



Methodology for prior analysis of interoperability

**Mamadou Camara, Yves Ducq, Rémy Dupas,
IMS University of Bordeaux 1**

Agenda

- State of the art & Definitions
- Interoperability representation
- Framework
- Methodology & Case study
- Conclusion

State of the art of interoperability

- **Interoperability** is the ability of two or more systems or components to exchange information and use the exchanged information **without special effort** on either system (IEEE, 1990).

State of the art of interoperability

- Qualitative models based on maturity models.
- Quantitative models use indicators to measure interoperability characteristics
 - time, cost and quality of interoperation.
- The main limitation of these approaches
 - the considered interoperability is **disconnected from enterprise objectives.**

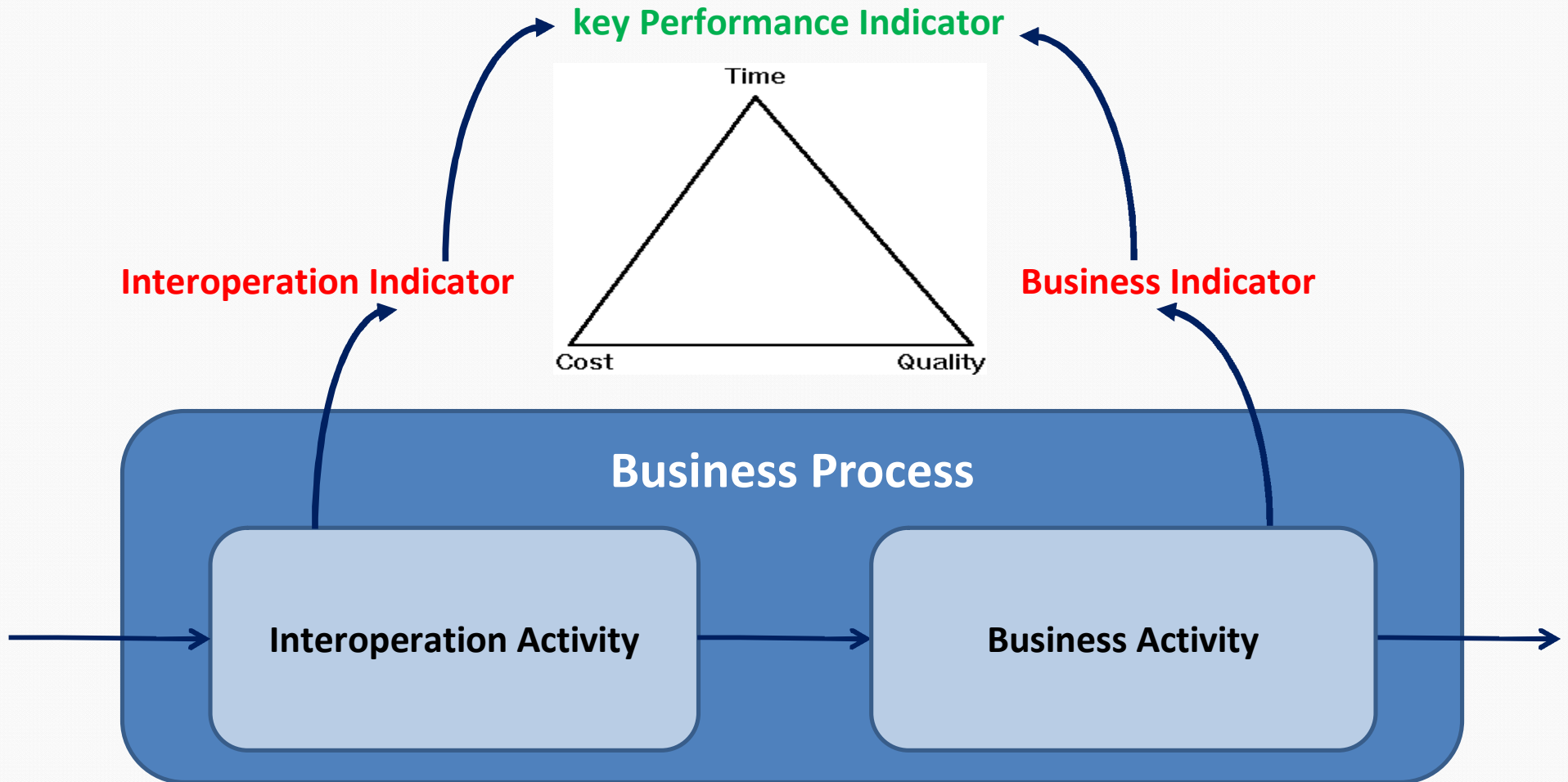
Definitions

- **Performance Measurement System**
 - a set of strategic objectives and performance metrics applied throughout the entire enterprise
- **Causal Performance Measurement Models**
 - links together the measures in the PMS by cause-and-effect relationships.
 - measures are arranged in a hierarchical fashion
 - Example:
 - Balanced Scorecard strategy map
 - Action-profit linkage

Interoperability representation and measurement

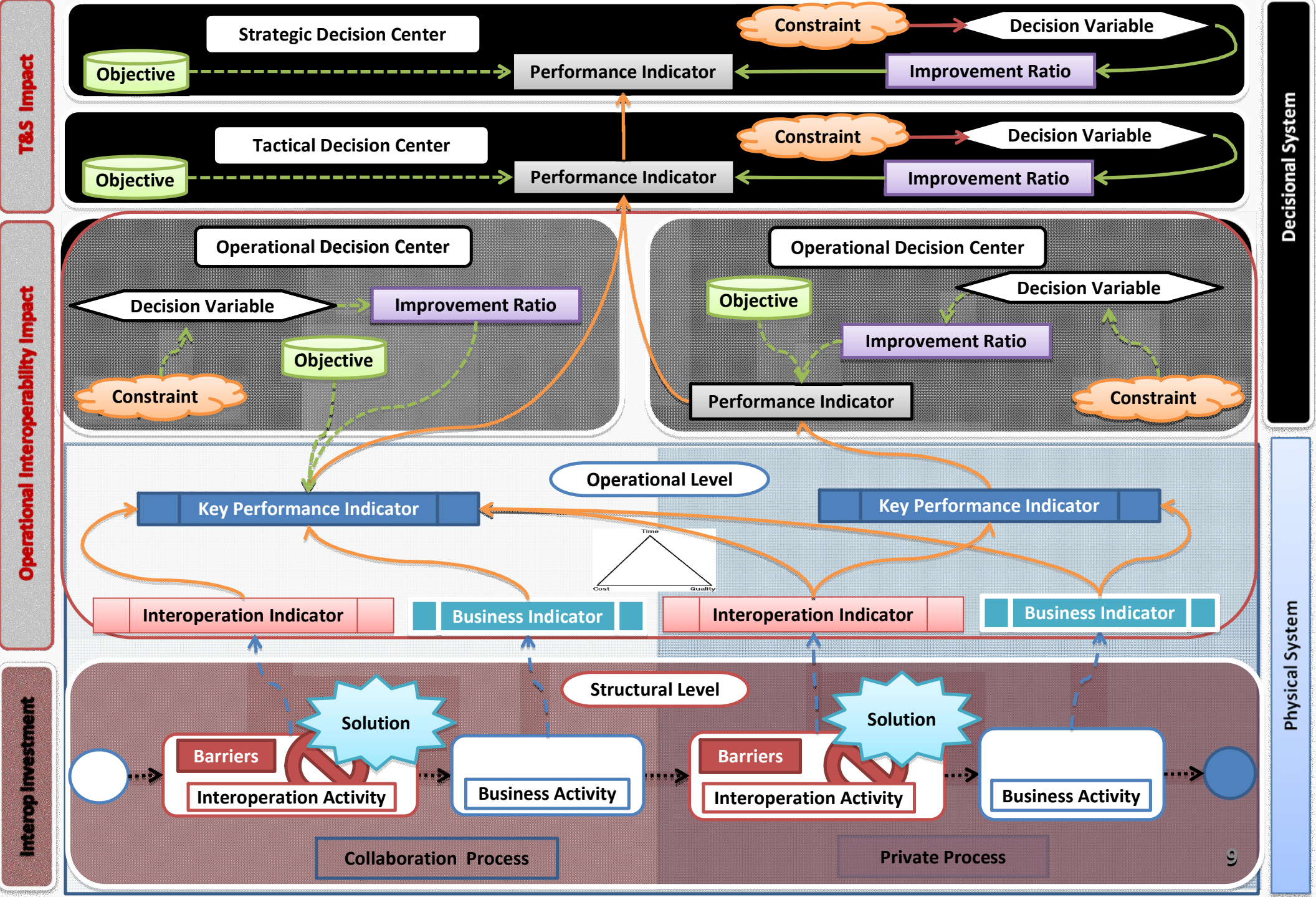
- Business activities are those which create value in business process.
- Interoperation activities are **non-value-added** activities representing **efforts** for the interoperability of information exchanges between partners
- KPIs are considered as aggregations of BIs and IIs of all activities of a business process

Interoperability representation and measurement



Interoperability evaluation framework

- It should enable an understanding of how interoperability influences the achievement of enterprise objectives
 - the interoperability investments layer,
 - the operational impact layer,
 - the tactical and strategic impact layer.
- The core element of this framework is the causal relationships between process KPIs and the objectives of partners, at all decisional levels



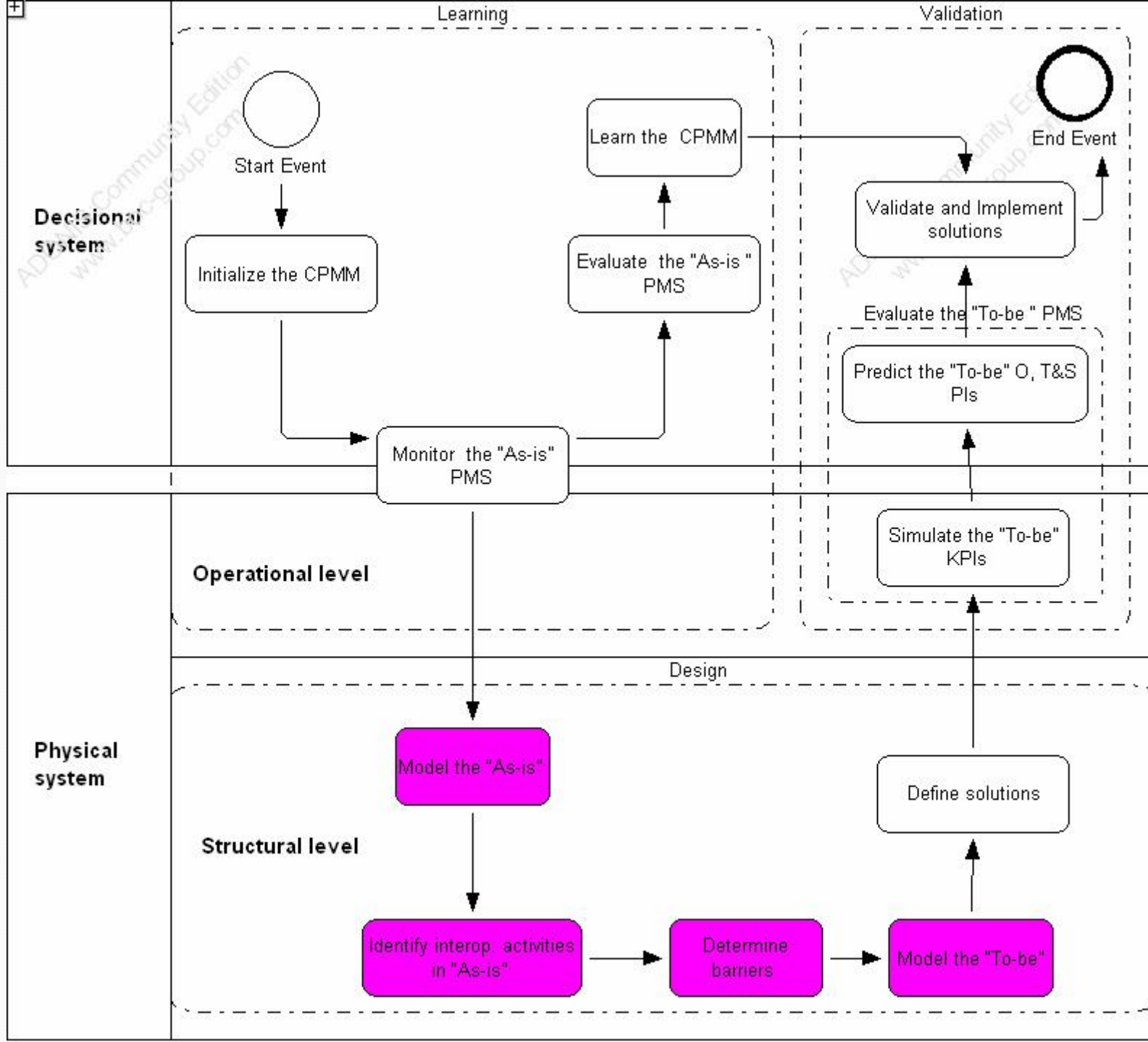
Case study : ASICOM project

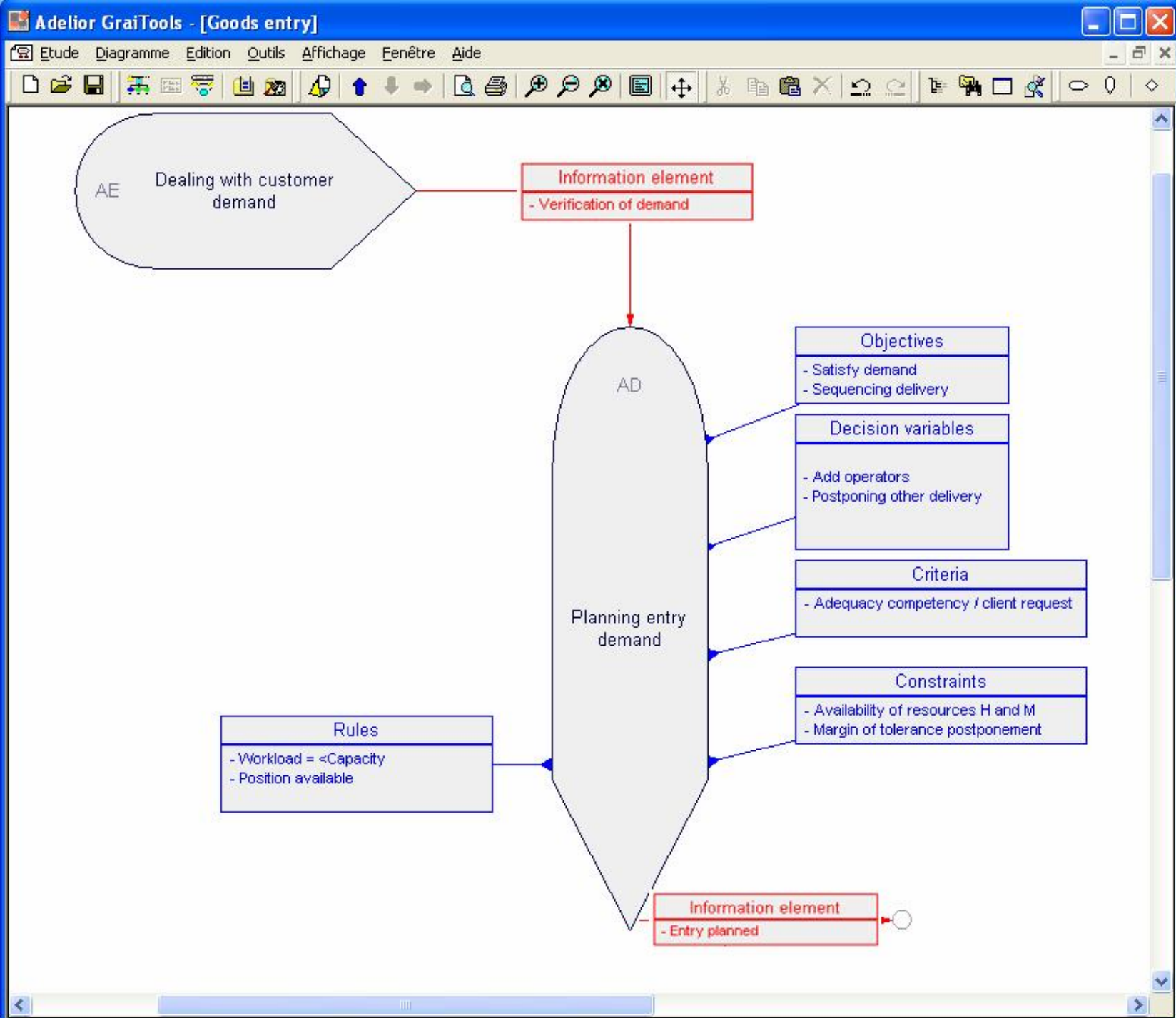
- Partners involved in the collaboration :
 - the customer (an e-commerce company),
 - the stockist,
 - the customs agent and
 - the customs.
- Two collaboration business processes
 - *goods entry and goods output*
- Two decision centers belonging to the *stockist*:
 - *goods entry and goods output.*

Interoperability evaluation methodology

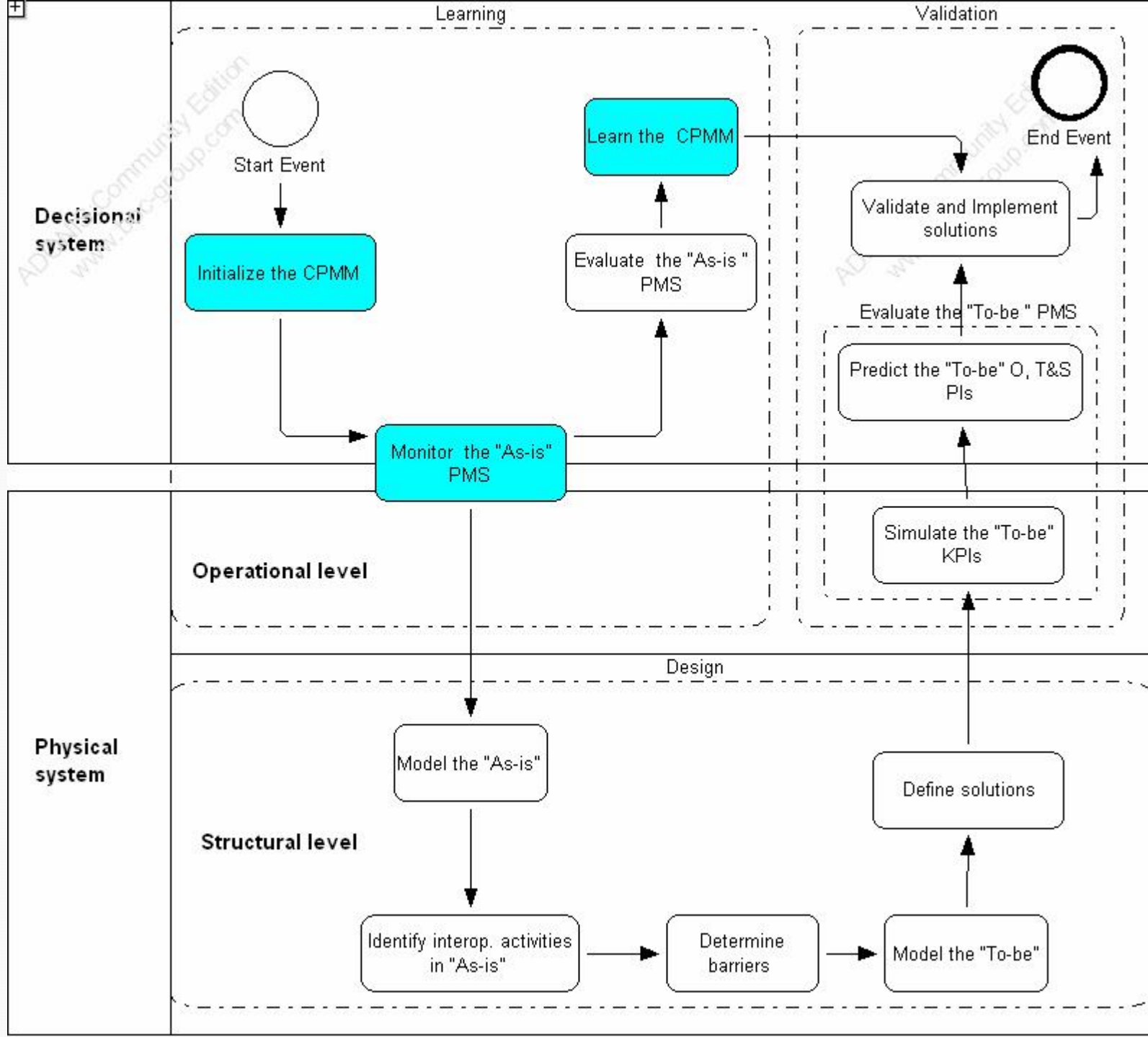
- Makes it possible an a priori evaluation on the basis of the capacity of solutions to improve the achievement of enterprise objectives
- Steps in the methodology can be grouped in three blocks: Learning, Design and Validation

Interoperability evaluation methodology





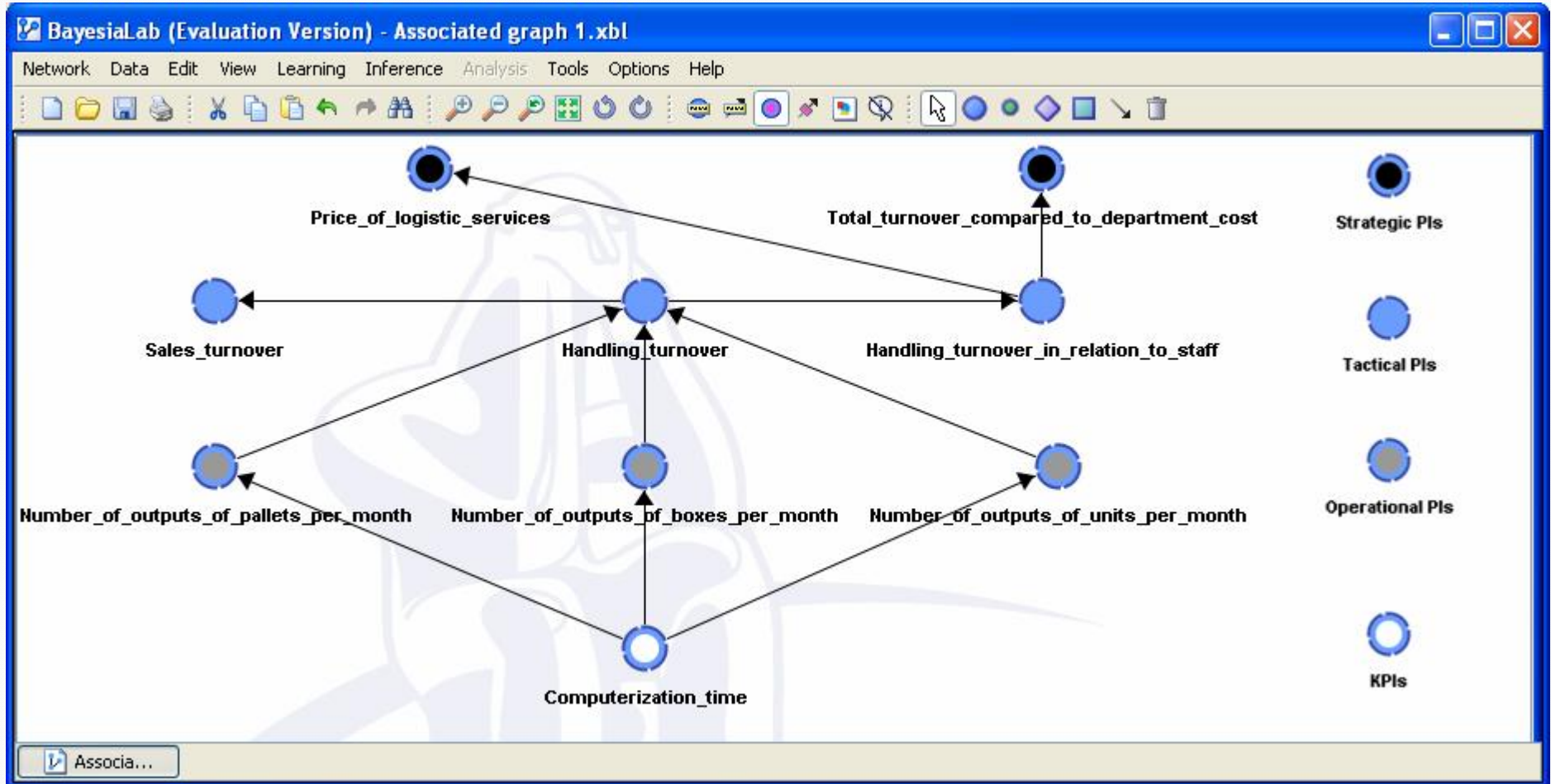
Interoperability evaluation methodology



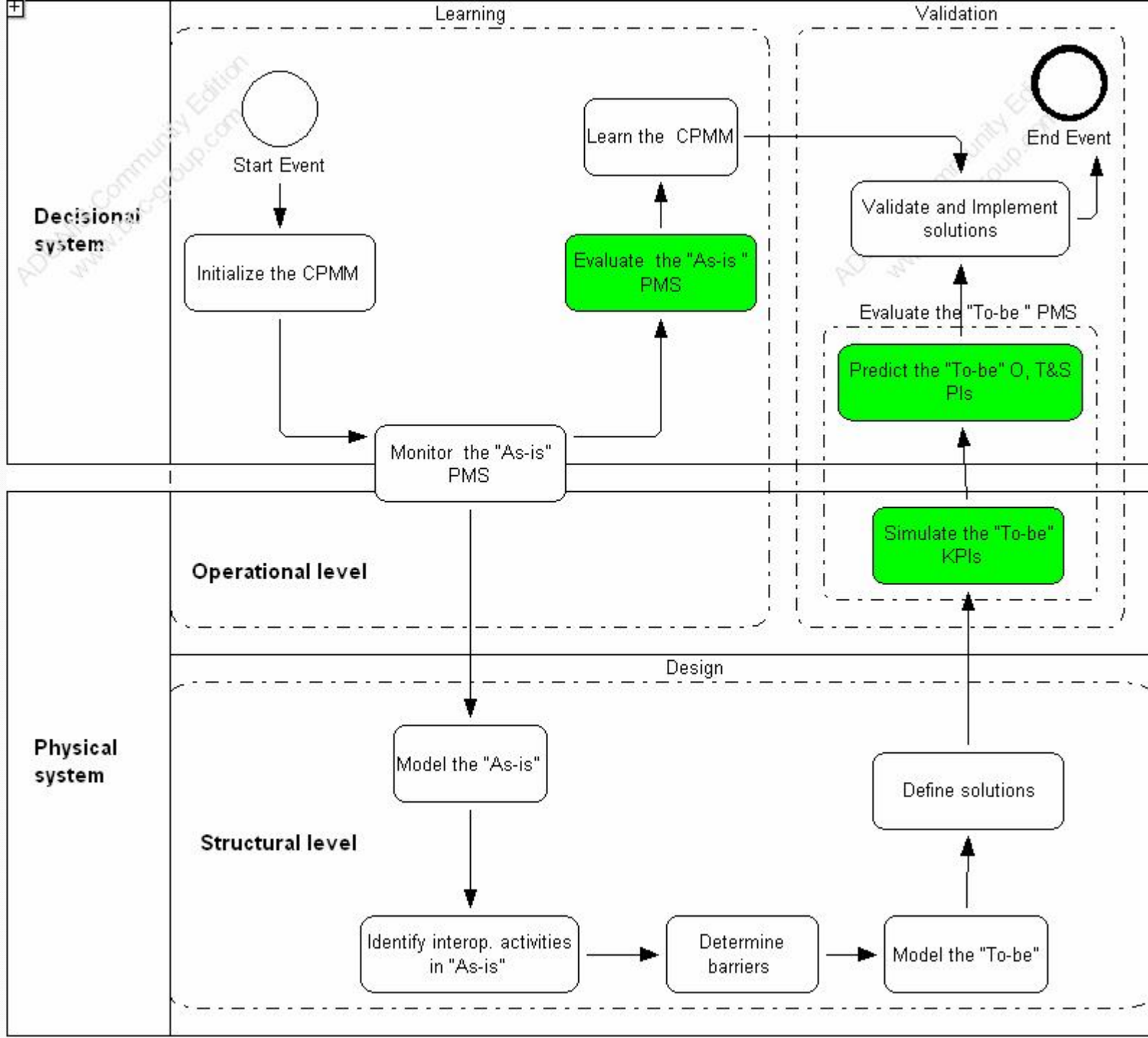
Initialize and learn CPMM

- Allow quantifying, from an estimate of the improvement in the **performance of a given process**, the benefits that can be hoped for in terms of achievement of **objectives**.
- The customers can run the goods output process and sell goods only once the goods are registered in the system (“**computerization time**” = average elapsed duration of the *goods entry process*).
- A **regression model** is learned using the data set

Initialize the CPMM



Interoperability evaluation methodology



Comparison table

Evaluate “As-is” PMS

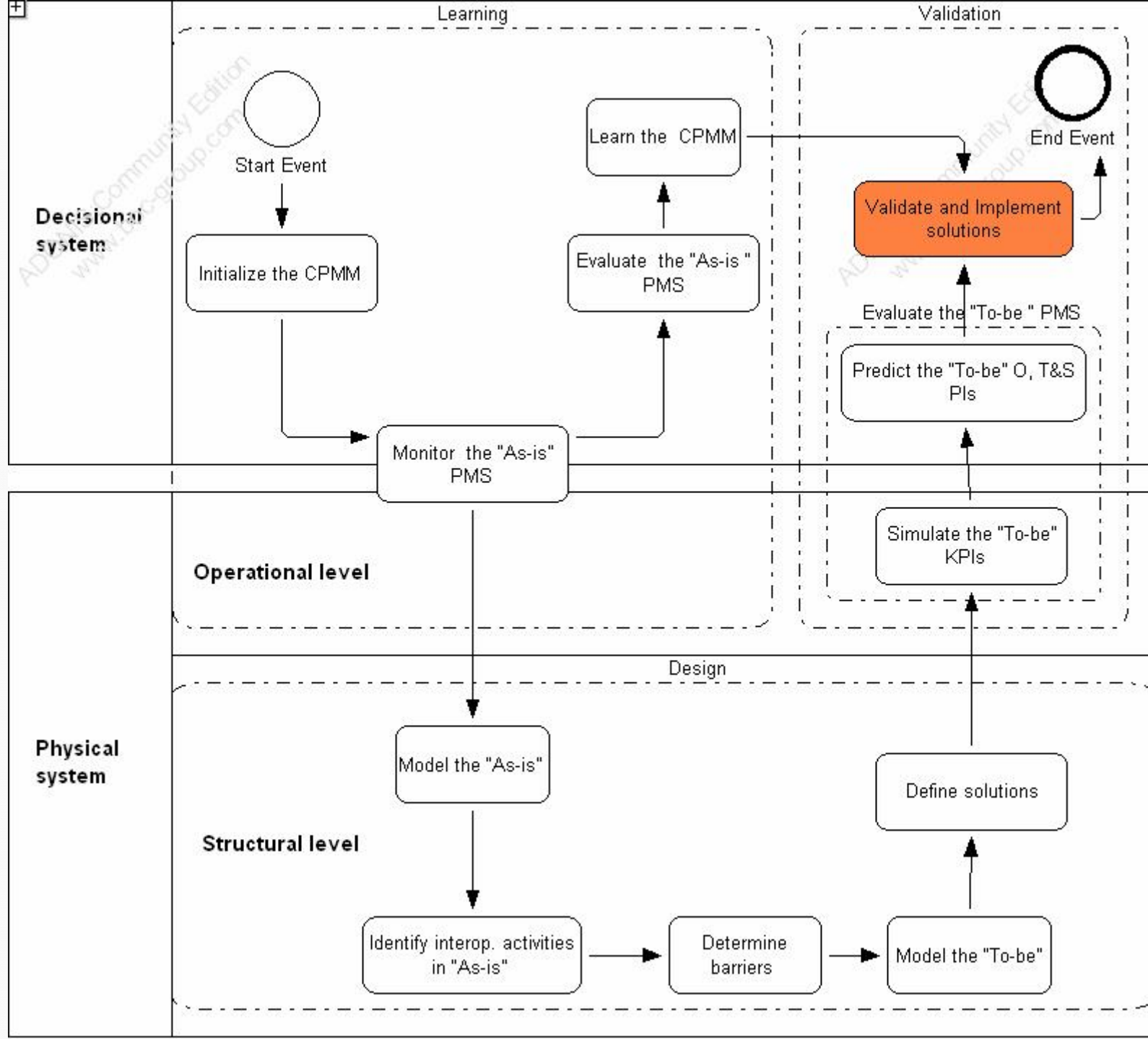
- The “As-is” PMS is calculated as being the average of indicators for cases **collected** from the “As-is” phase
- In our example, the average values were directly obtained from partners

Evaluate “To-be” PMS

- KPIs values of the “To-be” PMS are estimated by **simulation**.
- Values corresponding to operational, tactical and strategic PIs components are **predicted** using the CPMM

				Phase	
				"As-is"	"To-be"
	Model component	Variables	Acronym		
Physical System	KPIs				
		Computerization time	CT	183 min	152 min
Decisional System	Operational PIs				
		Number of outputs of pallets per month	NOPM	259	319
		Number of outputs of boxes per month	NOBM	25760	25865
		Number of outputs of units per month	NOUM	32451	32540
	Tactical PIs				
		Handling turnover	HT	109353	109951 €
		Handling turnover in relation to staff	HTRS	1521 €	1528 €
		Sales turnover	ST	252012	253341 €
	Strategic PIs				
		Price of logistic services	PLS	27.5 €	26.5
		Total turnover compared to department cost	TTCDC	1456 €	1459 €

Interoperability evaluation methodology



Validate and implement solutions

- Starts with the comparison of “As-is” and “To-be” PMS
- In our example, the *SOA* based solution was validated because the results highlighted important improvements that can be expected
 - 17 % in the “computerization time” process KPI
 - at the strategic level: a 3.7 % decrease in the “price of logistic services” for the customer and a 0.20 % increase in the “total turnover compared to department cost” for the stockist

Conclusion

- **The study proposes** a framework and methodology for evaluating interoperability impact on a supply chain
- **Contribution:** the use of business process models in order to locate interoperation activities and interoperability barriers, but also to measure interoperability
- **In future work,**
 - take into account non-technical interoperability problems
 - extended methodology with a posterior evaluation

Thank you for your attention