

## **BUSINESS REPORTING FOR DECISION MAKING: AN INTEGRATED FRAMEWORK FOR INFORMATION TECHNOLOGY AND INFORMATION SYSTEMS EVALUATION**

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**Abstract:** In the last fifteen years Information Technology (IT) has changed dramatically the way of working and doing business. IT has changed how entire departments work and people live. For example Finance has been automated to simplify strategic planning, better manage projects, automate payroll and incentive management, optimize cash management and make accounting closes more efficient. Human Resource systems are computerized to streamline recruiting, hiring, performance management and training. IT and Information Systems have also changed how companies communicate and transact with their customers and suppliers (i.e. CRM, SCM). Indeed, IT can be seen everywhere, but does ubiquity is equal to “value”? Researches and the trade press demonstrates that at least two over three IT projects fail to meet business goals. The former bursting of the Internet bubble, legislated standards such as Sarbanes-Oxley, IAS-IFRS, and high-profile ERP, SCM, and CRM project failures have created a permanent shift in how worldwide IT expenditure is being treated. As the economy changes, new ways to evaluate IT investments are needed. Traditional methodologies focused solely on cost, or those that merely take snapshots in time, are inadequate in today’s business climate. IT value depends on the value of data/information treated along the whole enterprise. Ordinary capital budgeting methods used to evaluate infrastructure or industrial investments need to be integrated into a more complex approach/framework in order to capture this information value over the whole enterprise. The reporting practices presented in this paper are written to support businesses and their stakeholders understand the value of measuring IT and IS investment performance, and thereby take the first step towards developing the capability to manage, continuously improve, and convert the value created from their IT investments into shareholder value and competitive advantage.

**Keywords:** Information Technology value, Information Systems, Business reporting, Information management.

### **1. INTRODUCTION**

Nowadays Information Technology (IT) while integrating processes and functions can help companies to achieve different levels of competitive advantage. Continuous innovations regarding better integration of data and information are always searched by organizations.

Innovation can be achieved by considering operating and decision-making processes and by appealing to communication improvement methods among different levels of responsibility. IT can be the key to improve management effectiveness and efficiency through the implementation of hardware and software solutions.

The degree to which IT helps business to succeed varies, as many other factors also contribute to the long-term performance. In recent years, IT-enabled business changes have become more frequent and more crucial. Different scholars have surveyed business executives in large companies and found that almost invariably, the executives indicated that the quality of their IT infrastructure fell short of their need and desire for strategic change [1-3]. In such a case, (existing) IT became an impediment to innovations and other strategic initiatives [4]. Many companies have started large IT projects, such as ERP, CRM and SCM projects, in their effort to revamp their business processes, however a great amount of them resulted in big organisational and financial failures [5-7]. As previous scholars pointed out, packaged enterprise systems are designed for stability in processes, not ability to evolve without a proper alignment of IT with the business [8, 9].

At the beginning of this millennium, ignorance and lack of rationality supporting IT investment strategies has led to uncertainty and mistrust about IT by today's business and scientific field. In 2003 Nicolas Carr, in his over cited Harvard Business Review article [10], explains that since IT cost has dropped precipitously in recent years, and now, IT is widely accessible to businesses large and small, IT no longer provides a distinctive advantage to businesses. The author concludes while saying that companies should stop investing heavily in advanced IT products and services, rather, they should spend the resources on reducing operational risks associated with IT [11, 12]. This controversial article started a long debate that is already alive today. Many scholars and industrial leaders [13-16], have debated Carr's view, and have shown evidence of the strategic importance of IT, while generally agreeing that IT alone is not enough to sustain strategic advantages.

Therefore, today we are witnesses to a widespread scepticism, because innovation strategies based upon IT, even if they continue to be used by most companies, beget opposite results as to their performance improvement. Substantially, the main causes of those results, often inadequate, are as follows [2, 17-22]:

- inability of the IT people to work together with the business side of the organization;
- lack of IT alignment;

- a prior lack of actual systemic business analysis (where or how to take IT solutions in, and what kind of IT solutions to choose);
- a lack, both prior to and during the implementation of actual costs/benefits analyses;
- under evaluation of the actual IT investment amount.

Actually, instead of considering IT as a proper investment, able to provide actual innovation, organizations have considered it an expense to get “improvement instruments”, without making actual investments analyses (or just making them to a certain degree and with inadequate tools) [17, 19, 23]. In fact, business characteristics of each company determine the “potential” value of the resource *information*, that “potential” can be released and increased by the resource *technology*. The resource *information* is the element that makes the business system unitary, compliant and turned to achieve expected goals. IT value depends on the value of data/information treated along the whole enterprise. As Clemons and Row argued [24], IT’s value doesn’t reside in its intrinsic properties, but it depends on how it can be effectively deployed to support business strategies.

Therefore, IT initiatives have to be considered as inseparable elements from the business system, and any IT investment has to be measured in accordance with the specific characteristics of the system itself. A great alignment has to arise between IT and the business processes. As the economy changes, new ways to evaluate IT investments are needed. Traditional methodologies focused solely on cost, or those that merely take snapshots in time, are inadequate in today’s business climate. Also ordinary capital budgeting methods used to evaluate infrastructure or industrial investments need to be integrated into a more complex approach/framework in order to capture this information value over the whole enterprise. Although different scholars have studied IT’s role and its strategic value [25-29], there is a lack of practical research about measuring the real impact of IT [30].

Given the current financial crisis and lack of resources, it is timely an important to develop a practical framework able to address the real IT and Information Systems (IS) benefits for organisations. As demonstrated by a previous study conducted by the authors, carried out on 2,000 Italian IT professionals, shows that more than 80% of the sample, considers IT a way to achieve competitive advantage but less than 5% of that sample confirms his capability to measure IT value.

This paper presents a practical framework evaluate IT and IS projects to support businesses and their stakeholders understand the value of measuring Information investment

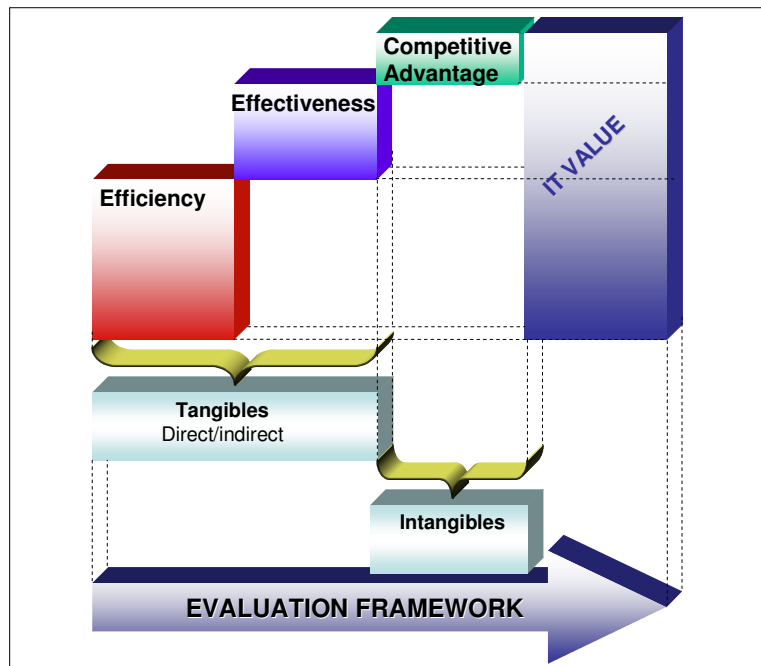
performance. The framework aims at aligning IT to the business needs and, thereby, take the first step towards developing the capability to manage, improve, and convert the value created from their IT investments into shareholders' value and competitive advantage.

## 2. THE FRAMEWORK FOR EVALUATING IT AND IS

The IT evaluation framework is based on the management and financial reporting practices already used by the organizations. Ordinary capital budgeting methods are integrated with the specific IT investments characters. Hence, the measuring approach is based on the consequences that IT initiative may cause complexity at business level. From this point of view, it becomes fundamental to form a project team charged with that initiative, to which both the charged IT staff and people responsible for involved business units/departments, as well as the top management and the persons in charge of management and financial control. The purpose is to fill the actual gap between IT and business people, anyone has to learn the basic economic-financial language on which framework outcomes are based. Above all, the influence that IT solutions may have upon business organization and management concerns the pursuit of [31-33]:

- *efficiency* (costs reduction, productivity increase, etc.) ;
- *effectiveness* (quality increase, errors decrease, service levels improvements, customer support, etc.);
- *competitive advantage* (achieving business goals, increasing market share, brand awareness, developing skills, reducing risks, etc.).

The elements, on which the described improvements are based, may be represented by features and variables having different natures and, thus, being able to influence each phases of the framework. There can be direct and indirect *tangible variables* to be quantified in economic terms and *intangible variables* hardly measurable in economic terms, anyway to be accounted for the value analysis. While the benefits, in terms of efficiency and effectiveness, that a certain IT solution can provide are quite direct or indirect; the benefits, in terms of competitive advantage, are quite intangibles.

**Figure 1 – Defining IT value along the evaluation framework**

The IT evaluation framework takes into account the above-mentioned features and, therefore, at its first stage is organized as follows:

- *cost benefits analysis*: definition of all IT initiative costs and benefits of a tangible nature, integration and use of financial evaluation methods (NPV, IRR, payback, etc.);
- *strategic impact analysis*: definition of IT initiative intangible benefits, determination and tracking of some indicators linked to those benefits.

Hence, an evaluation is given in terms of quantification and durability of the value created by the IT project; however, as every value definition approach, we must discount the results obtained with the risk element. Accounting for risks is fundamental for the evaluation process; those risks, if non-quantified or undervalued, can make the project itself unsuccessful. So, the next phase of the framework is related to the *risk assessment* activity while leading sensitivity analysis of different scenarios.

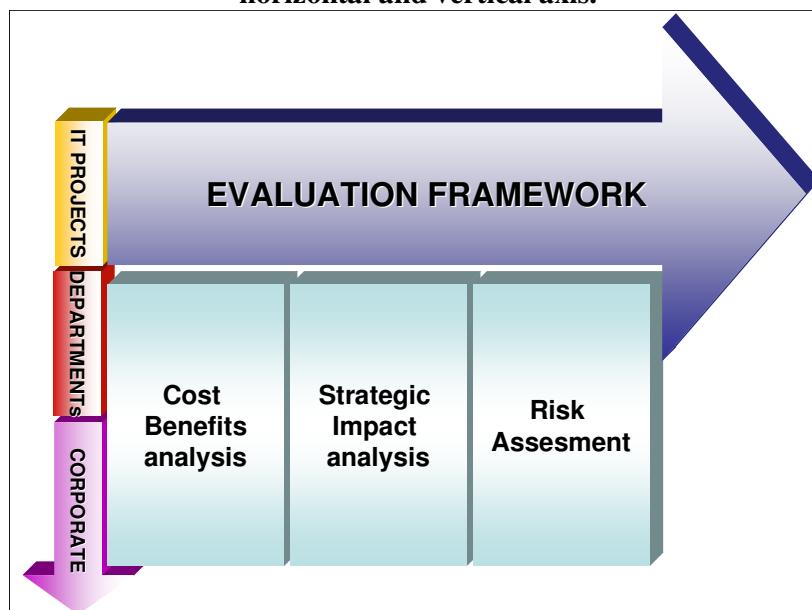
As seen above, the biggest evaluation mistake of IT strategy may be its lack of contextualization at the business level. It is, therefore, necessary to move the measuring process from a horizontal dimension, concerning the quality of the individual project, to a vertical dimension. The results are compared to other projects results and are integrated within the corporate context of business value generation. In fact, if the results of a specific

project, achieved through the three phases of the explained approach, can be justify the project, the contextualization within the specific company business environment may lead to opposite results. When a project is consolidated with other different IT projects, its objectives may be untenable or subordinate in comparison with an IT *projects portfolio* analyzed as a whole. Furthermore, the impact that the single project, or selected IT projects portfolio causes at a global economic-financial level must not be overlooked. So, the results reported have to be continuously consolidated, tracked and updated in the complex values system linked to other IT projects, which are under evaluation and/or already active, as well as different involved departments/ processes in the project, thus, the whole business environment.

From the framework viewpoint, activities that become necessary can be represented by:

- *IT projects portfolio*: definition of the best IT projects portfolio, based on the results achieved by a single projects in terms of quantification, durability and risk;
- *IT budget and other areas*: IT projects portfolio consolidation within the system of data concerning the IT area and other involved areas in order to understand tenability in terms of people, competences and assets at every operational level;
- *corporate*: IT projects portfolio consolidation within the widest company system of data in order to understand what the tenability is in terms of economic, financial, and patrimonial view.

**Figure 2 – Business reporting phases of the IT evaluation framework throughout horizontal and vertical axis.**



### 3. THE FRAMEWORK FEATURES

In the following sections, the different features of the IT reporting evaluation framework are analyzed while using best practices concerning real IT initiatives.

#### 3.1 Cost Benefits Analysis

We focus our attention upon the “tangible” variables that characterize the project in order to quantify them in financial terms. The objective is to define cash flows linked to potential costs and benefits in order to carry out ordinary capital budgeting methods. This analysis takes place by inquiring different business level and processes within the involved company departments. Great collaboration and communication are to be established among IT project responsibilities and management accounting personnel. Costs’ defining and subsequent financial quantification are based on specific data knowledge included in the involved functions/processes (i.e. using of suppliers and external consultants’ estimates and contractual formalities and internal personnel’s cost per hour), as well as monitoring of company processes involved by that solution (activities, involved people, time and material techniques) and similar projects costs. For a correct determination of the costs arising from different activities, support and aid by management accounting activity becomes relevant, as does the subsequent use of the company’s budgeting and reporting systems.

The IT cost typologies, as far as a project is concerned, can usually be reduced to a limited group of predetermined categories/typologies. Typical project cost includes:

**Table 1 – IT projects’ costs by nature**

<b>IT Costs</b>	<b>Business Unit Costs</b>
Hardware and software	Planning and coordination meetings
Support and maintenance fees	Requirements development and testing
Planning and design labor	Re-engineering business processes and change management
Professional services	User Training
Implementation Labor	Business unit on-going management and support
Application design development and testing	Retirement and transition labor and
Retirement and transition labor and fees	
IT training	
Hosting and application service provider fees	
On-going management and support	
Application maintenance and evolution	

Subsequently, all costs have to be merged into a synthesis report. For example, a synthesis report is drafted below, regarding an application linked to customer service.

**Table 2 – Example of Costs from a CRM solution.**

Date	Project phase	Description	Amount	Department	Process	Internal /External	IT Budget Category	Corporate Budget category	Financial statement	% Depreciation	Tax deduction
IV/2005	Planning	Development project team	20.000	Marketing, Sales	CRM	Int.	-	SG&A	Labor cost	0%	100%
I/2006	Purchase	n.2 Server Purchase	36.000	IT	Infrastruttura HW	Ext.	Data center, servers	Depreciation	Fixed assets	25%	100%
I/2006	Purchase	HW client Upgrade	50.000	Marketing, Sales	CRM	Ext.	Distributed processing	Depreciation	Fixed assets	25%	100%
II/2006	Purchase	CRM server license 1 year	100.000	IT	CRM	Ext.	Software	Depreciation	Intangibles assets	20%	100%
II/2006	Purchase	Client license 5 years	5.000	Marketing, Sales	CRM	Ext.	Software	Depreciation	Intangibles assets	20%	100%
II/2006	Implementation	Customizing CRM	120.000	IT	CRM	Ext.	Services	SG&A	Services	0%	100%
II/2006	Implementation	Implementation Labor	50.000	IT	CRM	Int.	Implementation labor	SG&A	Labor cost	0%	100%
II/2006	Implementation	Training	3.000	Marketing, Sales	Training	Ext.	-	SG&A	Services	0%	100%
III/2006	Management	Assistance	3.000	IT	Assistance	Ext.	Services	SG&A	Services	0%	100%
...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...
<b>TOTAL</b>			<b>387.000</b>								

In this case, the final expenditures concern purchasing hardware, software components and bearing expenses, such as customizing by external consultants, personnel training, use of internal people for implementation and assistance. Once costs concerning the project have been quantified and reported is required to quantify the related benefits starting from the tangible ones. This activity is strictly linked to the reasons and needs which led the company to a certain IT project.

Only if a list has been outlined concerning the possible improvements in terms of processes, activities and functions, it is possible subsequently to search the specific IT characteristics which can lead to those improvements. To be precise, it is necessary that the corporate objectives are clear and shared with the evaluation team. To such a purpose, the creation of a strong link is required between the critical success factors of the corporate strategy and the characteristics of the IT solution, as to be able to define the moment and the phase in which a benefit can emerge [34, 35]. The identification of the benefits is defined by structuring the ‘cause-effect’ links that are established among the following elements:

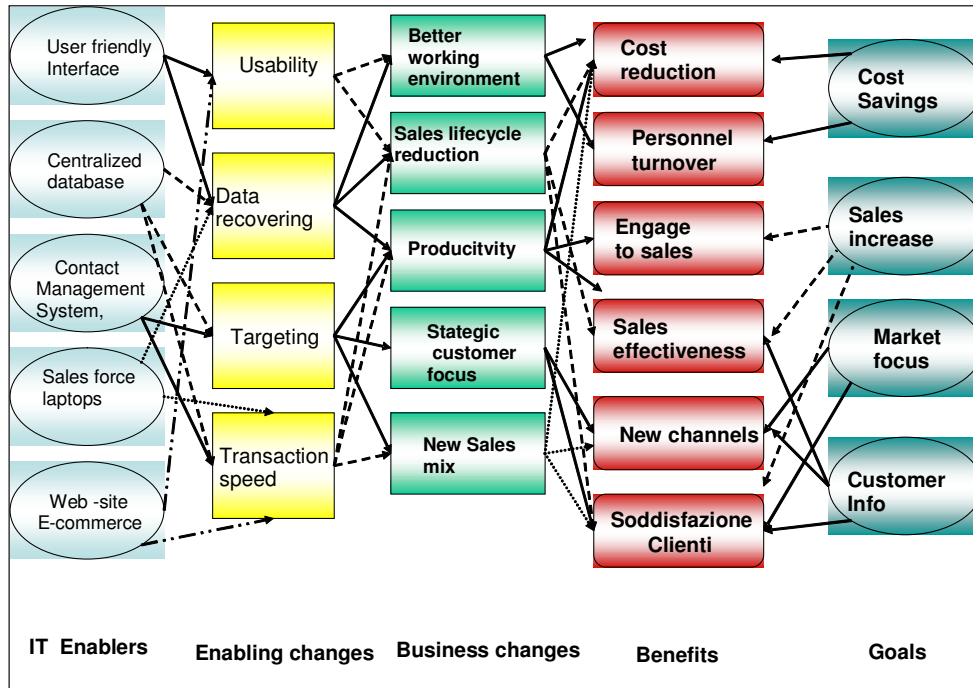
- *drivers*: represent the cause of taking in consideration the project;
- *objectives*: represent the expected improvement brought by the project itself, that is to say, the critical success factors;
- *benefits*: represent the modality through which the expected improvements display themselves inside the expected processes and corporate functions;



- *enablers*: represent the project characters able to bring expected improvements.

The scheme of the links among the different aforementioned elements could help understand the characteristics of the benefits expected in economic-financial terms by the IT solution. We present an example of the possible scheme of representation of these links to the benefits of the CRM's application seen before, according to a Benefit Dependency Network [36].

**Figure 3 – Example of Cause-effects relation in a CRM solution.**



The critical success factors which are sought in an IT solution are mainly represented by the operating efficiency improvements such as:

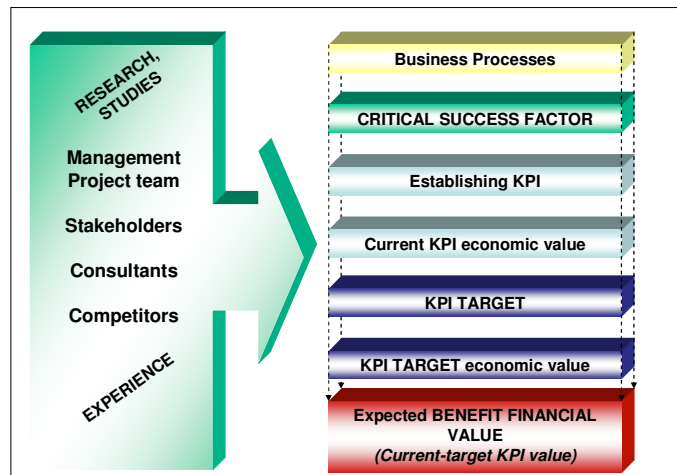
- ~ *productivity improvements and labor savings*: the gains in user productivity from implementing a solution, including efficiency gains in performing specific user tasks, reductions in productivity losses, such as those generated by travel time or system downtime or the savings due to expected headcount reduction from implementing the planned project;
- ~ *capital savings (expense reductions or purchase avoidance)*: the savings in capital expenses such as inventory costs, outsourced service fees, office supplies, shipping costs, printing costs, power or facilities expenses from implementing the planned project.

and also achieving strategic operating effectiveness like:

- ~ *business improvement*: the gains in profit resulting from increased revenue or maintaining same market share while new competitors are entering. These gains can be driven by increased sales, more effective customer acquisition and conversion percentages, and increased customer retention.

These benefits may arise from the creation of entry barriers in the market: for example, the developing of a new technological standard in the relation with the dealers (distributors) can create a slowdown in the entry of new competitors, etc. It is necessary to point out that the benefits linked to the increase of the sales proceeds and the income lead to a consequent increase of the corporate production and, hence, of the effective relative costs. Moreover, since even the tax burden can increase, it is necessary to consider such aspects in the consolidation of the data along the vertical dimension of the analysis. Hence, it is possible to quantify in monetary terms the various benefits expected through the definition of some Key Performance Indicators (KPI). KPIs are considered a small group of indicators defined by managers as basic values reflecting the quality of adopted strategies to a directional level [37]. A KPI represents the measurement of the critical factor linked to the improvement that we want to obtain from the project taken into account. In practical terms, it is necessary to establish with the involved stakeholders which monetary value can be linked to the increase of a unity of KPI. Afterwards, the final value of the improved KPI is established in two background hypotheses (scenarios): one is optimistic, and the other is pessimistic. A reasonable target of unity of improvement is the average of the two scenario values. The use of tools such as decision tree and theory of real options can improve the reliability of this definition process. This reporting process as showed in the following Figure.

**Figure 4 – Tangible benefits financial definition**



In the following Table, is presented a report concerning some of the benefits linked to the previous project of CRM. In this case, the direct benefits are linked to improvement in operational efficiency of after-sales people, while the indirect benefits are characterized by the operative and strategic effectiveness that arise to increases of cross and up-selling transactions.

**Table 3 –Benefits reporting from a CRM solution**

Year	Benefit category	Type	Description	Driver	KPI	Amount (5 years)	Department	Process	Budget category	Financial statement	Notes
2007-2011	Operative efficiency	Direct	Call center labor savings	Better addressing of inbound calls	Inbound calls volume	370.309	Sales	After-Sales	SG&A	Services, labor	
2007-2011	Operative efficiency	Direct	General & administrative expenses savings	Lower volume of inbound calls and personnel to manage.	Full Time Equivalent related to Administration	139.410	Sales	After-Sales	SG&A	Services, labor	
2007-2011	Operative efficiency	Direct	Turn-over reduction	Less stress due to easyness of finding informations/data	% friction among the personnels	44.437	Sales	Call center	SG&A	Services, labor	
2007-2011	Strategic effectiveness	Indirect	Cross-up selling increasing	Utilization and correlations of informations about the customer who is calling.	N° of cross-up selling transactions	262.753	Sales	Sales	Sales	Sales	net benefit resulting from increasing sales and relative COGS
...	...										
...	...										
<b>TOTAL</b>						<b>816.909</b>					

As an example, the Call Center labour savings has been obtained as the following Table 4.

**Table 4 – Example of Financial benefits definition.**

<i>Call center labor cost reduction</i>							
	2006	2007	2008	2009	2010	2011	Totale
<b>N. yearly inbound calls (KPI reference)</b>	<b>170.000</b>	<b>171.700</b>	<b>173.417</b>	<b>175.151</b>	<b>176.903</b>	<b>178.672</b>	<b>1.045.843</b>
N° hours duration average call	0,25						
Annual average salary personal	30.000	31.200	32.448	33.746	35.096	36.500	
N° annual working hours	2.000						
<b>Average cost per call</b>	<b>3,75</b>	<b>3,90</b>	<b>4,06</b>	<b>4,22</b>	<b>4,39</b>	<b>4,56</b>	
<b>All-in cost calls</b>	<b>637.500</b>	<b>669.630</b>	<b>703.379</b>	<b>738.830</b>	<b>776.067</b>	<b>815.180</b>	<b>4.340.586</b>
% Reduction n. calls		10%	10%	10%	10%	10%	
<b>KPI Target: inbound calls</b>		<b>154.530</b>	<b>156.075</b>	<b>157.636</b>	<b>159.212</b>	<b>160.805</b>	<b>788.258</b>
<b>Cost Reduction</b>		<b>66.963</b>	<b>70.338</b>	<b>73.883</b>	<b>77.607</b>	<b>81.518</b>	<b>370.309</b>
<b>Cash flow (from cost savings)</b>		<b>66.963</b>	<b>70.338</b>	<b>73.883</b>	<b>77.607</b>	<b>81.518</b>	<b>370.309</b>

Sometimes the benefits from implementing a project are not directly translated into bottom line savings. The reason for this is mainly linked to the characteristics of the company's employees and how them accept and use the new IT solution. A relevant characteristic concerning the acceptance of IT projects is employees' age. As a matter of fact, the level of knowledge in the utilization of Technology can be influenced by training and mentality along different generations of employees. The framework must, therefore, consider and quantify the probability of unsuccessful translation of the expected benefits in effective benefits linked to factors such as:

- *user adoption issues*: based on ease of use, business process re-engineering, capability of the individuals, training, culture, management focus and objectives and other factors (e.g. lack of sharing the main strategy over bottom lines managers).

- *translation issues to real productivity savings*: the ability to reach full time equivalent savings from the productivity enhancements (e.g. strict labor law or contracts), or predicted strategic benefits.
- *risk of multiple dependencies to achieve results*: the impact of risk in achieving benefits which are indirect, relying on a chain of benefits to produce a higher order effect (e.g. employees doesn't reaching full use of a new cost accounting solution may result in a lack on establishing real products cost and then in a loss of profits).

To account for the lack of direct translation to bottom-line benefits, a discount rate is provided, often called a realized benefit factor. This discount rate should be provided individually to each direct and indirect benefit in order to make the results more realistic and achievable. When costs and tangible benefits are defined in financial terms, it's possible to obtain a first measure of the value concerning the project while apply ordinary capital budgeting methods, such as NPV, Profitability Index, IRR and Payback period [38-40]. Usually, wide support is given up by financial professionals, for example, in order to define the average cost of capital.

### **3.2 Strategic Impact Analysis**

Sometimes it's difficult to understand the objectives of a specific IT project while only accounting for tangible benefits. For example, let consider the project concerning a corporate Internet website without e-commerce features. It's difficult to lead the reasons of the project only to the savings related on printing informative brochures. On the other hand, marketing and branding strategies could arise in order to reinforce awareness on customers and in general towards all stakeholders. Also mandatory projects due to respect of law regulations or provisions (e.g. IAS/IFRS adoption, Basel 2, Sarbanes-Oxley Act, etc.) are difficult to being justified if analysed only in tangibles aspect (more costs than savings) but, however, the contribution in terms of vitality and lastingness of the company is very important.

The analysis must, therefore, be shifted in order to account indirect increases of value linked to elements such as:

- ~ *intellectual capital*: Intellectual capital is the increase in relevant knowledge gained by the staff and the perceived market value from those gains [41]. This increased knowledge may indeed result in productivity gains or additional revenue, but is often difficult to quantify [42, 43]. As a result, improvements in the company's knowledge base, better management and sharing of intellectual capital are considered an intangible benefit. IT Projects that drive intellectual gains include business

intelligence, data warehousing and mining, product lifecycle management enterprise information portals, data visualization, on-line collaboration tools, and competitive intelligence automation.

- ~ *brand advantage*: it may be difficult for direct sales increases to be tied to the proposed project, but many new products or marketing and advertising related projects can lead to an increase in the perceived value of the corporate brand. Perhaps the clearest example of intangible benefits of brand-oriented projects is sports brands, which maintain expensive sponsorship with athletes to promote their brands. Of course there are tangible benefits in R&D that result from the collaboration but the billions spent on the athlete image is mostly a brand building exercise. For IT projects, some may be implemented primarily to promote the company's brand image in the marketplace, if the corporation's brand is perceived as stable, there may be significant intangible value investing in a disaster contingency facility and promoting this fact to the marketplace. If the brand is consumer-oriented, there may be valuable brand equity from implementing a content rich, multimedia web site that includes free games and promotions (e.g. Nike website through the customization of the shoes gain customer fidelization and brand awareness). If the brand is innovative, there is intangible value to the brand in launching a wireless access solution, such as wireless trading;
- ~ *strategic advantage*: certain projects are implemented because they are highly fundamental to corporate strategies. The company should have a set of written goals and the IT projects should align and support these goals. Using techniques such as the Balanced Scorecard can help drive the alignment of projects to the strategic objectives of the company. This is a very broad category and may include initiatives to help the company with M&A, legal and governance, better forecasting, reporting, quality management, project management, and growth. Several solutions that can aid in realization of strategic advantage include ERP systems, SCM, enterprise information systems, CRM and sales force automation, Balanced Scorecard, intellectual property asset management, computer aided design, quality management, management training, and project management.
- ~ *organizational advantage*: as seen above, enabling an organization to function more effectively can help to reduce costs and improve performance. Some of the initiatives can be quantified as operational savings or productivity improvements, while others, such as scalability of the organization, creativity, improved communications, maturity

and more effective collaboration are difficult to define in financial values. The intangible organizational advantages can be obtained from e-mail, instant messaging, wireless communications, mobile computing, knowledge management, data warehousing and mining, enterprise information portals, collaboration tools, human relations software, training, and coaching.

- ~ *competitive advantage*: competitive advantage could be recognized when a company is being able to release solutions faster, develop solutions less expensively, better address customer needs, meet changing market demand, scale easily and more cost effectively, and gain market share. Some of these competitive advantages can be quantified as tangible benefits, while others might be difficult to put specific revenue and profit figures on. A few solutions which deliver competitive advantage can include CAD, ERP, SCM, collaboration and project management tools, public relations, marketing and advertising performance tracking tools, online marketplaces, CRM and sales force automation.
- ~ *risk avoidance*: one of the most overlooked intangible benefits is the risk of non implementing the solution. What if a competitor implements the solution and you do not. Risk avoidance can include implementing a solution to avoid the risk of losses in market share, loss of key customers, employee loyalty, investor confidence and other important but intangible risks. Projects that avoid risk benefits may include scalable computer systems (simplification), backup systems (reduce risk of data loss), security (reduce the risk of external and internal threats), mobile applications (competitive positioning), e-commerce (market opportunity) corporate Internet solutions (meeting customer and investor expectations), and mandatory projects to meet government regulations (IFRS, Sarbanes Oxley, etc).

Financial definition of intangible benefits is quite a difficult operation. As a matter of fact the intangible benefit arise from the activation of the IT solution. Moreover, an intangible benefit can be represented as a complex system of immaterial elements whose unitary value is influenced by the belonging of the system itself and, for this reason, without any individual worth. In all cases, the items considered as intangible benefits should come under scrutiny to determine if they can be made tangible benefits, quantifying the potential savings or profit gains. However, if the team is “stretching” to accurately quantify the intangible benefit, it may be better to keep the benefit as intangible rather than ruin the credibility and accountability of the previous financial analysis.

If monetary quantification is not possible, then the team should seek to define a KPI for each intangible benefit: a measure that can be used to predict the improvement derived from the intangible benefit. Not putting a measure in place for the intangible benefits propagates issues in success tracking and accountability. These can include measures such as customer satisfaction and brand affinity metrics measures which can be used as benchmarks so that the project's impact on strategic advantage can be tracked. If such a tracking system is not put in place, full accountability of the project is lost.

The following Table presents an example of some KPI linked to the achievement of particular intangible benefits from a few ERP applications:

**Table 5 – Report of KPI linked to intangibles benefits expected.**

Application	KPI	Description of benefit			
			2005	2006	Target
Finance	Quarterly closing	decreasing of days preparing quarterly report	10	8	7
CRM	% market share	brand awareness, more fidelity, etc.	1%	2%	3%
	% Sales from new product	innovation, time to market, competitive advantage	15%	16%	20%
SCM	Sostitution cost	decrease of Cost due to bad raw materials supplied	13	10	7
	Days of inventory	Cash flow improvement due to decrease of working capital absorbed by inventories	20	15	10

### 3.3 Risk Assesment

Risk assessment quantifies the potential issues a project might have, particularly those issues which may affect achievement of cost, benefit and strategic goals. Risk assessment and risk management represent techniques and disciplines already consolidated in contemporary organizations. So we only provide hints and reflections related to best practices for accounting IT risks without replacing other well-planned and interiorised corporate approaches [44].

Defining possible risk areas need the deep knowledge of all phases related to the investment lifecycle. Issues can be represented by delays in the fulfilment of the project, the increase of estimated costs, the decrease of the expected benefits and some other elements that can turn a project from being positive to being negative. Usually, the more relevant in terms of processes, functional interested areas, financial and human resources involved, the more probable the increase of risk is. It is suitable to consider data and information deriving from previous project failures, list of risks that the company has assumed by approving

previous projects, stakeholders' opinion on risk, strategy and general corporate regulations regarding risk. Risk concerning a IT solution may deal with the following elements [5, 44, 45]:

- *people*: project people may be assigned to another project, and that project may not be completed in time; the skill set to implement the project may not be available in the given organization, meaning that training needs to occur, resources need to be hired, or key portions of the project need to be outsourced to skilled resources; the knowledge to implement the program relies on one or a small group of key resources who need to be retained in order for the project to be implemented successfully;
- *acceptance*: users may not accept the solution and rebel, or more likely, they will not adopt all or some of the key features, which reduces the benefits substantially;
- *compatibility*: the solution may not be compatible with current or future operating systems, platforms, or other applications;
- *suppliers*: vendor may not be able to deliver the solution in the promised time frame or with the required specifications. Or may be a start-up or not financially sound, so they may not be around in several years to support the solution and deliver required updates and upgrades;
- *schedule*: the project requirements may drive a schedule that is unrealistic. The overruns in schedule may cause cost overruns, delays to benefits, and impacts to other dependent projects;
- *legal*: there may be legal and governance risks and exposures in the project, such as not being able to implement the project in time to meet legal regulations, or a failure that may risk legal exposure. The project or issues with the project may also effect compliance with governance issues such as financial reporting requirements;
- *dependencies*: there may be risks that can affect a family of dependent projects, such as delays, resources or budgets.

Once a certain risk is identified, it is necessary to estimate the probability of occurrence to assign significance as regards to the corporate impact and, at last, it is necessary to establish the strategies of attenuation. Certain risks can be mitigated through the increase of the used resources in the project (capitals, employees, competences, the resort to the external, etc.) that, nevertheless, cause an increase of costs and a decrease of benefits including delivery, and consequently, the economic return. It becomes possible to cancel the risk by extending the times of implementation or by modifying some characteristics of the IT solution.

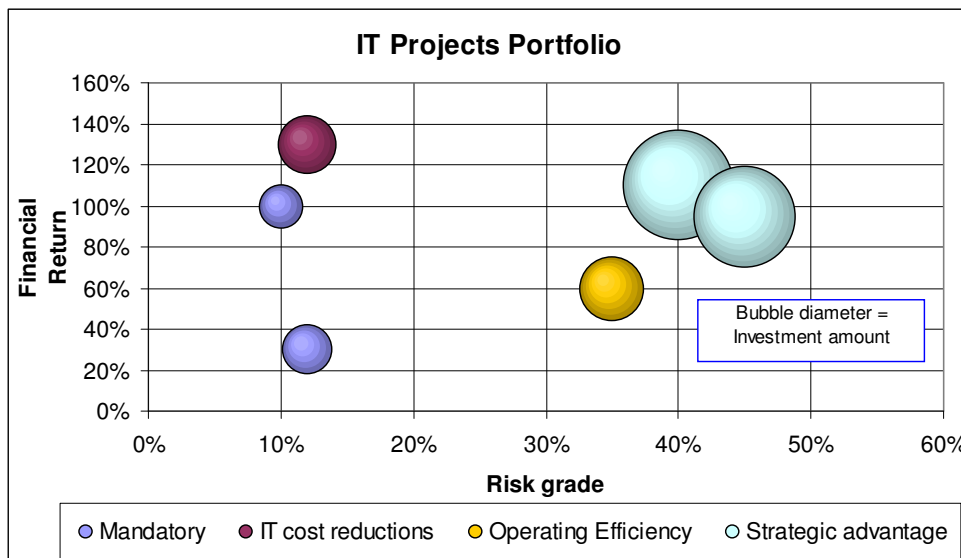


### 3.4 Vertical Analysis: Business Contextualization

The isolated analysis of a project may show excellent results in terms of the increases of productivity, labour savings, or increase in profitability but, if compared and consolidated with other projects and with the specific elements of the single organization, may result aggressive and unlikely. When a single IT initiative is analysed with other IT projects, the assigned IT budget couldn't be sufficient in terms of financial resources and employee headcounts.

The goal is to define an investment portfolio which is optimal and realistic and that respects the limits of the IT budget and also the corporate global Budget. Assessing the optimal portfolio may require inserting riskier projects with high expected returns together with more conservative investments able to mitigate the general risk of the portfolio. It's necessary to find out the best project related to different typologies (for example, the best project of CRM, the best project of SCM, etc.) in terms of maximization the results and minimization of risks in order to create an optimal portfolio and to simulate, at last, the financial impact of such portfolio on the IT budget (money and resources) [46]. The creation of the optimal portfolio is based on the comparison of the various projects with reference to the particular characteristics that distinguish themselves and in particular with elements as: targets and goals, type, description, investment amount, risk grade, NPV, Payback, IRR, etc. The characteristics of the optimal portfolio can be better analysed through the use of particular graphic techniques, such that one reported below.

**Figure 5 –IT Projects Portfolio representation.**



IT strategic impact into the corporate values can justify the approval of the enterprise to a directional level. As a matter of fact, the IT project, which need approval, must be presented to various subjects in a language that is comprehensible to them, the financial one, and not using data and diagrams characterized by technical issues. The details relative to technicality and to the architectures used by the project can interest the staff who deals with IT. On the other hand, the financial manager or the board of directors is sometimes more interested in the financial impact of the project on a global level than in its quality from a technical point of view.

The presentation of the results of the IT strategy according to the financial language permits avoidances of barriers and incomprehension among IT technicians and financial, administrative and directional people in charge. The objective of this phase consists in inserting the project into the complex system of economical and financial values linked to budgeting and financial statement management reporting process; so that process must be interiorised and institutionalized to all levels. Today, even due to IT project failures, top management's attention is concerned on the financial findings of the IT project. Holding the business unit/department personnel accountable for their responsibilities, both on project and on the relationship build within IT personnel, will actually improve and strengthen the IT-business alignment.

In practical terms, it is necessary to consolidate the financial results of the single project or the IT Portfolio in the widest system of values linked to the global budget of the company and define trends over the main indicators (e.g. ROE, ROI, acid test, leverage, etc.). If there has been collaboration within the team and controllers and administrative people, the integration in the global budget and in the financial statement of the company isn't so difficult. Reporting differences between the budget 'as is' and 'with IT' may help better understanding of economical, financial and patrimonial benefits related to the planned IT strategy. The reports created can be object to specific analysis in order to understand some issues about economic sustainability, financial aggressiveness, etc.

A constant information flow arise between who analyses the issues of the 'final' plans and the persons in charge of operative functions who have arranged them. Moreover, the informative cycle created by the process of measurement permits to obtain data and constant information about the planning and the trend of the various projects; information that can be easily used in meetings, lectures, boards and meeting with the shareholders. Once the quality of the IT strategy on a global level has finally been understood, it can be suitable to carry on

the analysis outside the business borders. The goal consists in understanding the way the company do business with the IT compared to the surrounding market. Operatively, some methodologies of benchmarking can be used.

#### 4. CONCLUSIONS

The presented IT evaluation framework is based on different layers of study in order to better understand the genesis of IT value issued on the business. If the people and the stakeholders are involved in an active way and had interiorised the process of evaluation, an easier achievement of the goals can be guaranteed. The final result in financial terms must almost be considered a formality; the really relevant result at a business level is the development of an organizational skill which is aligned in reaching the planned targets and the stakeholders' expectations about IT projects. In particular, the reporting framework proposed, if adopted and aligned with the business, is able to bring the following benefits:

- *increase of collaboration and organizational efficiency*: the involvement and the exchange of information among the various business functions necessary to develop the various phases guarantee an interiorization of the project, develops communication, problem solving and therefore makes the business organization effective;
- *reaching of adequate levels of IT Governance*: the deepened analysis of the aspects linked to the implementation and the utilization of the IT enterprise can avoid lacks and issues in governance that will be resolved and optimised;
- *definition of a general coherence in the evaluation of IT projects*: all the different variables and relative phases are considered in the analysis through a single point of view based on the specific business characters;
- *competitive advantage*: the reporting approach guarantee the alignment of the IT investments to the business strategic targets and it's possible to achieve improvements in competitive advantage;
- *shareholder value justification*: using the financial language and some the performances indicators allows shareholders understand the value arising from the project;
- *optimal IT project allocation*: the definition of the optimal IT portfolio in terms of minimization of risk and maximization of return guarantees the optimal use of IT resources;
- *definition of sustainable level of IT expense*: comparison of the expected results of the process through benchmarking can guarantee achievement of better IT expense control;
- *increase accuracy in forecast and efficiencies related to IT*: the interiorization of the

framework within the IT management allows the development of skills and experience in order to increase, in the future, the accuracy of the forecasts and the utilization of the framework;

- *improvement in planning and accountability of performances*: integration of the obtained results to a vertical level (e.g. budget and financial statement) guarantees a better accountability of the whole business;

However, the proposed framework is not a rigid vademecum but rather a flow of thoughts, praxis and methodologies directed to help the enterprise. The target is the support of corporate decisions in terms of IT, it is not their ‘heaviness’.

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