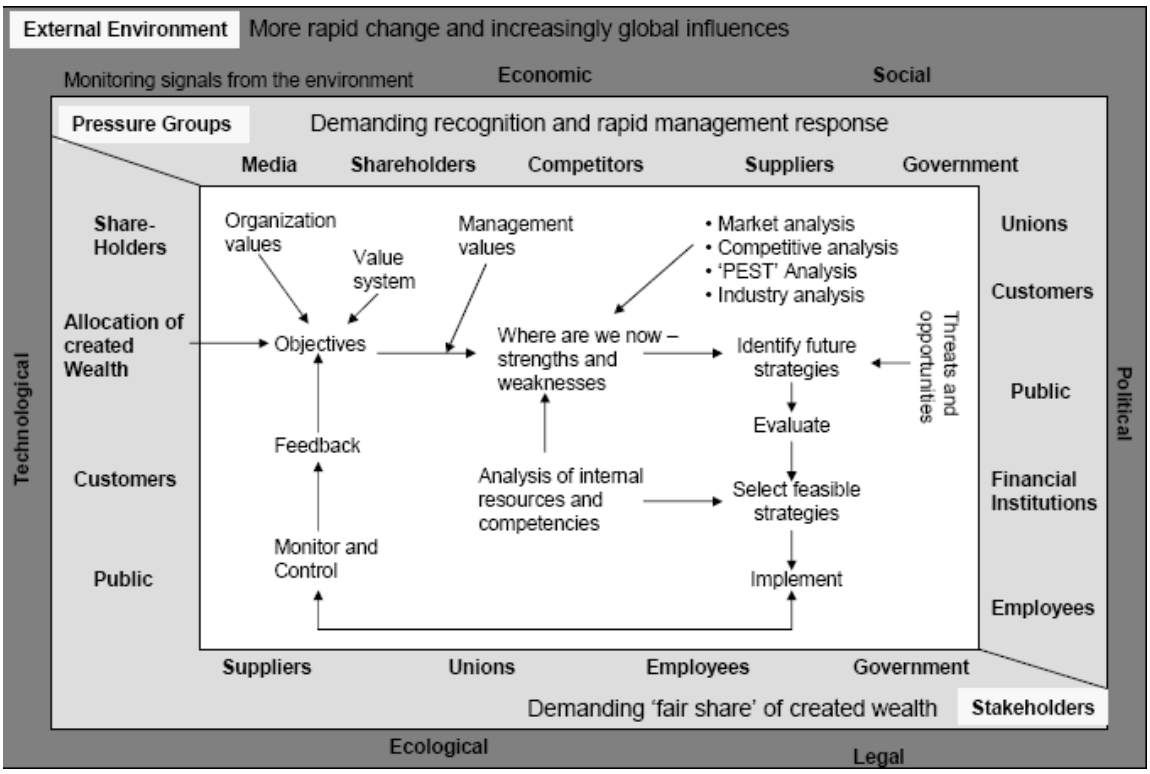


Figure 6 - Example of a strategic framework [Ward 2002]

The Strategic Framework [Ward 2002 at page 71] show in Figure 6 – is a broad context within which different techniques and tools are applied for strategic planning, from which we identify a small set of several business analysis techniques that together can give an overview and context for ISSP:

- PEST analysis (Political, Economic, Social, and Technological analysis) - PEST analysis stands for "Political, Economic, Social, and Technological analysis" and describes a framework of macro-environmental factors used in the environmental scanning component of strategic management [OxfordUnivPress 2007]
- Porter Five Forces analysis - "Porter's five forces analysis is a framework for the industry analysis and business strategy development developed by Michael E. Porter of Harvard Business School in 1979. It uses concepts developed in Industrial Organization (IO) economics to derive five forces which determine the competitive intensity and therefore attractiveness of a market. Attractiveness in this context refers to the overall industry profitability [Porter 1998].
- SWOT analysis – SWOT Analysis is a strategic planning method used to evaluate the Strengths, Weaknesses, Opportunities, and Threats involved in a project or in a business venture. It involves specifying the objective of the business venture or project and identifying the internal and external factors that are favorable and unfavorable to achieving that objective [Minzberg 1994].
- Value Network – "A value network is a web of relationships that generates economic value and other benefits through complex dynamic exchanges between two or more individuals, groups or organizations. Any organization or group of organizations engaged in both tangible and intangible exchanges can be viewed as a value network, whether private industry, government or public sector" [Verna 2002].
- Critical Success Factors - Critical Success Factor (CSF) is a business Advocate term for an element which is necessary for an organization or project to achieve its mission. They are the critical factors or activities required for ensuring the success of your business [Rockart 1981].

- Balanced scorecard - “The Balanced Scorecard (BSC) is a performance management tool for measuring whether the smaller-scale operational activities of a company are aligned with its larger-scale objectives in terms of vision and strategy. [Kaplan e Norton 2001].

2.3 The ISSP plan

An ISSP is a document that is used as basis for identification of a clear strategy for the information systems preferably in alignment with the business and strategies of the organization.
The plan should establish goals, schedules and milestones in order to be clear what has to be done, when it has to be done and when and how we can consider it successful.
One of the most important outputs of the plan is the needed applications, which should be prioritized and planned in advance. These applications can then be divided into different phases which reflect the short, medium and long range prioritizations.
The ISSP plan helps identifying needed resources, such as personal/staff, financial needs, facilities that are needed – that are clearly stated in the ISSP.
It’s important to get sponsorship and high level management involvement in the planning, as the document will provide a great opportunity for communication with top management and guaranty a good alignment, the approval of the plan and facilitate its implementation.

2.3.1 Benefits

There can be different reasons for a ISSP plan to be drawn, still the benefits are similar to the benefits of having a general plan and there is more value and benefit in it then in most other IS responsibilities as Anita Cassidy 2008 identifies, the benefits of IS strategic plans are:

- Effective Management of an expensive and critical asset of the organization
- Improving communication and the relationship between the business and IS organization
- Aligning the IS direction and priorities to the business direction and priorities
- Identifying the IS direction and priorities to the business direction and priorities
- Identifying opportunities to use technology for a competitive advantage and increase the value to the business.
- Planning the flow of information and processes
- Efficiently and effectively allocating IS resources
- Reducing the effort and money required throughout the life cycle of systems”

2.4 IS strategy

“The IS strategy defines the organization’s requirement or ‘demand’ for information and systems to support the overall strategy of the business. (…) It defines and prioritizes the investments required to achieve the ideal applications portfolio, the nature of the benefits expected and the changes required to deliver those benefits, within the constrains and systems interdependencies.” [John 2006 page 44].

IT (Information Technology) strategy in contrast to IS Strategy looks at the technology support necessary to answer to the IS Strategy.

2.5 The model of most relevant realities

Some fundamentals and paradigms associated with Information System Planning (ISSP) have been identified, by Luis Amaral and João Varajão – in "Modelo das Realidades Preponderantes" [Amaral 1994] (most relevant reality model) see figure 7 - for a deeper knowledge to support the discussion of the definition of ISSP in terms of relevant and important reality aspects. From the model where identified the most relevant or recognized taking in account the specific case ERS - a public entity that provides services to the general public and regulates a group of entities from which it collects, manages and uses large quantities of information.

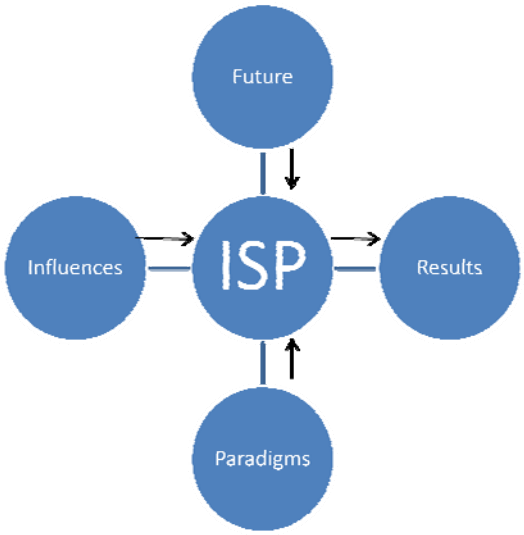


Figure 7 - Most relevant realities model for Information System Planning [Amaral 1994]

2.5.1 Paradigms

Paradigms are a class that represents a set of realities, beliefs principles and models that are believed as dogma and that are cornerstones and drive the ISSP [Amaral 2007].

In terms of Paradigms we identified from Luis Amaral model the set of paradigms that are particularly important for ERS case and that we detail in the next subsections:

- Rational motivation for planning
- Management and Information relation
- Alignment of strategies
- Information Architecture
- Continuous process
- ISSP Activities
- IT/IS sources of competitiveness advantages
- Value networks

2.3.3.1.1 Rational motivation for planning

In order to be able to achieve wanted results for the organization, certain activities have to be done to produce these results. Those activities can be done in a non-orderly fashion, which can take ultimately to not be able to achieve the expected results or to performing poorly.

To increase the chances that results are achieved, activities have to be thought and planned, so the resources are allocated in a timely way, and results are achieved in an efficient and effective way.

The rational for information system planning is similar to the organization general need for planning. In order for the Information Systems responsible to achieve the goal of supporting the organization needs and goals it requires planning, IS planning. Organizations management and operational levels rely more and more on the availability of the information from the information systems to be able to do their daily work and to go further in their responsibilities.

High Management will identify problems and needs that can be solved with the access to the rights tools for information management. It's the role of IS Management to help determining answers to these problems and needs, to support the definition of IS direction and policies and to assure that the right investments are done to achieve these results.

The organization focus on results is a strong rational for IS planning.

2.3.3.1.2 Management and information

Today organizations depend more and more on the information they have available and on the use management gives to this information. The quality of the decisions is linked to the quality of the information available to base the decisions on. So it's critical to have access to the right information at the right time. Information systems can be a great accelerator and mean for gathering, keeping, using and updating the information the organizations needs for its success.

Management recognizes the importance of IS planning, still often sees the Information System not so much as strategic investment, but more as a necessary cost or mean to achieve the organization goals.

2.3.3.1.3 Alignment of strategies

Information System strategy reflects the set of strategies – as shown in Figure 8 which includes:

-Information Strategy –defines how and what information to identify, collect and use to support the organizations processes and its goals

-Implementation Strategy – reflects how the change management is going to be achieved

-Human Resources Strategy – how the human resources are going to be used in an effective way to develop and use the information system

-Acquisition Strategy – the strategy for the organization in terms of if and when to acquire solutions in terms of hardware and software

These strategies must be in line with the overall organization strategy and its goals.

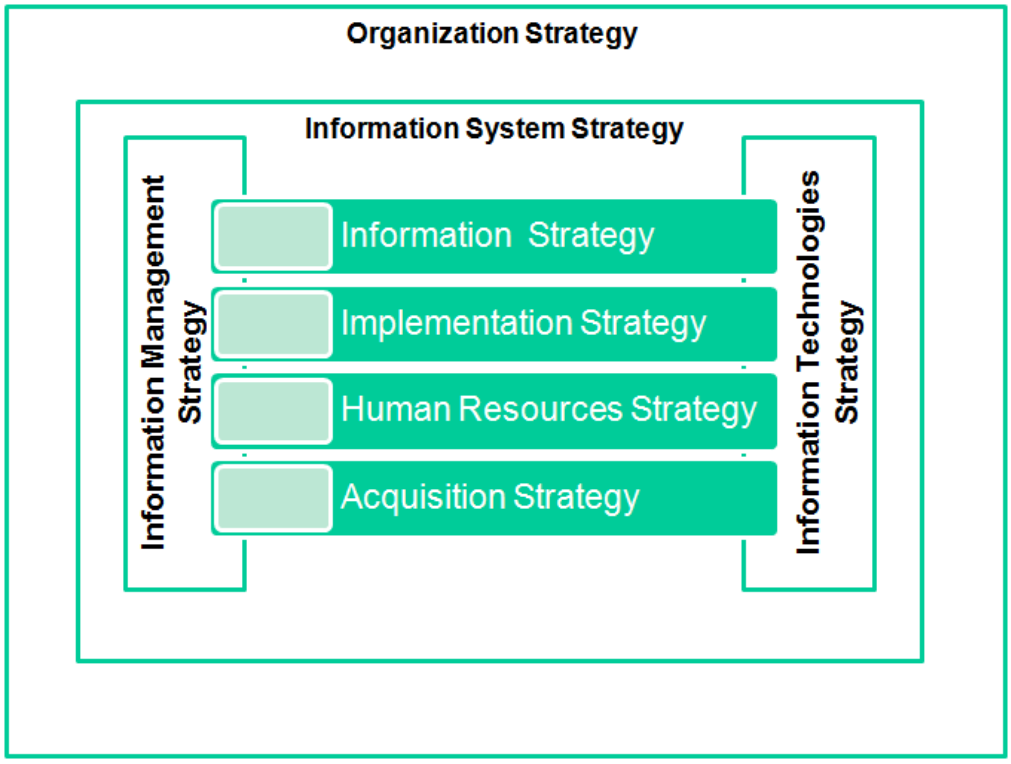


Figure 8 - Adapted from Different Strategies in IT/IS from Galliers 1991

2.3.3.1.4 Information architecture

In an organization in order for its collaborators to execute the organization processes, different information inputs are needed and information outputs are generated. Information Architecture is the way that this information is structured and linked to the organization processes that use it.
In BSP [IBM 1984] a direct mapping of the information requirements of the organization to its process structure is proposed. The idea is to identify opportunities that give competitive advantages to the use of IT/IS, so the IT projects developed are connected to the organization goals.
The knowledge of the information architecture allows us to define more clearly the limits of the business and project development and from it it's possible to determine needs for technological and organizational infrastructure so it can be a powerful and structuring element for IS development [Amaral 2007 – page 80].

2.3.3.1.5 Continuous process

ISSP is a continuous process as the organization and its context change continually, so it needs to be revised in a periodically cycle in order to keep rethink and for setting large milestones for important decisions. Then there is also the need to adapt and adjust it in between this yearly period.

2.3.3.1.6 ISSP activities

ISSP activities can be divided in set of activities as show in Figure 9 according to their timeline and focus:
-1. Strategic planning – starting the planning process and translating organizational strategic goals into IS goals and plans – focused on strategic level
-2. Analysis of Organization Information Requirements – focused on looking into the organization needs in terms of information and its information architecture – focus on tacit level

-3. Detailed plans & Resources allocation – activities for the identifying plans and resources needed to implement the strategy - focus on operational level

Figure 9 - ISSP Activities adapted from three stages of IS Planning [Bowman 1983]

2.3.3.1.7 IT/IS sources of competitiveness advantages

An organizations that sustains profit above its sector average, has a competitive advantage. A resource based approach as Michael Porter [Porter 1998] identified is based on a group of resources and capabilities to obtain competitive advantage in order to achieve higher value creation as shown in Figure 10.

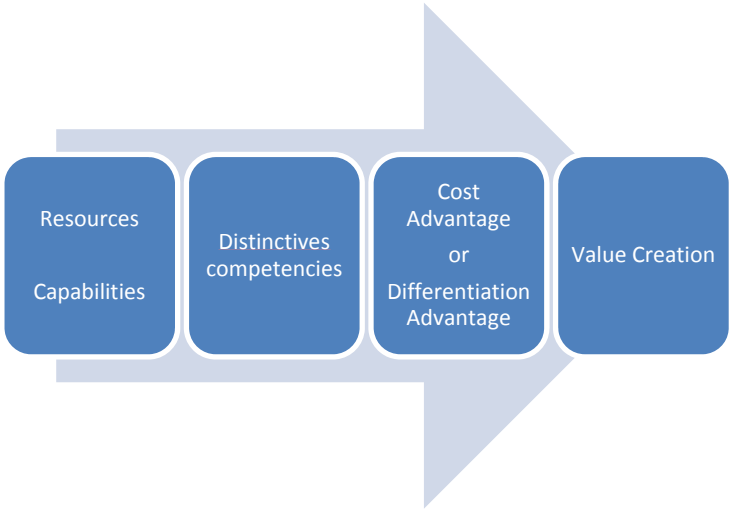


Figure 10 - A model of competitive advantage adapted from Michael Porter [Porter 1998]

Resources are assets that create advantage such as the organization information and its information systems.
Capabilities are the capacity an organization has to use its resources in an effective and efficient way. These capacities are immersed in the daily activities of the organization, so it's hard for the competitors to copy it.
These resources and capabilities are distinctive competencies that can leave to competitive advantage and to higher value creation; this is reached by performing value creation activities in a way that more value is created than in its competitors.

2.3.3.1.8 Critical success factors

"(…) the limited number of areas in which satisfactory results will ensure successful competitive performance for the individual, department, or organization. Critical success factors are those few key areas where "things must go right" for the business to flourish and for the manager's goals to be attained." [Rockart 1981]
Those activities and factors that are critical for the business are called CSF, and they represent a few factors that a company needs to focus to be successful.

2.3.3.1.9 Value networks

"The goal of a value network is to generate economic success or other value (benefits) for its participants. People participate in a value network by converting their expertise and knowledge into tangible and intangible deliverables that have value for other members of the network. In a successful value network every actor or participant contributes and receives value in ways that sustain both their own success and the success of the value network as a whole. Where this is not true participants withdraw or are expelled, or the whole system becomes unstable and may collapse or reconfigure." [Verna 2002]
Value networks are webs of relations between one or more organizations that create value and they show not just the tangible but also the intangible exchanges that are not shown in the traditional value chain. This makes it easier to understand and increase virtuous circles to enhance the creation of value for an organization and it's net. It's important for the information systems planning to take in account these positive exchanges and maximize them for maximizing the organization goals and success.

2.5.2 Influences

Influences are according to Luis Amaral and João Varajão [Amaral 2007] factors that in case of happening, their acceptance or choice have impact in the performance and ISSP results. They can be:
a) People – the motivation and involvement of the human resources is essential to the process of change. Having the perfect plan and technology but lacking the support from those in the organization that will use it or manage it can lead to poor results. The involvement of the managers and key users of the organization is a way to motivate and collect precious information for ISSP success.
b) Sponsorship – the high level commitment as an enabler of results by empowering those defining the ISSP and showing its importance to the organization
c) Balance between results and resources – the quantity of investment needs to find an optimal balance point, of time and money invested, to the impact and results expected. This point of balance is the one that gets most efficiency and effectiveness without wasting precious resources or missing its goals by not investing enough.
e) Services – The use of specialized consultants can be a positive way: to complement existing in house knowledge or lack of it; lack of time from organization members, the need for an independent external view or external resources;

2.5.3 Results

Results are the changes, consequences and artifacts produced as the result of ISSP according to Luis Amaral and João Varajão [Amaral 2007 – page 55] as shown in Figure 11 with the results listed in Table 1:

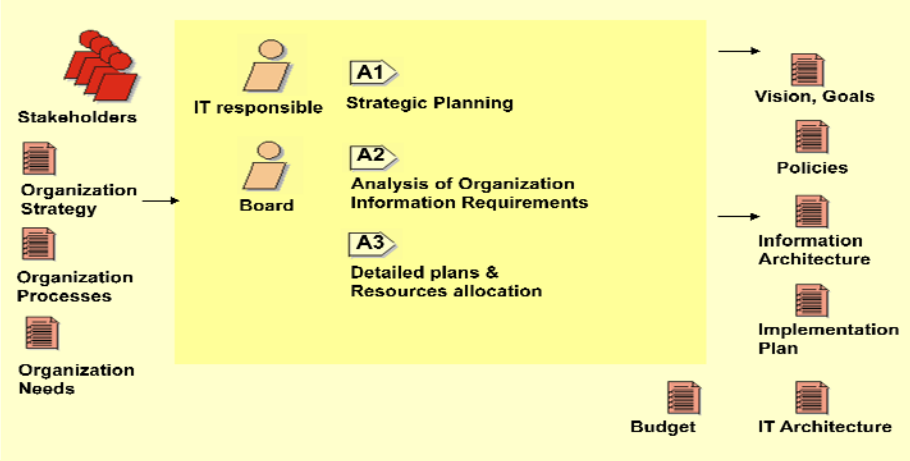


Figure 11 – ISSP - Inputs and outputs to its main activities

Table 1 – Results from ISSP [Amaral 2007 – page 72]

Vision – Represents what is expected to be achieved in middle/long term in terms of the information systems.
Goals – goals that ISSP pretends to accomplish by its implementations and impact
Policies – organization guidelines to support decisions and achieve rational outcomes in the implementation and management of the IS
Information Architecture - Information Architecture is the way that information requirements are structured and linked to the organization processes that use them.
Implementation Plan – Activities involved in the implementation of the IS plan
Budget – The money identified as needed to implement the IS plan
IT Architecture – Identification of the IT and the mapping to IT involved in the implementation of the IS plan
IS organization– determination of the organization structure that will be responsible for implementation of the IS plan
Change – Ultimately changes that are direct or indirect consequence of the ISSP or its implementation

2.6 Approaches

Approach is a style or philosophy for the resolution of problems, that can include a set of methods or techniques, procedures and guidelines for the formal and informal behavior and for decision making of the involved people [earl 1993] identified in [Amaral 2007 – page 87].

By looking at the methodology we found two interesting and distinct approaches:

- *Three stages of IS planning* [Bowman 1983] - see Figure 12.
- *Multidimensional Earl Approach* [Earl 1989] - see Figure 13.

Figure 12 - Three stages of IS planning – adapted from Bowman [Bowman 1983]

Figure 13 - Multidimensional Earl approach [Earl 1989]

We found the methodology “three stages of IS planning” to be more straightforward to use, powerful for its simplicity and with a more clear integration. We choose to use this methodology and decided to do some adaptations.

2.7 Chosen methodology for ISSP

ISSP planning requires knowledge of the organization, its business context and a clear IS strategy, requires an analysis of the organization information requirements and of its application portfolio, for prioritization and scheduling these applications into detailed plans and recommendations.

For this reason we adapted the methodology *three stages of IS planning* [Bowman 1983] - to fit our goals and we proposed the approach shown in Figure 14 divided in 7 phases.

- From phase 1 from the *three stages of IS planning* we divided the strategic analysis in three phases for a detailed analysis: phase 1 - ERS Context; phase 2 – business and technological environment analysis, phase 3 organization strategic analysis and phase 4 - Strategy tracks for ERS
- From phase 2 from the *three stages of IS planning* we have: phase 5 - Information System Characterization

• From phase 3 from the *three stages of IS planning* we have: phase 6 - Applications portfolio analysis, scheduling and conclusions; phase 7 - Verification; phase 8 – Validation.
In the phase 3 we don't identify resources needed, we just present and estimated effort, impact and priority for each application.

The methodology to achieve ISSP Plan is iterative and is divided in the following phases:

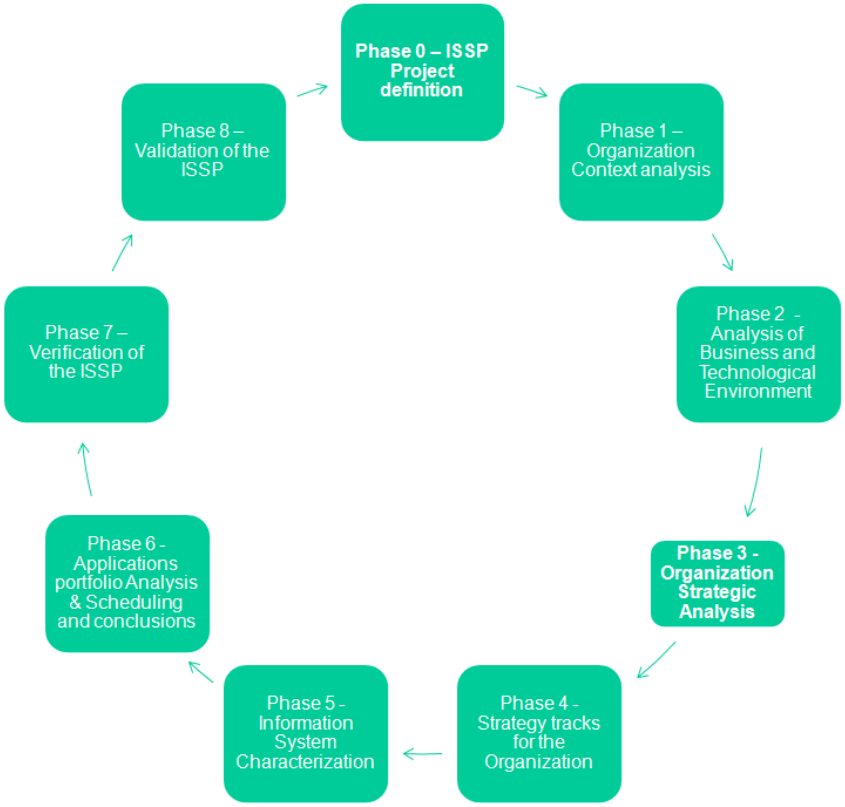


Figure 14 – Proposed ISSP main phases – adapted from Three stages of IS planning [Bowman 1983]

Phase 0 – ISSP project definition

In phase 0 the goal is to identify the purpose and goals of writing the ISSP, including brief information of the organization and of the ISSP work context and approach. It's important at this stage to look for high management support and clear sponsorship. At this point a team should be chosen, with a leader identified for the project as project manager. There should be a formal approval from the organization board to proceed with the ISSP project and a group of most relevant stakeholders should be identified to be involved in the project.

Phase 1 – Context analysis

After the project kick-off it's important to identify the organization, what is its mission and what are its goals. The context of the work should be explained together with assumptions it's going to be based on, dependencies, and which restrictions it has. The purpose and goals of ISSP work should be documented, together with the scope and a project plan for ISSP definition.

In this phase should be identified the organization context, its strategic goals in terms of mission and responsibilities, as well as the practice areas of the organization, it's operational guidelines and existing assets (including its infrastructure). The organization should be identified in terms of business units and hierarchy. An internal environment analysis should be made to identify resources, capabilities and services provided by the organization.

Phase 2 – Analysis of business and technological environment

In this analysis we want to know more about the environment the organization operates. We need to identify the actual sector and also to look at forecast for the future of this sector and of its players. At this point it's important to identify alternative future, as well challenges, issues and priorities.

Phase 3 – Organization strategic analysis

In this phase we do a group of business analysis techniques, such as PEST analysis, Porter Five Forces analysis, SWOT analysis, Value Network, Critical Success Factors and the Balanced scorecard we identify a group of important improvements/innovations for the organization IS and for the ISSP plan. We use a set of complementary approaches, in order to enrich the ISSP plan input and then we identify which ideas came from which business analysis techniques.

Phase 4 - Strategic tracks for the organization

In phase 3 we identify alternative future scenarios for the organization taking in mind the organization context and the strategic analysis from the previous phases, and choose one that we find realistic and interesting for the organization. We should now identify how technology can be used by the organization for its competitive advantages and to achieve the pretended scenario. In this phase is also identified the wanted future for the organization IS.

Phase 5 –Characterization of the organization Information System

In this phase we identify the organization information architecture model, the organization business view, and structure views, together with the use case model and other relevant models and views that show

Phase 6 – Applications portfolio analysis, scheduling and conclusions

In this phase we analyze the applications portfolio and identify the applications as: of critical importance for the business, strategic, high potential and support applications (using the Mcfarlan application portfolio).
In this phase is identified the time plan for the strategic development incremental plan of the applications identified in the portfolio analysis, in terms of short, medium and long term for implementation of these application. There should be written the main conclusions about the ISSP, as well as results and things to be done in the future.

Phase 7 – Verification of the ISSP

The verification activities should be done during the whole project and specifically in the milestones by reviewing or inspection of the deliverables of each phase. Still there is a need for a specific validation at every milestone in order to do necessary readjustments, as this is an iterative process.
In the verification phase all artifacts and outputs from the previous phases should be reviewed and changed if necessary to create a consistent and integrated ISSP plan.

Verification will help us see think if we are doing the job right, if the produced artifacts according to the ISSP project scope/goals. Then looking at the complete ISSP document we should ask the following questions:

- Is it ambiguous?
- Is it sufficiently detailed?
- Is it comprehensive?
- Does it have the input and output clearly defined?
- Are the stakeholders clearly identified?

If the answer is no to any of these question then we need to detail and change the document.

Phase 8 - Validation of the ISSP

In the validation phase we need to check if we are doing the right job and we need to compare ISSP plan with stakeholder´s needs. At validation phase we ensure that the stakeholder's needs were fulfilled and if it's possible to move on to the implementation; for that it's important to have an approval by relevant stakeholders.
We check the whole set of ISSP deliverables for: misunderstandings; clerical errors; to see that it is unambiguous; complete; verifiable; consistent. We can use several validation techniques that can be used: checklists; reviews; formal reviews/inspections; or prototyping/simulation.

2.8 Strategic implementation

This Dissertation does not cover the implementation phase after the ISSP is defined, still it's important to know that the realized strategy can be different from the intended strategy.

There is some distance between the intended strategy and the strategy that is realized or implemented as shown in Figure 15. This distance is consequence of the changes that occur from the minute we have defined the strategy, with new opportunities showing and with changes that are imposed or over which we do not have control.

Figure 15 - Strategic Implementation

The implementation should be followed by periodical evaluation, with assessment of the ISSP implementation and analysis of the outcome of the assessment.

2.9 Conclusions

In here we show a resume of the main findings and conclusions taken.

We have chosen a methodology that fits our intended approach t*hree stages of IS planning*. We believe ISSP planning for organizations that outsource all development requires a deep knowledge of the organization and of its business context. For this reason we defined a methodology that starts by looking in detail to the organization. Then we do a strategic analysis to the sector, we look at forecasts, trends and scenarios, and using a group of business analysis techniques we identify a group of important conclusions for the organization IS and for the ISSP plan.
Following the business context analysis we define clear IS strategy choices and an *ideal scenario*. Then we do an analysis of the characterization of the IS. On the application portfolio analysis we identify our applications and categorize them. Then we take in account all collected information to identify changes to the actual applications or to the development of new applications. Following that we do prioritization and scheduling of these applications. We set these into an incremental development ISSP plan and provide a set of recommendations. After that there is a verification that will help us see if we are doing the job right (verification) and if the produced artifacts according to the ISSP project scope/goals. Finally the validation phase, where we need to check if we doing the right job (validation) and we need to compare ISSP plan with stakeholder´s needs. At that point we have to ensure that the stakeholder's expectations have been fulfilled with the ISSP and if it's possible to move on to the implementation with the approval of the most relevant stakeholders.

In the chapter 3 to 7 we show how we implemented this methodology to ERS to come up with ERS ISSP.

3.Organization context analysis

In this chapter is presented the ERS organization context, including the organization strategic goals in terms of mission and responsibilities, as well as the practice areas of the organization, its operational guidelines and existing infrastructure.

Also here are presented the organization and the program units, there is an internal environment analysis which identified resources, capabilities and services provided by the organization.

3.1 Strategic goals: mission and assigned responsibilities

"ERS roles are: the regulation and supervision of the activity of the health care providers (regulated entities). Its duty is to look for the accomplishment of the legal and contractual rights of the regulated entities in terms of access of the users to the health care services, through observation the quality levels and securing the rights of those users. It's up to ERS to secure the universal and equalitarian access to everyone to the health public service, as well as to zeal for the respect of the freedom of choice for the private health units, preventing and punishing the practices of discriminatory or unreasoned rejection of patients. ERS role is, as well, to prevent and fight practices of artificial induction of the search for health care.

ERS shall, in collaboration with the *Autoridade da Concorrência* (Portuguese competition authority), guaranty the competition between health care providers, considering the characteristics of the health care market, always for defending the rights and legitimate interests of the users.

ERS is also responsible for the evaluation of the quality indicators of the health care providers, as well as the follow-up of the need for the establishments and services (serviços to be accredited." [ERS 2006]

Practice areas

The activity of the ERS is concentrated in four large areas [ERS 2006]:

- Guarantying the rights of the citizens – it's a responsibility of ERS to assure the rights and legitimates interests of the citizens in the quality of users of the health care services
- Regulate the flaws of the market (and of the state) – ERS shall reassure the universal and equalitarian right to health care services, using prevention and assessment.

• To punish practices of discrimination or illegitimate rejection of patients, as well as to prevent and fight the practices of artificial induction of demand of health care

• Regulate the economic relations between the operators and between these and their investors – ERS shall collaborate with *Autoridade da Concorrência*, in the terms covered by the law of competition for the sector regulatory authorities, in all the processes that involve their regulated entities as well with the role of arbitration of conflicts between public operators and privates, namely in the scope of PPP (Public Private Partnerships) and of conventions.

Operational guidelines

ERS way of acting is based on the will to contribute significantly for the health system work improvement, with a minimum of direct or indirect costs, for ERS, its regulated entities or for the user/citizens.

So ERS has a set of cornerstones and principles that are solid and compatible with its position in relation to the health regulation panorama in Portugal [ERS 2006]:

• To defend the rights of the health system actors

• To regulate in a proportionate and predictable way

• Independence

• Coordination of its action with the Health Ministry institutions and other relevant public institutions

• To have a solid role by having and showing a strong reputation

• The youth of regulation in health in Portugal makes it a challenge with more responsibility for this institution. Since 2006, ERS has based its activities in the highest levels of rigor that are shown into a higher contribution for the health sector. The fundamental orientation principles are the following:

- Promote information disclosure about ERS competences and actions
- Strengthen its acting in the area of supervision
- Promote the enrichment of its human resources and to secure a larger efficiency of the resources used;
- To boost the knowledge of the sector

ERS wants to implement internal practices and competences of excellence at all levels, namely, in the regulation activity and in the knowledge boost and meditation about the sector and in promoting ERS role, next to the entities that are players in the health sector as well as next to the citizens. [ERS 2006]

3.2 Stakeholders

There a number of organizations and persons that have a direct interest or indirect interest in ERS and in its IS:

• Health Ministry - Portuguese Ministry of Health with DGS being its central service. DGS mission is to regulate, orientate and coordinate the health promotion activities, to disease prevention, and definition of the technical conditions for health care.

• SNS – involves all the health care integrated services, the diagnosis, promotion and vigilance of health, prevention of disease, diagnose and treatment of patients, medical and social rehabilitation.

• Regulated Entities – Entities that provide health care with at least one establishment – by Portuguese law, they must be registered at www.ers.pt

- Professional Orders (related to health care services professionals) – they are entities that protect the interest of their professionals. Examples are: order of physicians, order of nurses, order of doctor dentists, and order of pharmaceutics.
- Infarmed – Is the public institute responsible for the regulation and assessment of introduction, commercialization and control of drugs and other health products in Portugal
- INEM – is the organism responsible for the coordination of the national integrated emergency system, to guaranty the sudden disease or accidental patients a ready and correct health care service.
- Health Professionals – Professionals that work on health related services, such as: physicians, nurses, doctor dentists, pharmacists, etc.
- Users/Citizens/Patients – Portuguese citizens or other users of the health care services in Portugal
- ACSS – Central Health System management of human, financial, equipment, technology and information system of the national health system
- IT Providers – Providers that are able to give development, support or other information system related services to ERS
- (News) Media - The news media refers to the section of the mass media that focuses on presenting current news to the public. These include print media (newspapers, magazines); broadcast media (radio stations, television stations, television networks), and increasingly Internet-based media (World Wide Web pages, weblogs).
- Faculties (Human Resource Suppliers) – institutions that are suppliers of knowledge to individuals that attend its courses. Portuguese faculties are also a source of research, development and innovation to the industry and government.
- ERS: ERS board, directors, IS responsible, consultants, collaborators and others users

ERS needs to take in account the different stakeholders and their direct or indirect influence for ERS to keep its power, influence and even existence. ERS was created by the government and can be closed down by the ruling government.

Information Technology infrastructure

The Figure 16 shows ERS network shows at a high level which are the main elements of the ERS system and its network. ERS is connected to internet trough ACSS (state institution for the health minister – former IGIF), who filters unwanted traffic and provides some basic maintenance services.

Additionally ERS has its own firewall and router that divides its traffic from outside to access the ERS portal (accessible to the general public) and the internal network, which is protected in this way, guarantying the security of its resources available only to ERS collaborators. The internal network is connected to the collaborators workstations, to the databases, email server, workflow, content management, to the health provider's registers and backup systems.

ERS infrastructures satisfy its actual functions, still as new needs and problems are identified there is a need to rethink the whole system in a global plan with a holist approach for integration of new tools/applications that will answer these needs and problems – this is one of the scopes of this document.

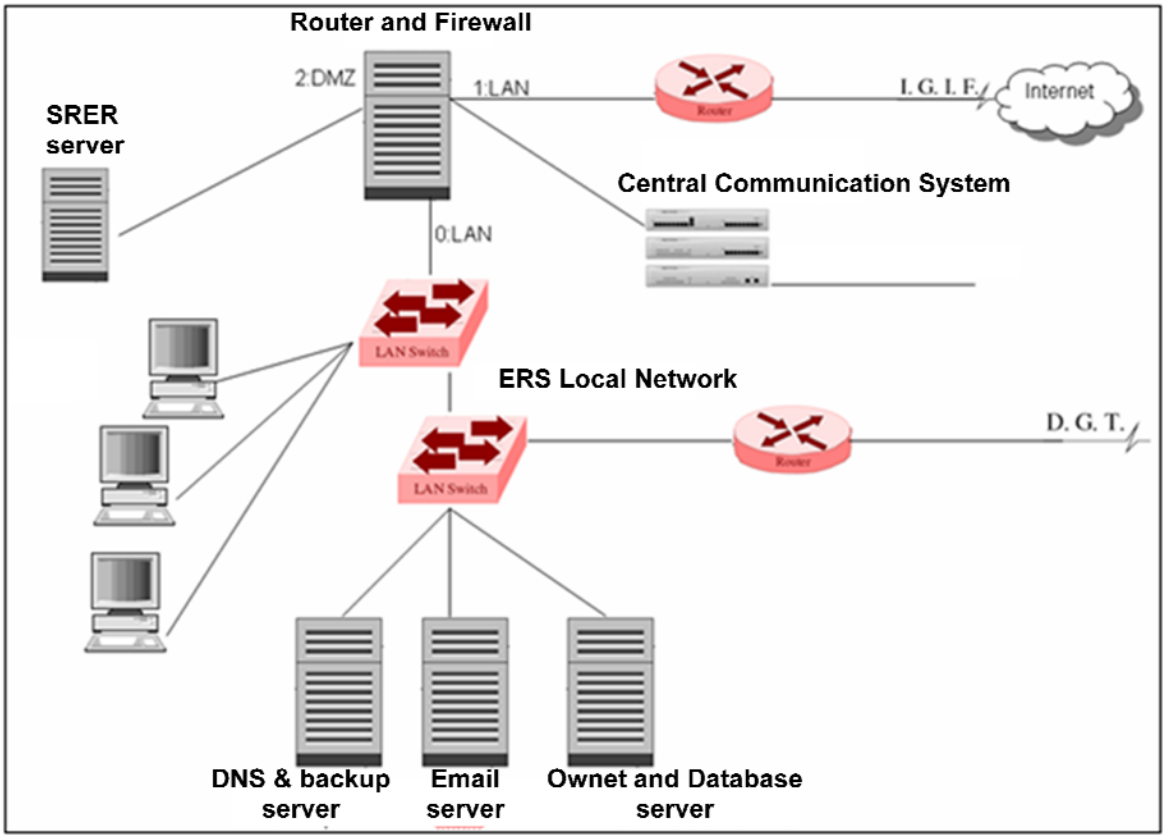


Figure 16 – ERS infrastructure

Organization and resources

In this subsection are presented the organization structure and ERS program units, there is an internal environment analysis which identified resources, capabilities and services provided by ERS organization.

Organization structure

The chart presented in Figure 17, shows the organizational structure of ERS. ERS is divided in four functional departments; three of them have been given the respective supervision of one of the directors of the board:

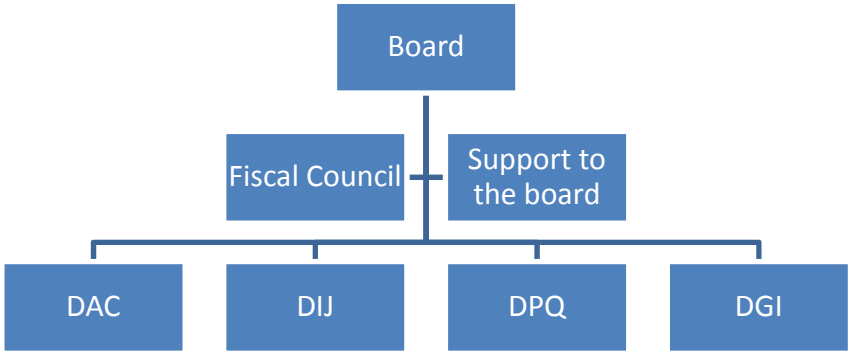


Figure 17 – Chart of ERS organizational structure

- DAC – Department for the follow up of the health system and the defense of the access and competition – responsibility of the President of the Board: Prof. Doutor Álvaro Santos Almeida.
- DPQ – Department of protection of quality and citizen rights, under the responsibility of the member of the board: Dr. Eurico Castro Alves.
- DIJ – Department of supervision and legal supervision, under the responsibility of the member of the board: Dr. Joaquim Brandão.

ERS board, is a colegial unit responsible for the definition of ERS direction, its made of a president and two board members, nominated in a Council of Ministers, by proposal of the minister of health, in 29th of September 2005, and they started at 16th December of2005.
Each department as its own define functions, in sinergy that is guaranteed by the Board.
The support to the board role is as the name shows a direct support to board activities, and its here where the information system responsible sits.

The ERS departments are divided in the following services:
- The department *Departamento de Acompanhamento do Sistema de Saúde e Defesa do Acesso e da Concorrência* (DAC), which integrates the service *Serviço de Defesa do Acesso* (SDA) and the service *Serviço de Defesa da Concorrência* (SDC);
- The department *Departamento de Supervisão e Intervenção Jurídica* (DIJ) – hás the service *Serviço de Supervisão e Regulamentação* (SSR) and the service *Serviço de Auditoria, Fiscalização e Intervenção Jurídica* (SAF).
- The department *Departamento de Protecção da Qualidade e Direitos dos Cidadãos* (DPQ) – intregrates the services *Serviço de Defesa do Cidadão* (SDC) and the service *Serviço de Protecção da Qualidade e Segurança* (SPQ);
- The deparment *Departamento de Gestão Interna* (DGI) – has two services *Divisão de Gestão de Meios Materiais* (DGM) and the *Divisão de Meios Humanos* (DGH).

The DAC main functions are:
- To follow and participate in all processes to solve bottlenecks in the access of citizens to health care
- Follow the information systems in health way of working
- To identify and analyze all legal instruments binding providers with SNS, as well as following the relation between private and public providers, in a way to find the best balance in the offer of health care services to the population needs.
- Create a internal information system, that promotes the dissemination of information relevant to all potential stakeholders.

The DIJ main functions are:
- Manage the registry and its database of all regulated entities
- Follow all the licensing procedures at its charge and other specific competences

• Proceed to the preparation and regulation, as well as recommendations in articulation with the other departments
• Support the coordination of all action of audit and surveillance, done by ERS or by other partner entities
• Evaluate and propose the resolution of all incidents identified or referenced by other department that can lead to fines or penalties
• Support all ERS juridical acts

The DPQ main functions are:
• Defend the rights of citizens in relation to the health care provider
•
Ensure the maintenance and improvement of the mechanisms related to the quality of health care
• Check the compliance of operators to the applicable quality standards
• Ensure respect and compliance with the administrative prices fixed or agreed on the National Health Service (SNS);
•
Ensure the adoption of good practice regarding the safety of facilities and actions of professionals.

The DGI main functions are:
• Develop activities for support for the ERS operations
• Promote and monitor the implementation of internal control mechanisms and appropriate results evaluation to further the missions of ERS and the performance of its staff
• Control the funds of ERS, in particular the receipts and payments and the issue of billing;
• Promote appropriate mechanisms to ensure the legality and regularity of all acts committed in the ERS with financial consequences in cases of acquisition and procurement of goods and services or human resources;
• Developing the application of procedures that ERS is bound by law, including the development of financial and tax documents required;
• Ensure the drafting of key documents from the ERS, including the business plan and budget, activity report, and account management, and interim reports to understand, that is required to prepare;
• Implementing the administrative activities;
• Supporting the Board in matters having to do with the management of ERS and not within other department responsibility.

Internal environment analysis - resources, capacities and services

Tangible resources

Human Resources

• ERS is made of 4 departments, with more than 30 collaborators assigned to different tasks, for instance:
– DAC:
• 3 Economists + 1 lawyer
– DIJ
• 4 Layers + 1 economist – 2 are exclusively dedicated to legal support and contentious
– DPQ
• 1 doctor + 5 collaborators
– DGI

• 1 lawyer + 1 accounting + 1 resource manager

– Support to the board:

• 1 Secretary for general public answer, correspondence management and general support to the board

• 1 public relations and responsible for internal communication

• Software Engineer – responsible for management of the IS and for the strategic planning of the information systems

• ERS subcontracts people for studies, actions and implementations of training or other services.

Non-tangible resources

Financial resources:

– Annual fee for regulated entities (health care service providers with establishment);

– Extraordinary income from ERS investment funds;

– Bet on low expenses, on productivity and maximization of the use of the resources: focus on core-business

Physical resources:

– ERS rents its office, with an area of 900 m2, including its auditorium with about 100m2. This space can be used for training, workshops and conferences. Part of the building will be improved in the future.

– Relatively modern Information System, video conference system and its own fast access to internet

– 1 digital and analogical telephony system, with call center capacity, queuing, voice response, call-forwarding, etc.

Capacities

• To analyze complains related to health care providers

• To prescribe opinions on subjects related to its scope of activity or to the health entities, by its own initiative or on demand by other organizations or official entities;

• To participate in the elaboration of health legislations in respect of the entities it supervises

• To ensure an claim the application of the laws, instruments of verification or supervision of the regulated entities and other health regulations

• To participate in the disciplinary process against the regulated entities, or to users/patients of those when ERS thinks it's useful and it's inside its scope.

• To give assistance or legal support, or other, to the regulated entities and its users/patients in conflict between them.

• To supply specialized information to the regulated entities.

3.3 Internal and external services

Legal Support

– Information– To provide information, or answers to questions written or verbal about issues related to the registration at ERS of the regulated entities and their services.

– Documentation– To provide freely ERS edited documents, which includes legal documents that are needed for the resolution of conflict related to providing health care services.

– Legal and Contentious support – advice and provision of technical legislation and questions related to the quality of services given, to the level of pre-contentious and contentious,

the writing of documents considered necessary for those matters, to direct or indirect diligences, in person or in written, etc.

Professional training

– Rely on strong qualification of the human resources of the institution, in a way that necessary means for acting are given, in both work and social level.

– Workshops to promote and debate essential issues to improve the qualifications of the key elements of the health organizations, or other organizations that incorporate high importance in the universe of ERS.

Administrative services

– The regulated entities that have registered in ERS have the right for a document that certifies this registry that must be put up in the establishments according to the law of administrative services. After payment there is a receipt that proves the payment for IRS/IRC matters given by ERS.

Conflict moderation (3rd party)

– ERS has a third party service for conflicts between the public and private operators, namely in the scope of Public-Private-Partnerships and of conventions. ERS tries to motivate the health operators for the advantages of using ERS mediation in conflicts - given its independence and neutrality.

Certificate generation

– All entities registered in ERS (in its information system), after payment of the correct tax, with the complete required information has the right to receive the certification generated by the system of its current situation, which it is to put in the wall of its establishments according to the law.

3.4 Conclusions

In this chapter were presented the ERS organization context, including the organization strategic goals in terms of mission and responsibilities, as well as the practice areas of the organization, its operational guidelines and existing infrastructure.

Also here are presented the organization and the program units, there is an internal environment analysis which identified resources, capabilities and services provided by the organization are identified as well as the stakeholders.

ERS is an organization that is independent but its board is politically selected by the government, so it's important to remember the different stakeholder's wishes and to take them in mind when planning the ISSP.

4. Analysis of business and technological environment

In this chapter it is described the Portuguese health sector, how the traditional health model is changing; some forecast, trends and alternative scenarios for the future, as well challenges, issues and priorities. Several business analyses are made in terms of the context where the organization works (PEST, Porter, SWOT analyses); its relations to the other organizations - partners, competitors and clients - value network analyses; as well as the critical success factors are identified.

In the Analysis of Business and Technological Environment we look inside the health sector, we look into some numbers, its evolution and how the health paradigm is changing.

This analysis is the result of the participation in several conferences, meeting with different stakeholders, IT suppliers, discussion with different levels of ERS organization. Several brainstorming, role-storming techniques were used to envision the ideal scenario.

4.1.1 The Portuguese health sector

The Portuguese health system expense in 2006 was 13,5 billions of Euros, with more than 70% financed by public money, employing more than 170.000 workers in the health sector, of which 36.000 doctors, 4.700 dentists and 45.900 nurses. More than 350 centre of primary/basic health care and 280 hospitals with around 37.000 beds. The private sector represented by 93 private hospitals and around 20.000 doctors [Massimiliano 2007] based on [OECD 2006] and [INE 2006].

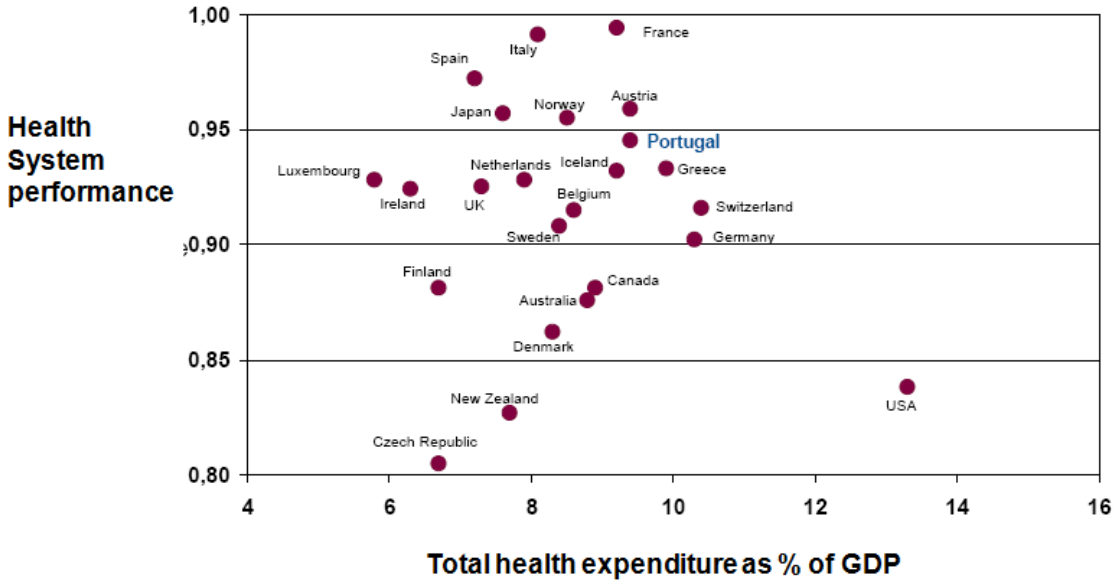


Figure 18 – Benchmark of health systems [Massimiliano 2007]

In 2000 the Portuguese health system was considered in the top list of developed countries as shown in the Figure 18 according to [Massimiliano 2007]. Data on healthcare system performance is sourced from a year 2000 WHO [WHO 2000] study and are a composite indicator of quality, quickness in service delivery, and equal access to services; information on health expenditure are sourced from OECD Health data, 2000 [OECD 2000].

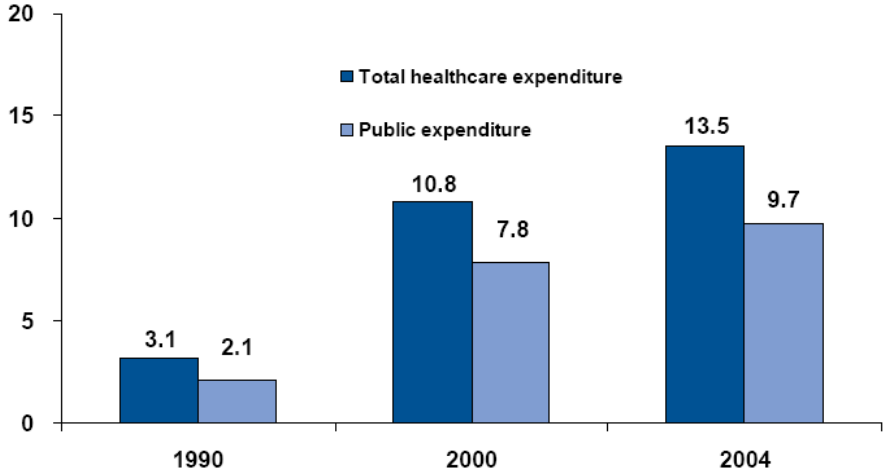


Figure 19 – Total healthcare expenditure vs. public expenditure growth [Massimiliano 2007]

The health system cost have been rising sharply and more than the public expenditure as shown in Figure 19 according to [Massimiliano 2007] with 2006 OECD data.

The needs for health services are growing with the demographic changes as shown in Figure 20.

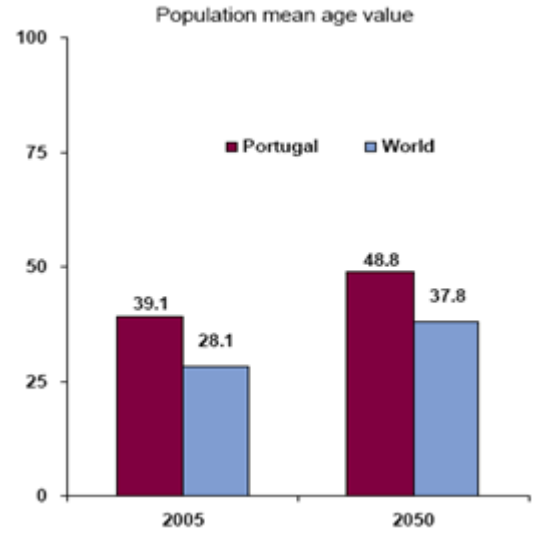


Figure 20 – Portugal vs. World aging [Massimiliano 2007] with data from [UN 2006]

Population is aging and with the older populations health costs to grow as show in Figure 21.

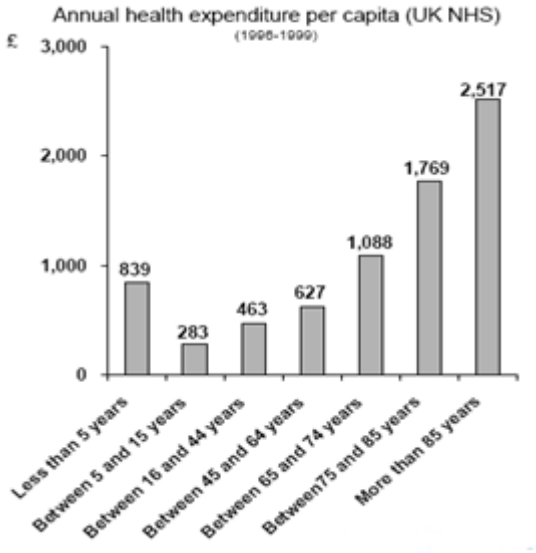


Figure 21 – Yearly Expenditure vs. age in UK [Massimiliano 2007] source: Health Economic Research Centre, Oxford University, UK

Adverse events are becoming serious problems, I.E.: According to a 2003 survey published by the French Health Ministry: 15% of medical acts are redundant and create a cost between €1 billion to 1.5 billion each year.

Another example are the long waiting list for eye surgery in Portugal that were over a year as the Figure 22 news from minister of health show that say “Hospitals don’t have enough capacity to solve the (waiting lists) problems”.

Figure 22 – News about long waiting lists given by minister of health [Publico 2007]

4.1.2 The traditional health model

The traditional health model is not sustainable, as it has been designed for acute care cases (e.g. infections) as shown in Figure 23:

– Currently more than 70% of health expenditure in many European countries is driven by chronic disease care (e.g. diabetes, asthma …).

– Portugal has the second highest mortality rate from Diabetes Mellitus at 28,39 per 100,000 population behind Austria, across all of Western Europe

– According to World Health Organization [WHO 2000] estimates, currently a billion people in the world are overweight, and in the next 10 years there will be 338 million deaths caused by chronic diseases.

Figure 23 - Traditional health care philosophy based on acute cases

4.1.3 A health sustainable model

To obtain a sustainable model there should be a shift from acute illnesses and diseases where the doctor is the gate keeper, and focus on solving problems. In this traditional system, all information was kept on paper, stored in hard to access archives.

There is a shift from this model, to a model where the general patrician acts as the gatekeeper to a team of specialized health centers and professional, where the patient is involved to combine prevention and cure and where the clinical data is digitized and shared at the regional level –as show in figure 24.

The ideal shift is to more and more prevention from home, to give comfort to the patients, save costs, and to have the patient be in control of his health. This wanted stage is focused on prevention of all aspects of lifestyle as the key, and where the gatekeeper is the patient to his national health record [Massimiliano 2007].

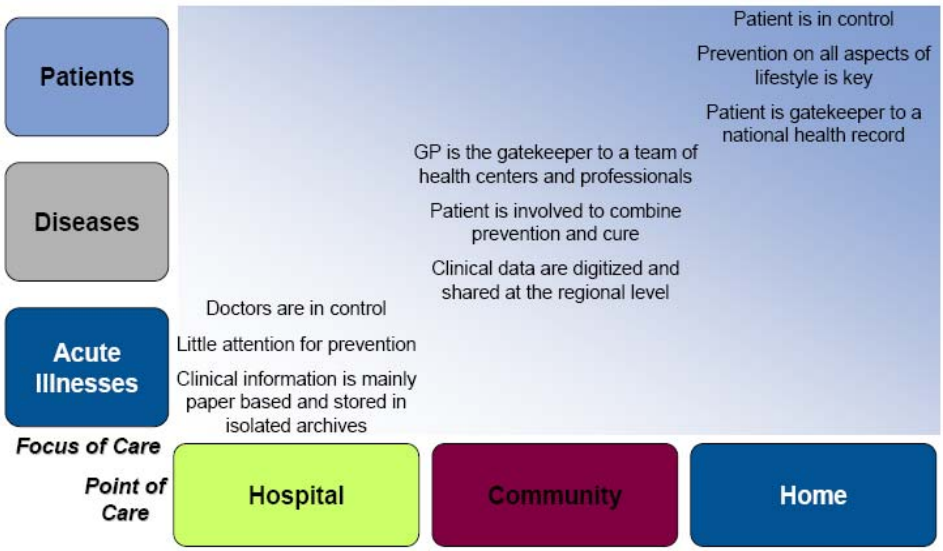


Figure 24 – The path to a health sustainable model [Massimiliano 2007]

4.1.4 Conclusions from health sector analysis

ERS should support the shift that health sector is having to keep sustainability, to more and more prevention from home, to give comfort to the patients, save costs, and to have the patient be in control of his health and health services. ERS should also allow the patient to communicate with ERS from home and use ERS services that support its mission.

4.2 Forecast, trends and scenarios

In this subsection we look at some forecast and alternative scenarios for the future of health services and its relation to IT.

4.2.1 Spending forecast in IT

As shown in Figure 25 IT costs are expected to continue growing, in all aspects shown: IT Services, Software and Hardware. This reveals itself as a threat of ERS system to become an outdated Information System as at the moment this work was stated there was no strategic plan for Information Systems. There is a need for continuous improvement and consideration of investment in this area to keep ERS competitive advantages. By another point of view it represents an opportunity to take this growth as an argument for the need of modern and innovator systems that answers to its mission and to ERS goals.

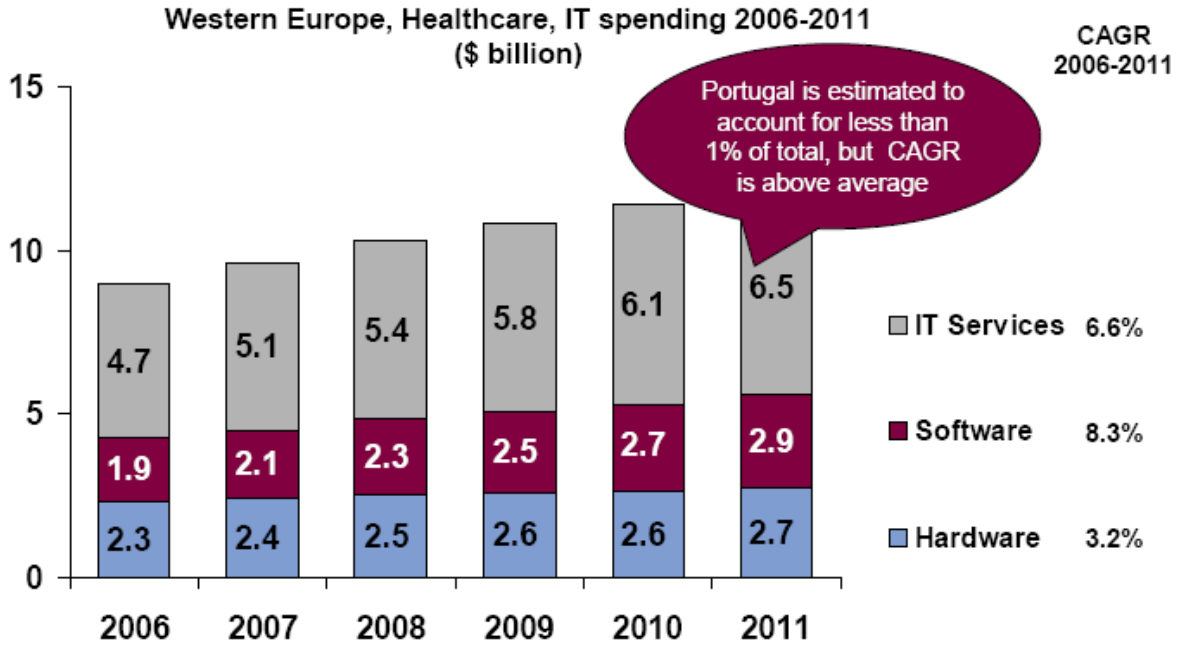


Figure 25 – Evolution of the healthcare spending in IT field [IDC 2006]

4.2.2 Technology and innovation boosting evolution toward the ideal scenario

At the conference e-Government & e-Health - 27 and 28 of June 2007 Lisbon where shown several scenarios for the future of e-Health by Massimiliano Claps and Silvia Piai [Massimiliano 2007] from Health Industry Insights. One set of scenarios was presented with the title "21st century healthcare scenarios". From these different scenarios in Figure 26 the one based on the technological push needed in order to keep the health costs and services in a good shape and balance. That one can be seen in at the top right side of the Figure 26, this scenario requires innovation with the adequate technologies to allow more efficiency and effectiveness of the health system.

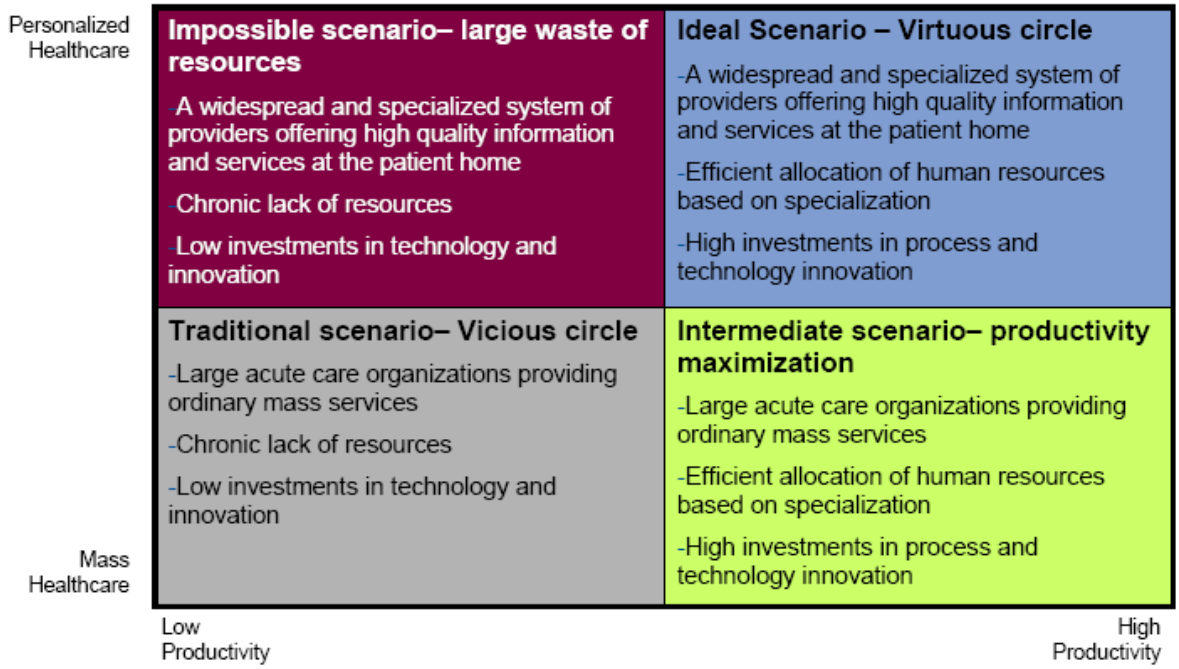


Figure 26 – Different scenarios in health sector services [Massimiliano 2007]

In order to achieve this ideal scenario, see figure 23, there is a need of technology that can push productivity and that can provide personalized and target services to the patients. Those services must include quality information about the services. Still there is the need of technology improvement and as well improvement in the processes in order to gain the required productivity and not get into a chronic lack of resources.
As Figure 27 shows evolution is going to be driven by technology so that organizations services are more efficient, more personalized, provide the necessary information and still are sustainable in terms of human resources and its associated costs – including for the Portuguese state and its tax payers.

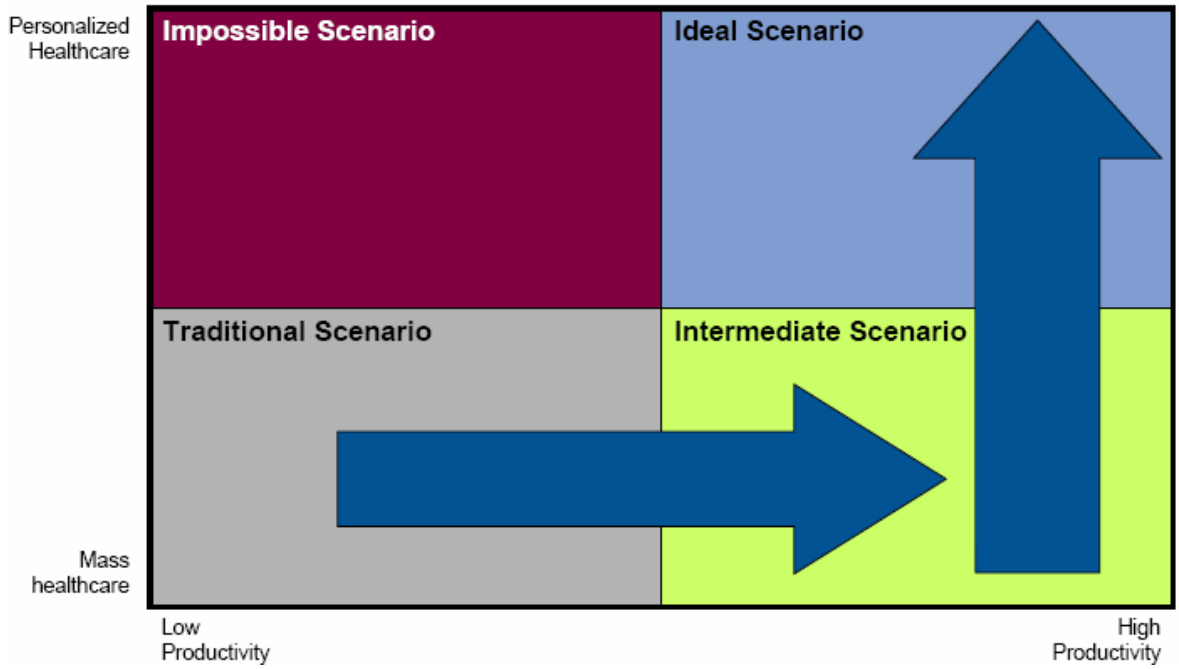


Figure 27 - Roadmap for the ideal scenario adapted from [Massimiliano 2007]

4.2.3 Portals in the health sector

It is important to provide one interface to the user/citizen; a web portal can be a good way to allow larger access, 24 hours of the day, to information that is relevant to the citizen. There are models for portal adoption that should be taken in account for that as shown in Figure 28.

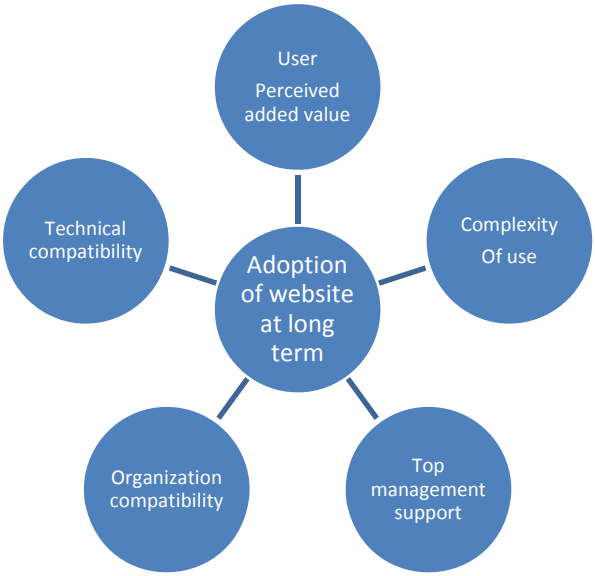


Figure 28 - Model adoption for website [Beatty 2001]

One important conclusion for ERS is that the user of the ERS website needs to perceive more added valued. Today there is a potential for large number of visits from the Portuguese population and regulated entities to ERS website which can boost its adoption at long term. Still it's necessary to stop and think how and which services do the users perceive as added value?

4.2.3.1 The Portuguese citizen portal example

The Portuguese citizen portal ("Portal do Cidadão") is a good example of adoption by the user/citizen with growing number of visitors. Its principles are its user friendly interface, which is, it's easy to get where you want, intuitive, simple and provides added value personalized online services and information. It is most of all at serving the citizen/user – see the main page in Figure 29.

Figure 29 - Portuguese citizen portal [Portal Cidadão 2009]

We show another example in Figure 30, the (Portuguese) health portal which is trying to focus more on the user as shown in the search engine in the web site first page.

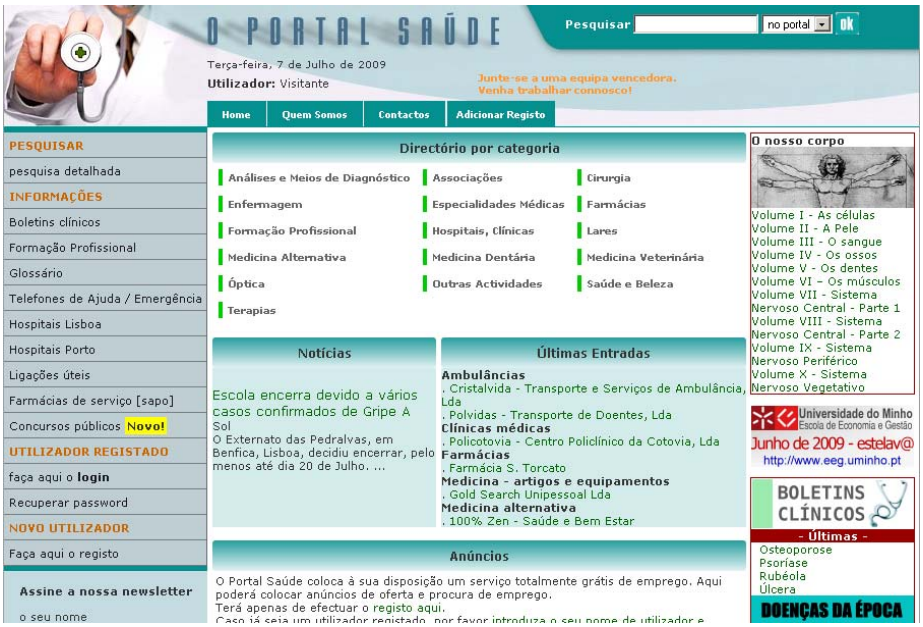


Figure 30 – (Portuguese) health portal [PortalSaude 2009]

It is necessary to go through an analysis of what are the most added value services that can be provide online in order to make life easier to the patients and users of the ERS services.

4.2.4 Strategy for ICT optimization

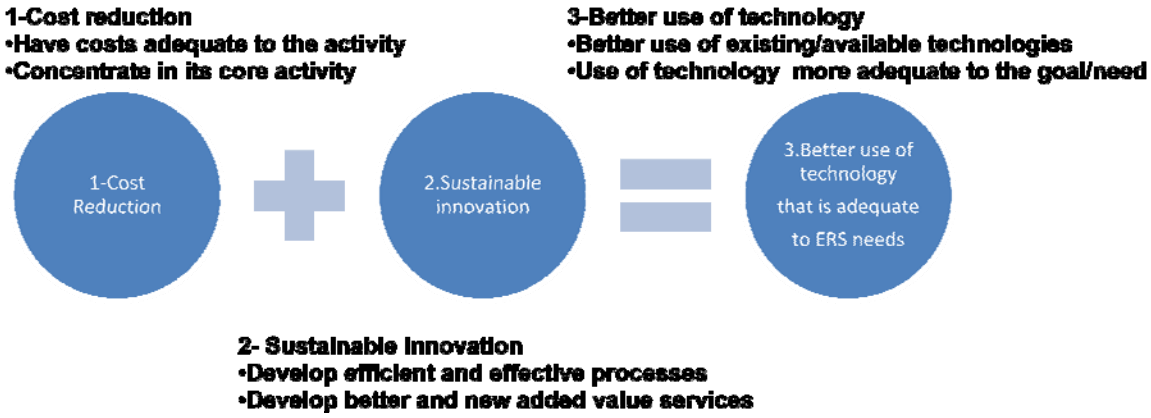


Figure 31 - Strategy for ICT use optimization

As Figure 31 shows cost reduction and sustainable innovation can lead to a better use of technology. For that it is necessary for ERS to focus on its core activity and to have adequate and reduced costs. It's also necessary to use technology and process innovation to provide better and new added value services. The final goal is to use better the existing and available technologies according to ERS needs and goals.

4.2.5 Conclusions from forecast, trends and scenarios

There were a set of conclusions made:

• Portal - One important conclusion is that the user to use the website needs to perceive added value services. Today the number of visits has large potential to increase taking in

account the Portuguese population. It's necessary to stop and think which services do the users perceive as added value ones? It is necessary to go through an analysis of what are the most added value services that can be provide online in order to make life easier to the patients and users of the ERS services.

- Strategy for ICT - It's also necessary to use technology and process innovation in order to provide better and new value added services.

4.3 E-Government approach

European community and the Portuguese government as well, are investing a lot of effort in E-government, as a way to serve the user/citizen better. Some questions arise when we think of citizens and their involvement in and with public entities for their own good:

- How is it possible to involve people? How can we make people participate and collaborate?
- How can we get a society that is more involved? Is E-government a possible solution? How can the health sector, ERS and its public benefit from that approach?

According to European Union- Information Society initiative :"e-Government is about using the tools and systems made possible by Information and Communication Technologies (ICTs) to provide better public services to citizens and businesses. ICTs are already widely used by government bodies, just as in enterprises, but e-Government involves much more than just the tools. Effective e-Government also involves rethinking organizations and processes, and changing behavior so that public services are delivered more efficiently to the people who need to use them. Implemented well, e-Government enables all citizens, enterprises and organizations to carry out their business with government more easily, more quickly and at lower cost." [EU 2009]

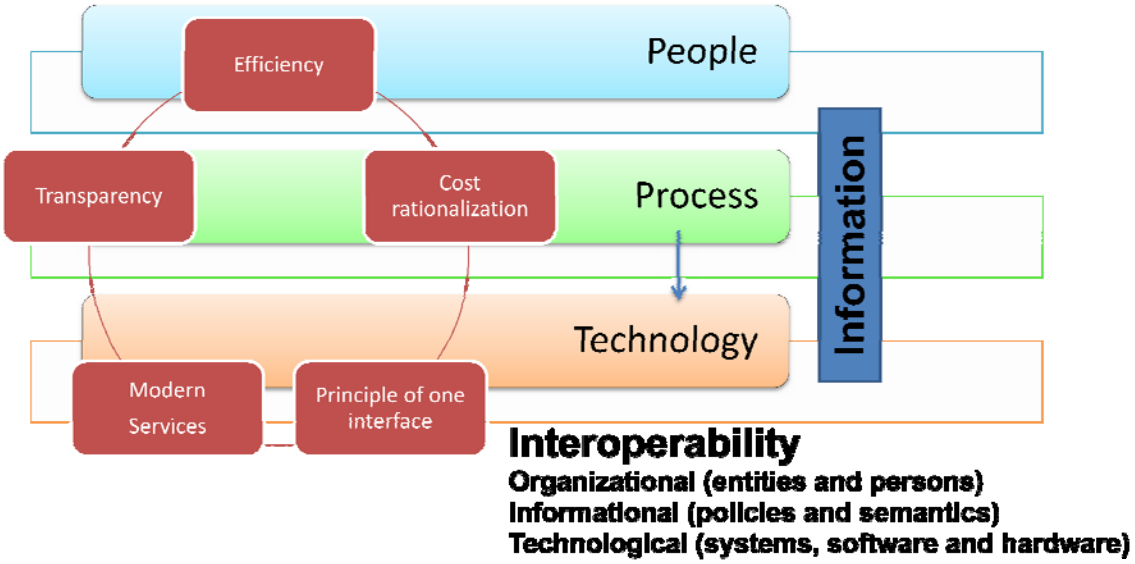


Figure 32 – E-government holistic approach for public services [Sousa 2007]

It's important to take an holist approach has shown in Figure 32, where clear processes are defined on top of the technology for people to be more efficiently. These processes show have cost rationalization and transparency. It requires modern services and a preferently a single point interface based on technology, to manage large quantities of information.

4.3.1 Needs and requirements

In this subsection we look at some of the challenges for public entities in implementing better e-government, related issues and priorities.

• Needs	Requirements
• **Stronger public presence via internet** • Interconnection of disperse locations of each entities • Platform convergence, interconnection of systems and processes • Optimization of infrastructures, centralized control and reduction of operating costs • **Promotion of teleworking and videoconference by making available services and/or information closer to the final user/client** • **Multichannel communication – web presence/applications, email, telephone, fax, in person, video, etc**	• **Connectivity and access to the internet in large bandwidth** • To guaranty security, scalability and support of different type of data transference that are necessary for Quality of Service • Integration of multiple services and data, voice, video or access to the internet over a platform of data services • Remote access to the private network with independence from technology • Convergence of accesses (fix/mobile) – service available anywhere • **Large bandwidth of access with possibility of multiple simultaneous services**

Figure 33 - Need and requirements for better e-government in public services [Sousa 2007]

As shown in Figure 33 there is a set of needs in order to have a better e-government presence for the public entities [Egov 2007b]: stronger presence in the internet, making available more information and services to allow teleworking and use of multichannel communication to allow the user to choose which way is easier/cheaper/better to communicate with ERS. There are requirements to satisfy these needs, such as connectivity and large bandwidth access to hundreds or thousands of simultaneous users. These are very obvious in ERS case due to ERS not having an open desk to the public.

To allow more e-governement and increase citizens involvement there are some challenges and requirements that have to be faced as shown in Figure 34. Mostly are communications and productivity issues that can be facilitated by technology and good processes.

Figure 34 - Productivity issues [Sousa 2007]

4.3.2 E-government statistics

From Figure 35 we can see that few organizations have extranet, available online forms, access to databases and sale of goods or services. This is an important feedback for deciding where ERS can put its efforts in order to differentiate. It can also provide insight on where it can cut ICT costs in order to reduce its overall operational costs.

	Central public administration	Local administration (municipalities)
Access and presence in the internet	• Entities with access to internet faster than 512 kbps – 77% • Entities with a site – 85% • Information about themselves – 98% • Information about their services – 89% • Information about legislation – 89%	• Entities with access to internet faster than 512 kbps – 93% • Entities with a site – 96% • Electronic email • Tourism information – 99% • About municipality – 99% • Agenda – 97&
Services made available	• Electronic email – 97% • Forms available online– 62% • Access to databases – 58% • Sale of goods or services – 49%	• Electronic email – 78% • Forms available online– 74% • Access to databases – 58% • Sale of goods or services – 12% • Public acquisitions by internet – 36%
Use of technology/ infrastructure	• Email – 95% • LAN – 93% • Intranet – 81% • WAN – 52% • Extranet – 42%	• Email – 99% • LAN – 99% • Intranet – 46% • WAN – 48% • Extranet – 22%

Figure 35 – ICT Indicators of Public Entities and municipalities [Sousa 2007]

4.3.3 Conclusions for e-government approach success

To allow more e-government and use of citizens and regulated entities we have found a group of conclusions:

• Need to identify ways to satisfy citizens needs with efficiency, cost rationalization, transparency, modern services and in particular to have one main interface, all this based in interoperable system that allow execution of processes by people, supported by technology

• Need for a multichannel communication – web presence/applications, email, telephone, fax, in person, video, etc

• Need of a connectivity and access to the internet in large bandwidth

• Its important to have a better e-government presence for the public entities: stronger presence in the internet, making available more information and services to allow teleworking and use of multichannel communication to allow the user to choose which way is easier/cheaper/better to communicate with ERS

• Facilitate contact with ERS

• Opportunity: few organizations have extranet, available online forms, access to databases and sale of goods or services. This is an important feedback for deciding where ERS can put its efforts in order to differentiate.

5.Organization strategic analysis

In this chapter we do a group of business analysis techniques, such as PEST analysis, Porter Five Forces analysis, SWOT analysis, Value Network, Critical Success Factors and the Balanced scorecard we identify a group of important improvements/innovations for the organization IS and for the ISSP plan.

We use a set of complementary approaches, in order to enrich the ISSP plan input and then we identify which ideas came from which business analysis techniques. It would not be necessary to follow all these techniques, still we found it valuable as some ideas were confirmed or identified in most techniques and other were identified by just one technique.

5.1 PEST analysis

Analyzing the external environment of ERS using a PEST analysis in Figure 36 shows us that there a couple of factors that influence ERS goals and needs. As we can see their strong challenges and, new social policies combined with growing demand power from health service users and its non-satisfaction, higher demand for health services means higher expenses. One of the important factors that can help dealing with these factors is the new technologies that allow bigger simplicity and higher speed in the processing and transference of information.

Figure 36 - ERS PEST analysis

5.2 Porter five forces analysis

As Figure 37 shows in terms of suppliers bargain power there is a strong dependency on one supplier – there is a need there for a clear acquisition and supplier management strategy. From the bargain power of customers, there is a dependency from regulated entities tax as the main source of receipts, which is regulated by law.

In terms of the threat of substitute players, we highlight, that there are number of overlaps with other organizations and unclear borders with other regulators.

In relation to the threat of entry from new competitors, there are sensitive believes like the dependency of political stability, but still there is only one ERS by government legislation, which keeps new competitors from overlapping ERS functions.

The intensity of competitive rivalry is reflected in the competition for highly qualified human resources with experience in regulation and in the health sector.

Figure 37 - Five Porter forces analysis to ERS

5.2.1 SWOT analysis of ERS

From the SWOT analysis made to ERS in Figure 38, several issues that have effects on Information Systems can be identified. Opportunity to access large quantities of information using online questionnaires/forms about regulated entities and users, the threat to reply in time to larges masses of demands of information or contacts from the regulated entities or user are examples issues identified. Weaknesses such as ERS incomplete database, the lack of human resources in terms of Information System and the basic level of ERS IT users were identified. ERS forces examples are its IS infrastructure and its good economic capacity as well as its independence.

Figure 38 - SWOT analysis to ERS

5.2.1.1 SWOT strategic actions suggested

From the SWOT analysis, in Figure 39, it's possible to come up with a group of strategic actions to empower the competitive advantages of ERS. For each set of SWOT issues were identified ways to support transforming weaknesses and threats to strengths and opportunities.
From these issues we would like to highlight the need to have a clear strategy to manage a diverse number of IT suppliers and to integrate with other health Information System; the use of online forms to know more about the market; the bet on training the ERS collaborators namely in ICT.

Figure 39 - Strategic action suggested for ERS Information System SWOT

5.3 Value network

A value network is a web of relationships that generates economic value and other benefits through complex dynamic exchanges between two or more individuals, groups or organizations. Any organization or group of organizations engaged in both tangible and intangible exchanges can be viewed as a value network, whether private industry, government or public sector.

Figure 40 - Verna Allee's value added network for ERS

In the Figure 40 we can see intangible values that ERS gets from its network:

- Market knowledge from regulated entities

In the Figure 25 it's also possible to see tangible values that ERS gets from its network:

- Funds from the health ministry
- Complains about health services from the patients

- Software solutions from the IT partners
- Health care news from the media
- Technical support from ACSS

Conclusion: ERS could get more information about list of services provided from the regulated entities to the SNS. ERS could as well provide more services to the users/patients to create more value for them to recognize its importance. ERS could also have more collaboration with the Professional orders. ERS could also get more information about what patients generally think of the health services provided, for rating purposes and for market screening.

The Figure 25 shows the key exchanges and interaction between ERS and its external stakeholders according to Verna Allee's value network definition [Verna 2002]. It shows that ERS receives registry and the associated fee from the registered entities, that ERS provides reports to the Health Ministry, that it provides information to the patients about health establishments, etc. As intangible value exchanges ERS receives the patients demand; ERS regulates and demands for inquiry to the regulated entities; ERS provides market knowledge to the government.

5.4 Critical success factors

As show in the CSF in Figure 41 these are the factors that if ERS focuses on them the chances of IS ERS success raises considerably

"Critical Success Factor (CSF) is a business Advocate term for an element which is necessary for an organization or project to achieve its mission. They are the critical factors or activities required for ensuring the success of your business." [Rockart 1981].

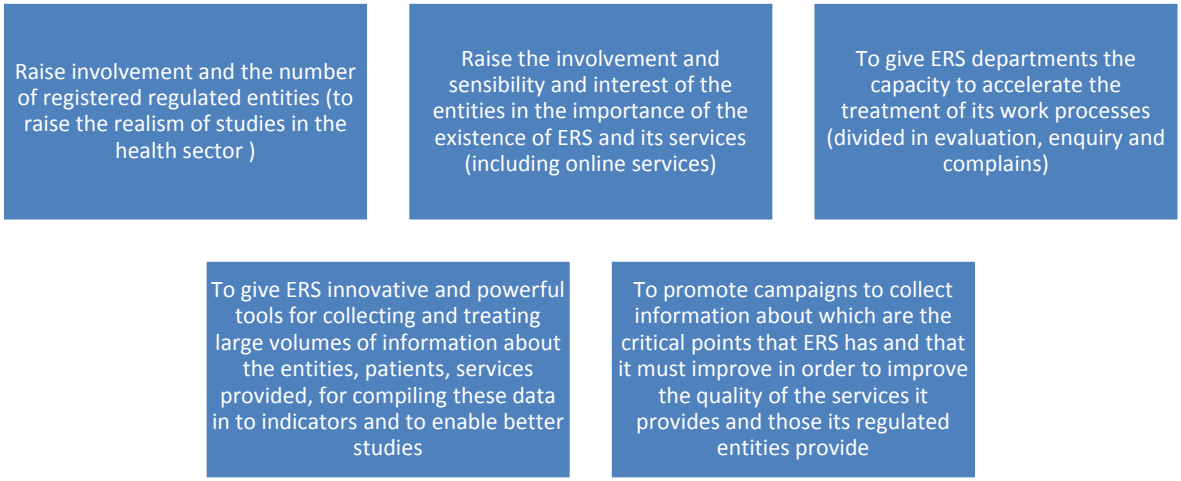


Figure 41 - ERS and ERS IS Critical Success Factors

5.5 Balanced Scorecard

A Balanced Scorecard analysis in Table 2 helped us identify goals, KPI and actions to improve the KPI to achieve the defined goals.

Table 2 - Balanced scorecard for ERS

Financial perspective		
Goals	**Key performance indicators**	**Actions**
Raise ERS cash flow -increase % of entities registered and with correct payment	% of pre-registered entities vs. registered % of entities fined that have not paid the tax to ERS Number of black listed companies (that are not legally registered)	Cross information with different databases to find entities that are not legally registered Do online campaigns about the obligation to register and its advantages
Customer perspective (entities & users)		
Goals	**Key performance indicators**	**Actions**
-Have the best and most complete health care providers database in Portugal -Give more added value to the client (entities and users) -Improve the image of ERS in terms of robustness -To have more feedback from entities and users -Be a central contact point for the regulated entities -Raise the sensitivity and interest from the regulated entities to the importance of the existence of ERS and its services by defining new applications, services and improved processes	-Number of suggestions return from campaigns in form of questionnaires and online pools to the users and regulated entities (to raise information of what ERS have to improve) -% of responses from online studies directed to the regulated entities specific targets -Evaluation from users of the importance of different services provided by ERS	-Define market targets by sectors and sub-sectors: such as hemodialysis, dentist, MCDC, etc) -Do personalized campaigns next to the defined targets -Evaluate the results of the campaigns -Define specialized services for the sectors -Work with media using a press body -ERS services Questionnaires of satisfaction of ERS services -Online campaigns and pools to identify improvement suggestions -Do partnerships with other entities to have more information about health care services for the users -Update ERS site with online news categorized by different areas of interest, that allow search by keywords or topics
Internal Process perspective		
Goals	**Key performance indicators**	**Actions**

-Improve productivity levels	-Average time taken in process of treatment (for accelerating the treatment of processes) -Measure against goals to be accomplished (daily, weekly, monthly, yearly, etc.), response times, etc - statistics for each department (by type of process)	-Measure the time taken for each process activity and use statistic tools to identify bottlenecks -Document ERS processes -Create a dashboard of KPI's in the intranet and some public ones in the website -Performance based career ladder -Launch collaborator of the month initiative -Define periodical IS meeting with the board
Innovation & learning perspective		
Goals	**Key performance indicators**	**Actions**
-To improve ERS processes -To identify new added value processes -Create more on demand service orders/request for information	-Number of collaborators submitted improvement proposal ERS IS monthly -number of integrated services with other organizations	-Develop new applications for collecting and treating ERS large volumes of information to be compiled into indicators for ERS studies -Have applications for analysis of data: entities, services, patients, etc – Datamining -Ways to improve the internal processes with the contribution of ERS collaborators IS Integration with INE, SNS, Professional orders

5.6 Conclusions from the organization strategical analysis

From the use of these business analyses techniques we get several conclusions in terms of IS.

From PEST analyses:

- New technologies allow bigger simplicity and speed in the processing and transference of information

From Porter analyses:

- Dependence of one IT company and from its response time for resolution of problems in critical times
- Strong commitment from the leaders, demand high productivity from the human resources
- Taxation of regulated entities is the main income for ERS
- Some entities refuse to pay or simply don’t register
- There is possibility for ERS to fine entities that are not legally registered and haven’t paid their tax to ERS
- Sometimes ERS is the only neutral organization to judge dispute between state and regulated entities

From the SWOT study:

- ERS can use online forms for studies in supervision or regulation of the health market
- ERS can use online marketing/communication campaigns to specific targets regulated entities
- Can promote its goals next to the user by using more the website with news and other health topics
- There is the opportunity to integrate with other health IS
- Establish protocol with professional orders for information validation
- Bet on training its collaborators to better use ICT and ERS IS use advantages
- Use indicators to demonstrate the users and government the capacity to effectively regulate the health care providers
- Use ICT to spread the word about legal requirement of regulated entities to be registered
- Define new added value services for regulated entities and users

From the value network:

- ERS could get more information about list of services provided from the regulated entities to the SNS.
- ERS could as well provide more services to the users/patients to create more value for them to recognize its importance.
- ERS could also have more collaboration with the Professional orders.
- ERS could also get more information about what patients generally think of the health services provided, for rating purposes and for market screening.

From the critical success factors:

- Raise involvement and the number of registered regulated entities (to raise the realism of studies in the health sector)
- Raise the involvement and sensibility and interest of the entities in the importance of the existence of ERS and its services (including online services)
- To give ERS departments the capacity to accelerate the treatment of its work processes (divided in evaluation, enquiry and complains)
- To give ERS innovative and powerful tools for collecting and treating large volumes of information about the entities, patients, services provided, for compiling these data in to indicators and to enable better studies
- To promote campaigns to collect information about which are the critical points that ERS has and that it must improve in order to improve the quality of the services it provides and those its regulated entities provide.

After identifying 36 improvements to the ERS IS, we listed them in this chapter classified and separated in general or specific improvements.

From all these conclusions some could be refused simply because of their associated political risks that might not be transparent or straightforward. Sometimes I have acknowledge that if someone does nothing, nobody will complain, but if does try to do something and fail people will complain.

5.6.1 General improvements identified

In the following table are shown some general conclusions for IS improvement by order of appearance in this chapter in Table 3.

Table 3 – General improvements identified and their sources

Source	General conclusion/improvement
Forecast, trends and scenarios SWOT Value network Critical success factors Health sector analysis	The shift that health sector presented here that states are following to keep national health service sustainability, allows patients to do more and more prevention from home, which gives comfort to the patients, saves costs and gives patient more control of his own health. ERS should also allow the patient to communicate with ERS from home and use ERS services, such see the offer of health care services and to choose consciously. ERS needs to define new added value services for regulated entities and users, to provide more services to the users/patients to create more value for them to recognize ERS importance ERS website use is based on recognition of added value information and services. To increase the number of visits Its necessary to stop and think which services do the users perceive as added value ones. Use technology and innovation to provide online services that make life easier to the users of the ERS services so raising the involvement and sensibility and interest of the entities in the existence of ERS.
PEST analyses E-government	Use new technologies to allow bigger simplicity and speed in the processing and transference of information still respecting accessibility and with user friendly interfaces to facilitate contact with ERS and its services.
Porter analyses	Achieve higher productivity of ERS human resources requires applications for performance analysis and optimization – including dashboards for management
Value network	ERS should have more collaboration and exchange of information with the Professional Orders, SNS, ACSS, etc.

This table show us that different analysis methods or techniques found some similar conclusions which gives us more confidence that they are important.
Some conclusions were only found because of the large diversity of the techniques applied which helped us finding more improvement ideas and so to enrich the ISSP.

5.6.2 Specific improvements identified

In the following table are shown some specific conclusions for IS improvement by order of appearance in this chapter to can be taken in account in ERS ISSP in Table 4.

Table 4 – Specific improvements identified and their sources

Source	Specific conclusion/improvement
Swot Value network	Integrate with other health IS - for instance with the professional orders, SNS and ACSS to validate and get more information. Establish protocols with professional orders for information validation - crossing database entries, for example to validate physician id numbers.
Porter analyses	Have more than one IT supplier and define service level agreement for a maximum response time to resolution of problems with ERS IS
Swot CSF	Use online forms for studies in supervision or regulation of the health market Raise involvement from the registered regulated entities by using online forms - to raise the realism of studies in the health sector Promote campaigns to collect information about which are the critical points that ERS has and that it must improve in order to improve the overall quality of the services it provides
Swot	Use online marketing/communication campaigns to specific targets regulated entities
Swot	Bet on training ERS collaborators to better use ICT and ERS IS advantages - train collaborators for using advanced functionalities in ERS critical applications such as: SRER, OWNET and SR
Value network	Get more information about what patients generally think of the health services provided, for rating purposes and for market screening - by providing online pools on ERS website
Porter analysis	Sometimes ERS is the only organization specialized to judge a dispute between state and regulated entities in a neutral way - make that 3rd party service more visible in the web channels - or in a tips of the day section
Porter analysis	Some entities refuse to pay or simply don't register all collaborators - use anti-fraud applications to find those entities and fine them. Maximize the number of registered entities (registered vs. pre-registered or non-registered) - Taxation of regulated entities is the main income for ERS
Porter analysis	Use datawarehouse for crossing information with other databases - to find unregistered entities
CSF	Get innovative and powerful tools for collecting and treating large volumes of information about the entities, patients, services provided and compiling these data into indicators that enable better studies of more solid information- datawarehouse with business intelligence built on top of it
Swot	Promote ERS goals next to the end user by stimulating the use of ERS website with internal news and other health related news
Swot	Use indicators to demonstrate users and government of ERS capacity to effectively regulate the health care providers – choose indicators that can be shared publicly online

Forecast, trends and scenarios	Use extranet, online forms, give search access to databases and sell services online, in order to differentiate as few public organizations have these type of online services
CSF	To give ERS departments the capacity to accelerate the treatment of its work processes by using dashboards to identify performance, bottlenecks and improving the processes themselves
Swot	Use ICT tools (such as website, email and newsletters) to spread the word about legal requirement of regulated entities to be registered
E-government	Allow multichannel communication with ERS for user comfort – web presence/applications, e-mail, telephone, fax, in person, video, etc
E-government	Have a better e-government with stronger presence in the internet, making available more information and services to allow teleworking so the user can choose which way is easier, cheaper and better for him to communicate with ERS
E-government	Have a connectivity and access to the internet in large bandwidth - to allow high-speed service to the users

In this chapter we used a set of business analysis techniques, such as PEST analysis, Porter Five Forces analysis, SWOT analysis, Value Network, Critical Success Factors and the Balanced scorecard we identify a group of important improvements/innovations for the organization IS and for the ISSP plan.

By using a set of complementary approaches, in order to enrich the ISSP pl. It would not be necessary to follow all these techniques, still we found it valuable to do so, as some ideas were confirmed or identified in many techniques and other were identified by just one technique, which helps as guarantying a more holist approach.

6.Strategy tracks for the organization

As the result of the strategic analysis we know more about the context where the organization operates, how it operates and which are its needs and problems. The goal of this section is to identify a path or a set of roads that we can take, to get to an ideal scenario or vision of where we want to be.

We propose a set of steps as shown in figure 42 to get to an ideal scenario:

- First we have to identify the ideal scenario that we want to achieve
- Secondly, we have to choose a direction we want to follow to go there, including which are the roads we are going to take.
- Thirdly we identify facilitators and blockers for our journey, so we mitigate the risks and take the opportunities.
- Fourthly we identify what are the differentiators we can achieve based on the IS
- At last we use this differentiators and we identify how they could boost the organization evolution

Figure 42 – Strategy tracks for the Organization

5.7 The ideal scenario

As the Figure 44 shows first the traditional model, only has a simple registration of service providers and a basic search for information about regulated entities.

As we can see in the Figure 44, ERS started by having a simple registration and payment based system, with basic information about the regulated entities.

After that ERS started to identify other services ERS could provide, such as online complains (which is partially implemented) about the regulated entities and other information that is being planned or though in the near future (as can be seen in the middle of Figure 44).

We identified future functionalities based on e-government principles and resulting from the improvements identified with context and busyness analysis. Such as giving the citizens the chance to see cost/quality ratios of the health care and their services, waiting lists and to use the citizen card to access the system in a secure way (as can be seen at the right side of the figure 44).

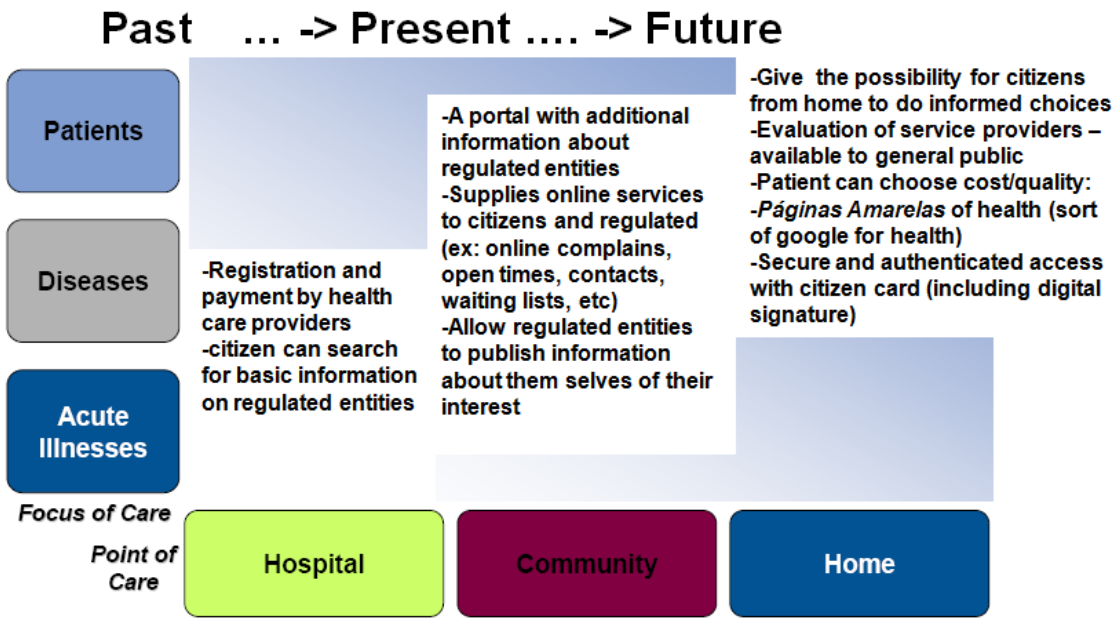


Figure 43 – Evolution towards the Ideal scenario for ERS – from past to present and to the future

Our vision for the future of ERS is to have a IS that allows the citizen to have more information, allows him to do informed choices, to see the quality of the health care providers and access the system in a secure way – to be empowered.

5.8 Identified evolution path

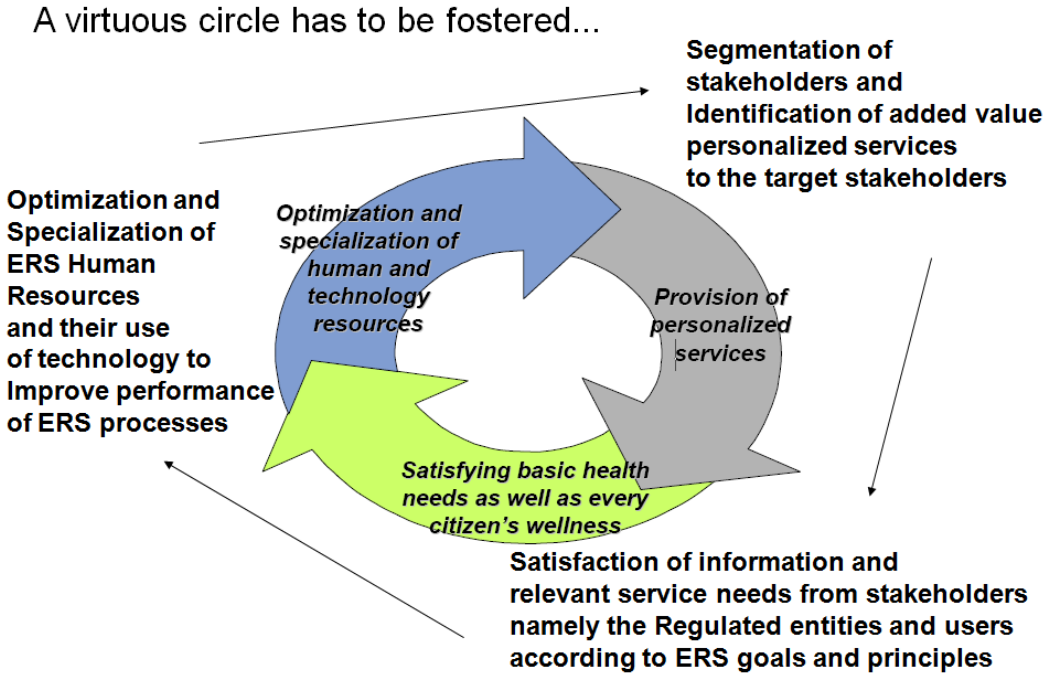


Figure 44 - The role of ERS in fostering virtuous circle in the health sector

For achieving the wanted vision is necessary to identify an evolution path. Our identified path for a positive influence in the health care sector is shown in Figure 45. That path is based on identifying clear segments of stakeholders and information about them, to identify added value personalized services to the target stakeholders that are in the scope of ERS. Then develop information and services to support the relevant stakeholders needs including for ERS. Following that, it's required to do an optimization and specialization of ERS Human Resources in terms of the use made of the available technology and optimization of the processes. This is a continuous virtuous circle that should not stop, that requires a constant effort for excellence by continuous improvement and innovation of ERS IS in close link to ERS services.

5.8.1 Facilitators and blockers in the ERS new model

Here are identified sets of facilitators and blockers to implementing the *ideal scenario* by following the evolution path identified.

5.8.1.1 Facilitators

There a set of facilitators or catalysts identified:

- The possibility to personalize treatment of information by categorization of sub-areas or sub-targets of ERS registered regulated entities
- Raise information about the regulated entities available (studies, new, etc)
- New technologies and services that make access and analysis of information easier
  - ERS registration systems and information about regulated entities
  - Online complaints
  - Geo-reference of entities in a map

– Forms/surveys of satisfactions and other

– Online pools

5.8.1.2 Blockers

There a set of blockers or hinders identified:

• The need to invest time in planning and designing a solution made of independent components (from different suppliers) integrated into one solution

• Acceptance of new social paradigms:

– Internet, email, portal, extranet/private area

– Choice between national public system and private

– The right to complain

– Conscious choice

• Resistance, namely of the older people, to new technologies and that the individual responsibility for health matters

• Privacy questions or fears

• Lack of aligned incentives for ERS to invest in solutions that bring benefits that are out of proportion to different stakeholder's power

• As an ERS collaborator said: "each one at ERS is worried about its garden and not having a holist approach– they need the large picture/perspective."

5.8.2 Conclusion from the facilitators and blockers for the ideal scenario

As we are going to see in the next section, without the investment in technology and innovation the organization can end up in a chronic lack of resources, with frustration and inefficiency as shown in Figure 46.

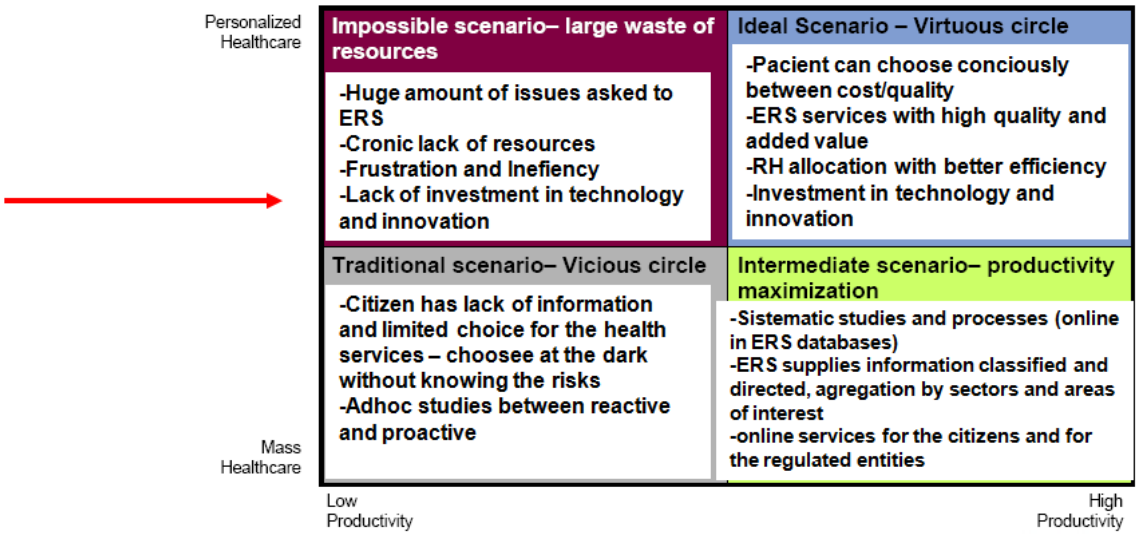


Figure 45 - Suggested ideal scenario requires investment in technology and innovation

5.9 Technology based competitive advantages

Here we identify how technology can help us having competitive advantages by differentiating our selves.

5.9.1 Opportunities to improve

The traditional model is “batch” oriented: patients spend most of its time waiting as seen in Figure 47:

Figure 46 - Traditional process in a patient perspective

To have a model that is lean is necessary to reduce the downtime, to maximize efficiencies and supply a service that is immediate to the user/citizen as show in Figure 48. For example: a patient being able to complain about an entity providing health care services at any time by registering in ERS website; a patient can know the queuing time for a consultation or surgery by using the site (this functionality is still not implemented);

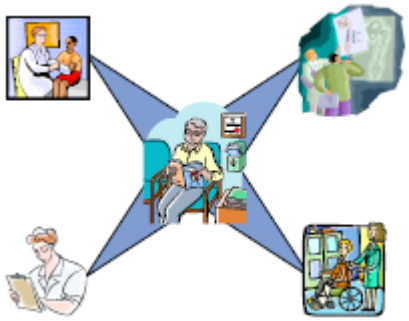


Figure 47 - An immediate service based on lean model

5.9.2 Investment plans of ICT health care providers

Companies are investing much in ICT including in Healthcare portals as shown in Figure 49. That can be seen as an opportunity by ERS to a given service of customized page for health care providers under a low symbolic payment or freely. This initiative would increase visibility and raise significant the number of frequent visitors and users of the ERS site.

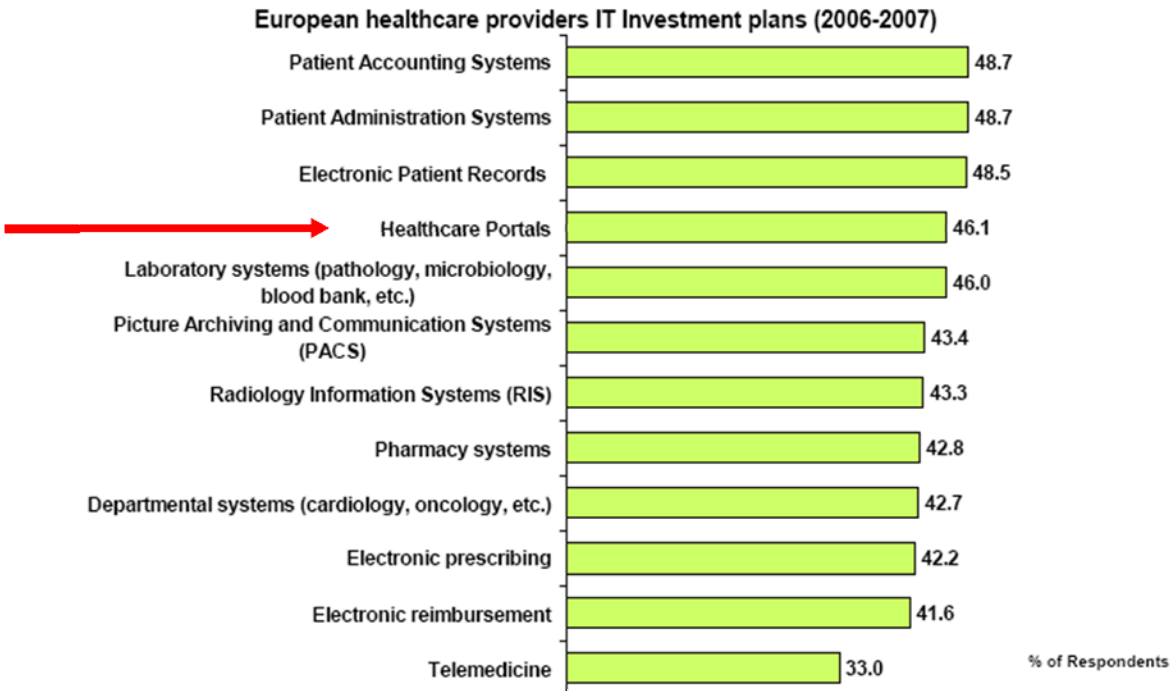


Figure 48 - Investment plans of ICT healthcare providers [Massimiliano 2007]

Vision of members of the board and others:

"Our goal should be to have the best health database in the country."

"ERS site to be the best source of information on health providers and with the easiest access."

"To be the first entrance, the yellow page of health … to incorporate all there is in health services in one site"

5.10 Technology boosting evolution

We suggest that ERS evolution can be based on technologies that boost knowledge about the health sector and the health care providers.

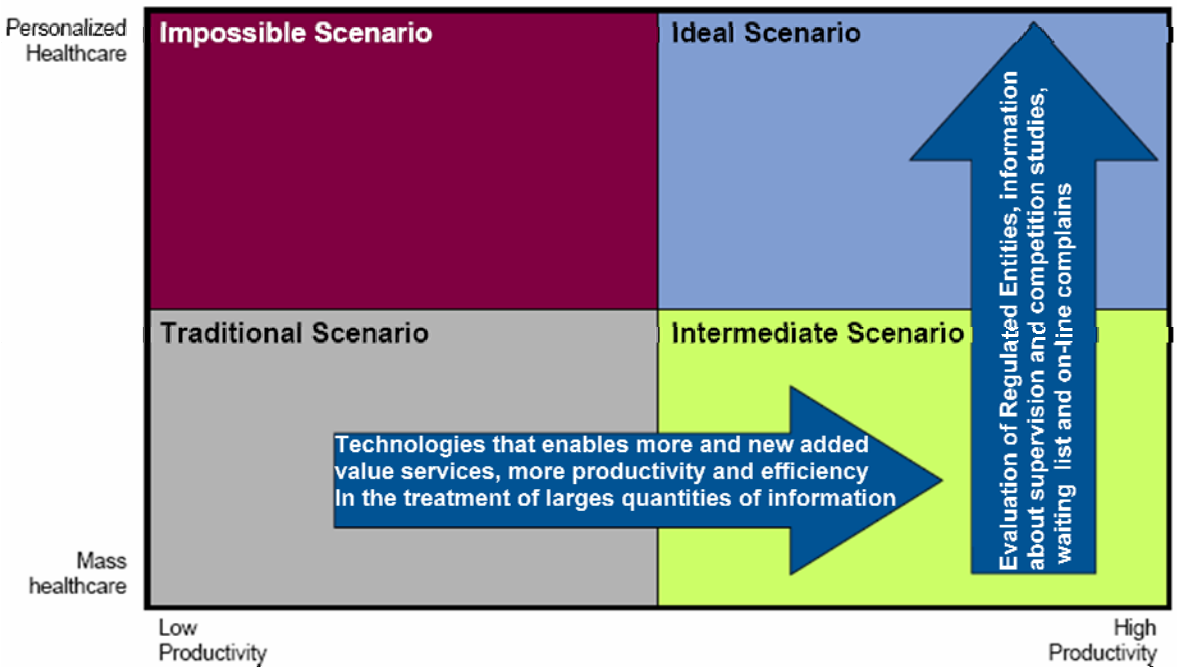


Figure 49 – Suggested technology drive for ERS competitive advantages

In order for ERS to be specialized as shown in Figure 50, ERS can do evaluation of regulated entities, have further information for supervision and competition studies, work on having indicators for waiting list and use on-line complains. This can be enabled by technologies that enables more and new added value services, for more process productivity and efficiency, such as: Online Forms, workflow management of issues, business intelligence tools, GIS (geographic information system) studies and Geo-referenced regulated entities search interface, as well as an improved Customer Relationship Management functionalities.

5.11 Outsourcing strategy and acquisition management

It's important to make clear that applications development is going to be done in outsourcing by public acquisition to different suppliers.

The reasons for this decision are two: first is the stated will of the board to keep a thin organization human resource structure, with low fix costs, and the second has to do with the will to focus on the core business of the organization, which is regulation and supervision and is not software development.

Typical reasons for outsourcing adapted from CMMI acquisition [CMMI-ACQ 2008]:

- To get the best solutions
- Due to lack of internal knowledge
- To buy time and deliver sooner
- To learn with the suppliers and innovate
- Not enough internal resources/time

In Figure 51 we show a high level typical process for acquisitions of solutions.

Figure 50 - Acquirer typical acquisition process [CMMI-ACQ 2008]

We can refer that the evolution of the development/acquisition of applications is schedule considering their priority, which will be achieved with some degree of flexibility. The investments are made according to the financial capacity of the organization. Although there is no fix budget for the information system development, the board rarely denies an investment if well justified from the information system responsible. Annually there is an estimation of budget to be presented in the yearly plan, which estimates a total amount of investment needed – but with little discrimination of what it involves.

Some critical issues/requirements for the new applications:

- Security – The system needs to respect security and privacy requirements (including does demanded by Portuguese, European and international law)
- Integration - to make stronger the integration between the existing applications and from the existing to the new ones being developed, including:
  - Single signing in an integrated portal with access to all applications
  - Consistent and coherent graphical interface
  - Guarantee the integration of all applications and components in a holistic approach
- Focus – concentrate in the core of applications indentified as critical and strategically for the business at short term
- Develop with the use of outsourcing in an integrated way – including guidelines for the need and with clear requirements for integration with existing applications.
- Price – The options that will be implemented will result from a compromise between what the organization needs and what it can afford in financial way.
- Software Development Process – preference should be given to supplier organizations that work with recognized methodologies or are certified, such as CMMI V1.2 [].

One important issue is that it's very important to keep in house knowledge so there has to be an appropriate acquisition management processes, we recommend training in CMMI Acquisition [CMMI-ACQ 2008]. ERS should keep its ISSP plan updated has a basis to keep a structured approach to its application development in a integrated way.

ERS should not rely only on one supplier, but on a couple of reliable suppliers, that bring new knowledge and innovation, while implementing the identified applications. Each project and supplier should be subject to an evaluation.

Typical acquisition questions and doubts [CMMI-ACQ 2008]:

- What is best to do? Build an IT department to develop my software solutions? Should we acquire/outsource software development?
- Who are the "best" partners/suppliers to do this with?
- How to control the work of the supplier?
- How to accept the product/service as ready?
- How will the transition to production be?

In order to answer to these questions SEI has created CMMI for Acquisition. CMMI for Acquisition comes from Software Acquisition CMM (SA-CMM) model released by the SEI and U.S. government in 1994.

CMMI-ACQ helps organizations that acquire in [CMMI-ACQ 2008]:

•Avoiding or diminishing barriers and problems in the acquisition process with improved operational efficiencies

• Initiating and managing a process for acquiring products and services, including solicitations, supplier sourcing, supplier agreement development and award, supplier capability management

• CMMI-ACQ helps with challenges such as teams coordination of functions, managing risks, and handling information flow with other organizations.

CMMI-ACQ, V1.2 model is a group of best practices from government and industry using the CMMI V1.2 Architecture and Framework.

The CMMI-ACQ model [CMMI-ACQ 2008] helps in the application of CMMI best practices by the acquirer, including: activities for initiating and managing the acquisition of products and services that meet the needs of the customer. Suppliers can provide artifacts useful to the processes addressed in CMMI-ACQ, but the focus of the model is on the processes of the acquirer.

One of the key issues for a public entity like ERS Organization is the solicitation process and the establishment of a supplier agreement. In CMMI Acquisition this is identified as SSAD Process Area - Solicitation and supplier Agreement Development. SSAD purpose is to:

- Prepare a solicitation package – to supply for the providers
- Select one or more suppliers
- Establish and maintain an agreement with the supplier – supplier agreement

SSAD includes three goals and corresponding specific practices in order to be compliant with it [CMMI-ACQ 2008]:

1-SG 1 Prepare for Solicitation and Supplier Agreement Development.

- SP 1.1 Identify Potential Suppliers
- SP 1.2 Establish a Solicitation Package
- SP 1.3 Review the Solicitation Package
- SP 1.4 Distribute and Maintain the Solicitation Package

2-SG 2 Select Suppliers

- SP 2.1 Evaluate Proposed Solutions
- SP 2.2 Establish Negotiation Plans
- SP 2.3 Select Suppliers

3-SG 3 Establish Supplier Agreements
- SP 3.1 Establish an Understanding of the Agreement
- SP 3.2 Establish the Supplier Agreement

For the evaluation of the proposed solutions there is a formal process decision analysis and resolution – DAR by using the form presented in Annex A.

In order to evaluate the suppliers, here is shown a set of criteria that can be considered for Supplier Evaluation [CMMI-ACQ 2008]:
- Compliance to the stated requirements
- Experience with similar products and services
- Familiarity with the acquirer process, the technical environment and the core of the business
- Total ownership and life cycle costs
- Technical capability
- Management, development, and delivery processes and techniques
- Financial capability
- Production capacity and interest
- Business size and type

Another important issue to consider is what is contained in the supplier agreement. The typical supplier agreement content includes [CMMI-ACQ 2008]:
- Compliance with requirements
- References, company overview and case studies
- Evidence of the organizational processes
- Plan describing how the supplier will deliver the product/service
- The pricing and compensation methodology
- Risk management plan
- Methods for defect detection
- Approach to escalation and resolution issues
- Retention of critical staff during the project
- Indication of work being performed by sub-contractors
- Deliverables and rights
- Compensation and payments
- Confidentiality
- Privacy
- Force majeure
- Termination
- Indemnification
- Insurance
- Right to audit
- Notices

5.12 The future of ERS IS

From the ideal scenario we identified three stages for ERS and ERS IS:

Basic scenario - Stage 1 (already implemented)
-Registration and payment by health care providers in ERS site

-citizen can search for basic information on regulated entities

Intermediate scenario - Stage 2 (partially implemented)
-A portal with additional information about regulated entities
-Supplies online services to citizens and regulated (ex: online complains, open times, contacts, waiting lists, etc)
-Allow regulated entities to publish information about themselves of their interest

Ideal scenario - Stage 3 (not implemented)
-Give the possibility for citizens from home to do informed choices
-Provide evaluation of service providers –available to general public
-Give patient information so they can choose the tradeoff between cost/quality:
  -ERS Portal as *Páginas amarelas* – *www.pai.pt* - online (the Google of health services)
-Secure and authenticated access by using citizen card (including digital signature)

For this *ideal scenario* we identified an evolution path.

A virtuous circle of personalized treatment has to be started in terms of the ERS and its influence in the health care sector. Optimization of human resources and modernization of processes are a prerequisite for the new paradigm. This new virtuous circle personalized treatment in the health care sector can also be applied to ERS in the way its services are oriented towards not just its mission and internal perspective, but also towards the most relevant stakeholders, namely the regulated entities and the users/citizens. This ideal scenario is one where ERS existence brings added value to people's life, guarantying a close supervision and regulation of the health care providers in an effective and efficient way.
The ICT can contribute greatly for this transformation both as an excuse for a positive change and as an enabler.

This scenario has to be guaranteed by the ISSP implementation plan.

7.Characterization of the organization Information Systems

In this chapter is identified the IS, shown the relation between processes and the organization and are identified the data classes that these processes use.

Here are shown two different complementary notations, the first one based in tables and matrix [Amaral 2007] and the second one based in diagrams – Views model [Ericksson 2000]:

1- Here is shown the relation between processes and data classes, related groups of processes are identified and dataflow between these groups are illustrated. There is as well an analysis of the IS support to the processes and of the relations between the stakeholders and the processes.

2- Is presented the Views Model [Eriksson 2000] including: the business view, the process view, structure view and behavior view

At last is presented using the outputs from these two complementary notations is defined the use case model with the main functionalities of the ERS IS from the different users perspective.

6.1 Definition of the organization processes

In this section is shown the relation between processes and the organization and are identified the data classes that these processes use.

6.1.1 Process Identification

Processes can be defined as "a set of interdependent tasks transforming input elements into products"[ITA 2003] according ITTA - International Transactional Analysis Association, a scientific organization which facilitates international communication.

In an organization processes are defined as set of task or decisions that are logically related. It's important to define organization processes according to Luis Amaral [Amaral 2007 – page 131] list of identified advantages:

- To have an IS independent from the organizational structure;
- To understand better how the organization does its mission~,
- To be a basis for the information architecture definition, identifying its scope, making it more modular and easier to prioritize;
- A base for identification of key requirements in terms of data.

For the reasons presented here we analyzed ERS and identified the following processes in Table 4.

Table 4 - List of ERS processes

ID	ERS Processes
P1	Establishment of policies and procedures
P2	Elaboration of activity plan
P3	Elaboration of annual budget
P4	Customer Service
P5	Litigation (registration and maintenance tax evasion, false declarations and fines)
P6	Elaboration of internal training plan
P7	Registration Management
P8	Database Report Generation
P9	Publications and Press Releases
P10	Human Resources Management
P11	Entities (Health Services Provider) Management
P12	Tax Management
P13	Balance/Liquidity Management
P14	Accounting
P15	Mail Management
P16	Validation of Registration Information
P17	Scheduling Management
P18	Information Technology Management
P19	ERS Enquiry Process Management
P20	Complain Management

6.1.2 Relation of processes with the organization

After identifying the processes we should identify who in the organization is related to those processes. This can be a good hint to identify users for interviews or for validation of their involvement. These same internal stakeholders can be important for validation of results at certain milestones of the ISSP definition project.

	Organization /Processes	Establishment of policies and procedures	Elaboration of activity plan	Elaboration of anual budget	Customer Service	Litigation (registration and maintenance tax evasion, false declarations and fines)	Elaboration of internal training plan	Registration Management	Database Report Generation	Publications and Press Releases	Human Resources Management	Entities (Health Services Provider) Management	Tax Management	Balance/Liquidity Management	Accounting	Mail Management	Validation of Registration Information	Scheduling Management	Information Technology Management	ERS Enquiry Process Management	Complain Management
1	Board	D	D	D	D	I	I	I	I	D	D	D						S	I		
2	Director of DAC	I	I	I					D	D			S	D	D	D			D		
3	Director of DIJ	I	I	I	I	S		D	I			S					D			D	
4	Director of DPQ	I	I	I					I												
5	Training responsible						D														
6	Internal management responsible						I	I			S		S	S	S	I		I	I		
7	Information System Responsible		I					I	S			S		I			I		S	I	I
8	Secretary				I	I		I		I						S		I			I
9	Accounting responsible							I				I	D	D	D		S				I
10	Complain responsible				I							I				I	I			I	S
11	Regulation studies responsible				I	I			S	S		I					I			I	I
12	Legal cases responsible				S	S		S	I	I		I				I	S			S	I
13	Consultant	I	I				I			I											

Figure 51 - Organization vs. Processes

As examples from the Figure 52 we can see that the Information System responsible is strongly involved at: Reports generation; Entities Management and Information Technology Management. He is also involved in: the elaboration of activity plan; in the Registration Management; in the Balance/Liquidity Management; in the Validation of Registration Information; in the ERS Enquiry Process Management; and in Complain Management.

6.1.3 Identification of data classes

In the identification of the data classes for ERS processes we can see some of the most relevant information for ERS processes in Table 5.

Table 5 - ERS data classes

ID	Data classes
1	Strategic plan
2	Activity plan
3	Annual budget
4	Meeting customer
5	Evaluation Processes
6	Enquiry processes
7	Complain process
8	Annual training plan
9	Stock Management
10	On demand reports

11	Human Resources
12	Entity registry
13	Registration fee payment
14	Money in/out
15	Accounting registries
16	Correspondence receive (mail)
17	Registration Validation
18	Booking of legal related meetings
19	Software solutions acquisitions
20	ERS enquiry
21	Complain about health service

Here is shown the relation between processes and data classes, also related groups of processes are identified and dataflow between these groups are illustrated. There is also an analysis of the IS support to the processes and of the relations between the stakeholders and the processes.

Figure 52 - Clustering information example - health care specialties

We consider clustering information in to subsectors to make easier access and manipulation of fragmented information in the ERS database, as shown in Figure 53, for the MCDT (complementary Diagnostic and Therapeutic Means). In this way, it's easier to make more solid and consistent studies in terms of competition, markets and submarkets. This method

is proposed to solve one of the major difficulties identified in ERS IS that is the fragmentation of the database which makes consistent reports hard to achieve.

6.1.4 Processes versus data classes matrix

The processes vs. data classes diagram in Figure 70 allow us to:

- Verify the data classes
- Communicate data sharing concepts
- Analyze data problems
- Find dependencies between several architecture subsystems

	Processes/data classes	Strategic plan	Activity plan	Annual budget	Meeting customer	Evaluation Processes	Enquiry processes	Complain process	Annual training plan	Stock Management	On demand reports	Human Resources	Entitie registry	Registration fee	Money in/out	Accountign regestries	Correspondance receive (mail)	Registration Validation	Booking of legal related meetings	Software solutions acquisitions	ERS enquiry	Complain about health service
1	Establishment of policies and procedures	C																		U		
2	Elaboration of activity plan	U	C	U							U									U		
3	Elaboration of anual budget	U	U	C					U											U		
4	Customer Service	U	U		C						U						U		U			
5	Litigation					C	C	C														
6	Elaboration of internal training plan	U	U	U					C											U		
7	Registration Management	U				U	U	U	U	C	U		U	U			U	U	U		U	U
8	Database Report Generation					U	U	U			C		U	U			U					
9	Publications and Press Releases	U	U	U		U	U	U			U											
10	Human Resources Management	U	U	U					U			C										
11	Entities (Health Services Provider) Management		U		U								C									
12	Tax Management	U			U						U			C	U		U	U	U		U	U
13	Balance/Liquidity Management			U						U	U			U	C	U						
14	Accounting														U	C						
15	Mail Management	U				U	U	U			U						C	U	U			
16	Validation of Registration Information	U		U	U	U	U	U	U		U		U	U			U	C			U	U
17	Scheduling Management																U		C			
18	Information Technology Management	U	U	U						U	U									C		
19	ERS Enquiry Process Management	U			U	U	U	U	U		U		U	U			U	U	U		C	U
20	Complain Management	U			U	U	U	U	U		U		U				U	U	U		U	C
							C- data class created by this process															
							U - data class used by this process															

Figure 53 - Processes vs. Data Classes

6.1.5 Identification of group of processes

From the reshuffling of the processes vs. data matrix we get into the following result in that shows how information is related, in Figure 54.

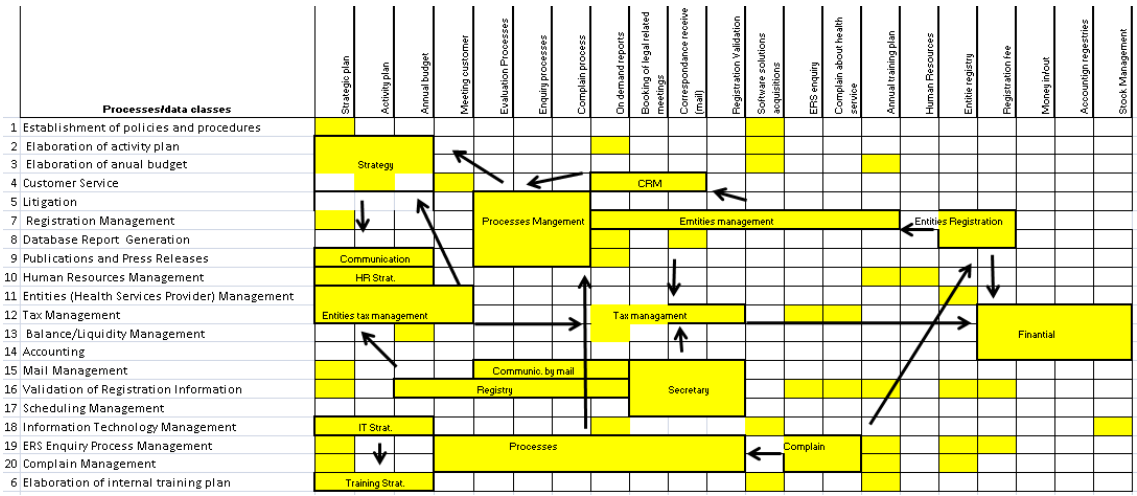


Figure 54 - Group of processes

6.1.6 Data flow between groups of processes

From the analysis of the group of processes in focusing on the flow between these groups we come into the Figure 72.

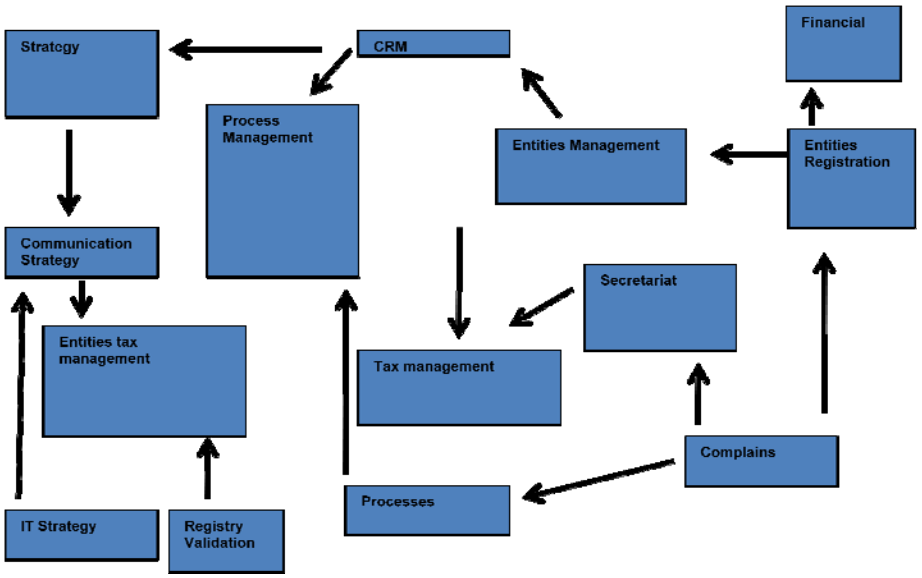


Figure 54 - Flow between groups of processes

6.1.7 Analysis of information systems actual support to the processes

In figure 55 we make analyses of what is the applications level of support to ERS processes.

Applications/Processes	Establishment of policies and procedures	Elaboration of activity plan	Elaboration of anual budget	Customer Service	Litigation (registration and maintenance tax evasion, false	Elaboration of internal training plan	Registration Management	Database Report Generation	Publications and Press Releases	Human Resources Management	Entities (Health Services Provider) Management	Tax Management	Balance/Liquidity Management	Accounting	Mail Management	Validation of Registration Information	Scheduling Management	Information Technology Management	ERS Enquiry Process Management	Complain Management	Web communication
Word	A	A	A	A	A	A		A													
Excel		A	A	A		A	A	A						A		A	A				
Human resources tool								P		A											
Suppliers management tool														A							
Money box												A	A	A							
Accounting												A	A	A							
SRER	P	P	A	P	A		A	P			A	A			P	A				A	P
ERS website				P			A	P	A							A					A
Stock Management			A							A				A							
Workflow Mgr (ownet)				P	A						P	P	P			P			A	A	P
mail server									P		A	A			A						A
	A -mean actual support																				
	P - means planned support.																				

Figure 55 - Applications vs. Processes

In the figure 56 we can the different levels of support that applications give to different parts of the organization.

Applications versus Organization	Board	Director of DAC	Director of DIJ	Director of DPQ	Training responsible	Internal management responsible	Information System Responsible	Secretary	Accounting responsible	Complain responsible	Regulation studies responsible	Legal cases responsible	Consultant
Word	A	A	A	A	A	A	A	A	A	A	A	A	A
Excel	A	A	A	A		A	A	A	A	A	A	A	
Human resources tool	A					A		A					
Suppliers management tool						A							
Money box						A							
Accounting						A							
SRER	P	P	A	A	A		A	P	A	A	A	A	A
ERS website				P			A	P	A				
Stock Management						A			A				
Workflow Mgr (ownet)	A	A	A	A	A		A	A	A	A	A	A	A
mail server	A	A	A	A	A	A	A	A	A	A	A	A	A

Figure 56 - Application vs. Organization

6.1.8 Relations between external Stakeholders and processes

In figure 57 we show an analysis of the relation between the stakeholders and the process that support them in ERS.

External Stakeholders/Processes	Establishment of policies and procedures	Elaboration of activity plan	Elaboration of anual budget	Customer Service	Litigation (registration and maintenance tax evasion, false	Elaboration of internal training plan	Registration Management	Database Report Generation	Publications and Press Releases	Human Resources Management	Entities (Health Services Provider) Management	Tax Management	Balance/Liquidity Management	Accounting	Mail Management	Validation of Registration Information	Scheduling Management	Information Technology Management	ERS Enquiry Process Management	Complain Management	Web communication
Health Ministry	X	X	X			X		X	X			X	X							X	X
SNS	X	X	X		X							X									
Regulated Entities	X	X	X	X	X	X	X		X		X	X	X		X	X	X	X	X	X	X
(Health) Professional Orders				X	X	X	X	X				X					X	X			X
Infarmed																					X
INEM																					X
Health Professionals	X	X		X	X		X		X		X	X			X	X	X		X	X	X
Users/Citizens/Patients	X	X		X	X				X		X	X			X		X		X	X	X
ACSS	X			X	X		X	X	X									X			X
IT Providers	X																	X			X
(News) Media	X			X	X				X								X			X	X
Faculties (Human Resource Suppliers)								X													X

Figure 57 - Stakeholder vs. Processes

This tables and matrixes are source valuable information for the information architecture model and use case model that are drawn in the next sections.

6.2 Information architecture model

In the analysis of the information system we looked into the methodology Business Modeling with UML (Eriksson and Penker 2000) for obtaining a way to organize information that supports and documents the business processes that will be useful for the planning of the future information systems as shown in Figure 58.

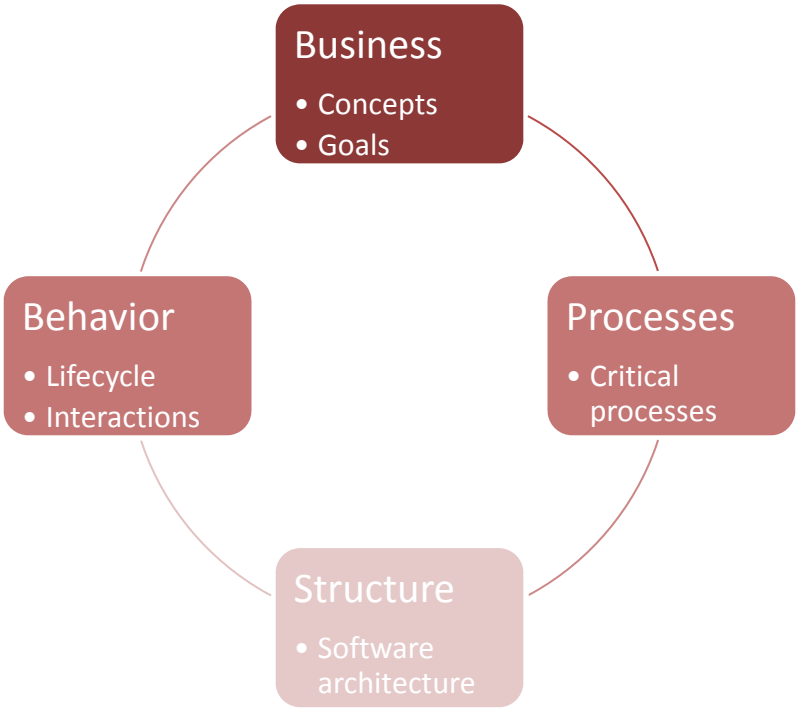


Figure 58 - Model of Perspectives or views – Eriksson and Penker, 2000 [Eriksson 2000]

The Perspectives or views model from Eriksson and Penker, 2000 [Eriksson 2000] are business modulation extensions to UML, they are a set of complementary views of the organization in order to have a holiest view. These views comprise:

-Business view - The goals of business modulation include understanding better the business mechanisms of the organization, and can be used as basis to adapt the IS to be more adequate to support the business by also identifying its goals.

-Processes view – this view shows how activities are done to achieve the specified goals and it shows which resources are needed to do so. The business view identifies the fundamental processes of the organization, those that interact with the outside and that are critic for ERS services.

-Structure view – this view shows the information assets and maps them from the business architecture to the software architecture.

-Behavior view – in this view we show the interaction between the resources.

A global model of the organization business can be a great input for requirements in the solicitation package (in the Portuguese public institutions is called "*caderno de encargos*"). The advantages of this global model are:

-IS becomes part of the business, supporting and improving work and results

-The applications integrate easier and can share and exchange information

-Changes in processes are easier to integrate in the IS, reducing maintenance and updating costs

-The business logic can be reused in several systems

6.2.1 Business view

The business view describes the business concepts and the goals of the company, it helps directing the modulation process, and it's also a point of reference for decision to be taken when building the IS as it clearly states goals. This business view should be shared by all stakeholders.

ERS business concepts model

As the model of ERS business concepts shows, in Figure 59, ERS regulates and supervises health care services providers. The health care service providers are the so called regulated entities that own establishments in order to provide their health services to the user or citizen.

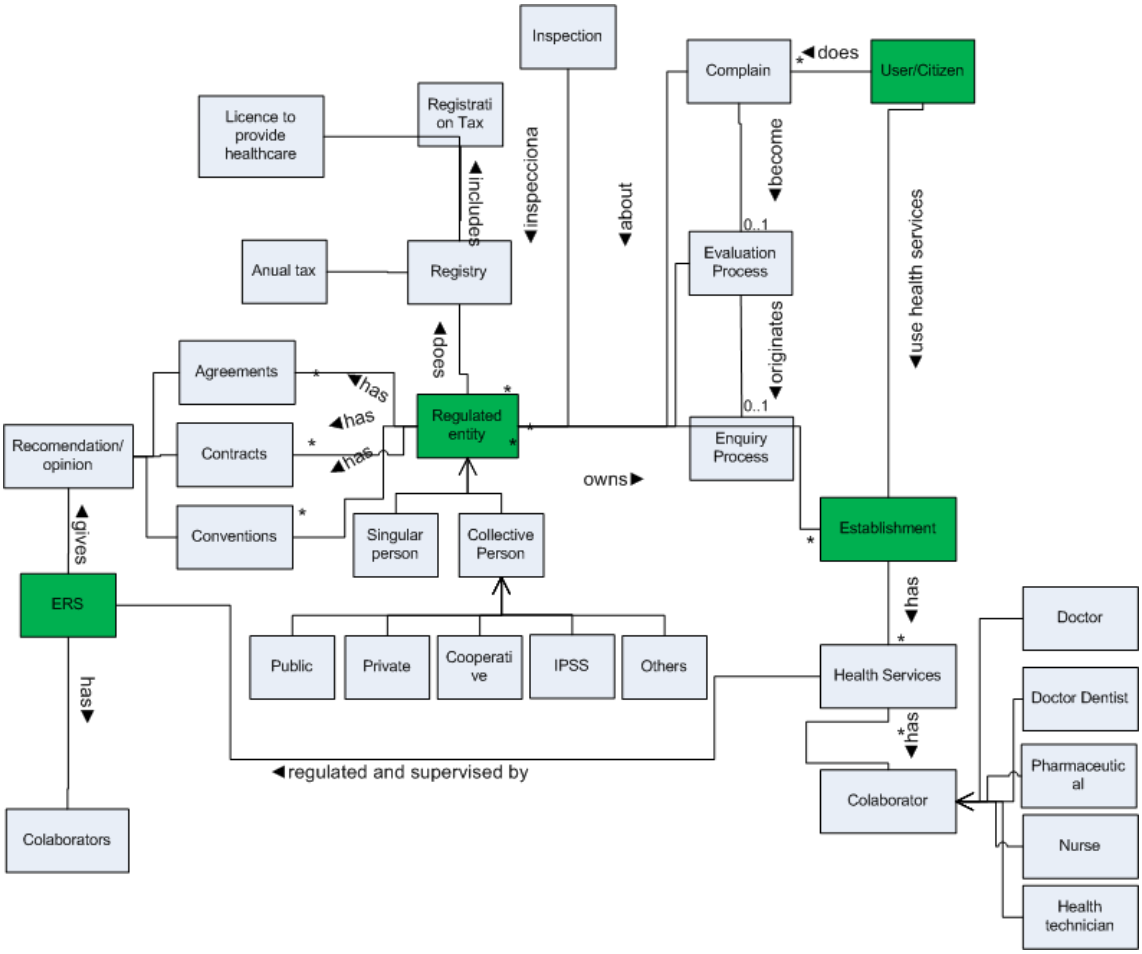


Figure 59 - ERS business concepts model

ERS can do recommendation or prescriptive opinions on agreements, contracts and conventions celebrated by regulated entities, given by its collaborators.

The regulate entities, can be singular or collective legal entities. The collective persons can be public, private, cooperative, IPSS, or others. These entities are obliged and have to register on ERS online Registry to be able to operate legally. For that it's necessary to pay a registration fee in the first year, followed by an annual fee to keep it active. The registry after being validated results in a registration certification document. This document works as a license to provide healthcare services recognized by the Portuguese government.

These entities own at least one establishment that provides health care services with the legally required personal. All collaborators of the registered entities must be detailed in the registry, as well as their profession in terms of health services.

The citizens use the health services given by the recognized entities in the establishments. In case they are not satisfied or fell discrimination, they have the possibility to complain. Citizens complains will be analyzed and can become an evaluation process or even an enquiry process (following the law for creation of ERS [ERS 2003]).

ERS is responsible for inspecting the regulated entities, at the facilities level and at the process level.

ERS goals model

The presentation goals model by identifying business goals and problems that can be hinders to achieving this goals, can:

-Help describe what the organization wants to accomplish and the way to do it

-Show ways to improve business and to solve goals conflicts

-Typically the goals more detailed are directly linked to the business processes

In Figure 60 are shown ERS goals. To help measure improvement of ERS in terms of the goal of larger number of registries, we identified other sub goals such as bigger visibility and preregister in the site, as well as few irregulars. This will turn into more cash flow for ERS. For establishing these goals, where identified in first place which problems we want to solve. One important problem identified was that there are still many health care service providers that should be registered and aren't. Some of these entities are not registered because they don't know they should, or even how they didn't know how to do it. The site lacks references and has low visibility. In order to fight these problems, qualitative and quantitative goals where set.

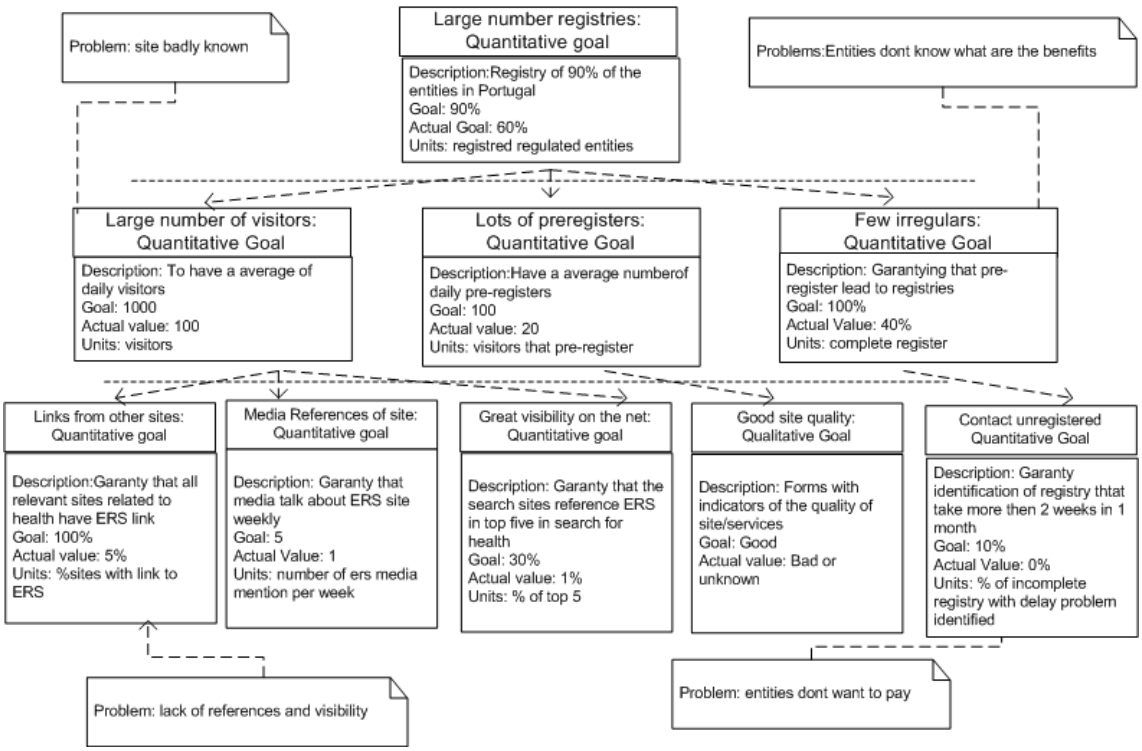


Figure 60 – ERS goals model

One example of a goal set is to raise from 0% to 10% the number of registered entities from those that only preregistered (only got a user login and password but didn't complete their registry).

6.2.2 Processes view

The process view shows how activities are done to achieve specified goals and it shows which resources are needed to do so. The business view should identify the fundamental processes of the organization, does that interact with the outside and that are critic for ERS services.

ERS critical business process

First we identify and module the main processes. Those that interact or are critic to the users, usually they are between one to five fundamental processes – we identify three.

These processes have interfaces with the users and they are the processes that the user evaluates to see how the organization performs.

We then decompose these fundamental processes in to sub-processes, and we identify the support processes (those that don't create value by themselves but which are required by the fundamental processes so they can be executed).

Process view – Entity registry management process

Here we give an example of a process definition by detailing a critical process to ERS business, the Entity registry management process.

The following defined processes are on Figure 61 in process identified as P12-Entity registry, P13-Registration fee payment and P17-Registration Validation.

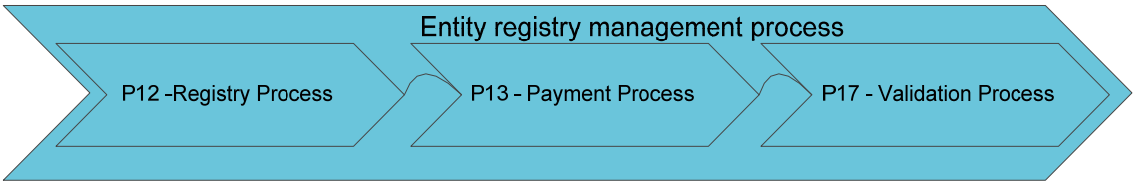


Figure 61 –Process view – entity registry process

Process view – Registry process

As shown in Figure 62 the process of registering and getting a proof of registry is divided in three consecutive processes, the initial registry, followed by the payment and validation process.

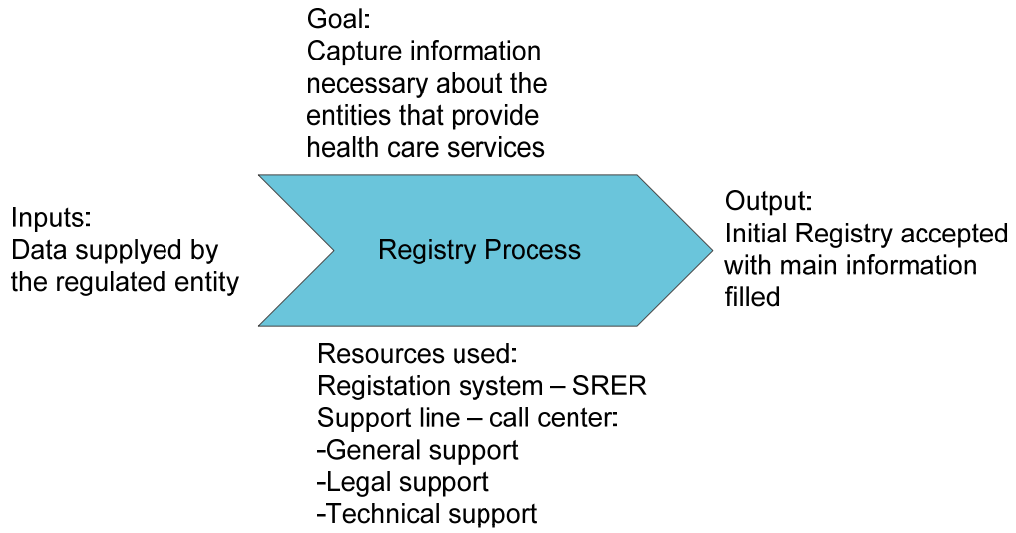


Figure 62 - Registry process

The registry process has a goal that is to registry all relevant information from the health care providers allowing them to register, it has a set of data input and the output is the acceptance of the initial registry of the organization. This process uses the registration system and the call center resources as shown in Figure 63.

Process view – Payment process

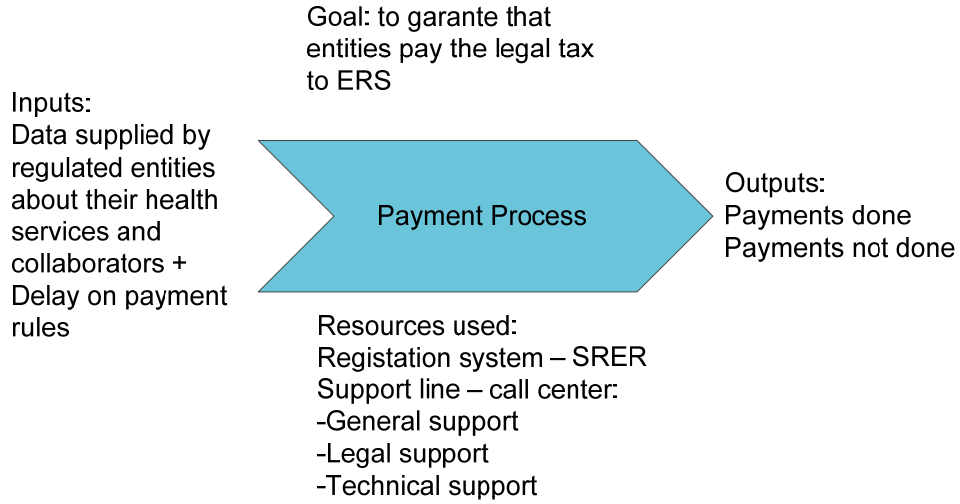


Figure 63 - Payment process

The payment process has a goal that is to guaranty that the entities pay the legal tax, it has a set of data input from the regulated entities and the output is the payment done or to be done. This process uses the registration system and the call center resources as shown in Figure 92.

Process view – Validation process

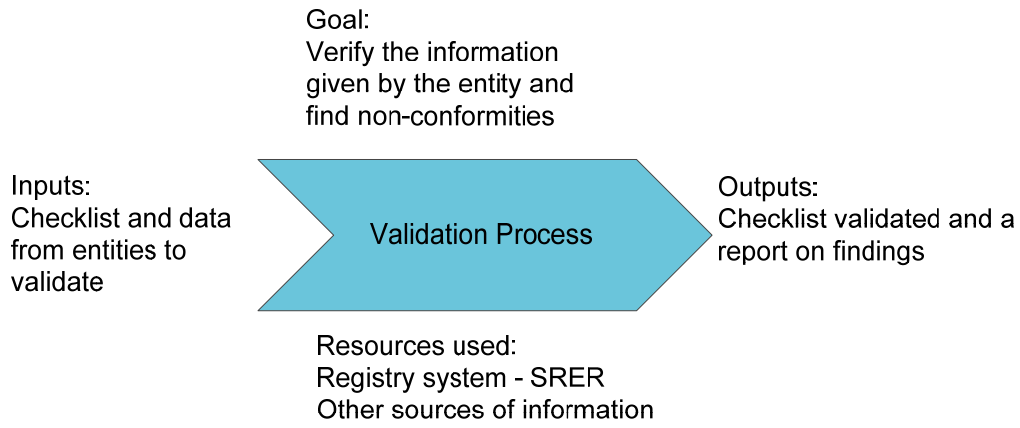


Figure 64 - Validation Process

The validation process has a goal that is to verify that the entities have filled the correct information and to find non-conformities, its input are the entities information to validate from the regulated entities and the output is the report of findings of these validation. This process uses the registration system and other sources of information as shown in Figure 64.

State Diagram - Registry and tax payment

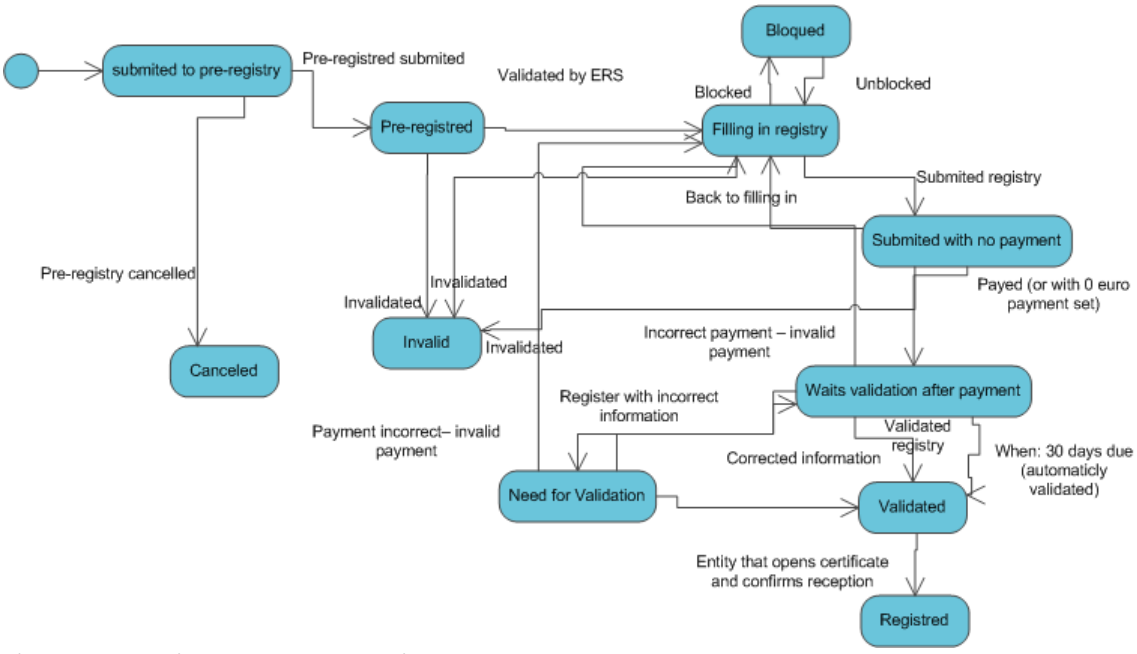


Figure 65 - Registry at ERS state Diagram

There are a number of states the registry of a regulated entity has to or goes through as indicated in Figure 65. The most usual track is that there is a pre-registry submission, leading to a pre-registered, followed by a filling-in of the registry. After submission of that registry and its validation, the entity is validated and when it receives and confirms reception it can then print the registration proof. Other states are also possible, as the canceled state for an invalid pre-registration or registration. It's also possible to recover from an erroneous payment after a validation.

State Diagram - Anual tax

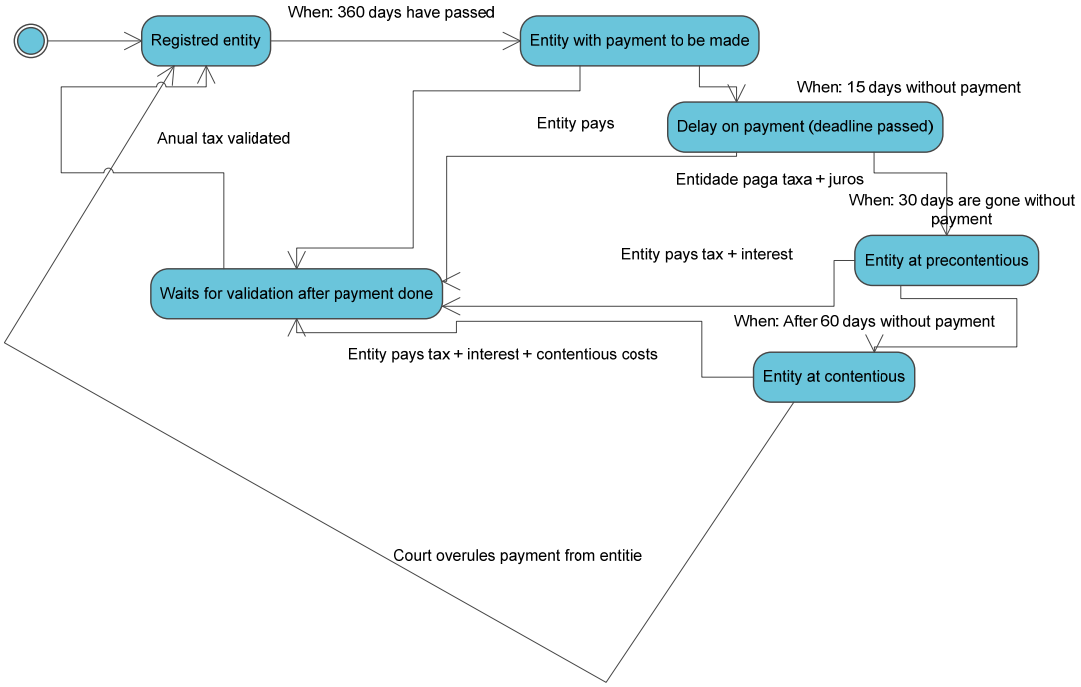


Figure 66 – State diagram for annual tax

Figure 66 shows the states that a regulated entity can go after the first year when it needs to pay the annual fee. If it pays on time it is validated its payment, otherwise if there are delays it can go to pre-contentious or to contentious and pay interests, apart from the normal tax.

Views of the company - processes

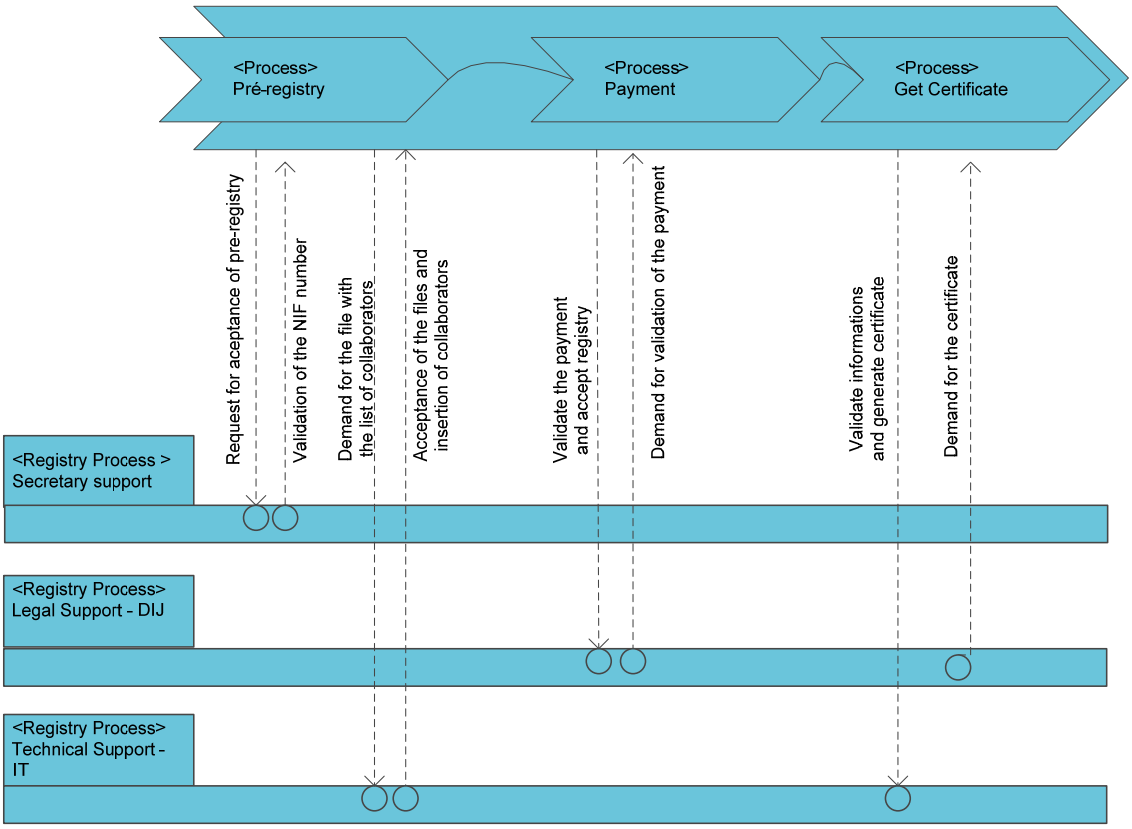


Figure 67 - Views of the company - Processes "Registry Process"

According to Figure 67 there are different actions, for example, the acceptance of the pre-registry that relate to secretary support and is an input to pre-registry process. This diagram shows how the inputs come from that influence the process and output from this same process that affect the organization. The results from this Figure 67 are consistent with those in Figure 55 - Applications vs. Processes.

6.2.3 Structure view

In the structure view we show the logic view, which maps from the business architecture to the software architecture showing the information assets at the organization.

High level vision of the information managed by ERS

In terms of IS architecture model, the Figure 68 IS architecture model shows the relation between the business identities. This table input was the group of processes identified before in Figure 54 - Flow between groups of processes.

This diagram shows the core information at high level of ERS IS. The main assets of information are: the regulated entities registries that are related directly with accounting and finances. The entities are the ones who supply the main source of income of ERS – registry and annual tax.

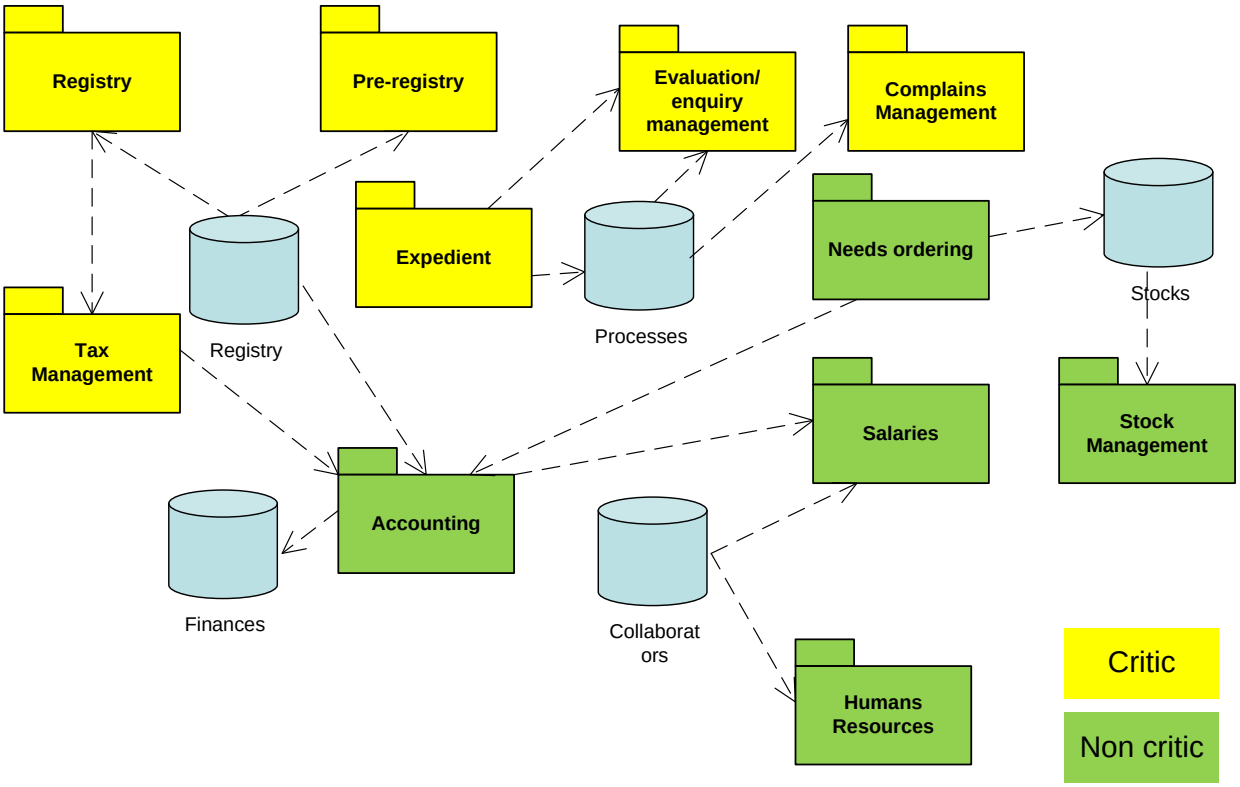


Figure 68 – From business architecture to software architecture- logic view

All expedient is registered and it can become an evaluation process, an enquiry process or a complaint. The stock management is done to satisfy the internal needs, such as the commissariat (or general store).

There is a database of collaborators that is managed by the human resources, that is the base for the processing of salaries.

After an exercise of looking at the existing information and processes of ERS we determined what was critic or not – as shown figure 96. For example, tax management is the main income of ERS that depends on the registry and pre-registry – these critic components are also much tailored made due to its highly specific characteristics. The non-critic systems have fewer requirements in terms of short-term failures or unavailability and for those reasons are typical off the shell applications with standard requirements.

6.2.4 Behavior view

In the behavior view we show the interaction between different resources.

Using a behavior view we typify how the flow of a complaint on an entity health care services is received, analyzed and who it goes trough till being approved, as shown in Figure 69.

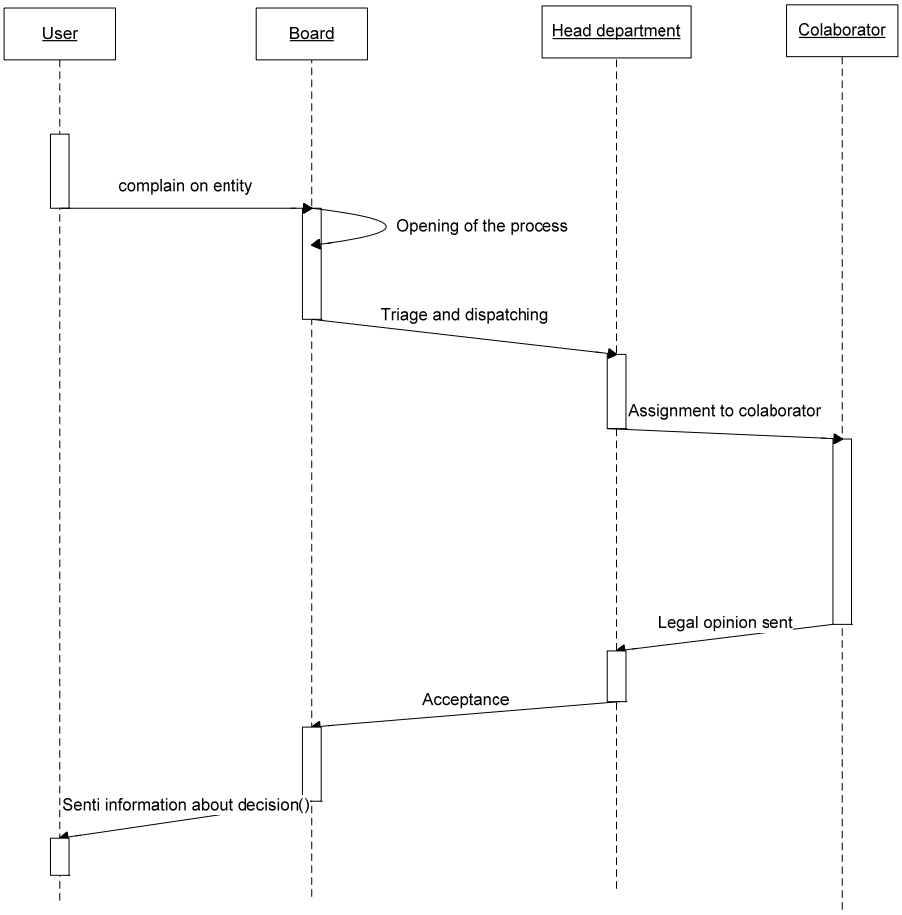


Figure 69 – Behavior view - for a complain in ERS (P20 – Complain Management)

6.3 Use case model

Here is presented the use case model. To elaborate the use case model we looked at the outputs from the two complementary notations used (the first one based in tables and matrix [Amaral 2007] and the second one based in diagrams – Views model [Ericksson 2000]) and defined the use case model with the main functionalities of ERS IS in terms of users perspective in added value.

First we used the organization roles (identified before in 6.1 – Definition of the organization processes) to identify the most important users of the system. Then we used the identified processes steps to see which were the most relevant steps from the user perspective. With that input we identified the use cases shown in the use case model.

In this chapter are present some core functionalities in the perspective of the most relevant stakeholders:

- The regulated entities – entities that have at least one establishment that gives health care services
- The user/citizen – any person that wants to know more, use health care services or might want to complain about health care services.

• The ERS collaborator – Someone that works on ERS that relies on ERS Information System to his actions and work in order to produce his expected work results.

The functionalities shown are identified has given added value to its user or to the organizations involved.

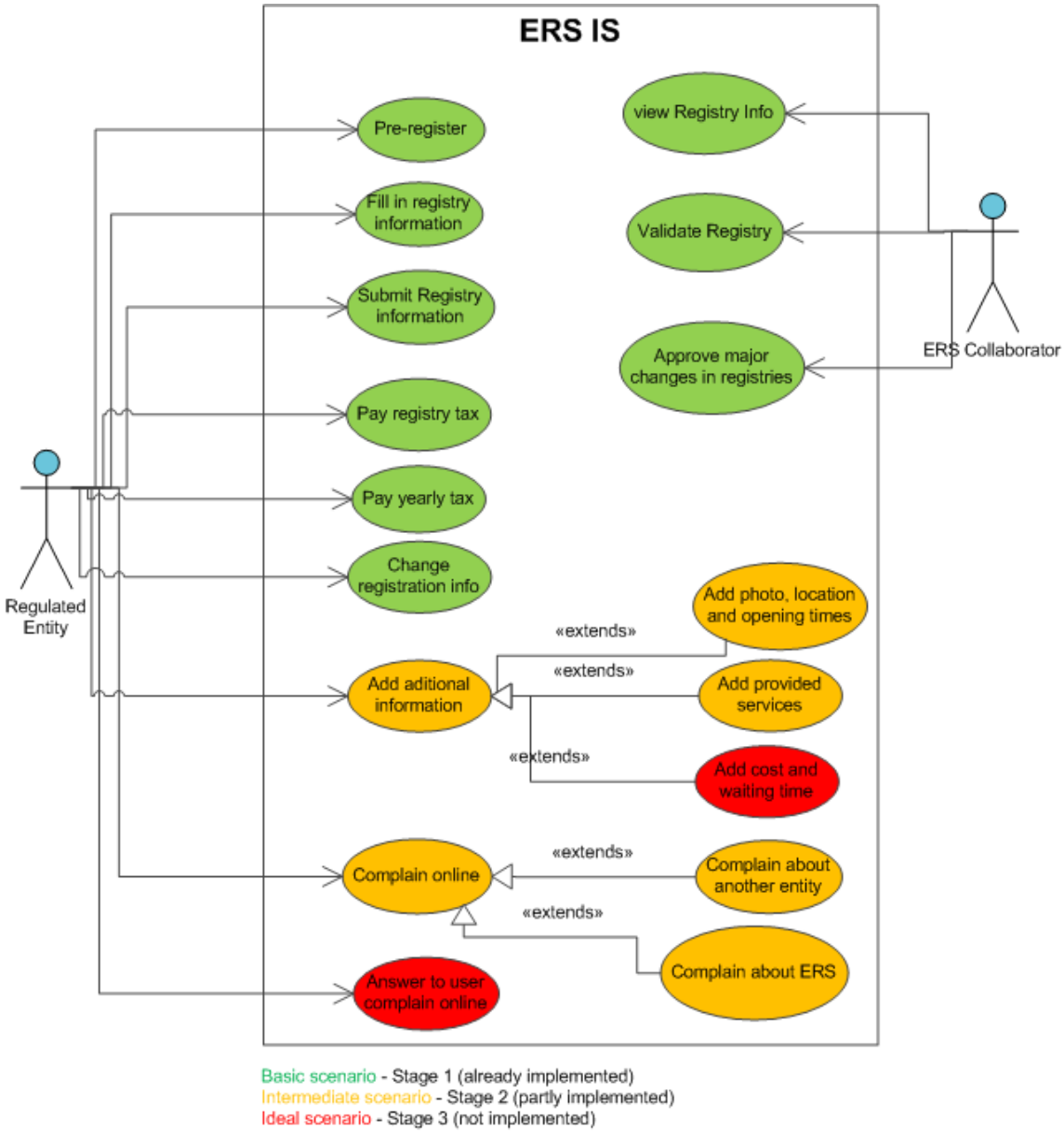


Figure 70 - Use Cases for ERS Regulated Entities

In terms of healthcare provider the ideal scenario he should be able to the operations shown in Figure 70. Still some of these functionalities are not yet available, such as the possibility for a regulated entity to online. The use cases in green are the ones already in place, the ones in yellow are the ones that could be implemented in short time. Those in red would take more time.

Figure 71 - Use Cases for Citizen/user

In terms of citizen in the ideal scenario he should be able to the functionalities identified in Figure 71. At the moment the user can't search for an entity in the map, or what's the way to get there from where he is. He can't either see what is the score for an entity (example how many stars a hospital has in terms of service), or see the indicators for that same entity. Still some of these functionalities are not yet available, such as the possibility for a regulated entity to online.

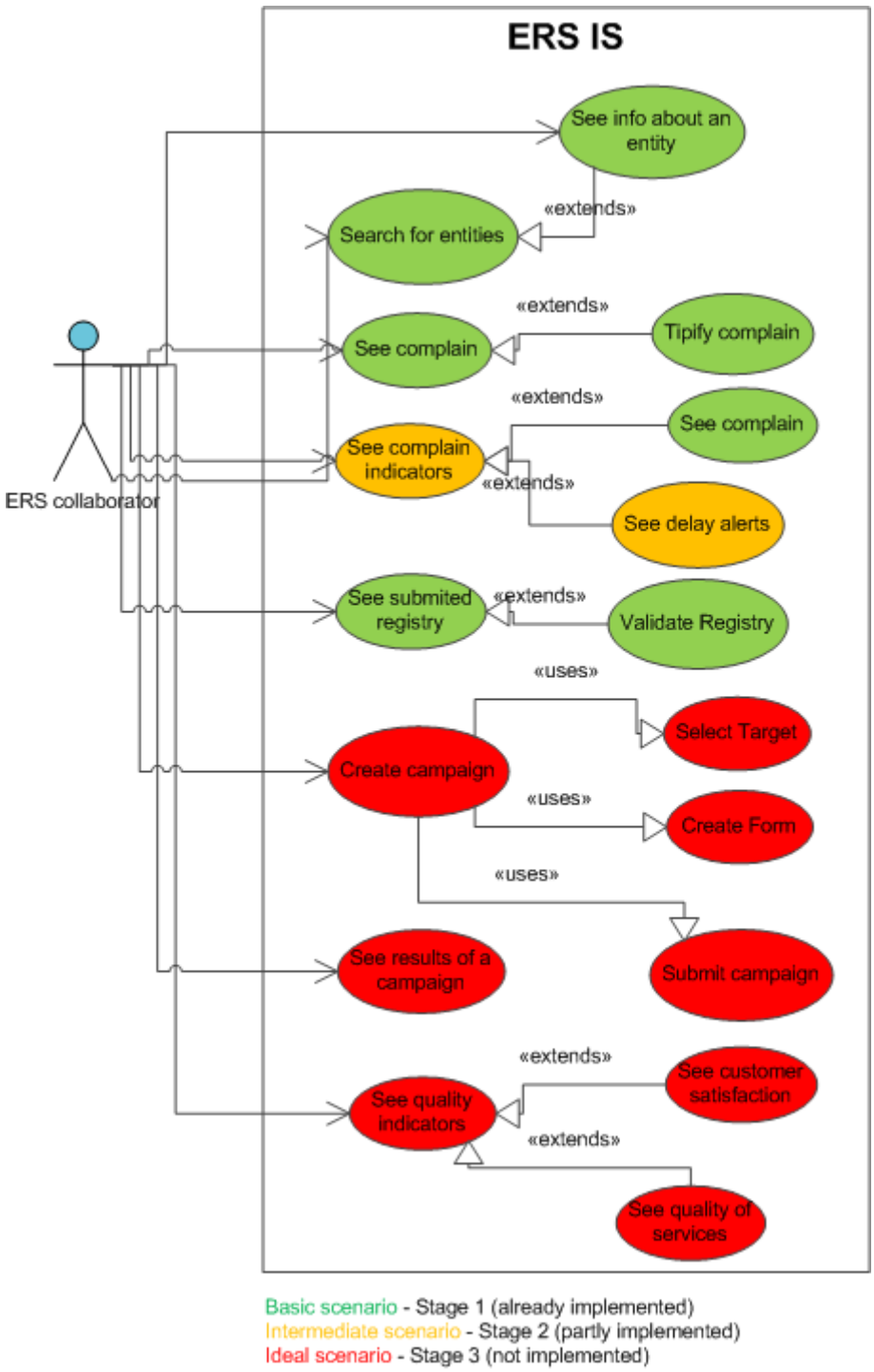


Figure 72 - Use Cases for ERS collaborator

In terms of ERS collaborator in the ideal scenario they should be able to do operations identified in Figure 72. From these identified operation, there are still some of them that aren't implemented, including: the creation of campaigns to contact specific targets of entities by providing them a form for them to fill in with information necessary for ERS regulation and supervision of the market; to be able to see the results of the launched campaigns; and to be able see health care services quality indicators.

6.4 Resume from characterization of ERS IS

In this chapter was characterized the IS, by using two different complementary notations, the first one based in tables and matrix [Amaral 2007] and the second one based in diagrams [Ericksson 2000]:

In the 1st notation were shown the relations between processes and data classes, also related groups of processes were identified and dataflow between these groups were illustrated. There was also an analysis of the IS support to the processes and of the relations between the stakeholders and the processes.

In the 2nd notation was shown a business modulation from four different perspectives: First we showed main concepts of ERS business in the business view, and then we identified the processes and detail the critical ones, and then identified the structure view of information and then the behavior view.

At last with input from both notations we created the use case model with the actors perspective of the system in terms of added value functionalities.

These analyses gave us a clearer picture of what information there is in ERS, what processes there are and who are the actors and stakeholders involved. We also identified how the actual system supports these processes and identified important use cases in the user perspective. We identified these use cases divided in three groups of functionalities: the existing functionalities (basic scenario), planned functionalities (leading to the intermediate scenario) and functionalities identified but not planned yet (leading to the ideal scenario) as show in Figure 70, 71 and 72.

At last we suggested a set of goals and indicators, for the goal of bigger number of registered entities, by having also a bigger percentage of registered entities. This requires bigger visibility of the site for citizen and for the regulated entities so they get to know about ERS and their legal obligation to register. This will result in a more accurate regulation and supervision by ERS and in more income.

8.Applications portfolio analysis and scheduling

7.1 Applications portfolio Analysis

MCFarlan application portfolio

After an analysis of the applications available at ERS, a Mcfarlan matrix was created, using McFarlan model.

The goals for a Mcfarlan application evaluation are the analysis of the state of the existing applications and their importance for the business, as well as the prediction of the future of the applications that are planned, or that might be considered.

Mcfarlan matrix [Mcfarlan 1981] – see figure 73 - divides the analysis in four categories: strategic, high-potential, critical and support applications, based on the contribution of IS/IT to the actual business and its future – based on the impact that IS/IT has on the organizations.

- The support applications are important but non-critical for the business.
- The critical applications are where the operation of organization relies for its success at the moment.
- The strategic applications are those that the future success of the organization will rely on.
- The application high potential applications are those where we don't know if the future of the organization will depend on them, but there is potential for that to happen.

It's very important to have applications that are thought for the future, as that reveals that innovation is being thought to improve those areas that most need it. Innovation is a key factor for success and future of any organization.

Figure 73 - Mcfarlan applications portfolio applied to ERS

From the actual applications portfolio support applications: Stock Management, Human Resource Management and Accounting are supplied by ACSS. This entity is responsible for its maintenance and updates with no charge to ERS trough the Minister of Health. There is also an agreement with Microsoft and ACSS that allows free Access to a large number of Microsoft applications, including Office Applications, Windows Operating System, Web server software, webmail application, etc.

The ERS portal and Intranet can and should be improved. The ERS portal can allow citizens to access very diverse information, about the regulated entities in a region, with a specific health service and collaborators. They can as well submit complains online. The Intranet allows to deliver information about costs, health markets, key indicators – about the running processes at ERS (complain, evaluation and enquiry processes), about productivity levels, quality indicators, deadlines, etc.

Critical applications

In the critical applications for the business there are three main applications (identified in Table 6:

- 1 – Registry entity system - SRER – a system for registry and payment of the regulated entities

• 2 - Content and Workflow Management - OWNET – a system for ERS internal use has all the information and documents from ERS, from the moment they arrive or are created in the system, till the moment where they archived.

• 3 – Online health care services complain system - SR – a system that allows citizens to complain about health care services.

The SRER has more then 20 000 registered health care providers. It allows ERS to have a unique panorama about the health care providers sector, it guarantees its main source of income, and the entities tax payment. This system is young, and was made with large pressure to launch (in a couple of months), for that reason quality was sacrificed and the functionalities are insufficient. SRER should be the preferential tool for collecting information from the entities; otherwise it is not practical to demand and collect large quantities of information in the traditional ways – letter, telephone, and fax.

SRER can also be used to collect information about ERS services provided by registered entities in online forms, namely, about its support line quality, about its Information System, suggestions for improvement, areas for improvement, etc).

The OWNET allows following all documentation that gets in and out of ERS and all documentation created inside the organization. It also allows following different predefined or customized workflows – so called processes. These processes are set up to respect the legal deadlines and ERS policies for work distribution/assignment. These processes are fine tuned to achieve balance on the work load distribution. The problem with this tool is that it does not allow: free search of information – only predefined fields; it doesn't allow the user or administrator to go back in a workflow; it involves too many steps for elementary 0perations; it's not user friendly and with bad visual design.

SR is a complain system that is the door to this national complain system, in a way it can automate the reception of complains in ERS portal. Depending on the complain scope the triage processes filter and forward them to the entity that is responsible to that type of complain. After the complaints are taken care, there is feedback to the relevant entities, and official decisions are sent by ERS and these are integrated in the system.

Table 6 – Critical applications and their descriptions, SWOT, suppliers and technologies

Application	Descriptions	Functionalities	S	W	O	T	Suppliers	Tecnologies
SRER (Registry entity system)	A system for registry and payment of the regulated entities	Allows registry management: -Pre-registry of the entities -Registered of complete entity profile -Tax payment -Certificate printing -Communication with entity -See payment executed -Validation of the pre-registry -Validation of the registry	Allow remote work -Simple and intuitive	There are no configuration or back office, all software is tailor made	Its easy to insert new functionalities - as the code is available -Register is the center point for the communication with the company	There are changes in the legislation it becomes outdated very fast	Supplier A	SQL and .net
Workflow (Content and Workflow Management)	A system for ERS internal use has all the information and documents from ERS, from the moment they arrive or are created in the system, til the moment where they archived.	Allows mail, fax and digital document registry -Mail - received and sent -Register of evaluation processes -Register of enquiry processes -register of complain (complain book)	Digitalization of processes is "mandatory"	System is not user friendly, not flexible and involves to many steps for simple tasks There are typical functionalities that are not available: -there is no general search field -you cannot reverse one workflow action (not even the administrator - only by database manipulation) -Is barely interconnected with SRER -Is not easy to integrate with other systems	There are processes in the company unused in the workflow engine, ex: -Accounting	The collaborator feel that the tool is not proper and that its basic, they are willing to change for another one	Supplier A	SQL and web application
SR (Online health care services complain system)	A system that allows citizens to complain about health care services.	Allows management of complains: -Online complain register -Online complain evaluation by ERS -Offline submission of complain	Allows patient to complain about provider online at any time and any place with internet	There are no functionalities that allow the user to see what is the status of a complain	To have online status and reply by message to the user that complained	There is the risk that to many complains are inserted and that ERS is not agile enough to answer in the legally demanded time	Supplier B, C, D	SQL and .net

Strategical applications

From the Mcfarlan applications portfolio analysis several are already identified as strategic which are the applications that the operation of organization relies for its success at the moment.

• 4-HQual – System for Health care services quality indicators – will be a system for evaluation of the quality of services that will give the general public a simplified, transparent and objective knowledge of the ratings of quality in the health care services provided by the registered entities. The evaluation system will use standardized indicators, clustering

information about these indicators in a simple and easy way for public reading. This information will be available and searchable in ERS portal.

• 5-Monitor – a system that will be designed for monitoring and detecting practices of systematic selection of patients. Discrimination of patients put at risk the guaranty of universal and fair access to the health care service users, so there is need to develop a powerful tool that allows the monitoring of acquired data to find systematic discrimination behavior.

• 6-CRM system – Given that the market strategy is based on differentiation, the bet on ERS high quality services, in the right time and adapted to the real needs of the different stakeholders (regulated entities, citizens, etc). This system is based on a unique repository of information such as: health care provider's information; knowing citizens/patients interaction with the health establishments, collecting information about health care in online forms and campaigns. The goal is to segment the type of regulated entities and their health care services in order to be able to provide direct information to them and other added value services (direct marketing). The ERS use of CRM goal is to identify, collect information and know about its regulated entities based on the following principles:

- Strong knowledge of each individual behavior of each entity – including interactions with ERS
- Infra-structure that is able to support a more personalized relation with each entity
- Share information about regulated entities and their issues inside ERS (those that are in the scope of ERS)

Relational projective marketing using the profile and knowledge of each entity – example arbitration services to support organizations in trial as a third party

- Development of information/marketing campaigns that are in line with each entity services

• 7 – Integrated national online complain system – SRI - this system should be built integrating ERS existing complain system for private entities linking to other complaint national system, in a way that there is only one single and efficient gateway to all health care services issues. This application will be responsible for automatic and selection of complains for manual triage of all the issues to all relevant health care related organizations in an efficient and effective way. It will have a workflow with indicators that allow detection of bottlenecks and optimization of processes, including communication with other private and public entities.

• 8 - Online Forms System – an application to provide a practical way to collect large quantities information of a target number of persons/organizations – saved in the database

• 9 - Geo-referenced Studies - GIS platform – A platform that allows geo-reference of entities to allow geo-referenced studies of supervision and regulation. Studies can be such as the following example: a map with displaying zones that have no emergency ambulance support in 1 hour time or 80 km distance.

• 10 - Waiting list online indicators – Online Indicators in integration with hospitals IS in a way that it shows the estimated time of waiting for a given surgery or consult in a specific location/establishment. This will allow patients to know what time on average to expect for a specific health care service in a specific establishment. This is a step toward user knowledge and freedom of the patient for an informed decision in health care services.

• 11 - Business Intelligence –This tool can provide advanced analysis that generates reports to discover with relevant statistical findings or trends. Provides a tool for analyzing information stored in the datawarehouse. This tool can be used to support mathematically and logically what is guessed or found as evident by ERS collaborators.

• 12- Automatic pre-register by Minister Finance online company creation – Each time a company is created online that provides health care services as its main purpose, there can be an automatic notification to ERS about this entity. A webservice can provide connection for these systems in a transparent way, allowing the health care provided to be automatically pre-registered at ERS and notified by e-mail and mail about ERS and its rules.

• 13 – Web Geo-referenced search - to allow user to search for establishments or services in a geographically logic, being able to see the results on a map. The system should allow seeing the top establishments that are closer to the user or a given location.

In table 7 is shown a resume about the strategic applications. We don't identify weak and strong points since they haven't yet been developed.

Table 7 – Strategic applications and their descriptions, opportunities, suppliers and technologies

	Application	O	Suppliers	Technologies
4 - Health care indicator of quality of service - HQual	will be a system for evaluation of the quality of services	give the general public a simplified, transparent and objective knowledge of the ratings of quality in the health care services	TBD	TBD
5 - Monitor	a system that will be designed for monitoring and detecting practices of systematic selection of patients.	allows the monitoring of acquired data to find systematic discrimination behavior	TBD	SQL
6 - CRM - Customer Relation Toll	unique repository of information such as: health care provider's information	behavior of each entity – including interactions with ERS Infra-structure that is able to	TBD	TBD
7 - Integrated national online complain system	integrating ERS existing complain system for private entities linking to other complaint national system	only one single and efficient gateway to all health care services issues	TBD	.net SQL
8 - Online Forms System	way to collect large quantities information of a target number of persons	collect large quantities information of a target	TBD	TBD
9 - Geo-referenced Studies - GIS platform	A platform that allows geo-reference of entities to allow geo-referenced studies of supervision and regulation	geo-referenced studies of supervision and regulation	TBD	TBD
10 - Waiting list online indicators	Online Indicators in integration with hospitals IS in a way that it shows the estimated time of waiting	on average to expect for a specific health care service in a specific establishment	TBD	.net SQL
11 - Business Intelligence	provide advanced analysis that generates reports to discover with relevant statistical findings or trends.	to support mathematically and logically what is guessed or found as evident by ERS collaborators	TBD	TBD
12 - Automatic pre-register by Minister Finance online company creation	Automatic notification each time a company is created online that provides health care services as its main purpose	allowing the health care provided to be automatically pre-registered at ERS	TBD	.net SQL
13 - Web geo-referenced search	allow user to search for establishments or services in a geographically logic	allow seeing the top establishments that are closer to the user	TBD	.net SQL

High potential applications

The application with high potential, are applications that we should keep in mind but without great investment effort:

• 14 - News search by topic – There should be a categorization of news from the media that should be made available in ERS website. This news should be categorized in order for a person or organization to see only the information that is relevant to them.

• 15 - Automatic phone response system – system that answers the phone, given indications of the choices available, forwarding to the department and person that is competent and responsible to reply to a given call. There is the possibility to identify its entity by its NIF

number to allow the call center to identify the entity and to show it to the ERS collaborator responsible for answering the call. It should keep statistics about phone calls, including last phone calls.

• 16 - BSC - Balanced Scorecard system: System that allows the establishment and maintenance of a balanced scorecard for management of the organization. BSC allows the managers to define a series of indicators and to show their progress toward defined strategic goals. This allows management to see if the organization is going in the intended direction and to take corrective action when it's not doing so.

• 17 - Electronic suggestion box – to allow identification of innovation and continuous improvement of the organization, with the knowhow and experience from its collaborators. It would be interesting to have a simple tool, for capturing ideas and continuous improvement suggestions. The toll should allow the prioritization and selection of the best ideas, so they can be implemented.

• 18 - SMS info and communication channel – There should be the possibility to alert the registered entities of the payments by SMS, do there is less entities going to contentious.

• 19 - Electronic signature (using national ID card) – There should be the possibility for ERS collaborators and its managers to digital sign the ERS documents.

• 20 – Workflow tool (a new one) – The internal workflow tool of ERS is outdated and it's limited in terms of functionality. There is the possibility to analyze competing tools to find one that can substitute the actual one after migration of all data into it.

• 21 - Datawarehouse – ERS datawarehouse goal is to study statistically the entities and their related information, in order, to find information that is relevant for the supervision and regulation of its market. For example, to identify monopoly or oligolopolies of market or markets niches. The potential of Datamining can be raised it the appropriated data are collected and kept in a datawarehouse, that was built to satisfy the need for information processing about the regulated entities. It should be defined as a repository of central data to be examined and to allow competition studies, fraud detection, etc. It will allow data extraction from operation data and integration from different sources of data and data formats. It gives managers a stronger support for their decisions and for managing operational activities.

In table 4 is shown a resume about the high potential applications. We don't identify weak and strong points since they haven't yet been developed.

Table 8 - High potential applications and their descriptions, opportunities, suppliers and technologies

	Application	O	Suppliers	Technologies
14 - Search news by topic and entity	categorization of news from the media that should be made available in ERS website	a person or organization to see only the information that is relevant to them	TBD	.net SQL
15 - Automatic phone response system	system that answers the phone, given indications of the choices available	identify its entity by its NIF number to allow the call center to identify the entity and to show it to the ERS collaborator responsible for answering the call. It should keep statistics about phone calls, including last phone calls.	TBD	TBD
16 - BSC - Balance scorecard system	allows the establishment and maintenance of a balanced scorecard for management of the organization	allows the managers to define a series of indicators and to show their progress toward defined strategic goals	TBD	TBD
17 - Electronic suggestion box	allow identification of innovation and continuous improvement of the organization	capturing ideas and continuous improvement suggestions	TBD	.net SQL
18 - SMS info and communication channel	alert the registered entities of the payments by SMS	less entities going to contentious	TBD	.net SQL
19 - Electronic signature (National card)	ERS collaborators and its managers to digital sign the ERS documents	digital sign the ERS documents	TBD	TBD
20 - Workflow tool (a new one)	There is the possibility to analyze competing tools to find one that can substitute the actual	substitute the actual	TBD	TBD
21 - Data-warehouse	study statistically the entities and their related information	allow competition studies, fraud detection, etc	TBD	TBD

Support applications

The applications that we identified as support applications are:

• 22 - ERS Intranet – ERS intranet has to be improved in order to facilitate it has a channel for the board and its directors to communicate to the departments and to all ERS collaborators. The way RID (media news that are published inside ERS) are displayed should be reviewed in a way that each time there are news they are classified and entered in to a repository. This repository will work as a knowledge base and soon will become a large source for information to be used by ERS collaborators. This same information could be made available for website searches by keyword or topics.

• 23 – Accounting – ERS accounting tool is outdated and limited. There should be an analysis of those in the market that can replace this one using its data and that are easy to use.

• 24 - Human Resource Management – ERS HR tool is outdated and limited. There should be an analysis of those in the market that can replace this one using its data and that are easy to use.

• 25 - Stock Management – ERS needs a tool for stock management. There should be an analysis of those in the market that can replace this one using its data and that are easy to use.

• 26 - Avaya phone central management – ERS is using a limited amount of the potential of the Avaya tool. It could be used in order to register the number of calls made by the call center, automatic number recognition, the classification of the calls, etc. It could be a good tool to identify times where there is massive number of contacts, in order to understand the trends and plan in advance that seasonal or expected exceptional number of contacts.

In table 5 is shown a resume about the support applications. We don't identify weak and strong points since they haven't yet been developed, expect the intranet (identified and described above as item 22 – ERS Intranet).

Table 9 - Support applications descriptions, opportunities, suppliers and technologies

	Application	O	Suppliers	Technologies
22 - ERS Intranet	channel for the board and its directors to communicate to the departments and to all ERS collaborators	This repository will work as a knowledge base and soon will become a large source for information		
23 - Accounting	ERS accounting tool	ERS accounting tool is outdated and limited	TBD	TBD
24 - Human Resource Management	ERS HR tool	ERS HR tool is outdated and limited	TBD	TBD
25 - Stock Management	tool for stock management.	ERS needs a tool for stock management	TBD	TBD
26 - Avaya phone central management	Software for call control and management	tool to identify times where there is massive number of contacts	TBD	TBD

Applications that could be developed, are planned to be developed or are being developed were identified in Figure 44 (total of 25 applications or improvements identified). By crossing this information from Mcfarlan application portfolio with the level of importance for the organization we can achieve an interesting analysis. The purpose is to see which are the applications that are most important for the business that have not being studied or planned yet just because they are not urgent.

Application priority by main relevant stakeholders

ERS is the entity responsible for regulation and supervision of the Portuguese health care sector. For that purpose it has to manage large quantities of information with a limited amount of human resources. The youth of this organization, together with the difficulty to identify and define its own processes and the size and diversity of the market of health, are as well a challenge for the organization has mentioned in the introduction of the ISSP.

Having in mind these limits, is proposed an improvement plan for the Organization based on the optimization of its Information System. That will also include a better integration for the existing system and the development of new applications that are critic for the business.

It's important to remember that ERS scope includes the regulation and the supervision of the health care providers in terms of its establishments, institutions and services, in respect of the legal and contractual obligations these entities have.

New applications will help ERS in guarantying and supervise:
-Observation of the levels of quality of the health care services provided by the regulated entities
-The access of the users to the health care
-Security and rights of the users of the health care services

Always having in mind that: the right to health is written in the constitution as one of the fundamental rights: "The state has priority to assure the right to health and to guaranty the access to all citizens, independently of their economic condition, to preventive health care, cure and rehabilitation."

We identified for each application its different targets in terms of stakeholders and their direct use of these applications:

- Internal use
- External use

- Citizens
- Regulated entities

- Both (internal and external use)

For each target we analyzed the importance and the result is show in Figure 74, in the columns priorities for (regulated) entities, priority for the public and priority for ERS (internal use). By identifying individual priorities and combining them into a final joint (average) priority (classified as 1-Essential, 2-Very high, 3-High, 4-Medium and 5-Low). The goal of this classification was to guarantee the integration of the different perspectives of the most relevant stakeholders by having their voices and perspectives in setting the priority.

	ID	Mcfarlan	Priority entities	Priority Public	Priority for ERS	Final priority
1 - Registry Entities System – SRER	1	1-Critical	1	1	1	1,00
2 - Content & workflow Management - ownet	2	1-Critical			1	1,00
3 - On-line health care services complain - SR	3	1-Critical	1	1	2	1,33
4 - Health care indicator of quality of service - HQual	4	2-Strategic	3	1	2	2,00
5 - Monitor	5	2-Strategic			1	1,00
6 - CRM - Customer Relation Toll	6	2-Strategic			3	3,00
7 - Integrated national online complain system	7	2-Strategic	3	1	1	1,67
8 - Online Forms System	8	2-Strategic	3	4	2	3,00
9 - Geo-referenced Studies - GIS platform	9	2-Strategic			3	3,00
10 - Waiting list online indicators	10	2-Strategic	5	2	1	2,67
11 - Business Intelligence	11	2-Strategic			3	3,00
12 - Automatic pre-register by Minister Finance online company creation	12	2-Strategic	1	5	3	3,00
13 - Web geo-referenced search	13	2-Strategic	1	1	3	1,67
14 - Search news by topic and entity	14	3-High Potentia	3	2	4	3,00
15 - Automatic phone response system	15	3-High Potential			4	4,00
16 - BSC - Balance scorecard system	16	3-High Potential			4	4,00
17 - Electronic suggestion box	17	3-High Potential			4	4,00
18 - SMS info and communication channel	18	3-High Potentia	3	1	4	2,67
19 - Electronic signature (National card)	19	3-High Potential			4	4,00
20 - Workflow tool (a new one)	20	3-High Potential			3	3,00
21 - Data-warehouse	21	3-High Potential			4	4,00
22 - ERS Intranet	22	4-Support			4	4,00
23 - Accounting	23	4-Support			5	5,00
24 - Human Resource Management	24	4-Support			5	5,00
25 - Stock Management	25	4-Support			5	5,00
26 - Avaya phone central management	26	4-Support			5	5,00

Figure 74 - Priority analysis for ERS Mcfarlan application portfolio

After having defined the different priorities from the stakeholders that use the applications a final priority for each application is defined as the Figure 105 shows.

Application size

We analyzed the applications size (which is directly related to the time of implementation) and its impact to ERS as show in Figure 75. Then we reviewed this size/cost of implementation with our current suppliers to adjust to the numbers according to their toughs. Size is defined as 1-Very big (more than 9 months); 2-Big (more than 3 months and less than 9 months); 3-Medium (more than 2 weeks and less than 3 months); 4-Small (more than 3 days and less than 2 weeks); and 5-Very small (less than 3 days);

Application impact

We analyzed the applications impact to ERS as show in Figure 46. Then we reviewed this classification with the board and other relevant stakeholders and adjusted accordingly. Impact was defined, as the impact for ERS work and its visibility: 1-Very big; 2-Big; 3-Medium; 4-Small; 5-Very small

Application final importance

The resulting final importance is a combination of the importance of these three factors (see figure 106):

- Priority
- Size
- Impact

So the most important, would be a combination of a high priority, with a small size and a big impact for ERS (as we chose equal weights).

	ID	Mcfarlan	Final priority	Size /cost	Impact for ERS	Final Importance
1 - Registry Entities System – SRER	1	1-Critical	1,00	2,00	2	45
2 - Content & workflow Management - ownet	2	1-Critical	1,00	3,00	3	45
3 - On-line health care services complain - SR	3	1-Critical	1,33	2,00	1	48
4 - Health care indicator of quality of service - HQual	4	2-Strategic	2,00	1,00	1	40
5 - Monitor	5	2-Strategic	1,00	1,00	1	45
6 - CRM - Customer Relation Toll	6	2-Strategic	3,00	3,00	2	40
7 - Integrated national online complain system	7	2-Strategic	1,67	2,00	1	47
8 - Online Forms System	8	2-Strategic	3,00	3,00	2	40
9 - Geo-referenced Studies - GIS platform	9	2-Strategic	3,00	2,00	3	30
10 - Waiting list online indicators	10	2-Strategic	2,67	1,00	1	37
11 - Business Intelligence	11	2-Strategic	3,00	2,00	4	25
12 - Automatic pre-register by Minister Finance online company creation	12	2-Strategic	3,00	4,00	2	45
13 - Web geo-referenced search	13	2-Strategic	1,67	4,00	3	47
14 - Search news by topic and entity	14	3-High Potentia	3,00	4,00	3	40
15 - Automatic phone response system	15	3-High Potentia	4,00	2,00	4	20
16 - BSC - Balance scorecard system	16	3-High Potentia	4,00	3,00	3	30
17 - Electronic suggestion box	17	3-High Potentia	4,00	4,00	4	30
18 - SMS info and communication channel	18	3-High Potentia	2,67	4,00	3	42
19 - Electronic signature (National card)	19	3-High Potentia	4,00	2,00	4	20
20 - Workflow tool (a new one)	20	3-High Potentia	3,00	2,00	4	25
21 - Data-warehouse	21	3-High Potentia	4,00	3,00	3	30
22 - ERS Intranet	22	4-Support	4,00	3,00	4	25
23 - Accounting	23	4-Support	5,00	3,00	5	15
24 - Human Resource Management	24	4-Support	5,00	3,00	5	15
25 - Stock Management	25	4-Support	5,00	3,00	5	15
26 - Avaya phone central management	26	4-Support	5,00	2,00	5	10

Figure 75 - Final application importance - combined from its Priority, Size and Impact

After achieving this list, values where adjusted often, in order to achieve the correct balance. Final importance is a good indicator to use for as the basis of planning to short, medium and long term, with some adjustments – see Figure 107, for example:

- A very light size/cost with medium cost turns to have higher importance due to low implementation effort that is needed to implement it. So that light cost applications go up in the placement terms of the final importance, even if they are not critic application in our portfolio. For example these 3 applications: 12 - Automatic pre-register by Minister Finance online company creation, 13 - Web geo-referenced search and 14 - Search news by topic and entity are rising in this lists and they can be seen in the column final importance as outliers (with 45, 47 and 40 points).
- Another conclusion are that there are heavy cost applications, such as 9 - Geo-referenced Studies - GIS platform; 11 - Business Intelligence and 15 - Automatic phone response system, which their final importance tends to decreases when compared to other applications with the same priority but more inexpensive. So in this case available budget will dictate when they are going to be done. In case there is budget we would follow the initial priority, otherwise these were candidate applications to be delayed to a medium or longer term as we think is the case.

	ID	Mcfarlan	Final priority	Size /cost	Impact for ERS	Final Importance	Short, medium or long term
1 - Registry Entities System – SRER	1	1-Critical	1,00	2,00	2	45	1-Short term
2 - Content & workflow Management - ownet	2	1-Critical	1,00	3,00	3	45	1-Short term
3 - On-line health care services complain - SR	3	1-Critical	1,33	2,00	1	48	1-Short term
4 - Health care indicator of quality of service - HQual	4	2-Strategic	2,00	1,00	1	40	1-Short term
5 - Monitor	5	2-Strategic	1,00	1,00	1	45	1-Short term
6 - CRM - Customer Relation Toll	6	2-Strategic	3,00	3,00	2	40	1-Short term
7 - Integrated national online complain system	7	2-Strategic	1,67	2,00	1	47	1-Short term
8 - Online Forms System	8	2-Strategic	3,00	3,00	2	40	1-Short term
9 - Geo-referenced Studies - GIS platform	9	2-Strategic	3,00	2,00	3	30	2-Medium term
10 - Waiting list online indicators	10	2-Strategic	2,67	1,00	1	37	2-Medium term
11 - Business Intelligence	11	2-Strategic	3,00	2,00	4	25	2-Medium term
12 - Automatic pre-register by Minister Finance online company creation	12	2-Strategic	3,00	4,00	2	45	1-Short term
13 - Web geo-referenced search	13	2-Strategic	1,67	4,00	3	47	1-Short term
14 - Search news by topic and entity	14	3-High Potentia	3,00	4,00	3	40	1-Short term
15 - Automatic phone response system	15	3-High Potentia	4,00	2,00	4	20	3-Long term
16 - BSC - Balance scorecard system	16	3-High Potentia	4,00	3,00	3	30	2-Medium term
17 - Electronic suggestion box	17	3-High Potentia	4,00	4,00	4	30	2-Medium term
18 - SMS info and communication channel	18	3-High Potentia	2,67	4,00	3	42	1-Short term
19 - Electronic signature (National card)	19	3-High Potentia	4,00	2,00	4	20	3-Long term
20 - Workflow tool (a new one)	20	3-High Potentia	3,00	2,00	4	25	3-Long term
21 - Data-warehouse	21	3-High Potentia	4,00	3,00	3	30	2-Medium term
22 - ERS Intranet	22	4-Support	4,00	3,00	4	25	3-Long term
23 - Accounting	23	4-Support	5,00	3,00	5	15	3-Long term
24 - Human Resource Management	24	4-Support	5,00	3,00	5	15	3-Long term
25 - Stock Management	25	4-Support	5,00	3,00	5	15	3-Long term
26 - Avaya phone central management	26	4-Support	5,00	2,00	5	10	3-Long term

Figure 76 - ERS applications prioritization to Short, medium and long term

From the resulting prioritization step according to their sorted final importance we came up to a list that we grouped into a list of applications to be developed/outsourced in short, medium and long terms – see Figure 107.

	ID	Mcfarlan	Final Importance	Short, medium or long term
1 - Registry Entities System – SRER	1	1-Critical	45	1-Short term
2 - Content & workflow Management - ownet	2	1-Critical	45	1-Short term
3 - On-line health care services complain - SR	3	1-Critical	48	1-Short term
4 - Health care indicator of quality of service - HQual	4	2-Strategic	40	1-Short term
5 - Monitor	5	2-Strategic	45	1-Short term
6 - CRM - Customer Relation Toll	6	2-Strategic	40	1-Short term
7 - Integrated national online complain system	7	2-Strategic	47	1-Short term
8 - Online Forms System	8	2-Strategic	40	1-Short term
12 - Automatic pre-register by Minister Finance online company creation	12	2-Strategic	45	1-Short term
13 - Web geo-referenced search	13	2-Strategic	47	1-Short term
14 - Search news by topic and entity	14	3-High Potential	40	1-Short term
18 - SMS info and communication channel	18	3-High Potential	42	1-Short term
9 - Geo-referenced Studies - GIS platform	9	2-Strategic	30	2-Medium term
10 - Waiting list online indicators	10	2-Strategic	37	2-Medium term
11 - Business Intelligence	11	2-Strategic	25	2-Medium term
16 - BSC - Balance scorecard system	16	3-High Potential	30	2-Medium term
17 - Electronic suggestion box	17	3-High Potential	30	2-Medium term
21 - Data-warehouse	21	3-High Potential	30	2-Medium term
15 - Automatic phone response system	15	3-High Potential	20	3-Long term
19 - Electronic signature (National card)	19	3-High Potential	20	3-Long term
20 - Workflow tool (a new one)	20	3-High Potential	25	3-Long term
22 - ERS Intranet	22	4-Support	25	3-Long term
23 - Accounting	23	4-Support	15	3-Long term
24 - Human Resource Management	24	4-Support	15	3-Long term
25 - Stock Management	25	4-Support	15	3-Long term
26 - Avaya phone central management	26	4-Support	10	3-Long term

Figure 77 - Prioritization in terms of short, medium and long term – reorganized

Application overview – Proposed pyramidal analysis

As shown in Figure 78 the applications work at different levels of information. From the highest levels the strategic information supports the board level with information for high level decisions that drive the strategy of the organization. Then at operational and department management level we identify applications that help the daily management tasks – such as department and individual performance, bottlenecks and workload distribution. At the individual level we deal with applications that help achieving individual non-management tasks in line with the responsibilities of these individuals.

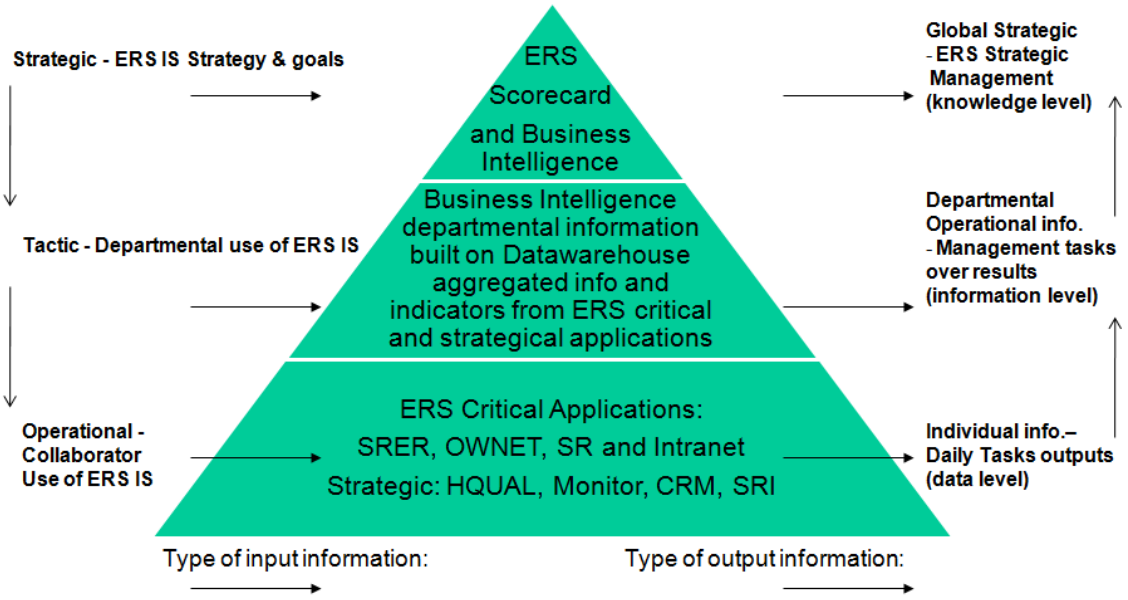


Figure 78 – ERS IS organization expected use by hierarchy – Proposed pyramidal Analysis

The goal of this pyramidal view is to be sure we are not forgetting or minimizing the applications and information needs of the different levels of the organization.

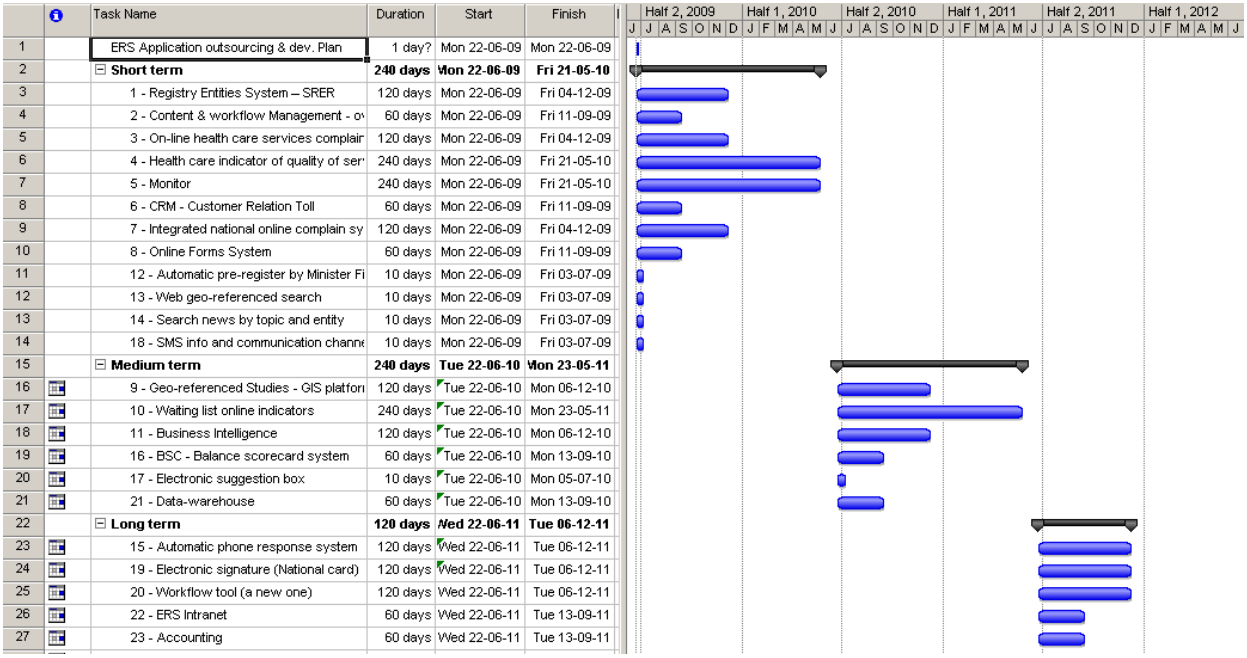
One conclusion we draw from doing this analysis to ERS, was that there is need to develop applications to support the management and board level in management and strategically tasks and decisions – such as on-line real-time dashboards for departmental and organization performance. We find that ERS has good critical applications but lack applications that are able to work with the processes ground data transforming it into information and into knowledge for the board to make more informed decisions and optimizations of its departments and workforces.

7.2 Time plan – application scheduling

We divide the evolution plan in the 3 following phases:

- Short term – next 12 months
- Medium term – from 12 months to 24 months
- Long term – more than 24 months

The result of this division is reflected in Figure 110 which reflects a simple direct mapping to 3 cycles that reflect the short, medium and long term.



	Task Name	Duration	Start	Finish
1	ERS Application outsourcing & dev. Plan	1 day?	Mon 22-06-09	Mon 22-06-09
2	**Short term**	**240 days**	**Mon 22-06-09**	**Fri 21-05-10**
3	1 - Registry Entities System – SRER	120 days	Mon 22-06-09	Fri 04-12-09
4	2 - Content & workflow Management - o	60 days	Mon 22-06-09	Fri 11-09-09
5	3 - On-line health care services complair	120 days	Mon 22-06-09	Fri 04-12-09
6	4 - Health care indicator of quality of ser	240 days	Mon 22-06-09	Fri 21-05-10
7	5 - Monitor	240 days	Mon 22-06-09	Fri 21-05-10
8	6 - CRM - Customer Relation Toll	60 days	Mon 22-06-09	Fri 11-09-09
9	7 - Integrated national online complain sy	120 days	Mon 22-06-09	Fri 04-12-09
10	8 - Online Forms System	60 days	Mon 22-06-09	Fri 11-09-09
11	12 - Automatic pre-register by Minister Fi	10 days	Mon 22-06-09	Fri 03-07-09
12	13 - Web geo-referenced search	10 days	Mon 22-06-09	Fri 03-07-09
13	14 - Search news by topic and entity	10 days	Mon 22-06-09	Fri 03-07-09
14	18 - SMS info and communication channe	10 days	Mon 22-06-09	Fri 03-07-09
15	**Medium term**	**240 days**	**Tue 22-06-10**	**Mon 23-05-11**
16	9 - Geo-referenced Studies - GIS platfor	120 days	Tue 22-06-10	Mon 06-12-10
17	10 - Waiting list online indicators	240 days	Tue 22-06-10	Mon 23-05-11
18	11 - Business Intelligence	120 days	Tue 22-06-10	Mon 06-12-10
19	16 - BSC - Balance scorecard system	60 days	Tue 22-06-10	Mon 13-09-10
20	17 - Electronic suggestion box	10 days	Tue 22-06-10	Mon 05-07-10
21	21 - Data-warehouse	60 days	Tue 22-06-10	Mon 13-09-10
22	**Long term**	**120 days**	**Wed 22-06-11**	**Tue 06-12-11**
23	15 - Automatic phone response system	120 days	Wed 22-06-11	Tue 06-12-11
24	19 - Electronic signature (National card)	120 days	Wed 22-06-11	Tue 06-12-11
25	20 - Workflow tool (a new one)	120 days	Wed 22-06-11	Tue 06-12-11
26	22 - ERS Intranet	60 days	Wed 22-06-11	Tue 13-09-11
27	23 - Accounting	60 days	Wed 22-06-11	Tue 13-09-11

Figure 79 - Short, medium and long term outsourcing and development plans for ERS IS

This is a five year plan that should be revisited at least every year. Depending on ERS liquidity adjustments could be made. For instance, in case there is enough budget investments could be made to implement some of the applications sooner or in a short term using more resources. The applications are shown in parallel in figure 79, because they can be implemented in parallel by different suppliers. Still some small and related applications will be aggregated to form substantial size projects.

Short term

A very important thing is to concentrate on the integration of the existing critical applications: SRER, OWNET and SR.

In terms of planning and development/outsourcing we should concentrate mostly on the planning of application that is critic to the business, still some strategic applications should be developed. Here follows the list for short term development according to Figure 57:

Critical applications:

- 1 - Registry Entities System – SRER
- 2 - Content & workflow Management – ownet
- 3 - On-line health care services complain - SR

- Strategic Applications:
- 4 - Health care indicator of quality of service – Hqual
- 5 - Monitor
- 6 - CRM - Customer Relation Toll
- 7 - Integrated national online complain system

- 8 - Online Forms System
- 12 - Automatic pre-register by Minister Finance online company creation
- 13 - Web geo-referenced search

High potential applications:

- 14 - Search news by topic and entity
- 18 - SMS info and communication channel

Medium term

Concentrate in the planning of applications which are strategic for the business that were not covered in phase 1 and some of the high potential applications, as shown in Figure 57, are:

- 9 - Geo-referenced Studies - GIS platform
- 10 - Waiting list online indicators
- 11 - Business Intelligence
- 16 - BSC - Balance scorecard system
- 17 - Electronic suggestion box
- 21 - Data-warehouse

Long term

-Concentrate on planning the application which have high potential or are support applications:

-High Potential applications:

- 15 - Automatic phone response system
- 19 - Electronic signature (National card)
- 20 - Workflow tool (a new one)

-Support applications:

- 22 - ERS Intranet
- 23 - Accounting
- 24 - Human Resource Management
- 25 - Stock Management
- 26 - Avaya phone central management

The chosen plan results from a compromise from what the organization needs and what is possible to acquire, from a financial perspective and the level of workload in terms of work/effort with internal resources.

7.3 Conclusions about ISSP scheduling

The organization faces problems:

- Large quantities of information with limited number of qualified human resources
- Youth of the organization and in the difficulty to identify and define its own processes, in the vast universe of health care market.

The improvement of the Information System is an opportunity for the organization to reposition in a way it can face problems in a more integrated way.

It was with analysis of ERS context, its actual IS and other business strategy tools it was possible to identify problems that will be attacked with the implementation or the evolution of existing critical and strategical applications for ERS business. These applications and their integration with the existing system are the leitmotiv of the Dissertation.

The goal of this ISSP is to propose a consistent and gradual improvement plan for ERS IS by defining and new tool needs in an integrated way, focusing not only the critic applications - SRER, OWNET and SR – and their integration, but also by identifying strategic applications that will work as competitive advantages for ERS.

From the strategic applications in the ISSP we would like to highlight the following for their high impact both on the user, government, media, regulated entities and on ERS itself: 4 - Health care indicator of quality of service - HQual; 5 – Monitor; 7 - Integrated national online complain system; 10 - Waiting list online indicators.

I would like to remark the goal of these critical applications and the impact they have for ERS as shown in Figure 80.

Critical Application	ERS organization Goal	Application Goal	Impact
4 - Health care indicator of quality of service- Hqual	Observation of the quality levels	Hqual - will be a system for evaluation of the quality of services that will give the general public a simplified, transparent and objective knowledge of the ratings of quality in the health care services provided by the registered entities. The evaluation system will use standardized indicators, clustering information about these indicators in a simple and easy way for public reading. This information will be available and searchable in ERS portal.	Allow citizens, health care providers, government and ERS to see indicators of quality for establishment and services provided
5 - Monitor	The access to all users to the health care	Monitor will be designed for monitoring and detecting practices of systematic selection of patients. Discrimination of patients put at risk the guaranty of universal and equitative access to the health care service users, so there is need to develop a powerful tool that allows the monitorization of acquired data to find systematic discrimination behavior.	Allow to find illegal discrimination of access to users of health care services in Portugal -
7 - Integrated national online complain system - SRI	To ensure security and rights of the users	SRI will be built integrating ERS existing complain system for private entities linking to other complain national system, in a way that there is only one single and efficient gateway to all health care services issues. This application will be responsible for automatic and selection of complains for manual triage of all the issues to all relevant health care related organizations in a efficient and effective way. It will have a workflow with indicators that allow detection of bottlenecks and optimization of processes, including communication with other private and public entities.	Insure that complains are taken care, in the most effective and efficient way in order to increase the quality of health care services in Portugal
10 - Waiting list online indicators – TE	Observation of the quality levels	TE will be a online Indicators integrated systems that collects information from the health care providers establishments for different types of health care services. It will be integrated with health care providers IS in a way that it shows the estimated time of waiting for a given surgery or consult in a specific location/establishment. This will allow patients to know what time on average to expect for a specific health care service in a specific establishment. This is a step toward user knowledge and freedom of the patient for an informed decision in health care services, as patients will be able to also search for providers based on waiting lists.	Insure optimization of health care system as a whole by giving visibility for high performance health care providers and giving users the option to choose waiting for a service in a informed way in a specific establishment

Figure 80 - Impact of most important strategic applications to ERS

From these four identified critical applications we estimated what the impact would be:

- To allow stakeholders to see indicators of quality for establishment and services provided – Application 4 - Health care indicator of quality of service- Hqual)

- Find illegal discrimination or other difficulties of access of users to health care services - Application 5 – Monitor
- To insure that all health care services complains are taken care in a integrated and efficient way - Application 7 - Integrated national online complain system - SRI
- Give visibility to health care provider's performances– Application 10 - Waiting list online indicators – TE

The intent of ERS ISSP is to align the IS strategic plan with ERS goals. As was shown all the benefits from these strategic applications are in line with the goal of ERS existence to try to give ERS sustained competitive advantages, so we strongly recommend that they are implemented in the short term and as soon as possible.

The goal of this document and work was to help ERS understanding where it stood in terms of Information System, to help defining where it wanted to go, and to choose a good path to go there. The ISSP defined here is ready to be implemented at ERS in a way that it prepares the organization for the possible future scenario giving it time to plan for them and to position itself towards the health care and regulators ecosystems.

We believe the outlined time plan in the ISSP is suitable for ERS to have a powerful IS that supports its activities in regulation and supervision of the health care sector. It's not enough to do what ERS does today better, faster or cheaper. ERS context evolves fast and ERS doesn't want to be a redundant organization. ERS has to define its border, the IS evolution is a good way to define better its border, reposition and to make it a public reference and a case of success in the public sector.

To give ground for a strong image based not just on being better, but also being innovative, caring about the citizen and achieving competitive advantages that can on give added value to its stakeholders and so ERS IS can support further ERS mission.

9.Conclusions and future work

Our problem was to define an ISSP methodology adapted to fit organizations, such as ERS, which have a small internal IS team, to deal with large quantities of information from different sources; do outsourcing of all IS development to a number of suppliers; and to lower fixed costs. All this outsourcing to different suppliers poses challenges, because none of them has the whole picture, which makes it a problem to develop medium-long-term plans in a consistent, integrated and innovative way. One of the reasons suppliers focus on the short and medium term is that the client often buys his services for development of IS solutions by mostly looking to the price criteria. That means to buy the cheapest solution—even if sometimes it lacks quality—is inefficient, not integrated or interoperable. There is a risk in buying the cheapest, trying to have the maximum quality and still wanting it to fit into a rich set of applications if we don't have a clear ISSP.

We have chosen and adapted an ISSP methodology that fits our intended approach: Three stages of IS planning. We believe ISSPs require deep knowledge of the organization and of its business context. For this reason, in our approach we start by looking in detail at the organization. Then we do a strategic analysis of the sector. We look into forecasts, trends and scenarios, using a group of business analysis techniques such as: PEST analysis; Porter Five Forces analysis; SWOT analysis; Value Network; Critical Success Factors; and the Balanced Scorecard to identify a group of important conclusions for the organization IS and for the ISSP. Following the business context analysis, we define clearly the IS strategy choices and an ideal scenario. Then we do an analysis of the characterization of the IS, by looking at which are the organization processes, its information requirements, and how IS supports its processes, thereby identifying the main concepts of the organization business and the information architecture model. We do an application portfolio analysis to identify our applications and categorize them into a business's critical, strategic, high potential and support applications. Then we take into account all the collected information to identify changes to the actual applications. The changes included an improvement in existing applications or the development of new applications. Following that, we prioritizated and scheduled these applications into short-, medium- and long-term programs. We set these into incremental ISSPs. This is followed by verification, which helps us see if we are doing the job correctly (verification) and if the produced artifacts are in accordance with the ISSP project's scope and goals. Finally, the validation phase ensures that we are doing the appropriate work (validation) by comparing ISSPs with the stakeholders' expectations. Then we have to ensure that the stakeholders' needs are fulfilled with the ISSP and whether it is feasible to start the implementation. It is critical to have a formal approval by the most relevant stakeholders.

In this Dissertation we show how we applied this methodology to ERS to define ERS's ISSP.

The goal of the ISSP was to help ERS understand where it stood in terms of an Information System, to help define where it wanted to go, and to choose the ideal path to get there. The ISSP defined here is ready to be implemented at ERS in a way that it prepares the organization for future scenarios giving it time to plan for them and to position itself towards health care and regulators ecosystems.

After the elaboration of ISSP, by following the defined methodology divided in phases in strong articulation, we conclude that ISSP ERS has all the conditions to accomplish its goals, to make ERS IS a reference IS, as well as to position itself nationally in the health sector, in a constant refreshment by following the context with the goal of being a leader in the evolution of the health sector.

Still we know that there are more technology and applications to analyze and research. There will always be more, because technology and Information Systems are always changing, always evolving.

The applications identified in this ISSP is by a Mcfarlan analysis, because critical applications are where the organization relies for its success at the moment. In ERS where these are already in place, they form the foundation for most of the rest of the applications because they are the central pieces of the ERS IS puzzle. The critical applications require improvements that were identified with higher priority in the ISSP plan and should be the first ones to be implemented.

The strategic applications are those that the future success of the organization will rely on, that will bring new capacities, new tools for the organization to be more efficient and effective, to differentiate itself by creating competitive advantages. By efficient, we mean having a high ratio of output to input; which means working or producing with a minimum of waste. In contrast, by effective we mean producing or capable of producing an intended result.

Some of those were considered as high priority and are recommended to be implemented in the short term.

The high potential applications are those applications in which we don't know if the future of the organization will depend on them, but there is potential for that to happen. Those identified applications have different timings for implementation. including, those with the lower cost, higher priority for stakeholders and higher impact for ERS. The most costly ones, with less importance for the stakeholders and with the least impact on ERS are a lower priority in the long term.

The support applications are the important but non-critical applications for the business. In this last category, we included all the applications that work at the moment but are outdated and sooner or later have to be replaced.

The next step is to validate the ISSP to the most relevant stakeholder, namely the ERS board, to step into the implementation phase, where it is necessary to follow the normal procedures of software acquisition in a public entity.

The importance of independent regulators is clear on the European continent. It comes with the end of public monopolies, regulation of the market, allowing new private operators and the need to supervise competition. Independent regulators supervise and regulate operators in both private and public sector. Today, regulators are considered increasingly important, but they need to show added value and clear results.

ERS role is growing in importance and in responsibility, so it requires powerful tools to gather and treat large amounts of information. The definition of an ISSP is an important step in that direction, so information is treated in a consistent and integrated way.

We expect that in September 2009 the implementation of this ISSP will begin, which we think is in line with goals of egovernment initiatives around Europe, following the spirit of the

Treaty of Lisbon: "Will provide the EU with modern institutions and optimized working methods to tackle both efficiently and effectively today's challenges in today's world. (...) The Treaty of Lisbon will reinforce (…) EU and its capacity to promote the interests of its citizens on a day-to-day basis."

We believe the outlined ISSP is capable of providing a plan for ERS to have a powerful IS that supports its activities in regulation and supervision of the health care sector. It's not enough to do what ERS does today better, faster or cheaper. The ERS context evolves fast and ERS doesn't want to be a redundant organization. , for that purpose it has to define its own borders, The IS evolution is a good way to define its border and to make it a public reference and a case of success in the public sector. For that reason and to provide a foundation for a strong image based not just on being better but also on being different—thus achieving further competitive advantages in a innovative way—ERS support furthers its goals and missions, ultimately benefiting stakeholders.

We believe that this ISSP ERS will enrich the knowledge available about the health sector, will promote competition in the market and give the citizen the opportunity to have access to relevant information and to make informed choices in its use of health care services.

8.1 Goal satisfaction

The goal of this work was to identify an ISSP methodology to help organizations by first understanding where they stand in terms of organization context, to do a strategic analysis to the organization and its information system, to define where the organization wants to get to, detailing the IS and choosing a strategic path and defining a plan to get there.

Dissertation goals were the following:

1- Define an ISSP methodology and a set of guidelines adapted to fit organizations that have a small internal IS team, deal with large quantities of information from different sources; do outsourcing of all IS development to a number of suppliers and have lower fixed costs.

2- Apply ISSP methodology to a study case by defining an ISSP plan for incremental improvements to the organization IS, so the organization can go further in the accomplishment of its goals.

All these goals where accomplished, by defining an ISSP methodology, implementing it to ERS's case, which led to the definition of the ERS ISSP.

Contributions

The major contributions of this work to the related research areas were:

- Bibliographic revision on information system strategic planning (see Chapter 2);
- Adaptation of *Three stages of IS planning* methodology and application to a very practical case – ERS:
  - -Detailed description of an organization context – ERS (see Chapter 3);
  - -Detailed application of business and technological environment analyses to ERS (see Chapter 4);
  - -Detailed application of organization strategic analyses to ERS (see Chapter 5)
  - -Detailed application of strategy definition steps to ERS (see Chapter 6);
- Detailed analysis of an Information System and its information needs (see Chapter 7);
- Systematic steps for classifying and prioritizing applications in for defining a development/implementation plan (see chapter 8).

8.2 Future work

In the case study

It's now necessary to go back to ERS and present the findings for validation:

-In the validation phase, we need to check if we are doing the job correctly, and we need to compare the ISSP plan with stakeholders' needs. We must ensure that the stakeholders' needs are fulfilled and, if possible, move on.

We check the whole set of ISSP deliverables for: misunderstandings; clerical errors; to ensure that it is unambiguous, complete, verifiable, and consistent.

We should define which validation techniques should be used to validate ISSP with the stakeholders, e.g.: checklists; reviews; formal reviews/inspections; and prototyping/simulation.

Several iterations to improve this plan should be done after inconsistencies or disagreement is found in the validation phase. Also, we have to take into account that the reality keeps on changing and next week a new law or regulation may require reshaping ERS IS. One example of this is the law that changes the ERS statutes that became active on June 27, Decreto-Lei n. 127/2009, at the time this work was being completed.

In terms of methodology

In this section, we list some directions for future work:

-We should do a mapping of the acquisition process to CMMI acquisitions methodology from Software Engineering Institute.

-We should do a mapping of some of the process areas in CMMI services, with the methodology phases defined here in order to include the services strategy and services definition and rollout in the ISSP.

-Apply the defined methodology to other similar public entities and then find out which techniques are necessary in case the person elaborating the ISSP is not part of the assessed organization and has limited knowledge. This will put special requirements on the ISSP and best techniques must be identified, such as good elicitation techniques.

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10. Annex 1– Rules of mandatory registry of entities (in Portuguese)

REGRAS DO REGISTO OBRIGATÓRIO DAS ENTIDADES PREVISTAS NO

DECRETO-LEI Nº 309/2003, DE 10 DEZEMBRO

(*Texto integral* – Portaria nº 38/2006 de 06 de Janeiro com as alterações introduzidas pela Portaria, nesta data, assinada por sua Excelência o Ministro da Saúde, aguardando apenas publicação em Diário da República, o que se prevê que ocorra nos próximos dias).

CAPÍTULO I

Disposições gerais

Artigo 1º

Âmbito

O presente diploma estabelece as regras do registo obrigatório e do pagamento das correspondentes taxas a que estão sujeitos os operadores previstos no artigo 8º do Decreto-Lei nº 309/2003, de 10 de Dezembro, e define os critérios e cálculos das taxas de registo.

Artigo 2º

Definições

Para os efeitos do disposto no presente diploma, entende-se por:

a) «Inscrição» a criação de um número de registo, atribuído pela Entidade Reguladora da Saúde (ERS);

b) «Registo» a identificação actualizada das entidades no sistema de informação da ERS, incluindo os averbamentos a que haja lugar;

c) «Entidade» pessoa singular ou colectiva que tutela, gere ou detém estabelecimento onde são prestados cuidados de saúde;

d) «Estabelecimento» toda a instalação, de carácter fixo e permanente, onde seja exercida, de modo habitual e profissional, a actividade de prestação de cuidados de saúde;

e) «Serviço» a unidade funcional que presta cuidados de saúde específicos no estabelecimento.

CAPÍTULO II

Supervisão

Artigo 3º

Obrigatoriedade do registo

1— Estão obrigadas a requerer o registo todas as entidades abrangidas pelo artigo 1º do presente diploma.

2— As entidades que já exerçam a sua actividade no momento da entrada em vigor da presente portaria devem requerer o respectivo registo até 30 de Junho de 2006, sob pena de aplicação das medidas e sanções legalmente previstas.

3— As entidades que iniciem a sua actividade após a entrada em vigor desta portaria devem proceder ao registo no prazo de 90 dias corridos contados a partir da data da sua constituição.

Artigo 4º

Elementos sujeitos a registo

1— Estão sujeitos a registo obrigatório todos os elementos considerados, pela ERS, como relevantes para uma correcta identificação dos operadores, nomeadamente:

a) Identificação completa da entidade;

b) Acto constitutivo da entidade;

c) Identificação dos titulares das participações sociais da entidade;

d) Corpos sociais da entidade;

e) Identificação dos diversos estabelecimentos detidos ou coordenados pela entidade;

f) Identificação dos responsáveis técnicos dos estabelecimentos e seus serviços;

g) Contratos de gestão, acordos e convenções, em que cada entidade e ou os seus estabelecimentos estejam envolvidos.

2— As pessoas singulares estão dispensadas dos elementos constantes das alíneas

b), c), d) e f) do número anterior.

Artigo 5º

Inscrição

1— O registo é suportado e processar-se-á no *website* da ERS, e os procedimentos para a sua efectivação, após a atribuição à entidade de um acesso personalizado, seguro e confidencial, iniciam-se com o preenchimento do formulário de inscrição nele disponível.

2— Todos os documentos comprovativos dos elementos constantes do formulário devem estar disponíveis, a todo o momento, para consulta da ERS.

3— A ERS pode solicitar informação adicional, sempre que tal for julgado oportuno.

4— Após a recepção do formulário de inscrição e o pagamento da respectiva taxa, deve a ERS, no prazo de 30 dias corridos, proferir despacho de rejeição do pedido sempre que o mesmo não preencha as condições exigidas.

5— Findo o prazo referido no número anterior, sem despacho de rejeição por parte da ERS, o registo transforma-se automaticamente em efectivo.

6— Sempre que seja necessário recolher informação de entidades externas à ERS, incluindo da própria entidade a registar, ou qualquer outro tipo de diligência, tal facto será comunicado a esta entidade, reiniciando-se a contagem do prazo do nº 4 supra.

Artigo 6º

Gestão e manutenção do registo

1— Os elementos constantes do registo serão disponibilizados pela ERS para consulta pública no seu *website*, com excepção daqueles que por esta não sejam considerados de interesse público.

2— Sempre que ocorrerem alterações em qualquer dos elementos das entidades registadas que tenham reflexo no registo na ERS, estão aquelas obrigadas a proceder à alteração do registo, nos 30 dias corridos seguintes, nos termos previstos no artigo 5º do presente diploma.

3— Cabe à ERS, no interesse dos utentes e dos operadores referidos no artigo 1º da presente portaria, garantir a actualização do registo obrigatório, tomando todas as medidas necessárias à prossecução deste objectivo.

4— No cumprimento do disposto no número anterior, a ERS pode proceder ao cancelamento do registo que não reúna as condições exigidas, após a notificação da entidade e subsistindo a falta desta, uma vez decorrido o prazo de 15 dias corridos.

Artigo 7º

Certidão comprovativa do registo

1— Todas as entidades registadas deverão afixar, em cada um dos seus estabelecimentos, em local público e bem visível, certidão comprovativa do registo com os elementos referidos no nº 1 do artigo anterior.

2— As entidades registadas podem obter as certidões referidas no número anterior a partir da aplicação informática que suporta os registos na ERS, sem qualquer custo adicional.

CAPÍTULO III

Taxas de registo

Artigo 8º

Taxas de inscrição

1 — Sem prejuízo do disposto no número 4, no acto de inscrição as entidades estão sujeitas ao pagamento de uma taxa calculada segundo a fórmula *TI* = € 900 + € 25 × *NTS*, com um limite mínimo de € 1.000,00 e um limite máximo de € 50.000,00, sendo *TI* a taxa de inscrição e *NTS* o número de técnicos de saúde da entidade proponente no momento da inscrição.

2 — Para os efeitos do disposto no número anterior, consideram-se técnicos de saúde os médicos, médicos dentistas, enfermeiros, farmacêuticos, e técnicos de diagnóstico e terapêutica que exerçam actividade remunerada na entidade proponente, independentemente da natureza do vinculo jurídico de cada um daqueles profissionais com a entidade.

3 — Os técnicos de saúde que exerçam a sua actividade nas farmácias hospitalares não são considerados para os efeitos previstos nos números anteriores.

4 — A taxa de inscrição é reduzida para o valor de € 200,00 no caso de profissionais liberais e associações de doentes legalmente reconhecidas que, comprovadamente, prestem cuidados de saúde em estabelecimento próprio e em regime de tempo de parcial.

5— O pagamento da taxa é efectuado no momento da inscrição, segundo as instruções constantes do formulário, emitindo a ERS o competente recibo de quitação.

6— Não sendo processado o pagamento no acto da inscrição, o registo é considerado como inexistente, sendo os dados eliminados do sistema.

Artigo 9º

Taxas de manutenção

1— Pelos serviços de gestão, manutenção e publicidade do registo, consagrados no artigo 6º deste diploma, e de emissão das certidões previstas no artigo 7º, as entidades registadas deverão pagar uma taxa anual calculada segundo a fórmula *TM* = € 450 +€ 12,50 × *NMTS*, com um limite mínimo de € 500 e um limite máximo de € 25 000, sendo *TM* a taxa de manutenção do registo e *NMTS* o número médio anual de técnicos de saúde, definidos no nº 2 do artigo 8º, correspondente à média aritmética simples do número de técnicos de saúde dos estabelecimentos da entidade registada no final de cada mês do ano civil anterior ao do pagamento.

2— A taxa referida no número anterior é reduzida para € 100,00 no caso de profissionais liberais a associações de doentes legalmente reconhecidas que, comprovadamente, prestem cuidados de saúde em estabelecimento próprio e em regime de tempo parcial.

3— O primeiro pagamento desta taxa vence-se 12 meses após o registo.

4— No dia seguinte ao da data de vencimento do pagamento referido no número anterior, a entidade é notificada para proceder ao mesmo; caso a falta subsista decorridos que sejam 60 dias corridos, o registo é automaticamente cancelado.

5— Para os anos consecutivos, aplicam-se as regras previstas nos números anteriores.

Artigo 10º

Sanções

1— O não cumprimento da obrigação de registo, prevista no artigo 3º do presente diploma, constitui contra-ordenação nos termos do disposto na alínea c) do nº 1 do artigo 43º do Decreto-Lei nº 309/2003, de 10 de Dezembro, sancionável com a coima máxima constante do nº 2 do artigo 44º do mesmo normativo, sem prejuízo de outras sanções previstas na lei.

2— Sem prejuízo do previsto no número seguinte, as falsas declarações proferidas no âmbito do registo constituem infracção de natureza criminal, punível nos termos da lei geral, e implicam a nulidade do registo.

3— O não cumprimento do disposto no nº 2 dos artigos 5º e 6º do presente diploma constitui contra-ordenação nos termos do disposto na alínea d) do nº 1 do artigo 43º do Decreto-Lei nº 309/2003, de 10 de Dezembro, punível nos termos do nº 2 do artigo 44º do mesmo diploma.

CAPÍTULO IV

Disposições finais

Artigo 11º

Norma revogatória

É revogada a Portaria nº 310/2005, de 23 de Março.

Artigo 12.o

Entrada em vigor

A presente portaria entra em vigor no dia seguinte ao da sua publicação.

O Ministro da Saúde, António Fernando Correia de Campos, em 14 de Dezembro de 2005.

11. ANNEX 2 – Decision analysis and resolution (DAR) template

Memo de Análise e Decisão

Código Projecto/Proposta	< inserir código >	**Referência Doc**	< referência deste documento >
Objectivo da avaliação			
< Referir qual o evento que necessita de uma avaliação / decisão formal e qual o resultado esperado desta reunião >			
Data	DD-MM-YYYY	**Horas**	hh:mm – hh:mm
Local			

Participantes			**Notificações**	
Nome	Empresa / Área / Dep.	Sigla Siglas pessoas envolvidas	Nome	Empresa / Área / Dep.

Organizador		Contacto	
Moderador		Contacto	
Registo		Contacto	

Solução 1
< Inserir uma descrição da solução considerada (recorrer a imagens sempre que possível para melhor descrever a solução em discussão) >

Solução 2
< Inserir uma descrição da solução considerada (recorrer a imagens sempre que possível para melhor descrever a solução em discussão) >

...

Solução N
< Inserir uma descrição da solução considerada (recorrer a imagens sempre que possível para melhor descrever a solução em discussão) >

Avaliação	
Critérios de Avaliação	< indicar quais os critérios a utilizar. Neste exemplo são considerados 3 critérios >
Método de Avaliação	< no exemplo dado, a Classificação C de cada solução apresentada é obtida individualmente na análise e é multiplicada pelo Peso P > < neste exemplo a classificação C é medida em percentagem; o peso P de cada critério indica a sua importância na avaliação > < para este exemplo consideramos a classificação total como sendo a (classificação individual Ci x Peso) / SUM Pesos ou seja, por exemplo para a solução 1, será [(65% x 0,2) + (70% x 0,3) + (80% x 0,5)] / 1 >

Solução		Critério 1 < Custo > Peso 0,2		Critério 2 < Qualidade > Peso 0,4		Critério 3 < Segurança Inf. > Peso 0,4		Classificação Total
		C	TP	C	TP	C	TP	
Solução 1	Microsoft	4	80,00	1	0,40	5	2,00	82,40
Solução 2	Linux	5	100,00	1	0,40	5	2,00	102,40
Solução 3	OS2	2	40,00	1	0,40	2	0,80	41,20

Selecção	
Solução seleccionada	< identificar o nome da solução escolhida >
Justificação da selecção	< indicar o motivo da selecção >

Informação Adicional

Motivo: No caso de ser decidido não proceder á avaliação, deve ser identificado qual o motivo
< indicar o motivo de desistência ou decisão de não fazer análise>