



## BENEFITS MANAGEMENT FOR AN E-INVOICE PROCESS

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### Abstract

This paper presents the application of a Benefits Management (BM) Methodology to an e-Invoice project, and analyzes the results brought forth by the application of the methodology to the project and its contribution towards a wider adoption in the targeted Organization. A Case Study research method has been used which began with a gathering and treatment of data related to the emission and reception of the invoices, continued with the identification of the type of investment and ended with the application of the chosen BM approach. The methodology demonstrated the financial viability of the project, identified and structured the resulting benefits and facilitated the understanding and preparation for the required transformations in the Organization, including processes, competencies/skills and technologies. The BM approach brings to the Organization a more wide and consolidated vision for the projects, a greater foresight and support for a rational decision on IS/IT investments and the strategic alignment of resources with the company objectives and priorities.

**Keywords:** *e-Invoice*, electronic invoice, Electronic Bill presentation and Payment, Paperless Invoice, Netinvoice, Benefits Management, Benefits, Type of Investment.

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### 1. INTRODUCTION

With increasing globalization and growing competitiveness in certain markets, organizations are committed to performing better with fewer resources and lesser operational costs. Amongst some options which can be adopted to achieve this goal, process dematerialization seems to offer a good opportunity for compa-

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nies to reduce their costs of storage and data processing, to optimize their administrative tasks, as well as for promoting their productivity and efficiency.

The Electronic Invoice (e-Invoice) initiative in Portuguese Organizations was facilitated after its legal framing was defined (Diário da República – Série I-A, nº 244, de 21 October of 2003). The e-Invoice allows a substantial economy of resources, by reducing the costs of transmission and reception of the invoices, automatic rules validation, an acceleration in the flows of communication amongst Organizations, with a greater transparency and confidence level with customers, suppliers and the Fiscal Administration, besides compliance with rules for environment protection.

According to UMIC – Agência para a Sociedade do Conhecimento, “... some of the biggest Portuguese Companies estimated a reduction of costs in the region of 80% to 90% with the dematerialization of invoices, not including savings that result out of secondary effects at the acceleration of administrative proceedings. It is estimated that the reduction of costs for the Portuguese economy is of the order of thousands of millions of euros, excluding the consideration of the resulting benefits of the simplification, improvement and acceleration of administrative processes...” (UMIC, 2009).

On the other hand, the ‘taken for granted’ idea that the simple adoption of IS/IT applications increases speed of business transactions, user satisfaction and business productivity, was questioned by Robert Solow (Nobel Prize recipient for Economics in 1987), when he said “We see computers everywhere but not in the productivity statistics” (Solow, 1987, p. 36). This paradox led some researchers from the “Cranfield School of Management” to analyze sixty United Kingdom’s Organizations regarding their investments in IS/IT and the related business benefits. This initiative produced a model for *Benefits Management* for investments in IS/IT. It analyses the viability of the investments in these initiatives and come up with mechanisms that contribute to the identification, realization planning, follow-up and accomplishment of the benefits. Hereafter, this model has found application in dozens of Organizations (Ward and Murray, 2000).

## 2. BUSINESS BENEFIT AND BENEFITS MANAGEMENT

A “business benefit” is “An advantage on behalf of a particular stakeholder or group of stakeholders” (Ward and Daniel, 2006, p. 384).

The prevailing approach to the topic of investments evaluation of IS/IT initiatives has been around ROI – Return on Investment. These evaluations tend to focus on a project’s efficiency and return in monetary terms (Wheatley, 2009). But in reality the project results may not be measurable, even if they become a business benefit. This shortsighted vision of quantitative analysis of project re-

sults can limit the capacity to address more “soft” metrics also linked to business benefits achievement. For example, metrics on employee satisfaction are often considered “soft” simply because they are subjective and can change from day to day. But projects aimed at promoting employee satisfaction can deliver a more real benefit because satisfied workers tend to yield positive results with regard to performance, quality, cost and length of service.

There are other reasons to treat a business benefit not just as revenue and profit consideration. Sometimes, namely in software industry, a project is aimed at creating a development platform to be used by later projects (Wheelwright and Clark, 2000). In such cases the first project’s ROI is hardly attractive, but one can point out that the investment has created intellectual property. This may change for the subsequent projects because they will take advantage of business benefits envisaged by the first one.

In most cases, in a scenario of economic crisis, many strategic projects face early denial because their business cases fail to address the other benefit dimensions of success besides ROI (Kown *et al.*, 2002). On the contrary, successful organisations which realise benefits develop realistic and robust business cases, which explicitly include benefits for all the investment stakeholders, if possible.

The concept of “benefits’ management” is defined as “The process of organizing and managing so that the potential benefits arising from use of IS/IT are actually realized” (Ward and Daniel 2006, p. 384). According to OGC recommended practices, “Benefits’ Management aims to make sure that the desired business change or policy outcomes have been clearly defined, are measurable, and provide a compelling case for investment – and ultimately to ensure that the change or policy outcomes are actually achieved” (OGC MBB, 2004, p. 1). Other practitioners use benefits management in the context of an investment management framework (State Government of Victoria, 2009). This framework provides a set of practices that allow an ‘investor’ to clearly define the reason for an investment, shape the solution that will best respond to the need, and track the delivery of benefits throughout the investment lifecycle.

Organizations of today, even those with dimension and critical mass like the one we used for this case-study, seem to lack knowledge and practical skills to deal with benefits’ realization and evaluation of IS/IT investments. Benefits are often identified in the early stages for forming the business case and to sell the idea to the customer or investor. A follow-up procedure with the purpose of evaluating those benefits is often missing, and problems often arise after the system delivery, when it’s time to show if the up-front stated benefits have been realized or not. (Remenyi *et al.*, 2007). So, this systematic review of investments results in terms of the benefits realized or not usually performed.

BM is closely linked with investment management, and is also driven by business strategy, which also drives the foundation and management of any corporate

portfolio, including projects and programs. Lack of this link to investment management rationale and business drivers is evident in cases where there are lists of disparate projects, when policy work or delivery initiatives run independently, when there is little visibility of priorities, interdependencies or overall scope of organization's change activity, and there is reduced accountability or ownership. So, BM is even more useful if an organization has the ability to deal with the interdependencies and risks associated with the projects and their respective value (portfolio management). BM success also depends on previous good practices concerning Project Management methodologies (Lemos, 2009).

BM is driven by two interconnected challenges. One is the need to assess the benefits realization of investments and other is to ascertain that benefits are more easily achievable if addressed within the pace of a change management process (Ward and Daniel, 2006). As a matter of fact, organizational change is a critical role that needs to be recognized since this is linked closely to the benefits realization process (Doherty *et al.*, 2008).

To conclude this point, the specific BM methodology used for this case-study is based on the one presented in the book "Benefits Management – Delivering Value from IS & IT Investments" (Ward and Daniel 2006).

### **3. ORGANIZATION – ANA – Aeroportos de Portugal, SA**

ANA – Aeroportos de Portugal, SA (ANA) runs Lisboa, Porto and Faro airports in mainland Portugal and Ponta Delgada, Santa Maria, Horta and Flores Airports in Azores. Madeira's (Madeira and Porto Santo) airports are directly run by ANAM, 70% owned by ANA. ANA belongs to Public Sector and is 100% owned by the Portuguese state. Its executive management board is assigned by and reports to the Ministry of Transport and Public Works. It owns 49% in ADA, which runs Macao International Airport, 100% in Portway, ANA's handling subsidiary, and 84,41% in NAER, the company set up to carry out the preparatory work for Lisbon's new airport (at Alcochete). ANA's business is divided into Aviation, Non-aviation and security activities, including services to persons with reduced mobility. The aviation business, which is regulated and stable by definition, consists of the management of infrastructure for the traffic of passenger and cargo aircraft. The non-aviation business, which is basically not regulated, encompasses activities such as the management of retail and advertising space, real estate, parking lots and rent-a-car facilities outside the airports. They also provide security for persons with reduced mobility services, which are financed by dedicated charges, protect people and property against illicit acts and provide assistance to persons with reduced mobility.

## Vision

To position ANA as an airport management company with a reputation for expertise, whose performance is founded on the confidence of its stakeholders and customers, and which is geared towards profitability and sustainability.

## Mission

The mission of ANA is to efficiently manage the airport infrastructures under its charge, linking them to the world and contributing to the economic, social and cultural development of the regions in which they operate. Further objectives are to offer its customers a high-quality service, creating value for its shareholders and guaranteeing high levels of professional qualification and motivation for its workforce (ANA, *Annual Report 2008*, p. 6).

## 4. E-INVOICE

In accordance with the recent study (Tavares *et al.*, 2008), the e-Invoice is an electronic document format equivalent to the one printed on paper, with legal value, since it fulfils the requirements of the law. Under the obligations of the Decree Law n<sup>o</sup> 256/2003, by the 1<sup>st</sup> of January 2004, the e-invoice may replace the paper invoice, provided that the following conditions are set:

- Acceptance by the customer;
- The authenticity of its origin and the integrity of its content is guaranteed, by means of advanced electronic signature or electronic data interchange (EDI);
- The electronic archive has to guarantee the complete access on-line to invoice data, and to assure the integrity of the origin and its content.

The Portuguese law contemplates two alternatives to guarantee the authenticity of the origin and the integrity of the content of the e-Invoice, which corresponds in reality, to the use of two types of e-invoices:

- Type 1 – Electronic documents whose origin and integrity are guaranteed by the imposition of an advanced electronic signature. This type is more interesting for the sender than the receiver, because the savings are significant for the entity that emitted it, due to cost savings in paper, in printing, in postage and in archiving.
- Type 2 – Electronic documents that are exchanged in the context of EDI. This type has advantages in the integration process, which translates into

increased business efficiency and consequently, a decrease in validation and integration costs.

According to (Tavares *et al.*, 2008, p. 17-18) companies should proceed with e-Invoice System if they comply at least with one of the following conditions:

In a scenario of emission:

- Concentration of a significant number of invoices for a reduced number of customers or great volume of invoices;
- The need to improve control over the invoices for recovery;
- Cases in which customers request suppliers to produce and send invoices through no automated channels (e.g. email or fax);
- Significant costs related to customer management (e.g. invoice duplicates).

In a scenario of reception:

- Concentration of a significant number of invoices for a reduced number of suppliers or great volume of invoices;
- High administrative costs associated with management of received invoices;
- Opportunity to improve the automatic confirmation of invoices or internal electronic distribution to the different areas that need to approve them.

“The adoption of the e-Invoice System, once stabilized, allows a reduction of processing costs, eliminating the need for repeated data entry of invoices from the various organizations involved and reduces errors of release and the resulting cost of correction. The facility to the archive and access to the billing by computer allows increase of efficiency of the accounting and financial management...” (UMIC, 2009).

In the last three years companies with large number of invoices belonging to industry sectors like distribution, automobile industry and tourism, have been the main adopters of e-Invoice in Portugal, because the costs incurred in its implementation quickly offsets the costs of manual invoices processing (Tavares *et al.*, 2008).

A European study accomplished by PricewaterhouseCoopers, in 2005, indicated increased efficiency, the costs reduction, and faster customer payments, as the main reasons that cause Organizations to join e-Invoice initiatives (figure 1). On the other hand, factors like *customer compatibility readiness, compatibility/readiness of internal systems, complexity and supplier compatibility/readiness* are considered the main problems associated with e-Invoice adoption (figure 2) (PWC 2005).

FIGURE 1

**Benefits of e-Invoice**

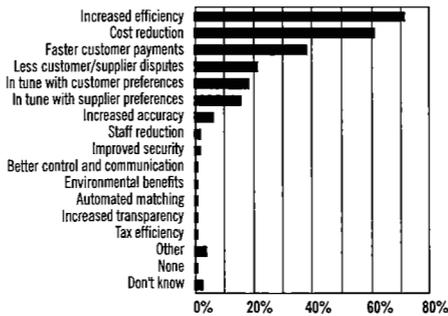
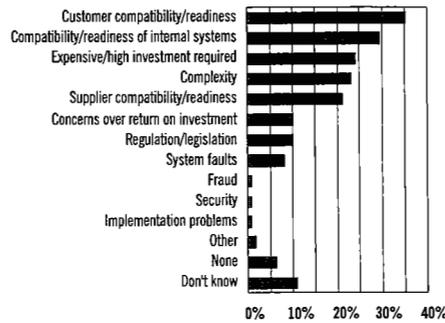


FIGURE 2

**Barriers to e-Invoice**



Despite the benefits which are recognized by all, the law to be defined and the technology available, the dematerialization of documents and streamlining of the processes involved are still at an early stage.

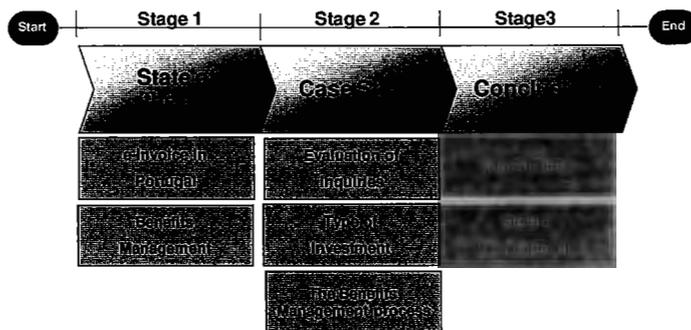
**5. CASE – STUDY UNDER RESEARCH**

**5.1. Methodology**

The main stages of the investigation process and the activities undertaken are represented in figure 3. The first stage consisted of the research and literature review (state of the art) about the subjects e-Invoice in Portugal and BM approaches and practices. The second stage, the Case Study (Yin, 2004) consisted of the data collection to measure and evaluate the processes of emission and reception of the invoices in the ANA.

FIGURE 3

**The stages of the investigation process**



Taking into account the geographic dispersion of the billing departments, we decided to submit two models of inquiries, one applicable to the billing department and the other to the corporate accounting department. The analysis of the surveys had no statistical purposes, as it was done to measure and evaluate the processes of sending and receiving invoices.

After collecting data from the surveys (ten to different billing departments and one to the accounting service), there was a treatment of information to calculate the unitary cost associated with the emission and to the reception of an invoice. The obtained results were compared with the official data published by the "Asociación Española de Commercial Codificación" (AECOC, 2009). This was very useful for the construction of metrics well suited to measure the benefits identified in the Case Study. This stage finished with the identification of the Type of Investment and the application of the chosen BM approach (Ward and Daniel, 2006) to the e-Invoice Project.

Figure 3 does not show the stage devoted to research methodology and some activities included in the case study, namely, mapping of applications portfolio, specific directives-gathering for the implementation of e-Invoicing in the Organization, and the inter-dependency amongst the various sub-projects needed to implement the full initiative.

## 5.2. Inquires evaluation

As stated before, with the objective to evaluate the current processes of emission and reception of the invoices in ANA, there were two types of surveys, and a model for the ten billing Departments and a second model for the accounting Department. Table 1 shows the inquiry results connected to billing departments.

Calculating the weighted average of the Business Units for the cost associated with the emission of invoices, in which the weight for each Business Unit is the ratio between the number of invoices and the total number of invoices issued in the Organization, we obtain the value of 0.78 €, which will be used in this paper as the Cost of Emission of Invoice (CEInv) in the Organization.

Table 2 displays the survey results accomplished with the accounting service. Adding the total cost of the three phases we got the value of 1.29 €, which expresses the Cost of Reception of an Invoice (CRInv) in the Organization.

Comparing the results obtained with the values published by (AECOC, 2009) – 0.76 € for the emission and 2.87 € for reception – we verified that the cost obtained, for the ANA, is higher by 0.02 € for the emission and lower by 1.58 € for the reception.

The difference in the emission invoice is insignificant. The difference in the reception could be explained, in ANA's case, by the absence of the manual autho-

TABLE 1

## The results of the inquiries conducted to Billing Services

	Airports							Comercial Departments			W. Average	%	
	Lisboa	Porto	Faro	Pt. Delgada	St. Maria	Horta	Flores	Retail	Spec. Proj.	Real Estate			
Emission	Traffic	2.690	1.550	2.320	399	768	128	56	0	0	0		27%
	Handling	445	24	53	12	12	12	12	0	0	0		2%
	Other services	941	509	994	289	82	78	6	0	0	0		10%
	Real estate	1.034	738	321	237	2.161	105	0	2.403	434	750		28%
	Consumption (electricity, water, gas, etc.)	1.238	941	603	240	2.459	60	0	0	0	0		19%
	Retail	0	0	35	72	0	38	12	2.128	1.022	500		13%
	Car parking	0	0	0	0	0	48	0	0	0	0		0%
	Advertizing	0	0	0	0	0	0	0	0	12	0		0%
	<b>Total of Invoices</b>	<b>6.348</b>	<b>3.762</b>	<b>4.326</b>	<b>1.249</b>	<b>5.482</b>	<b>469</b>	<b>86</b>	<b>4.531</b>	<b>1.468</b>	<b>1.250</b>		
	N° sheets A4	27.748	15.048	17.304	4.996	21.928	1.876	344	18.124	5.872	5.000		
	Unitary cost A4 (with brand)	0,03 €	0,02 €	0,04 €	0,05 €	0,05 €	0,02 €	0,05 €	0,04 €	0,04 €	0,04 €	0,04 €	
<b>Cost Printing p/invoice</b>	<b>0,15 €</b>	<b>0,10 €</b>	<b>0,18 €</b>	<b>0,22 €</b>	<b>0,22 €</b>	<b>0,08 €</b>	<b>0,22 €</b>	<b>0,18 €</b>	<b>0,18 €</b>	<b>0,18 €</b>	<b>0,17 €</b>	<b>22%</b>	
Enveloping	N° envelopes	5.940	3.600	4.326	1.249	3.432	432	86	2.400	480	1.250		
	Unitary cost envelope	0,10 €	0,09 €	0,06 €	0,05 €	0,10 €	0,18 €	0,05 €	0,09 €	0,09 €	0,09 €	0,09 €	9%
	Time spent in enveloping p/invoice	45	10	10	10	30	2	10	1	5	30		21
	Rate p/hour	8,78 €	10,94 €	8,78 €	11,62 €	7,76 €	9,81 €	10,94 €	10,94 €	10,94 €	8,29 €	9,44 €	6%
	<b>Cost Enveloping p/invoice</b>	<b>0,20 €</b>	<b>0,12 €</b>	<b>0,08 €</b>	<b>0,08 €</b>	<b>0,13 €</b>	<b>0,17 €</b>	<b>0,08 €</b>	<b>0,05 €</b>	<b>0,04 €</b>	<b>0,16 €</b>	<b>0,12 €</b>	<b>15%</b>
Expedition	N° National stamps	5.532	2.520	3.028	1.237	3.422	432	86	2.400	480	1.238	3.153	
	Cost of National stamp	0,31 €	0,31 €	0,47 €	0,31 €	0,31 €	0,31 €	0,31 €	0,31 €	0,31 €	0,31 €	0,33 €	30%
	N° International stamps	408	1.080	1.298	12	10	0	0	0	0	12	426	
	Cost of International stamps	0,67 €	0,67 €	1,85 €	0,67 €	0,67 €	0,00 €	0,00 €	0,00 €	0,00 €	0,67 €	0,69 €	9%
	Time spent in weighing p/invoice	10	40	0	2	0	1	0	10	10	10	10	
	Time spent in pasting stamp p/invoice	5	0	1	0	0	1	10	5	5	5	3	
	Rate p/hour	10,94 €	3,50 €	8,78 €	10,94 €	0,00 €	10,94 €	10,94 €	10,94 €	10,94 €	10,94 €	7,58 €	3%
<b>Cost Expedition p/invoice</b>	<b>0,36 €</b>	<b>0,44 €</b>	<b>0,89 €</b>	<b>0,32 €</b>	<b>0,19 €</b>	<b>0,29 €</b>	<b>0,34 €</b>	<b>0,21 €</b>	<b>0,15 €</b>	<b>0,36 €</b>	<b>0,38 €</b>	<b>49%</b>	
Archive	Time to archive an invoice	30	30	60	30	60	60	60	30	30	60	42	
	Rate p/hour	8,78 €	10,94 €	8,78 €	11,62 €	7,76 €	9,81 €	10,94 €	10,94 €	10,94 €	8,29 €		
	Access Time p/invoice	15	30	60	20	60	60	60	10	15	60	34	
	<b>Cost Archive p/invoice</b>	<b>0,07 €</b>	<b>0,09 €</b>	<b>0,15 €</b>	<b>0,10 €</b>	<b>0,13 €</b>	<b>0,16 €</b>	<b>0,18 €</b>	<b>0,09 €</b>	<b>0,09 €</b>	<b>0,14 €</b>	<b>0,11 €</b>	<b>14%</b>
<b>Cost Emission p/invoice</b>	<b>0,78 €</b>	<b>0,75 €</b>	<b>1,30 €</b>	<b>0,72 €</b>	<b>0,68 €</b>	<b>0,71 €</b>	<b>0,83 €</b>	<b>0,54 €</b>	<b>0,47 €</b>	<b>0,84 €</b>	<b>0,78 €</b>		

TABLE 2

The results of the survey accomplished to the accounting service

	Question	Answers	%
Reception	Number of invoices received?	22.138	
	Average days between receipt and authorization to payment?	15	
	Time it takes to open the envelope and validate the invoice (name, VAT...)?	5	
	Hourly rate of the collaborator who execute the task above?	10,94 €	
	Spent time to digitize and to insert an invoice into system GDF?	60	
	Hourly rate of the collaborator who execute the task above?	10,94 €	
	<b>Cost Reception p/invoice</b>	<b>0,1975 €</b>	<b>15%</b>
Accounting	Spent time to account an invoice, after its pay authorization (minutes)?	300	
	Hourly rate of the collaborator who execute the task above?	10,94 €	
	<b>Cost Accounting p/invoice</b>	<b>0,9117 €</b>	<b>71%</b>
Archive	Spent time to archive an invoice?	60	
	Hourly rate of the collaborator who execute the task?	10,94 €	
	Spent time to archive an invoice?	10	
	<b>Cost Archive p/invoice</b>	<b>0,1823 €</b>	<b>14%</b>
<b>Cost Reception p/invoice</b>		<b>1,29 €</b>	

ization process for the invoices payment. These authorizations are guaranteed by a specific application.

### 5.3. Type of investment

According to (Ward and Daniel, 2006) the e-Invoice project is a problem-based intervention, because the business objectives are well defined and quantified (ends) intend to make improvements in business processes (ways) and will use an IS/IT application (means) to solve the identified limitations.

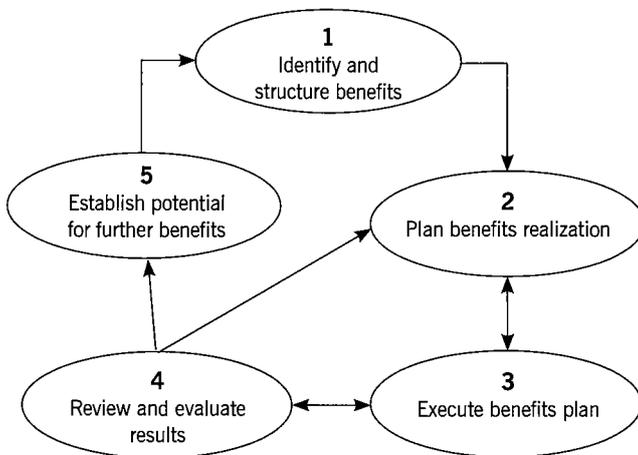
The e-Invoice System (*means*) will contribute to optimize and simplify the current processes of emission, reception, validation and visualization of the invoices (*ways*), providing costs-cutting, better efficiency and quality, and a shared access and enforced security along the invoices life-cycle (*ends*). This initiative is then targeted to remove constraints that are preventing opportunities from being taken advantage of.

### 5.4. The Benefits Management Process

The first three phases proposed by (Ward and Griffith, 1996) to the BM process (Figure 4) allow for the identification and structure, planning of benefits and execution of the actions necessary to reach the definite benefits. The last two phases are dedicated to the review and evaluation of results and identification of potential future benefits.

FIGURE 4

**Process model for benefits management**



Source: (Ward, Griffiths 1996)

#### ***Identify and structure benefits***

To identify and to structure benefits, it is necessary to analyze the business drivers of the Organization and the Investment Objectives (IO) that are necessary to respond to those drivers.

Business drivers, which can be external or internal, refer to a view held by senior managers about what is important in the business over a given timescale, such that transformations must happen. The table 3 lists the business drivers, their types and the reasons for the implementation of e-Invoice in ANA.

Based upon the business drivers, the IO's were defined. The table below shows the IO's with their respective codes (letter O followed by a sequential number).

The figure 5 shows the match between the IO and the drivers. Observing the table above, it appears that:

TABLE 3

**Drivers for the implementation of e-Invoice**

Driver	Type	Justification
Government Guidelines	External	The Council of Ministers, in the resolution nº.137/2005 determined that public organisms in the direct and indirect State administration must implement the e-Invoice up to 31/Dec/2006. As the ANA is a State owned company it must also respect the resolution of the Council of Ministers.
Pressure of business environment	External	The modifications introduced to the VAT Code, by Decree-Law nº. 256/2003, has enabled e-invoice implementation in Organizations. ANA have been invited by some customers and suppliers to join the e-Invoice community.
Technology	External	Stable solutions ("packages" and/or services) available in the market.
Economic	Internal	Reduction of costs related with the administrative activities and the dematerialization of the invoices
Environmental	Internal	Company environmental policy (www.ana.pt)

TABLE 4

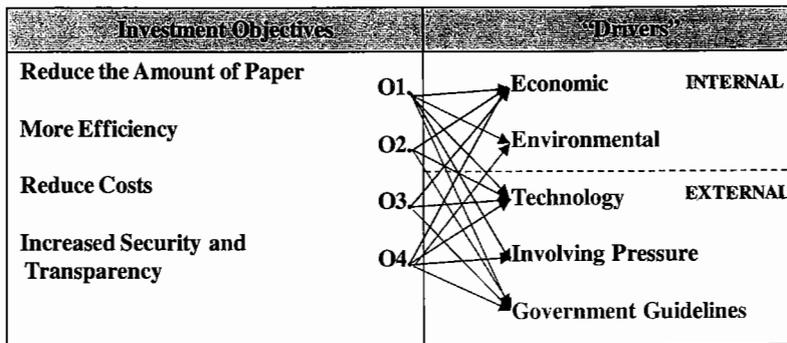
**Investment objectives for the implementation of e-Invoice**

Code	Description	Justification
O1	Reduce the Amount of Paper	Reduce the amount of paper to make processes more agile, economical and able to contribute to a better environment
O2	More Efficiency	The implementation of the e-Invoice stimulates processes rationalization, towards the optimization of processing, validation and invoices distribution, thus making the organizations more efficient. The study presented by PWC (PWC, 2005) indicates that companies who had implemented e-Invoicing had obtained 70% of efficiency relative to their original invoicing management processes.
O3	Reduce Costs	The e-Invoice brings to the Organizations a reduction of the costs associated with processing and distribution of the paper. The study of (PWC, 2005) announced a cost reduction exceeding 60% when compared to the invoice paper based costs.
O4	Increased Security and Transparency	The e-Invoice reduces the number of errors and loss, making it safer. A more effective transmission of invoices reduces bureaucracy and provides better means of analysis, control and transaction management for all stakeholders.

- Driver "Government Guidelines" stimulate all objectives.
- All objectives (O1, O2, O3 and O4) are aligned with the "drivers" Technological and Economic, because their achievement will depend on new technologies and will add value to the Organization in economic/financial terms.

FIGURE 5

**Match between the Investment Objectives and the drivers**



- The objectives O1 and O4 will contribute towards a better environment (Environmental), by reducing the amount of paper (printed A4 sheets, envelopes and stamps) and the amount of toner and/or cartridges.
- The objectives O1 and O4 will contribute towards a better environment (Environmental), will reduce the amount of paper (printed A4 sheets, envelopes and stamps) and the amount of toner and/or cartridges.
- Driver "Pressure of business environment" has originated objectives O1 and O4, because ANA's action towards invoices dematerialization will allow an answer to the requests on the part of some customers and suppliers. The reduction of the number of errors and data loss, and a better means of analysis, control and management of transactions, will contribute to a greater security and transparency in the emission and reception processes for invoices between the Company and its customers and suppliers.

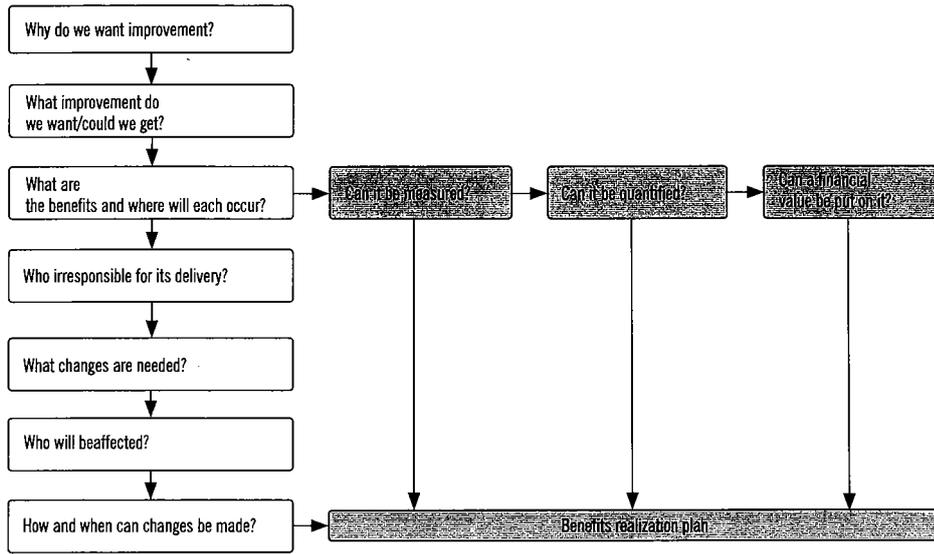
Defining the IO and answering the questions of the above diagram (figure 6) to identify the tangible benefits of the e-Invoice project, knowing that each benefit must have:

- Clear and tangible metrics;
- A owner or a person who is responsible for the benefit delivery;
- A unit of the Organization that will be affected;
- Acknowledged the "possible" opposition or difficulties in obtaining benefits.

The purpose of this paper is not to demonstrate the specific benefits calculations. But, as an example, we present the formula to calculate the Cost of Emission of Invoices (CEInv) that will measure the benefit B1.

FIGURE 6

Key questions in developing a benefits plan



Source: (Ward, Murray 2000)

TABLE 6

Identification and structure the benefits of e-invoiceproject

	Benefit	Local	Metric	Owner	Risks	IO
Emission	B1. Reduce the emission cost per invoice	Billing Services and Local Expedients	Nº paper invoices emitted Nº e-invoices emitted Cost of paper invoice Cost of e-invoice	Representative of Business Units	Resistance to change	01 02 03
	B2.Reduce the reception cost per invoice.	General expedient and Accounting	Nº paper invoices received Nº e-invoices received Cost of invoice paper Cost of e- invoice	Representative of Central Services		
Reception	B3.Reduce the time need to authorize a payment	Accounting Service	Average number of days (date authorization-data reception)			Lack of control of the invoices for pay
Emission/Reception	B4.Access to invoices and information sharing improvements	Billing and Accounting Services	Application to consult invoices and respective "tracking" Average access time to a invoice Cost to archive an invoice	Project Manager	Poor adherence to e-Invoice	01 02 03 04

$$CE_{Inv} = \frac{NPI_{Emi} * (CE_{Inv} - CWA_{Arc}) + NeI_{Emi} * CE_{eInv}}{TNE_{Inv}}$$

- where: **NPI<sub>Emi</sub>** – Number of Paper Invoices Emitted;  
**CE<sub>Inv</sub>** – Cost of Emission per Paper Invoice is 0,78 €, in accordance with the survey accomplished to the Units of Business;  
**CWA<sub>Arc</sub>** – Cost Weighted Average to Archive a paper invoice Emitted and according to the survey to the Business Units is 0.11 €;  
**NeI<sub>Emi</sub>** – Number of e-Invoices Emitted;  
**CE<sub>eInv</sub>** – Cost of Emission of an e-Invoice. The value used will be the result of the contract to provide services for the e-Invoice;  
**TNE<sub>Inv</sub>** – Total Number of Emitted Invoices.

The value CE<sub>Inv</sub> diminishes as e-Invoice increases, because the cost of e-invoice emission is significantly lower than the paper invoice.

TABLE 7

**Framework for developing a business**

Degree of explicitness	Do new things	Do things better	Stop doing things
<b>Financial</b>		<b>B1.</b> Reduce the emission cost per invoice <b>B2.</b> Reduce the reception cost per invoice.	<b>B4 (b).</b> Access to invoices and information sharing improvements – To eliminate the physical archive of invoices.
<b>Quantifiable</b>		<b>B3.</b> Reduce the time needed to authorize a payment.	
<b>Measurable</b>	<b>B4 (a).</b> Access to invoices and information sharing improvements – New ways to access the invoices and their tracking.		
<b>Observable</b>			

The table above shows that the first three benefits (B1, B2 and B3) will lead to changes in the ongoing process. The benefits (B1 and B2) are of a financial nature and B3 is quantifiable.

The fourth benefit (B4) has been separated into two parts, the first (a) is based on the creation of a new process to access invoices and assure their easy tracking and the other part (b) focuses on eliminating the current process that assures the invoices physical archiving. The first part of the benefit is just measurable, being the average time to access an invoice and it's "tracking" the metric to

be used. The second part of the benefit is financial, since the elimination of the invoices archiving (issued and received) translates into financial terms. Thus, we can assert, with a high degree of reliability, that the e-Invoice project can be measured in economic terms, because most of the benefits are of a financial type.

### **The Benefits Dependency Network (BDN)**

According to (Peppard *et al.*, 2007, p. 5) the BDN “provides the framework for explicitly linking the overall investment objectives and required benefits with the business changes necessary to deliver those benefits and the essential IT capabilities that enable these changes”. In our case the construction of a BDN (Figure 7) was accomplished in three phases, because the type of investment is problem-based.

The first consisted of the identification of IO (table 4) and the potential business benefits (table 6), which allowed the establishment of the *ends*.

The second phase, which describes the modifications in the business to obtain the identified benefits (*ways*), was focused on the analysis of surveys carried out in the billing and accounting departments (tables 1 and 2), the current emission and reception processes of invoices and their ways of working. This phase has concluded with the identification of the best combination between the business changes and functionalities of e-Invoice System (*means*) which we think can best contribute to the potential benefits achievement.

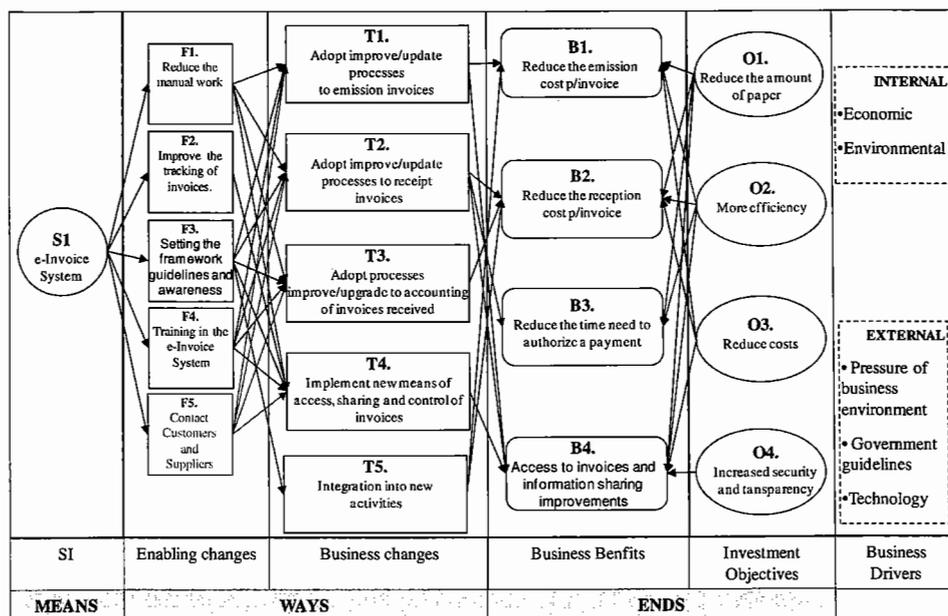
The overall analysis showed a significant impact in reducing manual work and in improving invoices tracking, which contributed, significantly, to the identification of the first two factors for enabling changes. The actions of setting the framework guidelines and changing awareness, training users on the e-Invoice System and the contacts with involved customers and suppliers, were considered as enabling changes because they are essential to the success of project start-up in the Organization

As pointed out by the utilised BM approach, enabling these changes encouraged transformations in the business, by improving and /or updating the processes for the emission, reception, validation and accounting of the invoices received, and by implementing new means of access, information sharing and control of invoices.

With the rollout of the e-Invoice System, along with its progressive adherence by customers and suppliers, the human resources that used to finish and post the physical invoices gradually lose their functional contents. A change management initiative has been to integrate them in other activities, taking care of their career development and welfare. This was an example of how ANA managed a “disbenefit” for some stakeholders of the e-Invoice project.

FIGURE 7

**Benefits Dependency Network for e-Invoices Project**



The third phase was based on searching the best combination between the business changes, the cost and the risk exposure of the e-invoice System in order to obtain the desired benefits.

**5.5. Main contributions and Limitations of the initiative**

As mentioned before, after the analysis and discussion of the surveys' results, the benefits about the usage of a BM methodology have been consistently proven. These findings triggered a set of actions guided to achieve more efficiency in the invoicing related processes, such as: a) Reduction in the number of copies, three instead of four in the emission of invoices, and b) Substitution of invoices delivery from express postage<sup>1</sup> to normal postage.

The surveys devoted to the billing and accounting services contributed significantly in identifying and structuring the business benefits of the e-Invoice project, besides having identified the time spent, amounts and costs, for each Unit of Business, in the processes of emission, reception, validation and distribution of invoices.

<sup>1</sup> In the Portuguese Post Office this is called "Correio azul", meaning a faster delivery option;

A solid financial evaluation (ROI) was a major decision factor in the viability of the project. The application of the Ward and Griffiths framework (Ward and Griffiths, 1996) to generate a business case proposal for the e-Invoice project, allowed its evaluation in economic terms, because most benefits were of financial type (table 7).

Beyond a significant contribution to the viability of the e-Invoice project, the application of this BM methodology allowed the company's operational areas to be identified in terms of 'which, where and when' the business benefits would be visible for their interested stakeholders. Besides, BM enabled these stakeholders to prepare for the changes they would have to accomplish before the new e-Invoice System went live. Change management is a complex issue. BM approach places a strong emphasis on the need to assess each stakeholder group's ability and capacity to make the identified changes. Additionally, the used BM approach allowed a dependency network visualization for the identified business benefits, the key enabling factors for change and the needed IS/IT assets (*means*).

The core business of ANA is the operational management of airports. That's why its largest investments are centered on the airports infrastructure improvements.

Despite the investments in IS/IT comprising only about 2% of the total company's budget for 2009, the Board of Executives decided to strengthen the IS/IT projects implementation soundness and capacity, within the scope of the "European Foundation for Quality Management" (EFQM) and "American Society for Quality" (ASQ), this initiative is currently taking place in the Organization. This initiative includes the project "Cost Benefit Analysis" (CBA) targeted at implementing a broad cost-benefit analysis methodology to help decision making of IS/IT projects at corporate level or at airports level (business), in a more coordinated manner, highlighting the gains that these initiatives can bring to the organization.

Applying the methodology CBA, the Organization will have a framework to clearly consider the costs and benefits associated with IS/IT initiatives and this will help managers to take more clear decisions on IS/IT investments. The CBA methodology will for sure contribute to the positioning of the Organization at the first stage of the BM approach (figure 4), the output of which contain the identified business benefits and a sound business case for the investment.

But with the use of BM approach applied to e-Invoice, we expect to extend CBA into the subsequent phases, and help managers/investors to monitor the progress and the realization of business benefits previously planned. We truly think that our work represented a sound contribution to this purpose.

Within the applications portfolio concept, the e-Invoice project in ANA is a support application (McFarlan, 1981). ANA income comes mainly from contracts and in pre-agreed payments planning with its clients. So, up-to-the minute fees and billing are not critical elements for the business. Even so, e-invoicing has to

comply with legal standards and specific legislation. Its implementation is meant to reduce invoices storage, processing, validation and mailing costs, as well as reduce administrative tasks. This will make the company more efficient in sending and receiving invoices, also investing the overall invoicing process with more quality and reliability along the supply and customer value chain.

This finding and the fact that the Decree-Law 256/2003 has not really turned the use of the electronic invoice obligatory made the Organization reduce the priority of this project. This has limited the desired impact of the e-Invoice project. ANA is currently involved in a corporate initiative towards centralization of its core operational systems. However, the existence of a study that highlights the e-invoicing business benefits (especially financial), have attracted the interest of the Board and the managers for the implementation outcomes of this project. They envisage this initiative as a pilot to prove the concept and then consider an extended adoption of the BM approach for the entire corporation, in close connection with the CBA initiative.

## 6. CONCLUSIONS, RECOMMENDATIONS AND FUTURE DEVELOPMENTS

After the e-Invoice System implementation, the forecast for the reduction of total costs for emission and reception processes will be about 93%. This percentage is slightly better than the values mentioned by the UMIC report- 80% to 90% (UMIC, 2009). This difference exists because the unitary cost of the e-Invoice used by AECOC (AECOC, 2009) is smaller than the value of the e-invoiced published by UMIC (UMIC, 2009).

The adoption of a BM methodology by ANA will allow the Organization to have a global and consolidated vision of all types of benefits elicited by IS/IT projects and programs. We hope this can make a strong contribution to the strategic alignment of the resources (human, financial or material) with the priorities and objectives of the Company and provide a more rational support for decisions involving IS/IT investments.

ANA manages heavy investments in infrastructure works related to the airports maintenance and modernization. IS/IT stands for only about 2% of those investments and so low attention has been dedicated to carefully justify the business benefits from those investments. The e-Invoice process and project seemed to us an appropriate case-study to introduce and elicit benefits management practices for all IS/IT initiatives. This project business-case delivers a lot of financial benefits and this has been a good entry-point to explain the BM approach as a methodology that brings considerable benefits along the project investments life-cycle. As much of the IS/IT projects deal also with "intangible" business benefits, not supported by a financial ROI, we hope to include BM as a complementary ap-

proach to Project Management practices, aimed at evaluating benefits fulfilment, be they financial, quantitative, measurable or even observable.

One recommendation to the Organization is the need to create a formal procedure/process to visualize, evaluate and keep up with the business benefits of its IS/IT projects. This intent involves a paradigm shift within projects evaluation and projects "success". This situation will have to evolve from a pure efficiency perspective to another that considers a consistent monitoring process of benefits achievement by the business areas that sustained the IS/IT projects. In fact, the old adage of "on time, on budget and conformance to requirements" can be, of themselves, satisfactory success projects criteria. The reality is that the notion of "success", and "project success" in particular, is a much more complex issue related to business benefits achieved by customers, linked to a customer's gain or fulfilment of some type of customer's needs (Shenhar *et al.*, 2001).

We also suggested that in the planning and discussion of departmental budgets, the impact of business benefits delivered by IS/IT initiatives can be explicitly considered. In other words, if an IS/IT application reduces by x% the amount of paper consumed, the obtained financial savings should be reflected in the departmental budget for the subsequent year. This will have at least two outcomes. Project proposals coming from the business areas to be developed by the IT department, should appoint a business project manager to work closely with the project manager assigned by the IT function. The project budget belongs to the business area that holds the functional needs and the IT department acts as an (external) provider, complying with the project objectives, plan and constraints. Upon project delivery, the business area should rely on the business project manager to follow and validate the business benefits achievement, according to the benefits realization plan. In other words, this is a planning mechanism to develop a shared statement of the benefits expected from an investment by a business area and the IT capabilities required to achieve those benefits.

The second outcome is that the IT function budget should then be mainly composed by money for IS/IT infrastructure maintenance and support (OPEX) and investment projects related do IS/IT Management tasks (CAPEX). We recommend this responsibility share, brought by BM approach, because it encourages a closer cooperation between staff from business areas and IT. In fact, no single group has all the knowledge necessary to identify all the benefits, changes and IS/IT enablers. BM, then, can bring an improvement in those relationships and the sense that true mixed teams working together can more clearly achieve the desired benefits.

For future developments, we want to recommend the implementation of e-Invoice for all the Organization, executing the last three phases to complete the process of Benefits Management (figure 4), and compare the estimated benefits with the real benefits obtained. Clearly presenting, disclosing and publicizing the

three first stages of our BM approach to the Organization, hopefully made a strong contribution to the implementation of the whole process of BM in the Company.

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## Resumo

O artigo apresenta a aplicação da metodologia de Gestão de Benefícios (GB) ao projecto da Factura Electrónica, na ANA-Aeroportos de Portugal, SA e analisa as mais-valias que a GB traz ao projecto e à Organização. O Caso de Estudo, método de investigação adoptado, incidiu no levantamento dos processos de emissão e recepção das facturas, na identificação do Tipo de Investimento e na aplicação da metodologia de GB ao projecto Factura Electrónica. A GB permitiu identificar e estruturar os benefícios, compreender e preparar as transformações/mudanças na Organização, nos Processos, nos Recursos Humanos e nas Tecnologias, tendo também demonstrado a viabilidade financeira do projecto. A adopção da metodologia facultou à Organização uma visão global e consolidada dos projectos, uma maior clarividência e sustentação racional na decisão sobre os investimentos em SI/TI e o alinhamento estratégico dos recursos com as prioridades e objectivos da Empresa.

**Palavras-chave:** Factura Electrónica, Facturação Electrónica, Sistema de Facturação Electrónica, Gestão de Benefícios, Benefícios, Tipo de Investimentos.

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