

# Management Tool of Information System Modelling of Knowledge of Management

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**Abstract**— A tool for management an information system is very sensitive organ for the survival of the organization. Using the concept of the cognitive domain, we propose the introduction of guided learning and Case remembrance in the control system to complement the indicators dashboards.

This capability of the information system becomes possible by adopting a service-oriented platform based on a BPMS engine. Each decision to improve or optimize becomes a memorable case and can reuse according to the context present in the dashboard and in the structure of the whole system.

Defining a cross-cutting decision to achieve an objective is a delicate and complex process; it requires an understanding of the current state of the system and the effect of this or that action on the basic axis of the system: resources, processes, business, finance, client, etc.

**Keywords**— Information System(IS), Knowledge, Case, reasoning, management, decision, BPMS

## I. INTRODUCTION

In the domain of information system, the knowledge is a data structure which crossed the stage of information, transformation and check to be able to define and control a defined activity.

This kind of data represents the most important aspect of the information and its value in an information system guaranteed the maturity and the stability of the organization.

As the system is based on various entities (resources, processes, actors), the most of them possess several types of knowledge embedded on a sub-system or linked to an actor or specific resource. Technically, these knowledge and skill are managed by the ERP and the processes related to the sub system.

According the role of system of piloting in the management of IS: key element of the innovation and implementation processes; the orientation of the evolutions of the system needs a tool to manage and remember piloting knowledge. It becomes possible with the combination of three systems: business process management, business intelligent and Case remember.

## II. MODELLING INFORMATION SYSTEM

### A. Data management

As the knowledge is a data structure, the feasibility of the modelling depends on the management of the existing data source:

- data input (problems, pattern and targets)
- data output (process, application, and resolution):

In our approach of modelling which is based on the experience, we categorize these data in three classes:

- design pattern
- resource
- case of decision

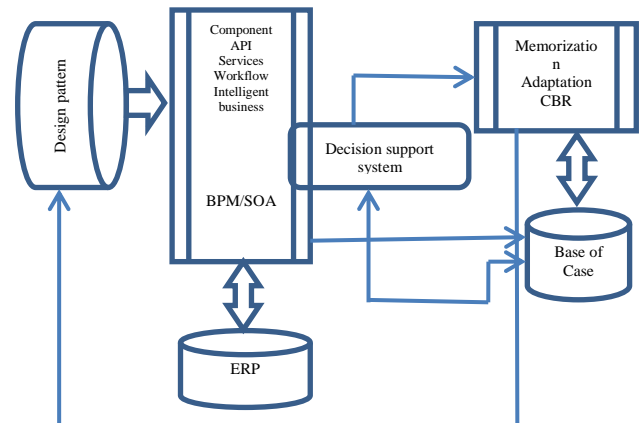


Fig. 1. Relation between data source and Tools in IS

By adopting the concept of management by process and architecture SOA, the information system which is a dynamic and distributed system can be defined by the following system:

- process management
- workflow
- business intelligent
- service provider

The pilotage system includes:

- decision support system : Dashboard and Cockpit
- memorization system : store and remember case of decision

**B. Model of Information System**

The modelling based on the concept process gives a clear and simple view of the information system. The mapping of process allows to identify the sequence of treatment on the whole system and it offers a big flexibility to pilot and manage changes.

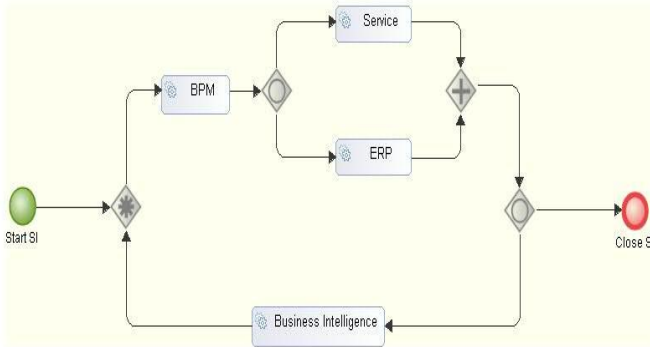


Fig. 2. Model of Information System

The system is defined as a closed loop:

- the modelling of the system starts with design of the processes. This approach is iterative because the system changes in the time and in the space. The BPM (Business Process Management) present as a kind of interface and artery which connects the operational system and the management system.
- the engine workflow interacts with a system SOA (Oriented Architecture service) to supply data to the pilotage systems (BI).
- the BI handles indicators and generates the dashboard. With this information, the pilotage system defines a new decision and new resource to reach the goals.

**III. SYSTEM ORIENTED SERVICE**

The architecture SOA offers to the system its capacity of interaction and flexibility.

**A. Distributed system**

The engine workflow generates discreet independent task that the oriented system service allows to have a dialogue to implement the job via the services and the resource in ERP (Enterprise Resource Planning).

The oriented service system defined the kernel of the system; it allows to connect all the elements of the system by bringing the physical implementation of each treatment.

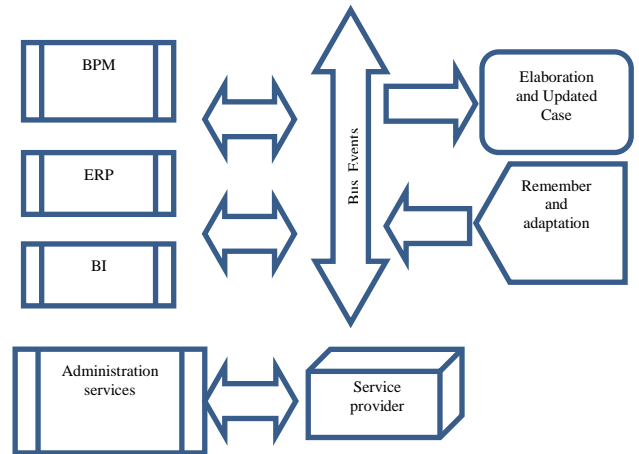


Fig. 3. Coupling of IS by a oriented service system

With the SOA architecture, a Bus event assumes the following responsibilities:

- listen and manage event
- implement interface
- transport data
- manage connection
- save log

**B. Framework**

By using the design pattern concept, we can define software layers capable to support the recommendations defined by the coupling of BPMS, SOA and ERP.

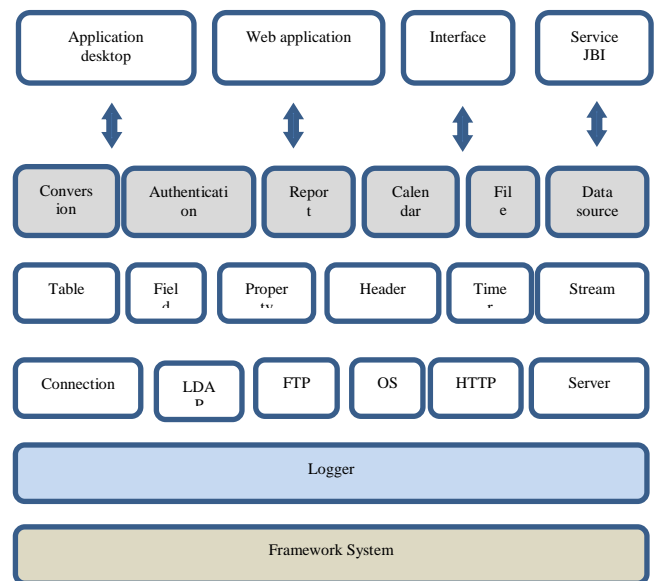


Fig. 4. Framework for basis data treatment

The information system has two kinds of applications:

- static: Include all applications of the core of the system.
- dynamic: Include all services and application used by the process

To assure the cohabitation of these applications, they have to use the same framework.

#### IV. STATE OF THE SYSTEM

The pilotage knowledge involves the knowledge of the state of the system at the time of the decision-making. By using four axes of the model of the system (resource, organization chart, processes, services), we can define the state of the system by adding the fifth axis which is the axis of indicators.

##### A. Axis process

This axis is defined by the couple of processes and product. It shows the relation between the list of the products of the system with its processes and the relations inter- process (parent and sub process).

With this axis, we can estimate the performance of a process according to its nature and its relations with the final products.

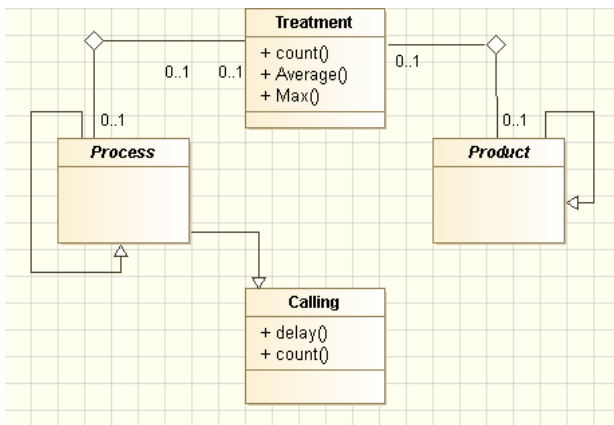


Fig. 5. Dimension of axis process

##### B. Axis organization

The axis organization highlighted the relation between the organization chart (hierarchy and area) and the processes which they use. The competence of each entity is defined by this axis.

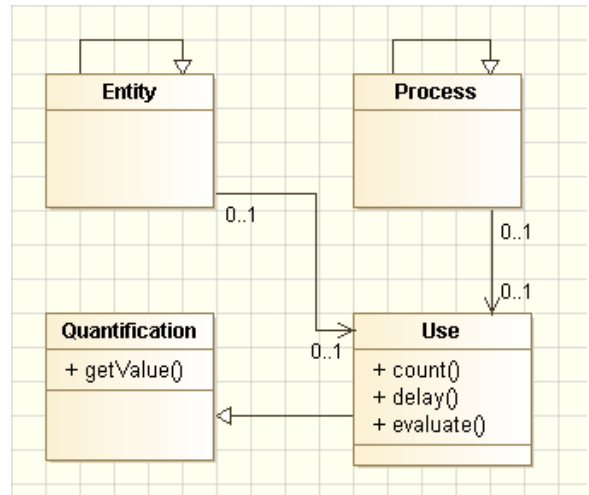


Fig. 6. Dimension of axis organization

With a specific tool, the IS manage the list of all profiles that can use (or run) a task in a process. This axis use this tool to fill and compute data.

##### C. Axis application

In the information system, data generation is always via an application and service. This axis allows to define the relation between the list of the applications which turn in the system and the entities (organization chart) which use it.

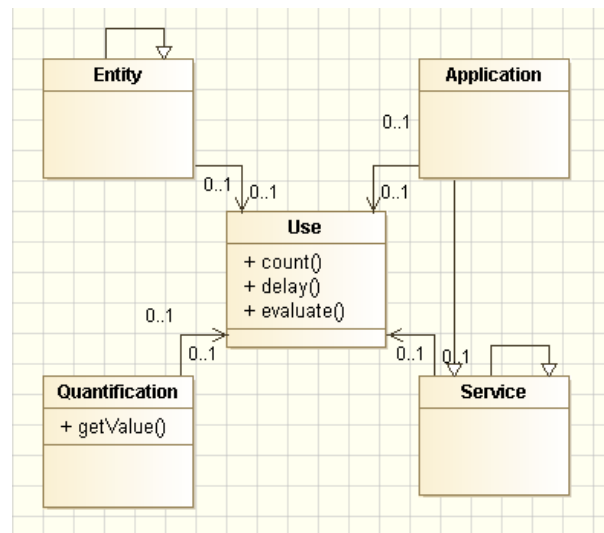


Fig. 7. Dimension of axis application

D. Axis resource

This axis is identical to the axis application but it concerns only the resources non application software:

- material,
- automat,
- raw material,
- etc. ...

The data concerning this axis have very different life cycles because its depreciation depends of the type and the process defined in the ERP.

V. STEERING - DASHBOARD COCKPIT

Dashboards Cockpit allows to translate the strategy into operational terms to improve the method of decision-making and the performance of the organization.

They allow understanding the strategy and the business to identify:

- key indicators,
- the information and the needs to make the operational decisions,
- the performance

To decrease in the maximums the risks, it is necessary to add the management of the experience in this methodology. The technique CBR (case-based reasoning) allows to search into the knowledge base of the organization and to propose a solution similar to previous Cases.

A. Data processing

The question concerning the possibility of efficient data processing and the use of electronically collected information has led to a staggering number of different systems, technologies, methods and standards. In its function as the central nervous systems of a company, data warehousing and business intelligence represent a connection between data quantity and quality of information and are essential for making business decisions.

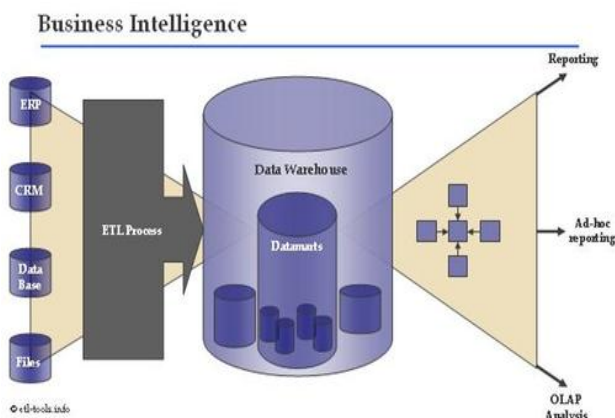


Fig. 8. Stage of transformation of the data for the elaboration of indicators

During the phase of calculation and elaboration of indicators, IS use tools of data processing to extract and transform the data. The function that we use in this type treatment is not generally reversible; it involves that the exact source of an indicator is not traceable 100%.

B. Cockpit

The cockpit is a place reserved only for specialists and decision-makers. It contains generally three things:

- list of indicators (real time situation),
- list of the possible actions (after a decision),
- communication means (to communicate the situation internally and externally)

C. Decision / objective

The analysis of a problem and the situation urges the team of piloting to make a decision and to define an objective. The interpretation of the existing according values of indicators and final state to be reached are both main factors which urge the leaders to take measures and actions to bring successfully the changes:

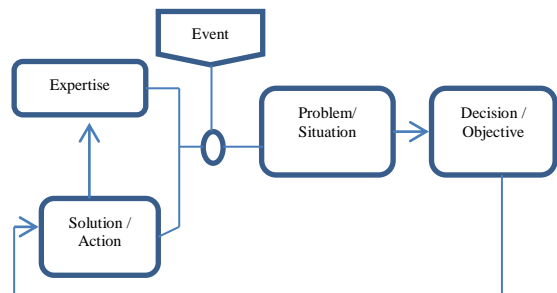


Fig. 9. Cycle of improvement of the knowledge of the system

The choice of the solutions and the actions depends generally on calculation of risk and the experience of the team of steering. This case involves a technical solution to save these experiences and to remember it when needed.

D. Modelling of knowledge by Object

1) Steering knowledge

A steering knowledge is a data structure that encapsulated the initial state ( $E_i$ ) and final state ( $E_f$ ) of the system, its characteristics are the list of actions to bring the  $E_i$  state to  $E_f$

An action defines one operation on the basic axis of the system according indicators selected:

- change on organization: structure, area, human resources
- change on process definition: process, application, profile,
- change on resource management: investment, charge reduction, etc. ...

2) Object

Modelling by object simplifies the presentation of the properties of the data:

- encapsulation of the properties and the methods (indicator and action)
- inheritance of the properties of the parents (tree of the values)
- instantiation (composition of other entity)

3) State Model

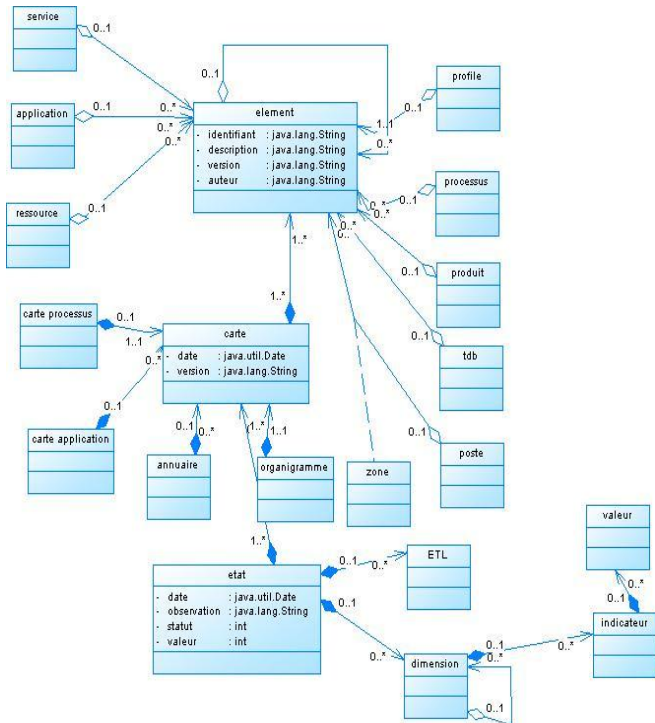


Fig. 10. State model

The state of the system contains essentially of an element, an association of element (map) and properties of the State

4) Decision model

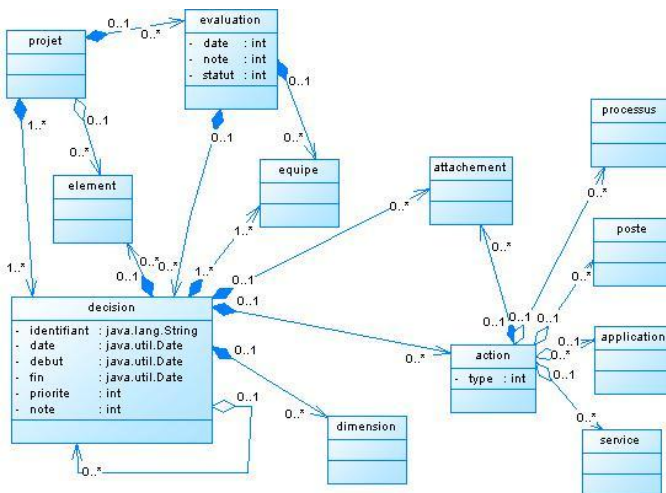


Fig. 11. Decision model

Decision combined three main entities :

- Project and Evaluation : to follow up the change
- Action : define a change
- Decision : contains properties

VI. CONCLUSION

The control of the management tool of information system requires a decomposition of the system. All informations produced by the system must be classified according to the list of analysis axis of the dashboard. With this configuration, the information axis system can adapt itself to the combination of the technology SOA, BPM, and CBR

The Case-Based Reasoning is a problem solving paradigm based on the reuse of past experiences to solve new problems. By using the model object, the decision-makers feeds a loop of processing to straighten the resources and the processes to reach the goal.

This loop is possible by memorizing the state of the system at the time of decision-making. If the actions are ended and that the decision is proved effective; We can consider the set of the information as state a knowledge which we can reuse every time the same Case appears.

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