

Introduction to Business Value of Enterprise Architecture

White Paper

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1 Executive summary

Reducing Costs is a major concern for many organizations. On the other hand, one of the major objectives of governance in organizations is to optimize the created Value. An accurate evaluation of the created Value is therefore a crucial metric in measuring Governance efficiency.

Value and Costs are therefore key elements in monitoring organization performance.

Since Enterprise Transformation decisions (corresponding to projects) are mainly based on a comparison between the expected future revenue and the investment plus future operation costs, many organizations have set up project assessment approaches.

During the last years, all CEISAR sponsors have rolled out such approaches mainly relying on “business cases” assessing the projects' revenue and costs.

However, these approaches are often just limited to the estimation of costs and value of projects, providing a dynamic point of view of the value created. But, the value of an Enterprise System must also be analyzed from a static perspective and an Assets point of view: the real value of an Enterprise System at a given time, regardless of any project, which is clearly related to the concept of Enterprise Intellectual Capital.

These two points of view, “static” / “dynamic”, match the “operate” / “transform” activities of an Enterprise System. Furthermore, the projects, from the dynamic point of view, also have an impact on the future value of assets, from the static point of view.

Because they are often aimed at managing investments by prioritizing among various projects, approaches for the dynamic point of view have been much more developed than for the static point of view.

Nevertheless, the static point of view is currently gaining momentum as confirmed, for example, by the creation of the “Intellectual Capital Observatory” (Observatoire de l’Immatériel) in France.

This document gives an overview of the various approaches allowing assessment of the costs and values of projects from the dynamic point of view, and the costs and values of assets from the static point of view.

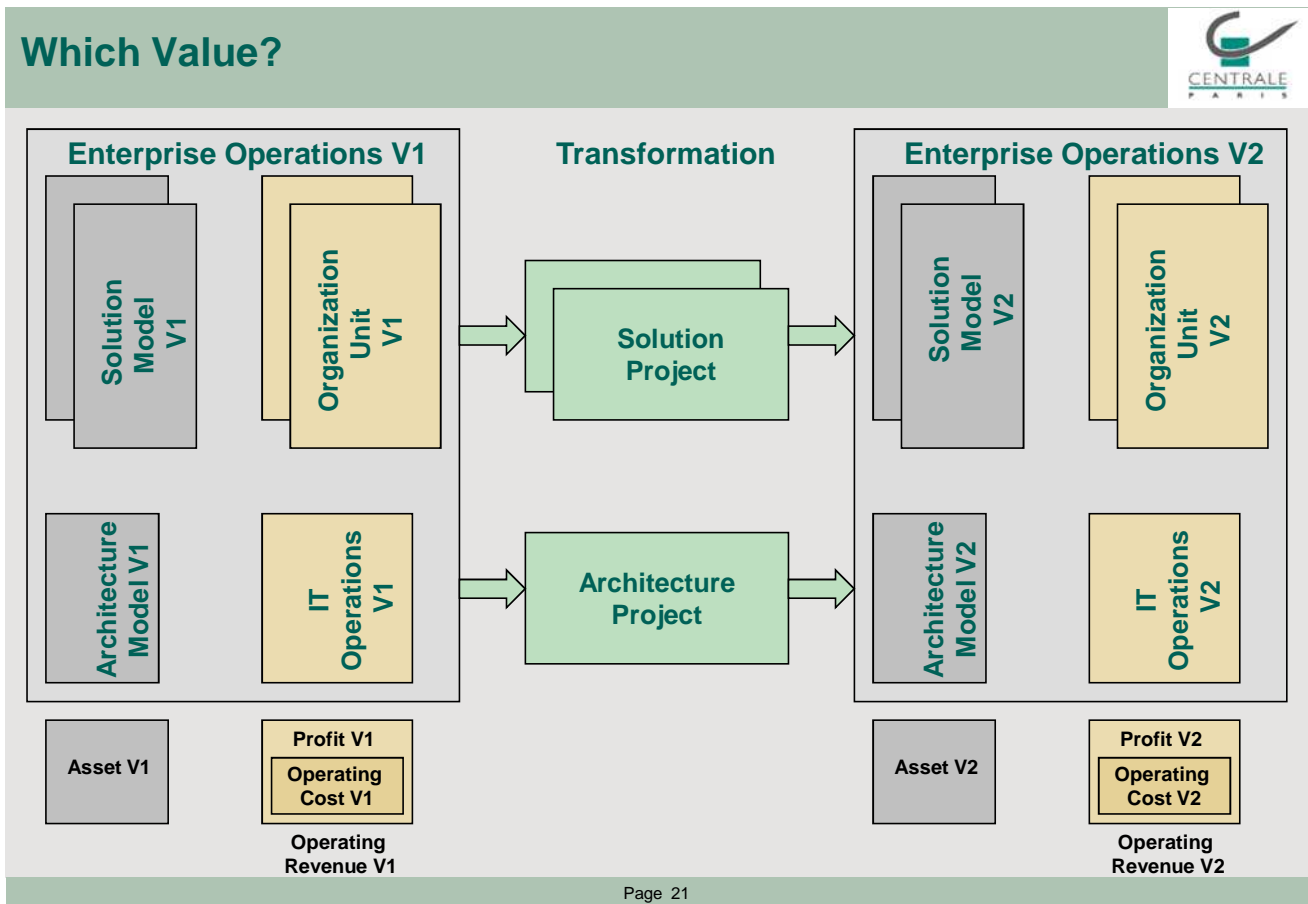
It also underlines the importance of assessing the Costs/ Value of Enterprise Architecture as well as the Costs / Value of Solutions. Enterprise Architecture value must also be analyzed beyond the value of IT. Indeed, Enterprise Architecture embraces business processes, organization and IT systems supporting these processes and focuses on what is reusable or what can be shared.

As described later in this document, the maturity level for assessing project Costs and Value is much higher than that for assessing the value of assets. Proposing a structured assessment approach and model for the latter could be the subject of a new White Paper bringing together the valuable contributions of the CEISAR sponsors.

2 General approach

As described in the CEISAR White Papers, an Enterprise System combines an Architecture with a set of Solutions. Both the Architecture and the Solutions contribute to the Enterprise's tangible and intangible assets.

Typically, a project has an impact on the Enterprise System by modifying one or more Solutions and/or the Architecture. This is represented on the figure below.



As stated above, Enterprise Architecture value must be analyzed beyond the value of IT alone. Value created by Enterprise Architecture derives from a set of various sources. Each source can naturally create value at the different Enterprise Architecture levels:

- business processes
- organizations
- information systems

The table below proposes some value creation sources broken down according to different Enterprise Architecture levels.

		Enterprise Architecture levels		
		Processes	Organization	Information System
Value source type	Knowledge management	Understand the Business Model: Products, Business Processes, shared Functions	Understand the Organization Model	Understand the IT Model
	Agility	Adapt the processes to react "quicker and / or with reducing costs" to environment changes, without decreasing quality of service	Reduce time to change an Organization Process. Easier staff mobility thanks to standardized and comfortable user interface, for example	Reduce time to design, develop, test, integrate, accept, improve a Software Solution
	Costs		Reduce Organization Costs: people, locations	Reduce IT Costs: Development and operations
	Quality		Increase Organization Service quality offered by the internal teams for the Customer	Increase IT Service quality offered to IT Users and customers
	Synergies, Merge and Acquisition	Merge or duplicate Products and Business Processes.	Mutualize organizations. Spread best practices	Mutualize information system components. Select "best of breed"
	Extended Enterprise	Integrate partners into the process	Integrate Clients, Partners, Providers,.. into the Enterprise Model	Interconnect external Systems

Value generated by the sources listed above cannot always be measured through a financial metric. Other indicators must then be chosen to assess the creation of value. For example, the increase of service quality offered to IT users and customers could be assessed using metrics coming from the help desk. Creation of value would be measured once the Solution is running.

To make good decisions for Solution or Architecture projects, Costs and future value of the proposed projects must be assessed. Furthermore, beyond the expected benefits of a project, which contributes to the Enterprise future **Profit**, a project should also increase the value of the Enterprise **Assets**.

Enterprise Assets include tangible and intangible items. The value of **Intangible Assets** not listed in the balance sheet (some Intangible Assets like "software" are in the balance sheet) is more difficult to assess because it includes items like:

- The capacity to quickly transform the Enterprise System
- Security levels
- ...

Most value assessment models are limited to the estimation of the future value of projects. These models provide a dynamic point of view of the value created by projects. They are often aimed at managing investments by prioritizing among various projects.

However, the value of an Enterprise System must also be analyzed from a static perspective and an **assets** or heritage point of view: at a given time, regardless of any project, the Enterprise System has a real value. Furthermore, this value clearly exceeds one of the corresponding assets in the company balance sheet (this may also be the case for building valuations, so such situations are not an exception). This value is therefore fully related to the concept of evaluating the Enterprise's Intellectual Capital.

These two points of view, "static" / "dynamic", also match the "operate" / "transform" activities of an Enterprise System.

Value and Cost must be therefore analyzed from two perspectives: a static perspective regarding the assets and a dynamic perspective regarding the projects.

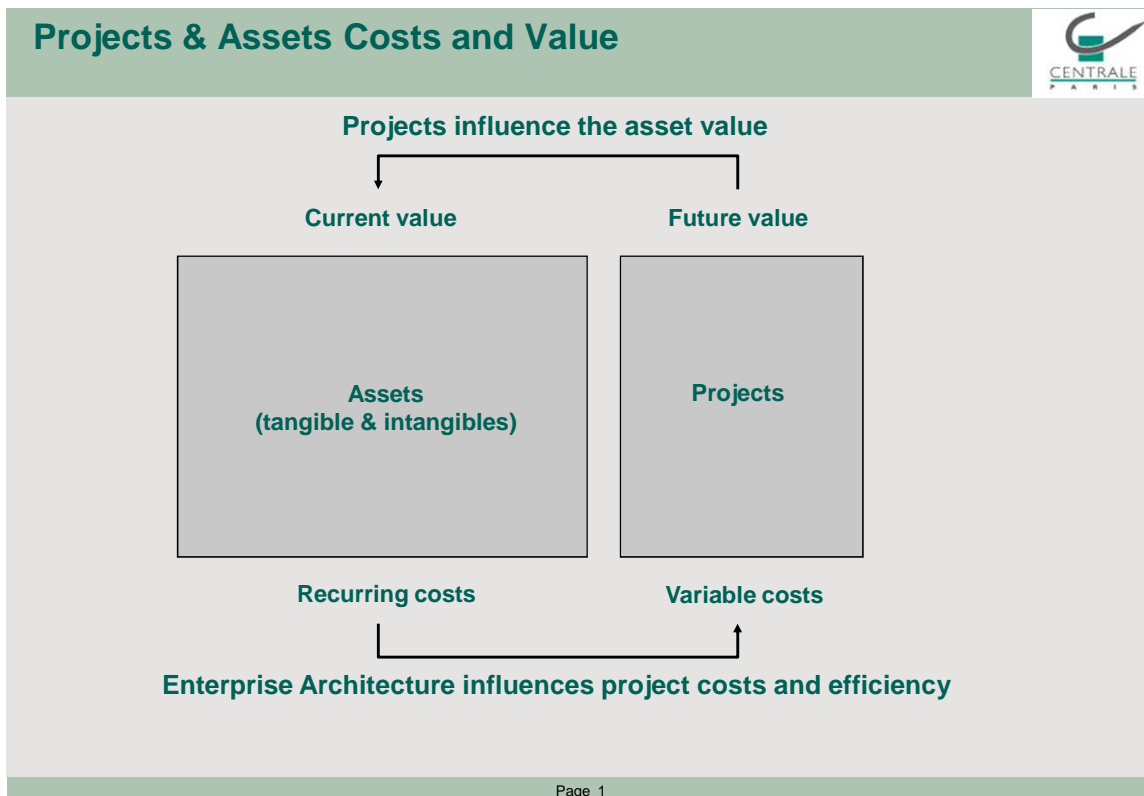
The main questions related to Value and Costs can then be sorted as follows:

- **Static** point of view:
 - Is it possible to assess an Enterprise in terms of :
 - Generated Revenue?
 - Global operating Costs?

- Asset Value?
 - Is it possible to split this Revenue, Costs and Value among Solutions and Architecture?
 - **Dynamic** point of view:
 - Is it possible to assess each Solution or Architecture project in terms of:
 - Project investment Costs?
 - Impacts of the Project on the 3 preceding items:
 - Generated Revenue?
 - Operating Costs?
 - Asset value?

Answering these questions should greatly help decision making. As we will see later in this document, some of these questions can be answered through quantitative financial assessments. However, the answer to other questions will be qualitative based.

To sum up, the figure below shows that projects have an impact (hopefully positive) on the asset value. Architecture projects also have an impact on the value of Enterprise Architecture, which represents part of the assets. On the other hand, Enterprise Architecture also has an impact on projects: an efficient Enterprise Architecture can reduce project Costs significantly or help to reduce time to market by providing a better agility in the projects. So, Enterprise Architecture brings value to projects, and projects in turn create value for assets, hence for the Enterprise.



A NPV (Net Present Value) approach for assessing a project compares the future revenues generated by the project with the investment and future operation Costs of the project. However, it doesn't take the impact of the project in terms of assets value into account.

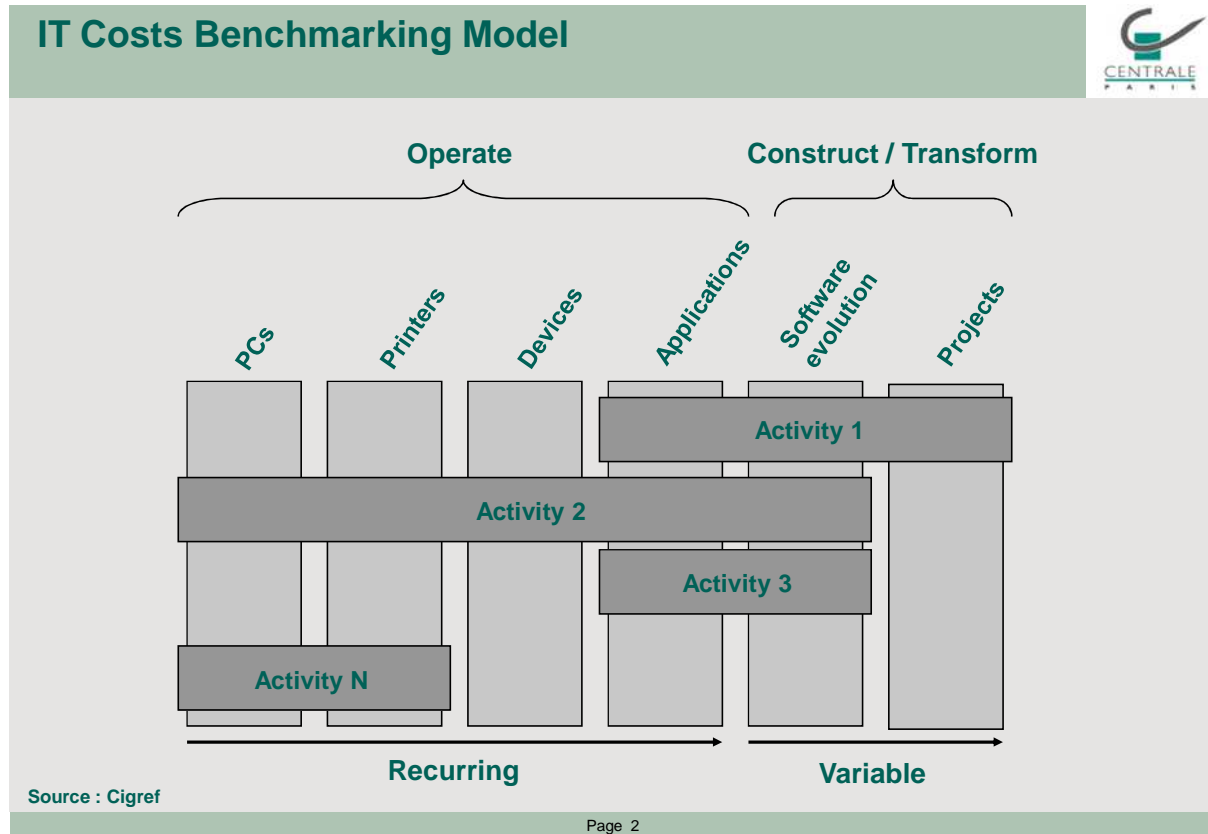
2.1 Approach for Cost evaluation

Various proven Cost measurement models, covering both static and dynamic points of view, are available. Among these, ABC (Activity Based Costing) is considered one of the most relevant methods to provide an accurate evaluation of activities and services Costs especially in case of indirect Cost intensive domains. This method is therefore especially well suited for the information systems domain as evidenced by the IT Cost benchmarking model proposed by the Cigref.

(http://cigref.typepad.fr/cigref_publications/RapportsContainer/Parus2007/pilotage_economique/Pilotage_Economique_2007.pdf).

This model describes the Activities of an IT department through a set of 6 processes providing various services:

- Providing PCs and associated services
- Providing printers and associated services
- Providing devices and associated services
- Providing applications as services
- Providing software evolutions
- Building projects



The schema above separates the recurring and the variable part of an IT department's activities. The recurring part aims at providing services and at maintaining the corresponding assets. The variable part is related to projects, the goal of which is to transform the provided recurring services and, hence, to increase the corresponding asset value.

Activity Based Costing is therefore well suited to assessing operating Costs as well as transformation (projects) Costs.

It is also important to notice that ABC can be applied to assess Costs of a whole Enterprise System and not only of IT.

3 Static view: assessing an Enterprise System

From a static point of view, an Enterprise System can be seen as a set of assets capable of creating value in the future.

The questions we are attempting to answer here are related to the revenue generated by operating Solutions and by an Architecture, to the corresponding operating Costs and finally to the corresponding asset value.

3.1 Approach for revenue evaluation

The global revenue of an organization is simply assessed by P&L (Profit & Loss). But assigning a revenue part to each asset is a difficult task. It is however possible to analyze revenue generation by assets through a “value analysis” approach derived from industry.

3.1.1 The « value analysis » approach

The value analysis or functional analysis aims at assigning a relative value to the various functions of a product. This approach can be transferred to an Enterprise System, for instance, by applying it to the Solutions portfolio.

The part of revenue generated by the Solutions (assets) should be compared to their associated Costs.

ABC (Activity Based Costing) method enables precise assessment of the operating Cost of Solutions. It is then easy to calculate the weight of each Solution compared to the global Cost of operating all Solutions.

Value analysis applied to the Solutions assets then consists in comparing the weight of each pair of Solutions in terms of revenue generation. Concretely, Solutions are compared one to one to evaluate their relative weight.

So, this analysis enables us to determine the weight of each Solution compared to the global portfolio revenue.

Comparing each Solution’ revenue with its Cost allows us to pinpoint improvement actions by focusing on the Solutions with the lowest “revenue / Cost” ratio.

3.2 Approach for asset value evaluation

An Enterprise System combines an Architecture with Solutions. The value of both the Architecture and the Solutions clearly exceeds the corresponding balance sheet value of assets.

As described for revenue generation, a “value analysis” approach can also be applied for assessing the value of assets.

However, the value of an Enterprise System can be naturally analyzed from an Intellectual Capital perspective, to which it contributes.

3.2.1 The « intellectual capital » approach

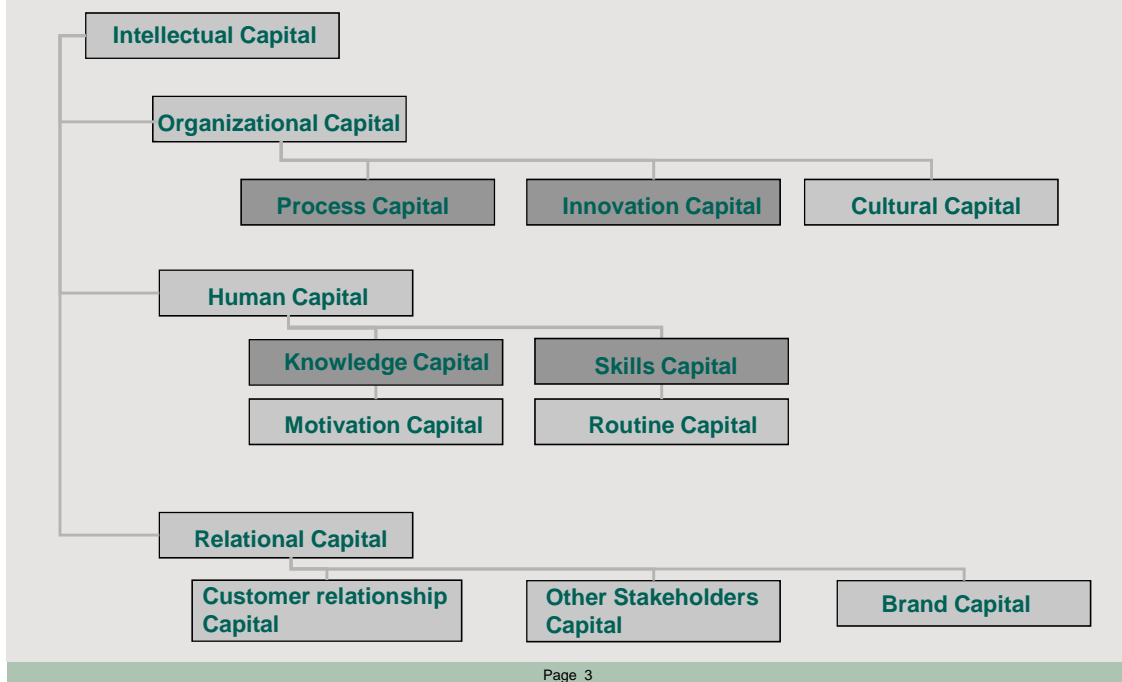
The Solutions and Architecture of an Enterprise System contribute to the intellectual capital of an Enterprise.

Various analyses of an Enterprise’s intellectual capital have been proposed. The Cigref, for example, propose to analyze the intellectual capital via three components

(http://cigref.typepad.fr/cigref_publications/RapportsContainer/Parus2006/2006-Capital-immateriel-7jours-pour-comprendre-CIGREF.pdf):

- Human capital: knowledge, skills, motivation...
- Organizational capital: processes, innovation, culture...
- Relational capital: customer relationships, stakeholders, brand...

The “human capital” and “organizational capital” components typically include topics related to Enterprise Architecture. The following taxonomy, proposed by the Cigref, is adapted from Roos and Alii.



The shaded components clearly include pieces of Enterprise Architecture.

The same analysis may be done using the taxonomy proposed by the “Observatoire de l’immatériel” (Intellectual Capital Observatory). This taxonomy lists 8 major intellectual assets: (<http://www.observatoire-immateriel.com/>):

- Organizational capital
 - Customer orientation & quality strategy
 - Employee security policy
 - Infrastructure security policy
 - Control policy
 - Supply chain maturity (industry)
 - Distribution channels
- Brand capital
 - Brand strength
 - Brand profitability
 - Brand investments
- Shareholder capital
 - Employee shareholders
 - Individual shareholders
 - Institutional investor shareholders
 - Share liquidity
- Customer capital
 - Risk related to the customer portfolio
 - Customer loyalty
 - Customer solvency
 - Customer portfolio profitability
- Technology capital
 - Technology portfolio concentration
 - R&D organization
 - Technology intensity of the activity
 - Patent strategy
 - R&D profitability
 - In Process R&D

- Human capital
 - Loyalty
 - Motivation
 - Ambiance
 - Skills
 - Profiles
 - International
- Information System capital
 - IT / Business alignment
 - IT contribution to the business
 - Information System performance
 - Information System innovation
- Supplier capital
 - Purchasing department profitability
 - Partnership strategy
 - Supplier contribution

3.2.2 Various intellectual capital assessment methods

Over the past 15 years or so, many methods have been proposed to assess and manage intellectual capital.

- Balanced Score Card approaches
- Applied Information Economics (AIE)
- Calculated Intangible Value (CIV)
- Danish Guidelines
- IC-dVal
- IC-Rating
- Meritum
- Lev model
- Wissensbilanz
- ...

The goal of this document is not to provide a detailed description of these various methods. It is however interesting to notice that many methods rely on indicators aimed at assessing and managing intellectual capital without providing a financial intellectual capital value.

Methods providing a financial assessment often have limitations which make them difficult to deploy. And, most of all, these methods do not easily enable distribution of value among the intellectual capital components.

3.2.3 A method example - Calculated Intangible Value (CIV)

This method aims at assessing the intellectual capital value of an enterprise by comparing its ROA (Return On Assets) ratio to the one of companies of the same domain. ROA corresponds to the ratio between the pre-tax earnings and the tangibles assets (excluding equity investments). The delta between the Enterprise ROA and the domain average ROA is considered as the financial counterpart of the intellectual capital. This delta multiplied by the asset value corresponds to the surplus of earnings generated by the Enterprise thanks to its intellectual capital. The intellectual capital value can finally be assessed by dividing this earnings surplus by the company Cost of capital.

3.3 Assessing Operating Solutions

- Revenue
 - Assessing the revenue generated by Solutions related to products can quite reasonably be done. Yet this is much more difficult for transversal Solutions (like accounting or HR Solutions for example).
 - However, as described above, the global P&L revenue can be split among Solutions through a “value analysis” approach.

- Operating Costs
 - Operating Costs of Solutions (including human resources, commodities, IT infrastructure...) can be correctly assessed through Activity Based Costing approaches, which handle indirect Costs with care.
- Asset Value
 - Tangible assets have a value in the Enterprise balance sheet.
 - Intangible asset value can be assessed through an Intellectual Capital assessment method combined with a “value analysis” approach to split the IC value among the assets.
 - Alternatively, the Intellectual Capital corresponding to each Enterprise Solution (process models, trained people, software components...) can be assessed from a qualitative point of view based on a set of indicators :

Indicator example	Corresponding assessment approach example
Function scope of the Solution	Use a “function points” approach
Agility	Assess the ability to adapt quickly and without Cost increase to an environment change: poor / good / excellent
Quality	Assess the quality of the Solution by measuring the number of incidents managed by the helpdesk for this Solution compared to the Solution Cost
Extended Enterprise orientation	Assess the implementation level of standards enabling smooth cooperation with partners in an extended Enterprise way
...	

3.4 Assessing Architecture Model

- Revenue
 - Assessing the financial revenue generated by the Enterprise Architecture model is a complex task. However, qualitative indicators can be defined to measure how well the Architecture model contributes to revenue generation. These indicators can then typically be used as benchmarks (internal or external):
 - Productivity increase thanks to **GUI standards, workflow**
 - Cross-selling thanks to client **master data**
 - Operating Costs reduced via **Quality** due to the Architecture
 - Operating Costs reduced thanks to lower Solution **Complexity** due to the Architecture
 - New partner / customer / supplier services thanks to **extended Enterprise** facility
 - Reduced **time to market**,
 - ...
- Costs
 - Operating Costs of Architecture black components can also be assessed through Activity Based Costing approaches
 - Architecture white components (models, inheritance, types, GUI...) shouldn't have operating Costs.
- Assets
 - Architecture Asset value cannot be easily assessed financially
 - However, a set of indicators can help to assess the Architecture asset value from a qualitative point of view. Such indicators are listed in the CEISAR Architecture Governance White Paper along with their respective qualitative benefits. The value of Architecture assets can therefore be assessed by evaluating each of these indicators with marks ranging from 1 (low, poor) to 3 (high, good) for example.

4 Dynamic view: assessing Projects

Projects or investments typically correspond to the dynamic point of view by contributing to Enterprise transformation.

As for the static view, the questions we are attempting to answer here are related to the revenue generated by Solution projects or Architecture projects, the corresponding Costs and finally their impacts on the corresponding asset value.

4.1 Approach for revenue evaluation

Estimating the future revenue generated by a project is the responsibility of the business unit who expressed the need triggering the project. Since a project is not limited to an IT component but has an impact in terms of processes and organization, measuring the project value must actually take these various components into account.

To be relevant, the assessment of the future revenue generation of projects must be conducted in a consistent and uniform way for all projects. This requires a more or less formal project evaluation framework. Such a framework is often set up through a project portfolio management initiative, which allows us to structure the method of assessing the future revenue of projects.

4.1.1 Pure financial approaches

Pure financial methods for assessing the future revenue of a project typically rely on NPV (Net Present Value) or Payback approaches for example, which combine future revenue with investment and future operating Costs.

However, these methods have some limitations that make them difficult or inappropriate to use. A pure financial evaluation of a project value must be interpreted in the light of the assumptions that were used for the assessment. Furthermore, a pure financial evaluation doesn't generally take intangible profits generated by a project into account, precisely because associating a financial value to an intangible profit is a difficult task.

4.1.2 Various methods for assessing the value of projects

Many methods have been proposed to calculate a project's value. Some of them rely on a strong economic core while others try to combine an estimation of both tangible and intangible project benefits.

- Applied Information Economics (AIE)
 - <http://www.hubbardresearch.com/method.htm>
- Architecture Tradeoff Analysis Initiative (ATAM)
 - <http://www.sei.cmu.edu/publications/documents/00.reports/00tr004.html>
- Business Value Index (BVI)
 - <http://ipip.intel.com/go/101/business-value-index-demo/>
- Information Technology Investment Management (ITIM)
 - <http://www.gao.gov/new.items/d04394g.pdf>
- Total Economic Impact (TEI)
 - <http://www.forrester.com/TEI>
- ValIT
 - <http://www.isaca.org/AMTemplate.cfm?Section=Deliverables&Template=/ContentManagement/ContentDisplay.cfm&ContentID=24261>
- ...

4.1.3 The difficulty in setting a comparison reference

The goal of this document is not to provide a detailed description of the various methods used to assess project value. It is however important to notice that a comparison reference must be chosen when measuring a project's value.

The easiest comparison reference corresponds to the existing situation when the project has not yet been rolled out. However, such a reference has limitations in two respects:

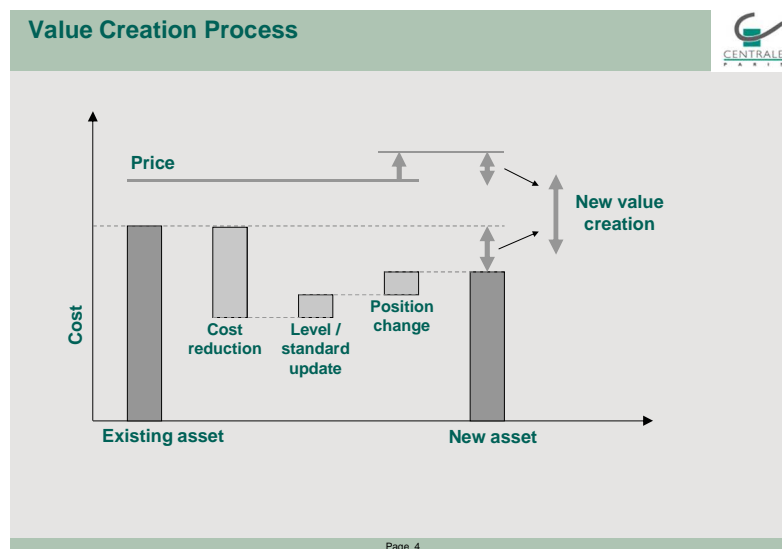
- Even if the project is not yet rolled out, the business need related to the project is probably being handled in another way (a non-IT Solution for instance). Measuring against such an alternative scenario seems more relevant.
- In addition, even if the project is not yet rolled out, the internal resources, which would have participated in the project, have a Cost that must be taken into account for the comparison, especially if these resources cannot be allocated to another project.

4.2 Impact of projects on Solutions revenue

It is interesting to compare the impact of a transformation project on the corresponding Solutions revenue (or the corresponding assets value) with a “model change” project in the industry (automobile industry for example).

In many cases, a project is not intended to create a new asset, but to transform and enhance an existing one. In such cases, it makes sense to compare the value creation process with that involved in an automobile “model change” project.

The figure below represents this value creation process. The value created corresponds to the difference between the revenue – the price the customer accepts to pay (for the car or for the application provided as a service in the case of an IT project for instance) and the Cost (production Cost of the car or recurring Cost of providing the application as a service in the case of an IT project for example).



The expected impacts of such a project are the following:

- A Cost reduction: car production Cost reduction by improving the industrial production process or application, operation Cost reduction thanks to a technology change, for example
- A “standard update” Cost: in the automobile industry, the car must conform to new security or comfort standards for instance. In the IT domain, an application may have to integrate new exchange formats, new protocols or conform to new GUI standards, for example
- A “position change” Cost: in the automobile industry, changing the position of a car can, for example, consist in making it a bit longer to reposition it against the competing models. In the IT domain, a “position change” can, for instance, consist in integrating new functions expected by the users (it is therefore important to integrate functional evolutions in a redesign project).
- These “position change” efforts allow increase of revenue: the price the customer accepts to pay for the new car or the new application.
- The Solution (the car or the application) value creation generated by the project is made up of two elements:
 - the surplus revenue: surplus of price the customers accept to pay for this Solution
 - the Cost reduction, decreased by the “standard update” and “position change” Costs

This Solution recurring value creation must be compared to the transformation project Cost, using a NPV or Payback method, in order to make a go / no go decision on the project.

4.3 Assessing Solution Projects

- Project Costs:
 - Investment Costs related to projects can be properly assessed through Activity Based Costing approaches, which handle indirect Costs with care
 - Various other “business case” approaches also allow us to assess the project Costs
- Impacts of the Project on:
 - Generated Revenue
 - As described above, many quantitative and / or qualitative approaches exist to assess the future revenue generation of a project
 - Operating Costs
 - Future operating Costs related to projects can also be assessed through Activity Based Costing approaches, or by other “business case” approaches
 - Asset value
 - Impacts of projects on asset value cannot be easily assessed financially
 - However, a set of qualitative indicators can help to assess the impact on asset value

Indicator example	Corresponding assessment approach example
Ability to reduce Solution obsolescence	Qualitative assessment : poor / good / excellent
Legal constraints conformity	Qualitative assessment : poor / good / excellent
Maintainability / rationalization	Compare the number of functions points implemented in the Solution to the number of functions required by the business
...	

4.4 Assessing Architecture Projects

- Project Costs
 - Investment Costs for an Architecture project can be assessed in the same way as the Costs for a Solution project.
- Impacts of the Project on:
 - Generated Revenue
 - Future revenue generation by an Architecture project cannot be easily assessed financially. However, a set of qualitative indicators can help to assess future revenue generation:

Indicator example	Corresponding assessment approach example
Components re-use (increases the transformation productivity and reduces the operating Costs)	Qualitative assessment : poor / good / excellent
Maintainability / rationalization	Compare the number of functions points implemented in the Solution to the number of functions required by the business
...	

- Operating Costs
 - Future operating Costs for an Architecture project can be assessed in the same way as the Costs for a Solution project.
- Asset value
 - The same qualitative indicators used to assess impacts of Solution projects on asset value can be used to assess impacts of Architecture projects.