

Integrated Governance of IT Services for Value Oriented Organizations

Antonio Folgueras Marcos, Belén Ruiz Mezcua and Ángel García Crespo

Carlos III University, Escuela Politécnica Superior, Computing Department
Av. Universidad 30, Madrid, Spain, 28911 Leganés

Abstract. This paper shows a latest generation model for the management and governance of the technologies and Information Systems (IT) in the organizations. IT governance is the key to achieve high level of maturity in the SOA Maturity Model. Currently there are standards and methodologies of international character that cover in detail the different critical aspects of the Information Technologies' governance such as CobiT, Itil, ISO20000 and Balanced Scorecard for IT. This governance model starts from the knowledge acquired in the mentioned standards and allows carrying out the tacit and strategic governance of all the activities in an information systems department. The model depicted in this paper includes: the monthly and tacit control of the IT processes, the system's portfolio management, the IT strategy planning and the alignment of the strategies with the operations (four alignments because considers: systems and business). This model is called IG4 (Information Governance Four Generation) due to the fact that it includes important improvements on the classic management and governance IT models.

1 Introduction

The objective of this paper is to define a standard to cover the IT Governance in all kind of service oriented organizations. With this standard the CIOs can plan, manage and control all the IT processes in an integrated way. Despite the Information Technologies' Governance (IT) being a relatively new area, it boasts interesting tools that provide best practices to cover five basic aspects:

1. Audit and control of the IT internal processes by means of metrics. The IG4 model reaches the monthly level, the tacit and strategic, because the daily control of the operations (for example the incidences) exceeds the IT governance tools' reach.
2. Better practices that provide a comparison with the IT work of the organizations in similar sectors and environments.
3. Double aspect alignment: business and technologies as well as strategy and operations.
4. Strategy planning and simulation.
5. Added value techniques of investment and decision analysis to manage the projects / applications to deal with.

This four generation model fulfils all of these aspects but in a way:

1. Totally integrated, defining in detail the way to accomplish the interfaces among each of the five aspects mentioned. The integration is complete both in the aspect of integration of the best tools for the analysis of the information systems as well as the integration between the IT and business [7]. These two integrations must take into account innovation [16] and added value as two key aspects.
2. Taking into account the positive points of each standard or methodology in existence, avoiding researching in areas where the acquired knowledge is high.
3. Doing a governance model usable by any organization without requiring any adaptations. For this purpose, the standards are simplified taking into account the size of the enterprise and the sector it works for.

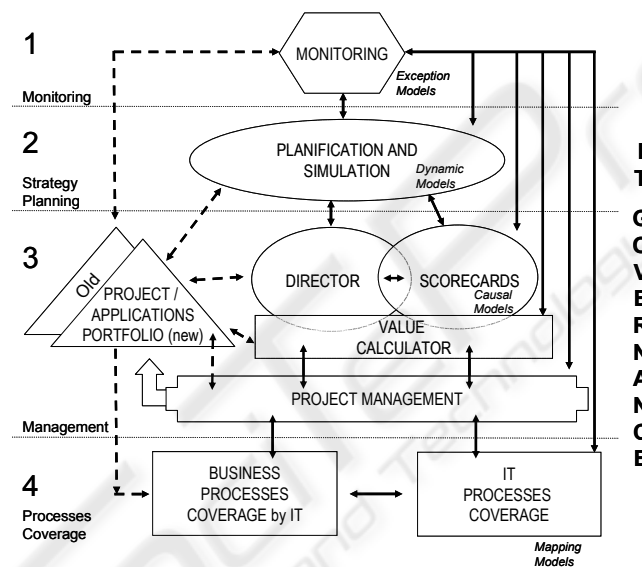


Fig. 1. General view of the Information Model (IG⁴).

Within the IG4 model's reach is giving response to the monthly control (real, plan and deviation), to the tacit needs (medium term) and strategy needs (long term). Moreover, the IG4 model starts from a detailed analysis of the business processes coverage by IT and of the processes of any IT department. The said coverage analysis is complemented by an analysis of the double alignment sought (technology/business and strategy/operation) and some control tools. All of these control, coverage analysis, alignment and strategy planning functions are valued and analyzed by means of three useful techniques which are complemented in the IG4 model: metrics, benchmarking and maturity models.

As it has been previously mentioned, there are five key aspects to bear in mind if an efficient and effective governance of the IT is required within the organizations: Audit & control, benchmarking, alignment, strategy planning & simulation and added

value techniques. These five aspects are essential when it comes to managing any IT department, so if the governance models do not include them in a totally integrated way:

1. Some key requirements of management or governance are left uncovered.
2. Multiple solutions are forced to be used so the dispersion of the different solutions does not allow the IT's Governance traceability.
3. High efforts of adaptability by the IT departments are demanded so that complete governance tools are available when it is not the CIO (Chief Information Officer) ultimate purpose to prepare or customize these governance tools.

As figure 1 shows, the model boasts four layers that pursue different objectives and where the six system's modules are situated:

1. Monitoring level: it matches up with the monitoring module. It includes key information and alerts of the rest of the modules.
2. Planning level: it matches up with the simulation and planning module. The strategy planning is carried out by means of dynamic models that allow simulation and help the detailed planning that is carried out and supported by the two processes coverage (of business processes and of IT processes).
3. Strategy management and analysis level: This level is covered by two modules: applications portfolio module and the balanced scorecards BSC module (based on the BSC philosophy: Balanced Scorecard). The latter module is divided into the BSC of the business activities coverage by IT and into the BSC of IT activities' coverage. A sub module of project management is incorporated.
4. Processes' coverage level: It details which are the business' processes and what their coverage is by the IT and which are the IT processes and what is the coverage given to these processes. It reaches a level of detail of the processes' activities. The coverage level boasts two information arrangements: by applications with all the supported functionality's details (only to analyze under IT coverage) and by processes to consider, for example, the lead time.

2 Related Work

In a technical codification level there has always been a lack of orientation view to the value, subject that the software's economy discipline has tried to give an answer to [2] [3]. In a more aggregated system's level and not of software the current dispersion in the achievement of governance information is indicated by the different surveys where there is a great dispersion of used methods and there is no massive use tool: IT Balanced scorecards, regulations (ISO 9000, ISO 15000, ISO 17799, etc), governance methods (CobiT, ITIL, Coso, etc), simulation models, project / application based management (PMBOK [18], CMMI [1], etc), quality and process based management (6 SIGMA and Lean [22]), etc. Moreover all of these methodologies are treated in a disintegrated way so that its use with important tools such as applications portfolio and system's strategy planning is complicated.

The start of the IT Governance was due to the classic analytic accountancy conception in which the computing areas were considered centers of structure cost in which some natures of expense were imputed, which by means of sharing out methods proceeded to the assignation to the products or expenses structure in a more or less contrived way. An important advance to this traditional view was brought by the ABC methods (Activity Based Costing) very appropriate for areas with an important level of indirect expenses as it is the computing department's case. This way of distributing the costs by means of some activities allows a sharper assignation (by definition of activities and cost-drivers) of the computing department's expenses to the different units of business, products and accounts of results. Both the ABC method and the traditional method have the same lacks: they do not ensure the alignment with the strategy or businesses, they do not promote or bear the innovation and they do not have at their disposal planning or simulation tools. Also the control and system audits were inexistent as they limited to a few cost centers with six or seven classes of expense.

To the previous insufficient IT governance proposal, continues an interesting approach orientated to ensure the strategy management's monitoring by means of alignment techniques of the main objectives. These methods are based on balanced scorecard of Kaplan and Norton versions with their four views: innovation, internal, client and financial [13]. The IT Balanced Scorecard (itBSC) is a variation of the balanced scorecard based on the typical activities of a computing department summarized in two views, a first one for the acquisition and development and a second view for the delivery and support. The two main points of the IT balanced scorecard are a complete alignment of the IT strategy with the IT operations and a subsequent alignment by means of a cascade of balanced scorecards with businesses. Besides that alignment the balanced scorecards is a good tool for strategy's implementation as it allows the monitoring of the enterprise's objectives once the critical success factors have been defined.

However, the IT balanced scorecard do not give a complete solution for the IT field as they are based on the strategy level, they lack an auditor value and an internal control, and their point of view of ensuring the alignment with the strategy leads them to give an incomplete view and only focus on those chains of critical success factors / goals / indicators meant to be aligned. The theories related to the strategy planning of the information systems cover key aspects such as the decision-taking for the IT's position of our organization in the future. The planning model is key for the IT governance due to the high cost of the investments in applications and the need of recouping during several years [14]. However, these models are not enough for a detailed control of an IT department's different activities so they cannot be used in an isolated way to carry out a correct IT Governance.

A third generation of models and methodologies for the IT governance is brought by an evolution of different IT audit and control methods [10] among which we can find the well-known CobiT [5], Itil [11] and Coso [6] (the latter one with a general approach as for enterprise's audits). These methods, due to their depth, give a great level of detail and have been completed until reaching high levels of rigor and have therefore evolved towards governance models with some peculiarities: Itil focused to the service, CobiT to the control in a more strategy level, ISO17799 if you are looking for a complete security solution [4]. and Coso to the internal business control.

Only taking into account each one's complexity taken separately in addition to the necessity of having the best of each of them leads inexorably to the impossibility of its use bearing in mind the busy agenda of a CIO. Due to the important investments that require software's developments and the application's implementation, the philosophy of the CMMI maturity models must be integrated in the IT governance models [1]. Based on the CMMI philosophy, a very useful tool that complements the governance models are the maturity processes, as they include the time variable and the routes needed to allow a better approach to the benchmarking techniques as it is the appropriate way of weighing up the results without forgetting that the better practices' tools and the standards must be designed in a way that the mere comparison with the best practices does not get to stop the real innovation.

This IG4 method means a new advance to the IT governance by means of a tool that integrates in a forced way the necessary requirements of planning/ simulation/ audit/ control, better practices / added value and alignment. Another aspect that distinguishes the present approach is the existence of an added value module that works like a value calculator of all the modules.

3 General Description of the Model

As it has been mentioned in the previous sections, this IG4 model is a model that pretends to provide solution to the problems of enterprises in the IT field without gathering lots of methodologies or spending a lot of time adapting them. Due to the importance the systems' area has achieved in the enterprise as essential part of survival or as part that sets the difference in the business, the fact of controlling the IT area is not an easy task and it requires the following model described (it is described the three main layers by size reasons):

3.1 Level of IT Strategy Planning

It is in this level where the system's planning to five years is carried out. It is a critical module if considered that the decisions in IT involve important investments to be recouped in large periods of time. Also the IT require simulation tools that allow to analyze different alternatives to determine how current decisions influence (for example selecting a COTS or a CASE tool) in a future costs' decrease (or value generation) in the medium and long term [9][20]. This module is supported by a dynamic system's planning and simulation tool like Vensim or Stella. As the level of detail is to five years, it is lower than that one of modules that supports monthly control information (coverage modules). In this planning and simulation module the information is, because of the tool's needs, of a monthly regularity, whilst in the activities' maps where the planning/real situation/deviation control is carried out in a detailed way the information's level of detail is: in the first future year it is month to month whereas the information's detail in the following four years is four-monthly to four-monthly [21].

The way of feeding this planning and simulation tool is by the coverage modules although only in those concepts that have enough level of detail to boast planning information. The way of calculating the value and costs like the rest of the IG4 model is carried out according to the scheme followed in the value calculating module (section 3.4.). This module sends information to the calculating module and receives the value and costs (as the breakdown that will be indicated) of the calculating module.

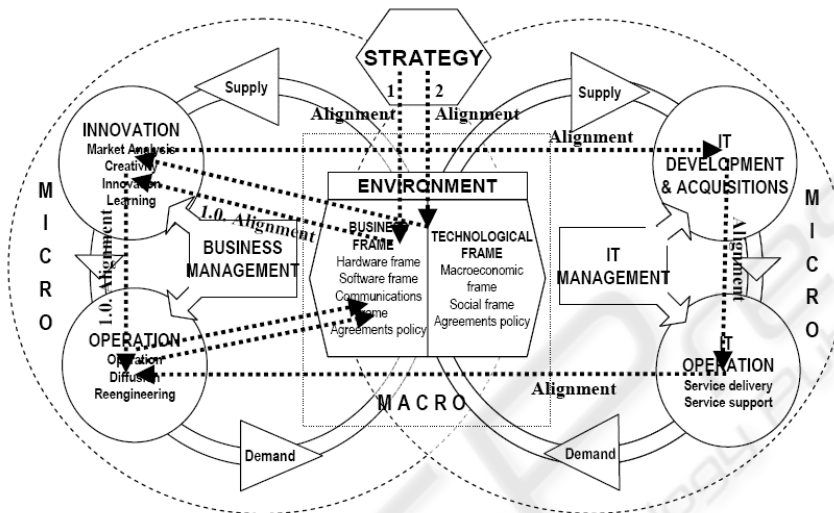


Fig. 2. Balanced Scorecards with active alignment between business and IT.

3.2 Level of Management and Analysis for IT

The Scorecards' module for IT main task is to help defining the strategy, ensure the strategy's fulfilling, ensure the alignment between the business needs and the systems' coverage and analyze the suitability and improvement points of each of the systems and enterprise's applications. In order to achieve these objectives there are two modules: applications portfolio and director scorecards for IT.

1. Applications Portfolio (AP): Both the corporate systems (COTS and legacy) and the systems based on Internet technology are analyzed in this applications portfolio in a level of detail of systems/ modules and sub module (only the main sub modules). The information with a higher level of detail of the business' processes and its coverage by IT is bore in the processes' coverage modules by IT (it is the module that feeds the applications portfolio).

2. Director Scorecards (DSC): They work similarly to the Balanced Scorecards (BSC) developed by Kaplan and Norton as for causal diagrams but they differ from the latter ones on the fact that they follow a cyclic supply and demand structure that starts with the market's understanding, continues with the innovation followed by the operation and ends as supply in the market again. The IG4 model bears similar treatments at a business and IT level. Taking into account all of what has been said and due to the fact that it is considered more suitable, the financial view of Kaplan and Norton's

BSC is extracted in a calculating module that deals with all the IG4 model. Also as this view depends on the supply/demand, it facilitates a parallelism with the planning simulation that follows a complete model of supply and demand too as it is shown in figure IV for business processes. Just as it has been mentioned the planning view follows a high level of detail but considers all of the business processes and IT processes. On the contrary the BSC specialize in the strategic objectives and all of the steps required in order to define the strategy and ensure the strategy's alignment between businesses and IT.

In the IG4 model the adjustment of the businesses coverage's views by IT and of the IT activities' coverage is innovative. Currently the businesses and systems of information's adjustment is carried out by means of the systems' alignment with businesses in a unique direction that goes from businesses to systems. But this approach implies three problems:

1. A first problem is that in the current enterprises and in sectors such as the bank, a great number of functions and activities totally depend on the information systems: there is no business without IT that bear the business' processes [15]. Any BSC that do not include a complete integration with the IT balanced scorecards are wrong.
2. The second point to take into account is that many business models base their innovation on the technological tools' functionalities so in this case a business alignment is produced simultaneous with the steps indicated by the IT's strategy [8]. The Internet channel in most of the sectors (for example an on-line newspaper or CRM model) are good examples of this tendency in which the technological tools' strategy marks the step of the business' strategy.
3. The client's perspective is not enough and it disintegrates in two scorecards: market analysis (start of the demand) and penetration in the market (end of the supply), which include the key macroeconomic variables of the sector and IT there are at that point of time.

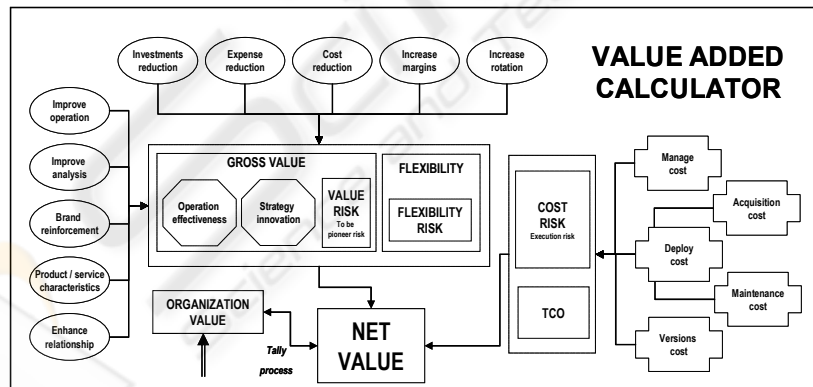


Fig. 3. Value calculator model of the information Governance Model (GI⁴).

The alignment is carried out by means of BSC cascades following the businesses' logic and the interrelation with technologies, being possible three routes:

1. When it is about aspects not influenced by the IT and that lead to innovation, the BSC's cascade is the following: markets understanding, businesses innovation, busi-

nesses operation and market penetration. In this case only the monitoring level and the management and analysis level are affected.

2. When it is about aspects not affected by the IT and with no innovation, the BSC's cascade is the following: markets understanding, businesses operation and market penetration.

3. When it is about aspects affected by the IT the DSC's cascade is the following: Markets understanding, businesses / IT innovation (simultaneous), development and IT acquisitions, business / IT operations (simultaneous) and market diffusion.

The third important difference provided by the IG4 model is that the scorecards' financial view has been extracted in a calculating module for several reasons:

1. The calculating formula is fixed and identical, it is required in all of the IG4 model's modules and is not subjected to variations. This calculating formula is based on the strategy innovation concepts, operational efficiency, and some variants of the "Total Cost of Ownership" and "Total Economic Impacts" [23] methods.

2. In this IG4 model, as it has been previously mentioned, the value's management is critical in all the modules as is it the only way of objectifying the IT's improvement points in the organizations that would otherwise remain very subjective. This calculating way is used in the four levels and in the six modules of this IG4 module.

3.3 Level of Processes: Maps and Coverage

This IT governance model has its limits in the Systems of Information's fields. So it is not the IT's governance objective to analyze the business strategy, but, on the contrary, it is this model's objective to analyze the way the information systems give coverage to the business needs detected. Because of this the IG4 model bears two big groups of processes maps: business processes to analyze its coverage by IT and typical processes of the IT departments.

The IG4 model would not be useful to give a complete support of the Computing Field of an organization didn't it support a level of detail enough to justify the decisions and to analyze the source of the inefficiencies. On the contrary, taking into account the IG4 model, the best solution is to reduce the analysis detail because this is an integrated tool with clear executive orientation. For example, reaching a level of detail as exhaustive as the one ITIL can have in the monitoring of the service's management has tried to be avoided (more in the field of daily operation control).

The two large groups of processes and activities bore by the IG4 model are:

1. Coverage map of the business processes by the IT: It follows a supply and demand approach just like BSC (balanced scorecards) and the planning module. The classification followed in order to classify the processes, define their activities and determine the best CSF and metrics (KGI and KPI) has been starting from the main modern theories about businesses. This view also takes for base information an analysis of the magnificent application maps that SAP [19], Navision and Oracle bear distinguishing between basic processes common to the generality of the business sectors and functionality / processes that are particular of specific sectors. The IT portfolio reads this process coverage to group the information according to applications. Besides the most modern theories that manage innovation and operations, in the current decade a good management tool of the IT can't be understood without taking into account the

internal practices of a good finance and social governance (Sarbanes-Oxley [10]) that are also represented within the IG4 model's processes (only to analyze the IT coverage). To allow the testing, each of the processes is analyzed in accordance with the maturity they include: maturity in the operational efficiency, maturity in the strategy innovation, maturity in the risk treatment and maturity in the flexibility treatment. The maturity in the operational efficiency and in the strategy innovation regards the delivery (lead time analysis), the functionality's grade of coverage and the service's quality (confidentiality, integrity, availability, compliance and reliability). As control of the monthly operation this module registers in detail the processes, the critical points of this process, the real data (metrics) and the planning and deviation from the planning for each process. Because of the load of work the control of planning and deviations leads to, this control task is only carried out for the main processes (to make up by the user).

2. Coverage map of the IT processes: Following the same supply/demand scheme used for the business processes, the IG4 model proceeds to analyze the processes and activities of the IT field. Those processes that require so have a detail of system to system. In this module all the information needed for the monthly control and the costs calculation is bore: critical success factors, key performance indicators, key goal indicators and maturity grades. All the costs are accurately allocated to the business processes coverage map.

4 Aspects of the Proposed Model that Make the Difference

As it has been shown throughout this paper, the IG4 model gathers the best of the theories and standards in existence proceeding to include, among others, the following improvements:

1. Integrated and pragmatic approach of the best practices nowadays about IT Governance and Management. Complete and integrated approach that provides solution to the IT governance needs in the organizations of any size by means of a four-level structure: monitoring, strategy planning, management and process coverage. Without a model of IT Governance oriented to services (Service Oriented Enterprise) is impossible to reach high levels of maturity of SOA and SOC (top-down approach).
2. Integration of all the requirements to be regarded in a model of IT Management and Governance by means of six modules: monitoring, planning & simulation, applications portfolio, director scorecards, value calculator and processes coverage. The second forced integration is the integration between the business coverage by IT and the IT activities. This second integration allows defining a Governance of the IT that leads to the investments in IT as springboard for success among organizations.
3. Balanced Scorecards where the finance view, last step in the causal diagram, is replaced by a complete and detailed method of added value that provides service to all of the system's modules at the same time. This added value calculation includes as valuable concepts as benchmarking, metrics, maturity models, Total Economic Impact and Total Cost of Ownership in a tidy way. Also these Balanced Scorecards include alignment routes between business and the closest IT to what really happens in the organizations (for example they start and end in the market).

4. Detailed analysis of the business coverage by the IT with and innovative view of the processes following the supply/demand cycle, what also facilitates a complete parallelism with the strategy planning module. The functionality of strategy planning is totally integrated in the model and it includes a simulation tool too.

References

1. Ahern, D.; Clouse, A. and Turner, R.: CMMI Distilled. Second Edition. A practical to introduction process improvement. Second Edition. Addison-Wesley. Pearson Education (2004).
2. Bakos, J.Y. and Kemerer, C.F.: Recent Applications of Economic Theory in Information Technology Research. Decision Support Systems (December 1992).
3. Boehm, B and Sullivan, K.: Software Economics: A Roadmap. Future of Software Engineering. Limerick Ireland. ACM (2000).
4. CobiT: CobiT Mapping. Mapping of ISO/TEC 17799: 2000 with CobiT. IT Governance Institute (2004).
5. CobiT: CobiT 4.0. Control Objectives / Management Guidelines / Maturity Models. IT Governance Institute (2005).
6. COSO: Internal Control over Financial Reporting – Guidance for Smaller Public Companies. Executive Summary (June 2006).
7. Davenport, T.: Putting the Enterprise into the Enterprise Systems. Harvard Business Review (1998).
8. Folgueras, A.; García, A. and Ruiz, B.: A Proposal of Integration between IT Governance and Business Balanced Scorecard. 2007 IRMA International Conference (2007).
9. Forrester, J.W.: Industrial Dynamics. MIT Press, Cambridge, MA (1961).
10. Fox, C. and Zonneveld, P.: IT Control Objectives for Sarbanes-Oxley: The Role of IT in the Design and Implementation of Internal Control Over Financial Reporting, 2nd Edition. Printed in the United States of America. IT Governance Institute (September 2006).
11. itSMF Library: Foundations of IT Service Management based on ITIL. IT Service Management an Introduction, based on ITIL. Van Haren Publishing (2004).
12. itSMF: Planning and Achieving ISO/IEC 20000 Certification. Version 1.0. Office of Government Commerce (OGC) (2006).
13. Kaplan, R.S. and Norton, D.P.: The Balanced Scorecard: Translating strategy into action. Harvard Business School Press (1996).
14. Mintzberg, H.: The Rise and Fall of Strategic Planning. New York: The Free Press (1994).
15. Olazabal, N. G.: Banking the IT Paradox. McKinsey Quarterly. Number 1 (2002).
16. Organization for Economic Cooperation and Development (OECD): A New Economy? The Changing Role of Innovation and Information Technology in Growth (2000).
17. Porter, M.E.: What is Strategy? Harvard Business Review OnPoint (2000).
18. Project Management Institute (PMI): Effective Benchmarking for Project Management (2004).
19. SAP: Solution Componer. Quick Guide. SAP Business Maps & Engagement Tools November 2005.
20. Senge, P.M.: The Fifth Discipline. The Art and Practice of the Learning Organizations (1990).
21. Ward, J. and Peppard, J.: Strategic Planning for Information Systems. Third Edition. John Wiley & Sons, LTD (2002).
22. Womack, J.P. and Jones, D.T.: Lean Thinking. Free Press. First Free Press Edition (2003).
23. Zojwalla, S.: The Total Economic Impact™ Of The Forrester TEI Multicompany Case Study. Forrester Consulting (August 2006).