Designing a particular Balanced Scorecard to manage de last and very difficult stage of a very important hydroelectric project

(the academic feed back)

**R. Uzal (*) (**), G. Montejano (*), D. Riesco (*),
A. Dasso (*), A. Funes (*)**
*(*) Universidad Nacional de San Luis
Ejército de los Andes 950
5700 San Luis – Argentina gmonte@unsl.edu.ar
(**) Universidad de Buenos Aires - Argentina*

N. C. Debnath
*Winona State University
Winona, MN 55987 - USA
Ndebnath@winona.edu*
Eduardo Petrolo
Entidad Nacional Yacyretá

Presentation abstract

In this presentation we describe the design, using an evolutionary prototyping approach, of a very specific Balanced Scorecard (BSC) oriented to manage the last stage of the Yacyretá Hydroelectric Project. We present, briefly, the Yacyretá Hydroelectric Project and we also introduce some general aspects of Kaplan and Norton BSC point of view for the conceptual design of Executive Information Systems. We compare the "canonical" BSC perspectives against the perspectives included in the particular application reported in this paper. We also describe the indicators included in each BSC perspective. Finally, we point the several information sources to feed the BSC Datawarehouse. This paper is based on our experience and interaction with the Harza Engineering Company (the firm in charge of the last stage of the project) and also with governmental officials who supervise the project.

Introduction

- Top management information needs include IT tools to follow up the evolution of manager's Critical Success Factors (CSF) using selected indicators.

- Executives Information Systems (EIS) are IT applications oriented to optimize the decision making process and the management control.

- Balanced Scorecard (BSC) approach is an excellent point of view to face EIS conceptual design.

- CSF indicators, in the BSC context, are grouped in "perspectives". The goal of this presentation is to show the adaptation of Kaplan and Norton concept of BSC to the very specific environment of the last stage of Yacyretá Hydroelectric Project. After the project, we arrived to important conclusions to be used in the academic field

Understanding the project environment

- According to plans the Yacyretá Hydroelectric Project should have been completed in 1983.

- The project was designed to have a reservoir 83 meters above sea level with an installed power of 3200 megawatts.

- The project is located on the High Paraná River on the international border between Argentina and Paraguay.

- In 1974, the two countries signed a treaty to share in the benefits of the project.

- Argentina and Paraguay Governments have decided to outsource the last stage of Yacyretá Hydroelectric Project general management. Harza Engineering Company (currently MWH - Montgomery Watson Harza Inc) was selected to finish the project.

Project IT support

- Harza Engineering executives and governmental officials decided to use a specific IT tool (Executive Information System) to support the decision making process and management control during the development of the last stage of the project

- Harza Engineering Controlling Team suggest the use of Kaplan & Norton Balanced Scorecard (BSC) approach for the conceptual design of the EIS needed.

- Analyzing BSC prototypes, Harza Engineering executives and governmental officials perceived that, the classical four BSC perspectives, must be adapted according to the particular project structure and environment

EIS based on BSC approach

- EIS(s) based on BSC approach are very useful both for the decision making process support and for management control.

- Kaplan & Norton BSC concept helps to translate planned strategy into action.

- BSC starts from the organization vision and strategies, from where critical success factors are defined. BSC is a performance measurement system.

- Kaplan & Norton BSC approach introduced four different ("classical") perspectives [3] from which a company's activity can be evaluated:
  - Financial perspective (how do we perceive our shareholders?)
  - Customer perspective (how do we perceive our customers?)
  - Process perspective (in what processes should we excel to succeed?)
  - Learning and innovating perspective (how will we sustain our ability to change and improve?)

The modified BSC perspectives

- Social Perspective

  - More than 11,000 people must be move to increase the water level from 76 m to 83 m above sea level. It is needed to track the programmed social actions to support the people moving process.

- Financial Perspective

  - The finance support of the project is no trivial. To control effectively the project finance side is a management challenge.

- Environment Perspective

  - The lake is currently 100 km long and (average) 20 km wide. The water surface will increase one third at 83 meters level. The environmental impact of this huge new water surface is important. The follow up process of the environment preservation actions is an important aspect of the project management.

The modified BSC perspectives

- Working programs (outsourcing approach) Perspective

  - The project working programs include more than 1,700 tasks. Most of these tasks will be faced using an outsourcing approach. An important part of the project success is based on this BSC perspective.

- Certifications and Payments Perspective

  - Harza must certificate the task faced by other firms (see prior point). When Harza certificate a task, EBY must pay the budgeted amount to the third firm. If we consider more than 1,700 task, more than certifications and payments must be controlled during the project.

The modified BSC perspectives

- Internal Administrative Processes Perspective

  - The follow up of thousands of administrative is a Critical Success Factor of the project: land expropriation processes, certification processes, task inspection processes, payment processes and so on

- Innovation and Development Perspective

  - To change the organization culture is another Critical Success Factor of the project. The Harza executives and Argentina and Paraguay government officials must use, effectively the EIS based on BSC approach, the timing of the administrative processes must be contolled, etc.
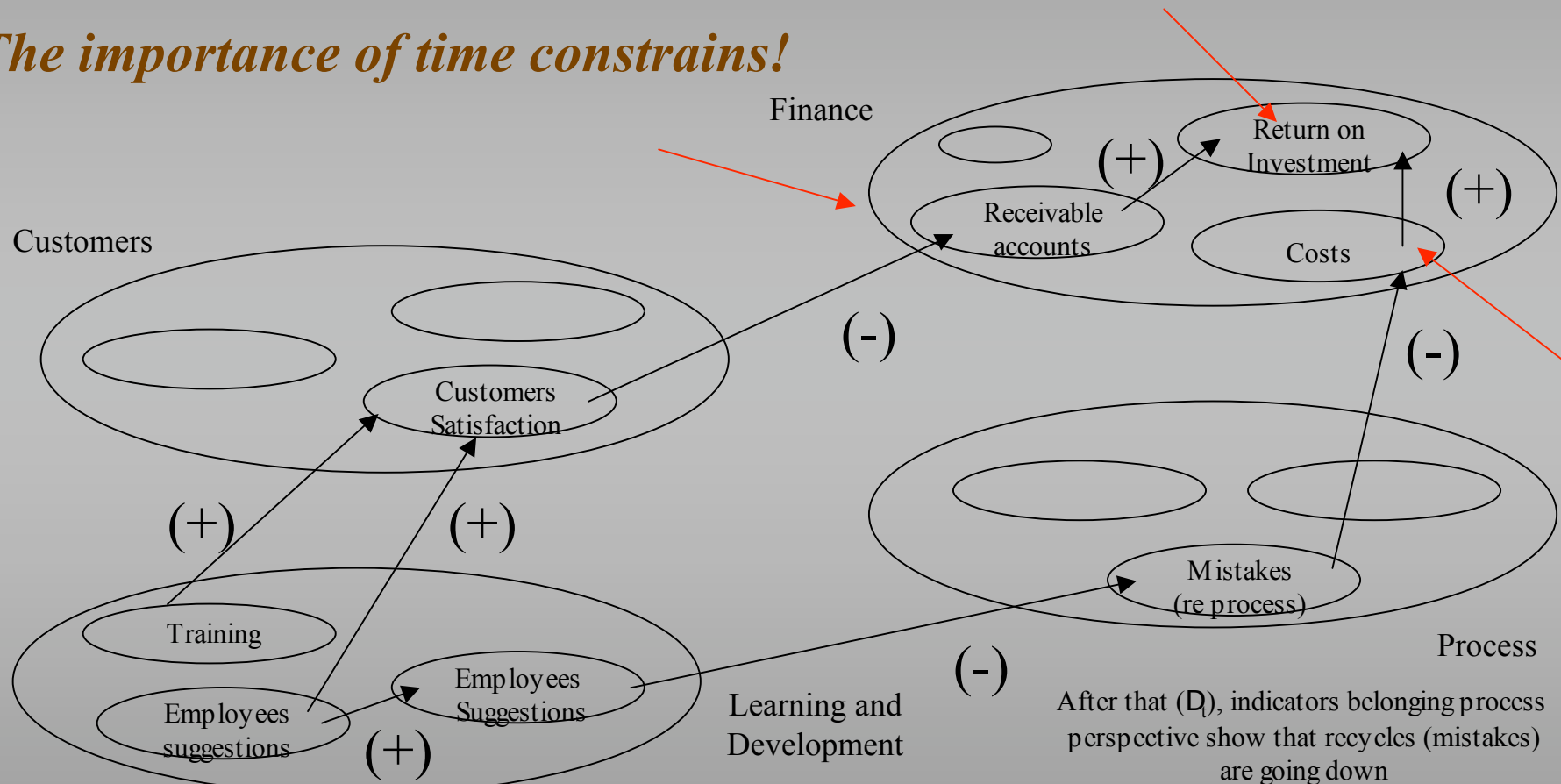
The modified BSC perspectives

BSC Indicator (ratio)
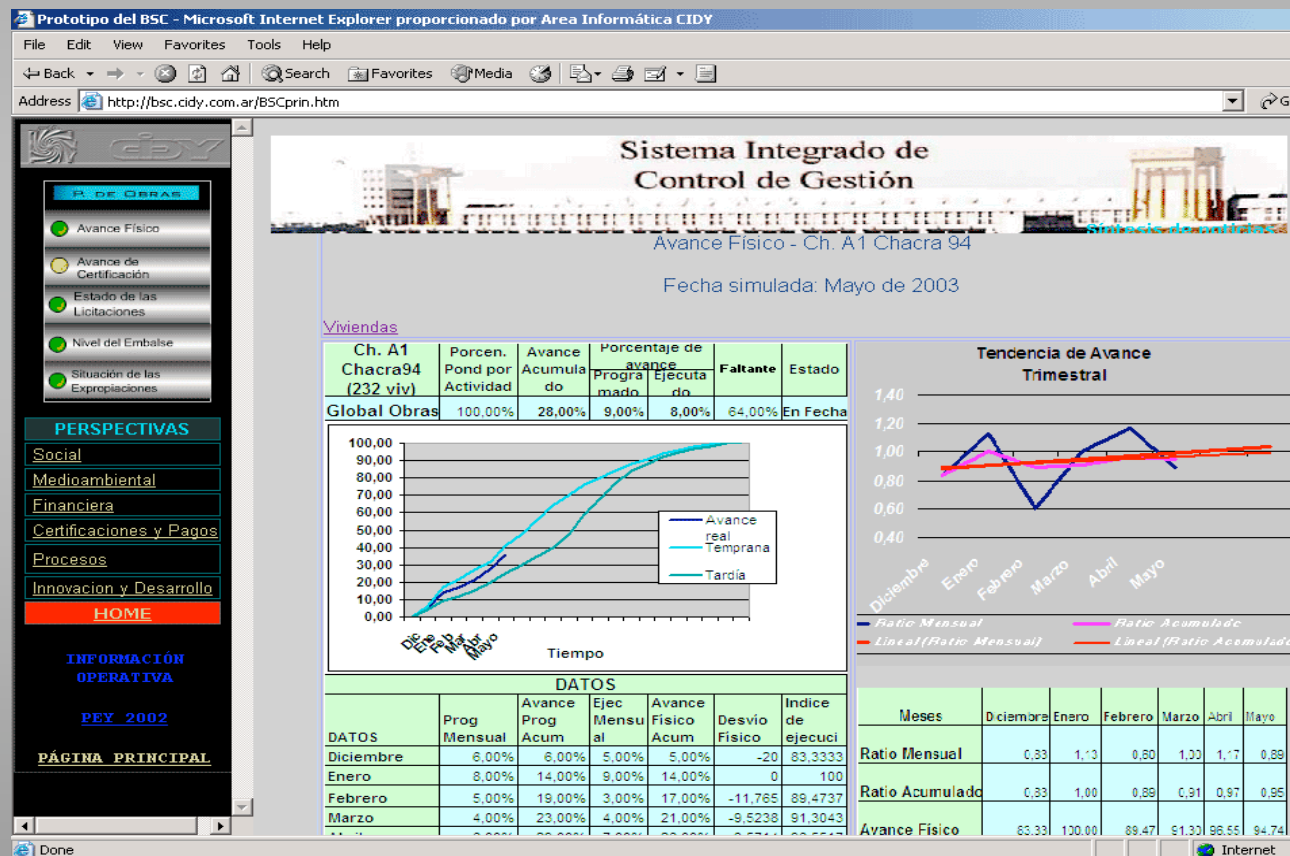
Heterogeneous information sources to feed the BSC Datawarehouse
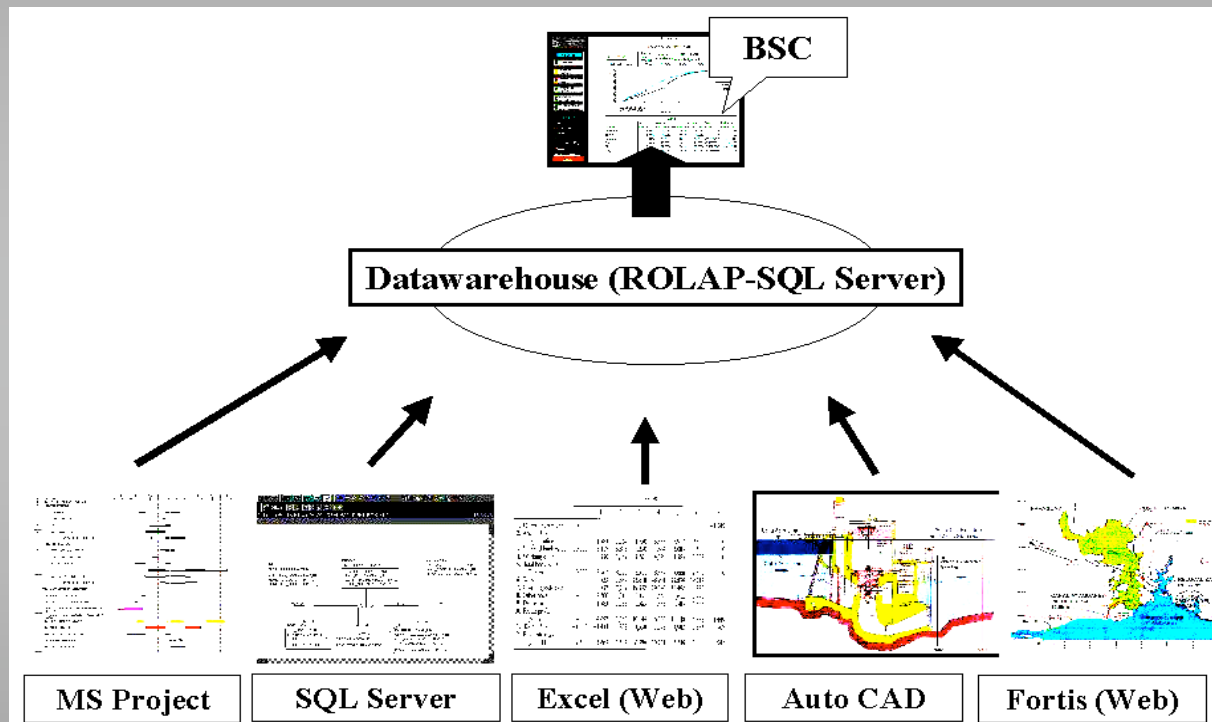
Figure 1

Conclusions (I)

The importance of time constrains!

Finance

Return on Investment

(+)

(+)

Customers

Receivable accounts

Costs

(-)

Customers Satisfaction

(+)

(+)

(-)

Training

Mistakes (re process)

Employees Suggestions

Process

Employees suggestions

Learning and Development

(-)

(+)

After that (D_t), indicators belonging process perspective show that recycles (mistakes) are going down

Important training and motivation activities have been faced.
Employee skills and motivation improvement is recorded in indicator values belonging to "development perspective".
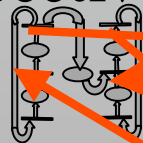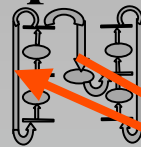
Dr Roberto Uzal

13

Conclusions (II)

There are hard time restrictions!

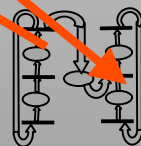**Financial Perspective Indicator**

Indicator are f(t)

Process Perspective Indicator
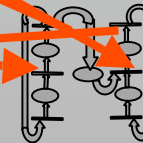
Customer Perspective Indicator
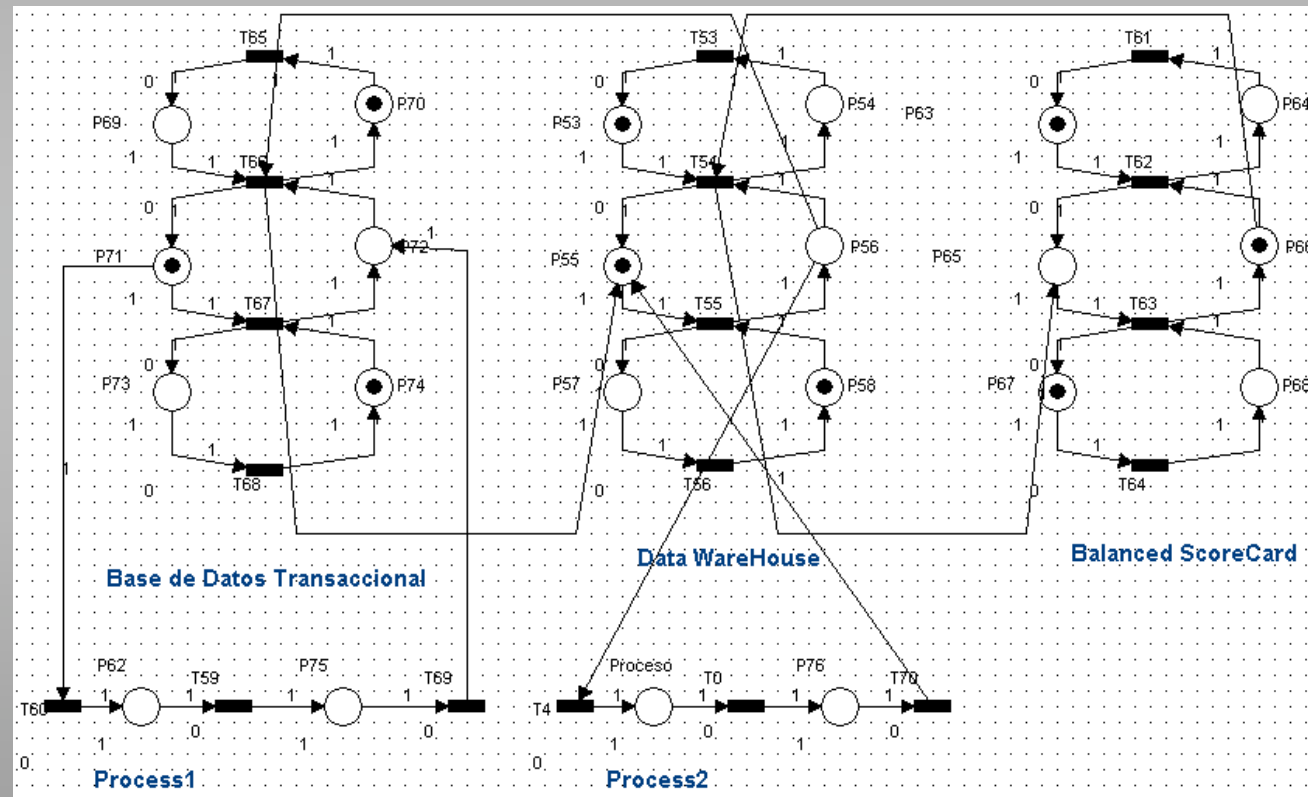
Relations between indicator are also f(t)
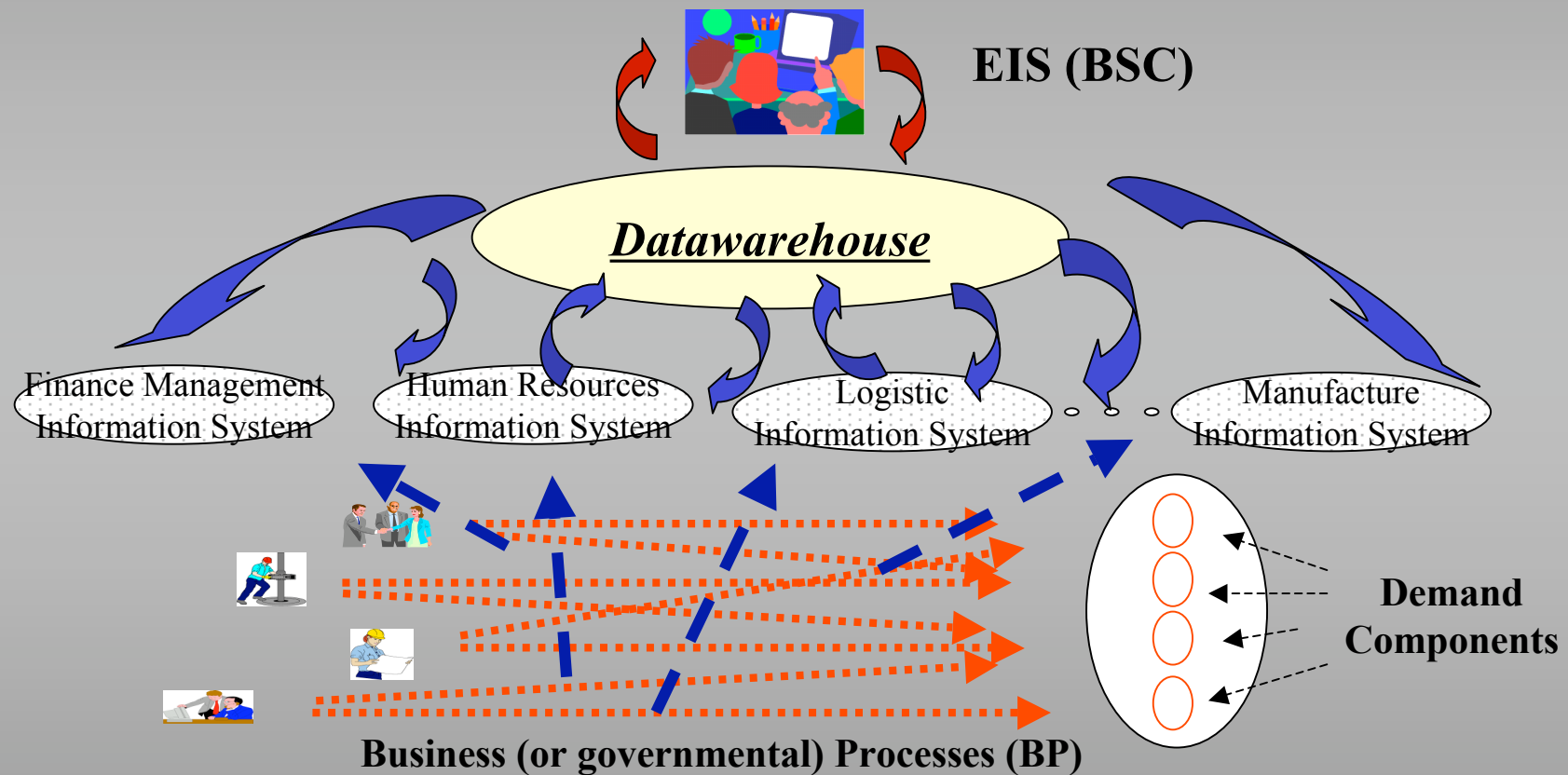
Time consistency is a challenge!
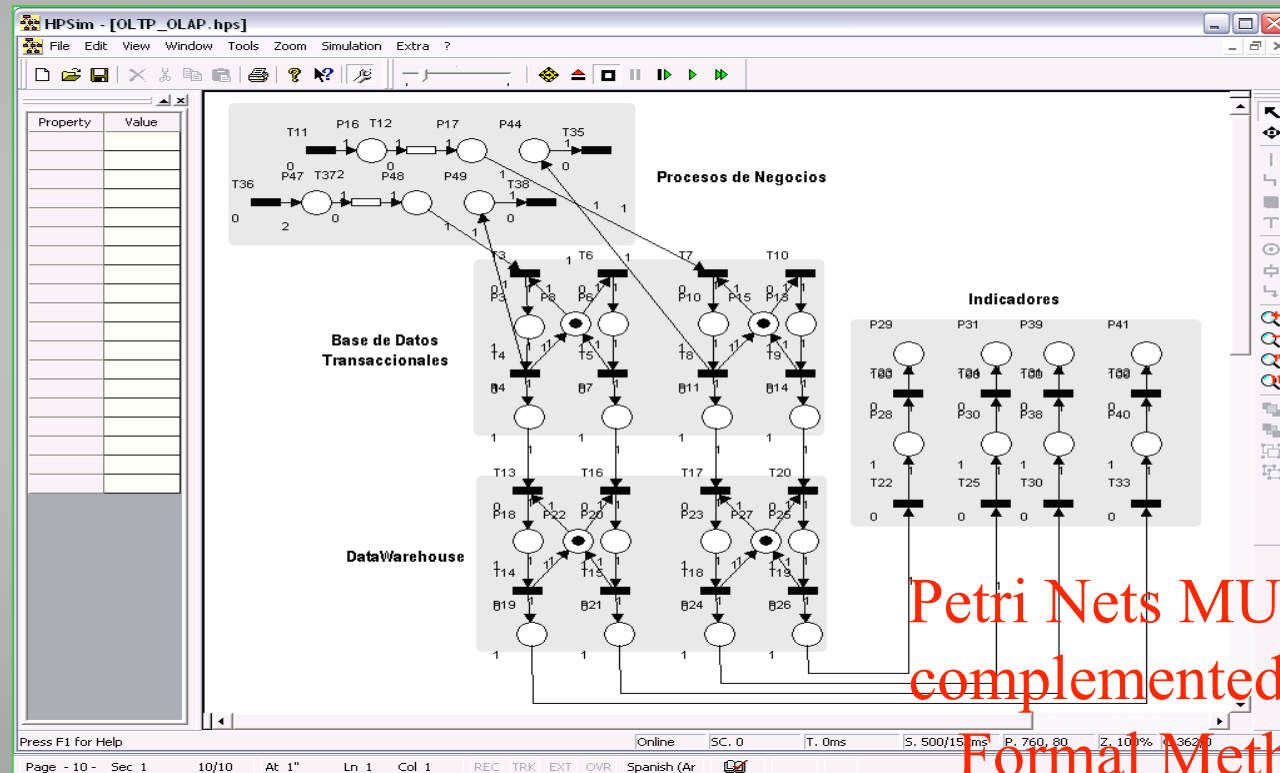
Innovation Perspective Indicator

Conclusions (III)

Conclusions (IV)

EIS (BSC)

__Datawarehouse__

Finance Management Information System

Human Resources Information System

Logistic Information System

Manufacture Information System

Demand Components

Business (or governmental) Processes (BP)

Conclusions (V)

Petri Nets MUST be complemented with Formal Methods
RAISE is very useful

Conclusions (VI)

- After the project, we studied several BSC implanted in important organizations. Most of them have not the time constrains well defined. So, indicator could show inconsistent information.

- We also studied BSC software tools provided by important firms. We found the same limitation.

- Additionally, in general terms, BSC in use have deep limitations (not rigorous) in their functional specifications (formal methods are needed)