How to Succeed in Business Intelligence Initiative:
A Case Study for Acquisitions in Romania Public Institutions

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Abstract –Considering the demands of knowledge society each organization must became an intelligence organization. Business Intelligence (BI) helps achieving this goal. The large variety of Business Intelligence solutions on the market, the difficult process to select one of them and evaluate the impact of the selected solution on the organization leads to the need of creating a strategy to help organizations chose the best solution for investment. Taking into account that every organization must spend its money carefully, and every solution that does not provide a rapid impact on the basic business is not considered a viable solution, the efficiency of its use must be correctly evaluated and demonstrated based on evaluation criteria, but also through monetary analyses (more difficult to achieve). We suggest and explain the main steps in order to choose the right solution and to evaluate it and we present a case study of the integration in Romanian public institutions of a Business Intelligence solution for acquisitions.

Key-Words: business intelligence, innovative strategy, public acquisitions, return of investment, metrics, efficiency.

1 Introduction

In order to cope with the competition environment and to take advantage of the market opportunities, the organizations need to have real-time access to information on clients, products, providers, and markets. Beside the real-time access, the actual business environment means increased speed of business, information overload, increased globalization, increased complexity and dynamics of internal processes and of the environment, speed of technological changes, which imposes the need for the implementation of Business Intelligence solutions within the organization.

According to Zeljko Panian, "Business Intelligence allows organizations to access, analyze and share information and knowledge. This helps them to track, understand, target and manage their business in order to improve enterprise performance."[15]. In addition, Business Intelligence Systems "give the complete vision to learn from the past monitor and communicate the present, and gain insight into the future" [2].

In the mature stage of Business Intelligence solutions, they tend to lead the business and then the market, providing intelligent services to the stakeholders of the organization. This is the beginning of a new era, one of proactive, extensible, performance oriented Business Intelligence [8]. This new era may be regarded as a new perspective by which Business Intelligence is combined with business process management, business rules engines, master data management, complex event processing and other instruments and techniques directly and immediately applied to business decisions.

The decision to invest in a Business Intelligence solution may be tactical ("generally involves a relatively small amount of funds and does not constitute a major departure from what the firm has been doing in the past") or strategic ("may involve large sums of money and may also result in a major departure from what the company has been doing in the past") [5].

Companies see business intelligence playing a strategic role, they also want to be able to use insights gained from their data for more tactical decision-making purposes [15]. According to Mihaela Muntean and Cornelia Muntean, the "Buinsess Intelligence is the art of gaining business advantage from data thought collaboration" [10].

Considering the vast variety of Business Intelligence solutions on the market, organizations must decide which solution will contribute more effectively to benefits/results of the organization and asses the opportunity of spending their money on that particular solution [3]. In order to take the best possible strategic decision organizations must

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achieve a strategy of selecting a solution and evaluating its impact.

2 The Need for a Strategy to Select and Evaluate Business Intelligence Solutions

Selection and evaluation of the Business Intelligence solution represents a difficult process of analysis and evaluation of current and future demands, settings the evaluation criteria, evaluation and selection of Business Intelligence solution, analysis of risks, costs and benefits of selected Business Intelligence solution, which must be done by a team of both business and IT personnel. The initial evaluation is followed by a series of analyses made after each year of use in order to verify the initial estimation and to adjust the business strategies.

In the process of selecting the BI solution, one of the main problems is the creation of a balance between the relevance granted to choosing the best solution and the time and money needed for analysis and evaluation of all the criteria. Taking into account that every organization must spend its money carefully, and every solution that does not provide a rapid impact on the basic business is not considered a viable solution, the efficiency of its use must be correctly evaluated and demonstrated based on evaluation criteria, but also through monetary analyses (more difficult to achieve).

The main value brought by Business Intelligence is intelligence and this value must be assessed in order to decide on the profitability of the solution. The need for the evaluation of the Business Intelligence solution is a result of at least the next issues:

- rather high investment costs;
- avoiding buying a BI solution not suited to the needs of the organization, regarding the cost/performance ratio;
- it represents a decision factor in choosing a BI solution;
- helps organizations in understanding the goal of implementation;
- focuses on the foreseen incomes and results;
- provides an environment for the financial management;
- helps to monitor BI processes (monitoring of actual results compared to the expected results);
- represents a feedback to refine and revise business strategy;

The main problem that confronts the present frameworks for the measurement of Business Intelligence solutions is the fact that much of the benefits are strategic benefits, hard to quantify and only appearing several years after the implementation of the solution. Thus, many of the effects of the BI solution are non-financial, sometimes intangible effects that lead to financial results after a certain period of time. These benefits come from improved decision-making, increased quality of information and are not financial incomes directly quantifiable. Beside this problem, the strategic nature of the Business Intelligence solution, the dispersion of benefits inside the organization, and the effects on the culture of business represent other motives that make the Business Intelligence solution a difficult process.

From this comes the need for the creation of a measurement framework that would entail understanding and quantification of costs and benefits needed by a well-founded decision. Analysis of costs and benefits represents a methodological framework for verifying feasibility of investments, t.i. analysis of their economic justification [1]. When analyzing costs we look at events that reduce utility whereas when analyzing benefits we explore events that contribute to higher utility [1]. Measuring utility in absolute terms and making a monetary valuation of results of a Business Intelligence solution is very difficult.

There are different methods to evaluate an investment into an IT solution such as: IRR (internal rate of return) – compares the present benefits to the capital costs of the company, NPV (net present value) – evaluates the investment potential of resources, the payback period - determines the time needed for benefits returned to equal the initial cost of a project, ROI (return of investment) – shows how much each dollar spent will yield in returns.

The problem with these methods is that they measure the financial value of the investment, while the value of BI is mainly intelligence that is difficult to measure. The increase of IT costs emphasized the processes and techniques to measure the benefits from IT. Although many techniques are able to measure the tangible benefits, many of them face difficulties in measuring the intangible benefits. There are several techniques on the market to measure the intangible benefits of operational systems, but there are problems with evaluating intangible benefits of strategic systems like Business Intelligence. Therefore, measurement in practice is quite difficult [1].

3 Key Steps for Choosing the Right Business Intelligence Solution

Considering the diversity of BI solution on the software market and the fact that each organization aims at a more efficient use of funds, it becomes necessary the creation of a strategy for purchasing based on a decision making process. Mintsberg, a well-known expert in artificial intelligence (AI), divides a decision-making process into three stages: problem identification, problem research and making choices [6]. He considers that problem identification is the most important stage for the whole decision-making process because it directly determines the complexity and success norm of the following two steps.

The strategy that we are proposing in purchasing a Business Intelligence solution involves five stages (figure 1) - which are the result of research in the field of Business Intelligence solutions and of methods of selecting the best solutions for investment – presented in detail in [8].
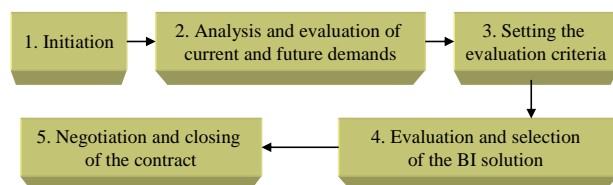

Fig. 1 Selection strategy for BI solution [8]

The present paper completes the stage four of the strategy of selecting a Business Intelligence solution – that of creating an environment for measuring the impact of the Business Intelligence solution on the organization. The strategy of selection involves evaluation of Business Intelligence solutions based on the gathered information and the set criteria and choosing the solution with the best score among those that satisfy the minimal requirements and fit the investment budget [5]. In order to achieve success, the Business Intelligence initiative must [16]:
- support critical business processes,
- be seen by users as mission critical, and
- meet the main needs of the users.

3. 1. Initiation

Initiation of the acquisition process may start as result of noticing a problem within the organization or an opportunity [8]. The stage is closed by the creation of the project team and of the solution for implementation (long or short term).

3.2. Analysis and evaluation of current and future demands

At this stage the following issue must be ascertained: who needs BI, what information is needed, why is information important, present and future needs, how may Business Intelligence represent value-added. If a decision to purchase a commercial solution is made, the project team has the duty of setting the criteria for selection, first taking into account the identified demands, and also the facilities that the solutions provide.

3.3. Setting the evaluation criteria

After the requirements have been validated, team personnel should break out into subgroups, delineated by area of responsibility/expertise, to create the evaluation criteria necessary to support the agreed-upon objectives [16]. In selecting the evaluation criteria there must be taken into account the creation of a balance between the relevance granted to choosing the best solution and the time needed for analysis and evaluation of all the criteria [8].

Two stages are needed for creating the means for evaluation: a) a general form of the model and b) a detailed description of the modeling component, adapted according to [5].

The general form of the model in phase one is: $S_j = W_1 R_{1j} + ... + W_i R_{ij} + ... + W_n R_{nj}$ (1)

where,

n = the number of the criterion

S_j = the score for the j-th alternative

W_i = the weight assigned to the i-th criterion

R_{ij} = the rating assigned to the i-th criterion, which reflects the performance of alternative j relative to maximum attainment of the criterion

A detailed description of the modeling component in phase two is as follows:

Let

n be the number of BI solution under consideration

T be the total budget remaining

Bi be the required budget of i-th BI solution

Ri be the priority-to-cost ratio of i-th BI solution

Xi 1 if i-th BI solution is selected

   0 otherwise

We wish to maximize:

$X_1 R_1 + ... + X_i R_i + ... + X_n R_n$ (2)

subject to:

(1) budgetary constraint:

$X_1 R_1 + ... + X_i R_i + ... + X_n R_n \leq T$ (3)

(2) integer constraints: $X_i = 0,1$ for all i.

3.4. Evaluation and selection of Business Intelligence solution

At this stage the key for success is matching the demands and needs of the organization with the software characteristics of the solution. Once the Business Intelligence solution was selected according to the evaluation model that was set at the previous stage, there must be must be measured the impact that the solution has on the organization.

The proposed solution is the creation of a framework that would evaluate the impact of Business Intelligence solutions in all the areas of the organization and would take into account all costs and benefits on a correctly defined period of time. The proposed framework is based on the calculation of the ROI indicator and represents a stable framework to justify and measure the benefits of the BI solution.

The main stages of creating a framework for measurement are:
- setting the way in which the BI solution affects the organization
- identifying and measuring costs;
- identifying and measuring benefits
- evaluating the risk of the project.

3. 4. 1 Return of investment

From financial measurement instruments we have chosen ROI, which is accepted as a financial measure to evaluate the benefit of BI solution and which combines features of NPV, IRR and payback period. A follows we present the main ROI components of the framework: the estimated period of investment and the estimated costs and benefits.

$$ROI = \frac{\dfrac{TNV}{t}}{TIC} \times 100 \ (4),$$

ROI – return of investment represents the average annual revenue for initial investment, TIC – total initial cost of the investment, t – number of years,

TNV – total net value represents the net revenue from the estimated period of time t of the investment calculated based on the formula

$$TNV = \sum_{i=1}^{t} (TAB_i - TAC_i) \ (5),$$

TAB_i – total annual benefits on the year i, TAC_i – total annual costs in year i

. In the course of calculating the ROI indicator the evaluation team must face certain challenges such as: information and intelligence are intangible entities, users do not understand value, benefits are hard to measure, and there are no suitable instruments to translate data into dollars.

a) Estimated investment period of time (t)

Estimated investment period of time depends mainly on the changes induced by the BI solution chosen, namely: *(1)* the implementation of BI solution or *(2)* enlargement/change of the present BI solution and may be of several months or years. Given the tendency that organizations have to implement long-term solutions, the complexity of these solutions and the time of implementation, the period of time taken into account is of several years (usually 3 years).

b) Estimated costs

In evaluating a BI solution there must be considered all costs associated to the implementation and maintenance of the solution. The total cost associated to the BI solution is composed by the total initial cost and the total annual cost of the period of time t according to the formula:

$$TC = TIC + \sum_{i=1}^{t} TAC_i \ (6)$$

where TIC – total initial cost, TAC_i – total annual cost in year i, t – number of years

Costs associated to the BI solution that are comprised by the total cost may be grouped on categories according to table 1.

Table 1 Costs associated to the BI solution.

Cost category	Description	Mathematical formula
1. Hardware cost (HIC)	= value of equipments needed for the implementation of the BI solution. The cost of hardware depends of the chosen solution and the present hardware equipment in the organization.	$HIC = DC + SC + NC + OHC$ (7) DC – desktop costs, SC – server costs, NC – network costs, OHC – other hardware costs
2. Software costs (SIC)	= software costs associated to the BI solution and support software costs.	$SIC = BISC + ASC + SSC + OSC$ (8) BISC – BI software costs, ASC – aditional BI services costs, SSC – suport software costs, OSC – other software costs
3.	= costs of transition to the BI	$IIC = PC + MC + TC + CC + OIC$ (9)

Implementation costs (IIC)	solution, which comprise in general.	PC – personnel costs (no. of people involved in the implementation * no. of hours* average hour salary), MC – migration cost (costs of parallel functioning of systems, data migration, costs imposed by organizational change etc), TC – training costs (education costs + costs of facilities provided + time costs), CC – consulting costs, OIC – other implementing costs
TOTAL initial cost (TIC)		$TIC = HIC + SIC + IIC$ **(10)**
4. Maintenance costs (MAC)	= costs after implementation of the solution needed to support the BI initiative.	$MAC = T_rC + SC + HC + OMC$ (11) T_rC – training costs, SC – software costs (license, subscription taxes, database, operating system, server, network, maintenance, others), HC – hardware costs, OMC – other maintenance costs
5. Personnel costs (PAC)	= costs related to the BI and IT users	$PAC = S_aC + IC + S_pC + OPC$ (12) S_aC – salary costs, IC –infrastructure costs, S_pC – space costs, OPC – other personnel costs
6. Hosting costs (HAC)	= tax paid for the hosting service for BI solution which generally does not exceed 15-20% of the implementation costs.	$HAC = H_oF + OHC$ (13) H_oF – hosting fees, OHC – other hosting costs
TOTAL annual cost (TAC)		$TAC = MAC + PAC + HAC$ (14)

The tax for the hosting service appears if the choice is SaaS (software as a service), which represents an increasingly popular approach especially for small and middle-sized enterprises. Gartner states that by 2011, 25% of business software will be provided through SaaS. The main benefits of the SaaS approach are: quick development, low maintenance costs, short implementation period (a few weeks).

c) Estimated benefits
Estimation of benefits associated to the BI solution means: *1)* identifying main benefits associated to BI solution; *2)* grouping them into categories; *3)* value estimation of benefits. The measurement framework must include the main *strategic* benefits (generally intangible and non financial), *tactical and operational* (generally tangible and financial) identified in all areas of the organization (operational, financial performances of stakeholders).

Measurement of benefits was achieved, directly and indirectly, objectively and subjectively, as follows (table 2):

Table 2. Measurement methods

	Objective	Subjective
Direct	Quantification on the base of indicators calculated before and after the implementation of the solution.	Evaluation made by the manager, market surveys and research.
Indirect	Identifying a benefit associated to the initial benefit and its assessment by objective measures.	Identifying a benefit associated to the initial benefit and its assessment by the use of surveys/researches or interviews during which the users are asked about the performance obtained.

Strategic benefits are generally intangible benefits that appear after a long period of time after the implementation of the solution and are hard to quantify. In order for the intangible benefits to be measured, we propose the following method:

- measuring the intangible benefits by interviews and surveys in organizations that have implemented the intelligent business solution, before and after the implementation, and associating of a quality level;

- setting a relation between the intangible benefit and the business processes and associating an value estimated through market research / case studies;
- associating financial results to the business processes set

Total annual benefit is calculated based on the formula:

$$TAB = TDB + TIB \ (15)$$

where TAB – total annual benefits, TDB – total direct benefits, TIB – total indirect benefits (table 4)

Monetary value of direct benefits, which is annual, may result from the decrease of costs or the increase of incomes (table 3).

Table 3. Direct benefits associated witch BI solution

Benefit	Formula
Increased revenues (IRB)	$IRB = DQB + SAB + CPB + PSB + OIRB$ (16)
1. Increase data quality (DQB)	$DQB = R \times Ir \times \Pr mg$ (17) R – annual revenue, Ir – increase revenue due to data quality increase, PrMg – profit margin
2. Increased efficiency of stock administration (SAB)	$SAB = R \times Ir \times \Pr mg$ (18) R – annual revenue, Ir – increase revenue due to right stock administration, Prmg – profit margin
3. Optimization of the price of products and service cost (PSB)	$PSB = R \times I_r \times \Pr mg$ (19) R – annual revenue, I_r – increase revenue due to optimization of the price of products and service cost , P_{rmg} – profit margin
4. Reducing period of time between command and payment (CPB)	$CPB = R \times N \times I_d \times I_{cf}$ (20) R –revenue, N - number of payment days saved, I_d – discount rate, I_{cf} – correction factor
5. Other benefits (OIRB)	
Reduced costs (RCB)	$RCB = OCB + ACB + AOB + MFB + MCB + TCB + PCB + ORCB$ (21)
1. Reducing the operational costs (OCB)	$OCB = OC \times I_{oc}$ (22) OC – annual operational costs of the organization, I_{oc} – operational cost reduction index
2. Reduction of the cost of acquisition of a client (ACB)	$ACB = AC \times I_{ac} \times 12$ (23) AC – month customer acquisition cost, I_{ac} – index of the reduction of acquisition costs by elimination of inefficient efforts
3. Reduced administrative overhead (AOB)	$AOB = AC \times I_{ac}$ (24) AC – annual administrative costs of the organization, I_{ac} – administrative cost reduction index
4. Reduced maintenance fees (MFB)	$MB = MF \times I_{mf}$ (25) MF – annual maintenance fees of the organization, I_{mf} – maintenance fees reduction index
5. Reduced marketing costs (MCB)	$MCB = MC \times I_{mc}$ (26) MC – annual marketing costs of the organization, I_{mc} – marketing costs reduction index
6. Reduced training costs (TCB)	$TCB = TC \times I_{tc}$ (27) TC – annual training costs of the organization, I_{tc} – training costs reduction index
7. Reduced procurement costs (PCB)	$PCB = PC \times I_{pc}$ (28) PC – annual procurement costs, I_{pc} – procurement costs reduction index
8. Other benefits (ORCB)	
TOTAL direct benefits (TDB)	$TDB = IRB + RCB$ **(29)**

Table 4. Indirect benefits associate witch BI solution

Benefit/business process	Financial result
Improved decision making (DMB)	$DMB = ADB + TMB + WCB + ODMB$ (30)
Faster access to data (ADB)	$ADB = ADC \times I_{adc} \times 12$ (31) ADC – month cost of access to data, I_{adc} – access cost reduction index
Reduced or managed time to market (TMB)	$TMB = TMC \times I_{tmc} \times 12$ (32) TMC – month cost of time to market, I_{tmc} – time cost reduction index
Improved working capital [11] (WCB)	$WCB = \dfrac{AB}{365} \times Icc \times (AR_0 - AR_1)$ (33) AB – annual billings, AR_0 - Accounts receivable days before technology, AR_1 - Expected accounts receivable days after technology, Icc – cost of capital
Other decision making benefits (ODMB)	
Improved information organization and access [11] (IOAB)	$IOAB = UPB + ITPB + OEB + OIOAB$ (34)
Increased user productivity (UPB)	$UPB = N_{biu} \times C_{biu} \times H \times 12$ (35) N_{biu} - Number of BI users, C_{biu} - hour cost /BI user, H - no. productive hours/month
Increased IT productivity (ITPB)	$ITPB = N_{itu} \times C_{itu} \times H \times 12$ (36) N_{itu} - Number of IT users, C_{itu} - hour cost /IT user, H - no. productive hours/month
Increased operation efficiency (OEB)	$OEB = N_u \times C_u \times H \times 12$ (37) N_u - Number of users in production, C_u - hour cost / employee, H - no. productive hours/month due to re-allocation of workforces
Other information organization and access benefits (OIOAB)	
Improved customer and partner management [11] (CPMB)	$CPMB = CSB + PSB + OCPMB$ (38)
Improved customer support (CSB)	$CSB = CSC \times I_{csc} \times 12$ (39) CSC – customer support cost/month, I_{csc} – reduction index of customer support cost
Improved partner support (PSB)	$PSB = PSC \times I_{psc} \times 12$ (40) PSC – partner support cost/month, I_{psc} – reduction index of partner support cost
Other customer and partner management benefits (OCPMB)	
Other indirect benefits (OIB)	Such as: Increase of client satisfaction, Improvement of employees' satisfaction, Innovation
TOTAL indirect benefits	$TIB = DMB + IOAB + CPMB + OIB$ (**41**)

3. 4. 2 Risk evaluation

In choosing a Business Intelligence solution it must be also considered the risk involved by the implementation of the solution. Thus, revenue should result from implementing the solution, which should exceed the cost of capital and compensate the risk associated to the project. Among the evaluation risks we have chosen the Investment Rate, which measures the ratio of ROI to cost of capital, which is a more accurate assessment of the relative return of a project.

$$InvestmentRate = \frac{ROI}{DiscountRate} \quad (42)$$

The BI solution represents a big risk if $Ir<2$, a medium risk if $2<=Ir<=4$, a low risk if $Ir>4$ [11].

3. 5. Negotiation and closing of the contract

Based on the final offer of the provider and the contract sample, the contract provisions are negotiated: the price, service conditions, payment, implementation period, obligations for the parties, etc., and the contract is closed.

4 How to Buy a Business Intelligence Solution for Acquisitions in Romania Public Institutions

Taking into account the need of implementing a Business Intelligence solution in every organization, the EU policy on public acquisitions and the principle of efficient use of public funds, and the experience of team members in the field of IT and public acquisition, we present a study on the strategy presented before on the purchase of a Business Intelligence solution for acquisitions in the public institutions of Romania, taking as example the Academy of Economic Studies of Bucharest.

Although the present electronic system of public (http://www.e-licitatie.ro) provides many benefits to the Romanian public institutions, in many of them, especially in the large public institutions (universities, hospitals, army, etc.) there is a need for an intelligent solution regarding public acquisitions.

At the present, excepting the lack of pay management, Electronic System for Public Acquisition (ESPA) is getting pretty close to the ideal of electronic acquisition system. It brings a lot of benefits to the public institutions (reducing the cost of acquisition, monitoring procedures of public auction, reducing the costs of the system, the time needed for an acquisition, etc.), but does not provide the management of acquisition at the level of the institution.

The increase of organizational needs, quality standards, the increase of funds allocated to public institutions but also of the own funds, the lack of information management systems regarding acquisitions in most imposes the need for the integration of a Business Intelligence solution for acquisitions.

The Academy of Economic Studies (AES) is pioneering legislation changes and is ensuring best efficiency and transparency. AES leadership is open to new methods of learning and work that are project oriented and linked to the use of Information and Communication Technologies (ICT).

Concerning acquisitions, the Academy of Economic Studies is in full process of automating its activity of public acquisitions. It stated in 2007 with the acquisition of an automating system for the warehouse activity of AES that will ensure not only automatic management of stocks and electronic payments, but also will transform it into a store adapted to digital economy. This stage will be finalized by the start of the school year 2008-2009.

The process of automation continues with the analysis of opportunity for integrating a Business Intelligence solution into the compartment, of the possibility for acquisition and of the effects at the institution level.

4.1. Initiation of the procedure for acquisition.

Initiation was achieved by the Compartment for Public Acquisitions of the institution (created according to OUG 34/2006) based on the problems that were identified and the possible opportunities. At this stage, the acquisition of a Business Intelligence solution was proposed, in order to be accepted. The next step was reaching approval and setting an expert team of representative end users, IT specialists and key managers.

The type of the solution that is best adapted to the present situation is a long term Business Intelligence solution, especially if we consider the trend of the last few years of increasing funds for acquisitions (an increase of approximately 0.5% compared to 2007 of funds from the state budget, annual increase on the last four years of funds from research projects, and also larger investments from own profits).

4.2. Analysis and evaluation of current and future demands

The analysis must start with identifying the users of the Business Intelligence solution and the information that the users need (table 5).

Table 5. Users of the Business Intelligence solution

Users	Information needed
Public acquisition compartment	Information related to the acquisition process
Economic department	Financial and accounting information
Chief of the public acquisition compartment	Aggregated reports
Administrative general director	Strategies

Analysis will continue with identifying the present and future demands and the possibility to bring value-added. These are also the minimal requirements that the Business Intelligence solution for acquisition has to meet. Starting with the analysis of present demands and the possibility to bring value-added, the Business Intelligence solution for acquisitions must ensure that at least the following requirements are met (adapted from [13]):

a) Analyze spend
- analyze total spend for a particular supplier, buyer, institution, item, CPV cod, category, type of procedure, type of contract;
- monitor price and quantity changes;
- compare purchasing data against accounts payable activity;
- analyze data to measure contract compliance, total spend, discounts, and more;
- provide key-information (price saving, quantity change etc.) in order to find the best prices and agenda;
- information that will help monitor purchasing trends, leverage purchasing power and assess the efficiency of acquisitions;

b) Monitor contract utilization
- identify new sourcing opportunities by monitoring non-contract purchases at the products, category, item, CPV cod or buyer level;
- observe the contract utilization trend in contract purchases, non-contract purchases;

c) Improve supplier relationships
- compare supplier performance across price changes, returns, receipt date exceptions and products quality;
- determine which suppliers provide the best prices;
- analyze and improve suppliers' on-time delivery performance;
- manage suppliers;
- identify the return reasons across many dimensions;
- measures either early or late receipts and track the trends over time;
- measures the total amount that is not only inspected, but are also rejected;
- measures price increases and/or decreases from an individual supplier, and the impact of this change to the organization's bottom line;

d) Drill from aggregation to source transaction
- start with the high level, aggregated data and drill into the most granular level – the transaction;

- identify which specific transactions contributed to the key performance indicators;
- complete the full cycle from aggregation to detail;

e) Maximize internal efficiencies & automation
- monitor purchases that are bypassing the procurement organization;
- monitor manual processing of requisitions and compare it with automation;
- increased automation in the procure-to-pay process, tracking exceptions to the automation process, inform procurement management with the required details to continue to automate the process;
- provides the information needed to take decisions on automation of Purchase Requisition Processing;
- improve the Procurement Organization efficiency by increasing automation & reducing manual work;
- provide information on the automation trend that is being followed in the procurement organization;

f) Comparative analysis
- observe trends over time periods of weekly, monthly, quarterly or yearly;
- perform organizational & commodity comparisons;
- compare performance today with the prior period or the same period a year ago;
- compares procurement measures for a period-to-date against the previous period or the previous year;
- organizational comparisons across the enterprise in both functional and global currencies;
- commodity trends to measure spend and supplier performance;
- view period-to-date results for any day or time period in the past;

g) Daily summarization and personalization of purchasing activity
- receive daily reports in minutes with daily summarization architecture;
- access intelligence reports and application forms immediately with customized related links;
- projects for all users;
- the solution must provide for mobile users;

h) Flexibility to support your business
- utilize predefined key performance indicators for tracking management goals;
- leverage security across operating units and commodity(s);

- collect data from a single instance for a view of purchasing information across the enterprise;
- analyze data from multiple business perspectives using common dimensions;
- data collecting on commercial demands of beneficiaries;

i) Better view of the performance of buyers
- total work load processed and fulfilled in a given period of time;
- provides accurate & up to date information to Procurement Managers about the status of workload in the procurement Organization;
- provides information on the Requisition assignments i.e. who are the buyers who processed and fulfilled the requisitions;
- analyze buyer performance by knowing the amount and number of Requisitions they have processed & fulfilled;
- comparing buyers' performance considering savings, number of procedures, workloads, number of complaints ;

j) Better view of the performance of procurement organization
- details of requisitions that are processed and fulfilled past expected date;
- details of requisitions pending unprocessed and pending processed fulfillment;
- an unparalleled knowledge of the procurement trends that are having the greatest impact on profitability;
- provides the detailed information about pending workload (pending Unprocessed & Unfulfilled & Unassigned Requisition) in the Procurement Organization;
- information on why a requisition is pending processing (Pending on Buyer's workbench, pending sourcing, Pending PO Approval, Pending Processing, Pending Processed fulfillment);

k) Organizational integration
- integration with present systems of the organization;
- compatibility with existing software;
- possibilities for future enlargement;

According to the minimal requirements that the Business Intelligence solution for acquisitions must meet and the market prices, the budget and the acquisition procedure are establish according to the provisions of the law.

4.3. Setting the evaluation criteria

Taking into account the complexity of the solution and the aria for the implementation within the organization, and the minimal requirements imposed in selecting the Business Intelligence solution we propose the following criteria for evaluation and weight of each of them (table 6).

Table 6. Evaluation factors and their gravity

Nr. Crt.	Evaluation factor	Weight (%)
1.	**Total cost of BI solution**	**50**
2.	**Technology**	**35**
2.1	Platform	4,5
2.2	Instruments of analysis	4,5
2.3	Interoperability and integration	3,5
2.4	Standardization	3
2.5	Software stability	3
2.6	Processing capacity and scalability	3,5
2.7	Administration and development	3,5
2.8	Easiness of use	3
2.9	Means of implementation	3,5
2.10	Flexibility	3
3.	**Provider's quality**	**15**
3.1.	Users' satisfaction	9
3.2.	The market impact	6
3.2.1	Income	0,5
3.2.2	Global extent and local presence	1,5
3.2.3	Geographical extent	1
3.2.4	Size coverage	1
3.2.5	Strategy and execution	0,5
3.2.6	Vision and stability	0,5
3.2.7	Market recognition	0,5
3.2.8	New clients	0,5

Formulas for calculation of evaluation factors of points 2 and 3 are set taking into account the description made in [8], and the total cost of the acquisition is set according to the total cost presented in 3.4. The selected solution will be the acceptable Business Intelligence solution (the one that fits the maximum budget allocated and meets the minimal requirements), with the best score based on the calculation of the evaluation factors and of their gravity.

4.4 Evaluation and selection of BI solution

Calculation of the evaluation factors is done by considering the information from solution providers and from the Business Intelligence market. Measurement of the impact on the organization of Business Intelligence solutions must consider the following benefits:

- Managing supplier relationships results in better prices, higher quality, improved delivery performance, cost saving, and greater customer satisfaction. Metrics on price, delivery, and quality provide real-time visibility into a supplier's performance [13].

- Compartment Manager can use to 1) improve supplier performance, 2) identify sourcing opportunities for new contracts and monitor existing contract compliance.

- Using Business Intelligence solution for acquisitions, managers have rich, integrated and up to the day information to improve acquisitions execution and meet strategic objectives.

- By optimizing the supply base and reducing the suppliers per item, category and commodity, the commodity manager can achieve cost reductions and obtain better prices [13]. Contracts help to obtain better prices for items that an organization purchases in high volumes.

- By the use of contracts loss of money from following causes is avoided: 1) purchases are made at the market price instead of a negotiated price, 2) volume discounts are being missed on existing contracts, 3) volumes purchased exceed volumes specified by the contract, providing a missed opportunity to negotiate for even lower pricing [13].

- Business Intelligence reports provide potential savings opportunities if the off-contract purchases are eliminated.

- By improving purchase processes and increasing automation within the procure-to-pay process, the Business Intelligence solution provide time and money saving.

- Reports provide procurement management with the required details to continue to automate the process.

- Buyers workload management and acquisitions demand management leads to increased satisfaction of beneficiaries and supplementary benefit or to avoiding loss from not succeeding an acquisition of demands in due time.

- Buyers' workload reports and performance is an important instrument for the chief of compartment, especially in giving assignments and in the policy of stimulating the employees. Increasing buyers' performance through stimulating policies based on real results and consequently greater performance for the organization (grater savings in the organization).

- Daily summarization enables the commodity manager to spend minutes – not days – gathering important information about the business [13].

These are but a few of the important benefits brought by the implementation of a Business Intelligence solution. It brings benefits for all stakeholders of the organization (figure 2).
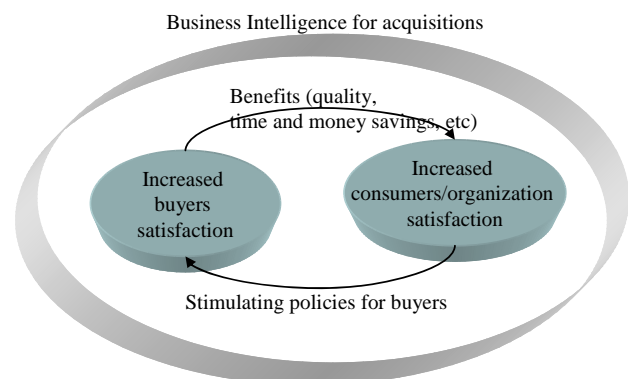

Fig. 2 Circle of benefits of the BI solution for acquisitions

4. 5. Negotiation and closing of the contract

The closing of the contract will be made with the winning bidder according to the law.

The final strategy for acquisition, as well as all experimental results shall be presented after the end of the process of acquisition.

5 Conclusions

This paper presents a strategy for the selection of the proper Business Intelligence solution, underlining the need to create an environment for the measuring of its impact and a case-study for the purchase of a Business Intelligence solution for acquisitions within the Academy of Economic Studies of Bucharest.

Some of the most important factors that must be taken into account for the success of introducing a Business Intelligence solution are [1]:

- Justification of Business Intelligence systems has therefore to be business (not technology) oriented and act as an enabler for reaching business goals of an organization.

- There is a great necessity for partnership between management and informatics within an organization.

- Business Intelligence system introduction and development has to be based on decision support strategy of the organization as a whole.

Since business value of Business Intelligence systems derives from improved business processes based on better information quality it is mandatory for its achievement a proper culture for business process improvement (perhaps even renovation).

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The framework for the measurement of the value of Business Intelligence for the stakeholders of the organization, presenting in detail a part of the costs, benefits and risks associated with this project. It refers to methods of measurement of costs and benefits tangible/intangible.

This research is useful both to the beneficiaries of the solution (business sponsors, in order to justify the investment, executive managers in BI process management) and to the providers, in identifying the techniques that would help finding and measuring the benefit of the provided solutions, especially the intangible one. In creating the measurement framework, the team must put emphasis on the evaluation of the Business Intelligence initiative from the perspective of reaching and exceeding the objectives of the organization rapidly and with a low risk, and not so much on fining the perfect method of evaluation of the initiative.

Companies are encouraged to apply the methods of measurement of BI and to provide the practice experiences that would lead to identifying the possible problems and to improving the methods of evaluation of BI solutions.

Analysis of the implementation of a Business Intelligence solution will continue with creation of an effective strategy (starting from the presented case-study) for the introduction of a Business Intelligence solution for acquisitions to the Academy of Economic Studies and providing the practical results for the support of other public institutions of Romania.

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