

Cognitive Economic Modeling: Application to Business Management

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Abstract:- The total or partial automation of a problem-solving process requires analysis, modeling and then translation into a computer program of human knowledge. This research paper deals with the problem of enterprise development. Solving the problem begins with a cognitive approach (Data entry - Data processing - Results output), through modeling to computer simulations. In the case of traditional management of shrimp fishing, each activity center is piloted by a cognitive agent who conducts management, production, collection and packaging operations as well as marketing.

Keywords:- Cognitive Sciences, Modeling, Traditional Management.

I. INTRODUCTION

A. Contact (Subject Brought):

In recent years, the cognitive approach has been spreading in the field of Economics and Management and many authors have placed great hopes on its supposed possibilities. Today, the disciplines making up the cognitive sciences are: cognitive psychology, philosophy, linguistics, artificial intelligence and neurosciences (neuro-anatomy, neurophysiology, neurobiology, etc.). Logic, mathematics, computer science and physics also have a role to play.

This study that we present here is part of this orientation proposing an economic cognitive modeling of the company. We seek by studying the cognitive processes of the latter during the exploitation of information of a strategic nature, to provide them with a method of assistance for the activity of business leaders and thus for decision-making of the same nature.

To carry out our research, Madagascar was chosen because the secondary sector (business and industry) in the Big Island remains in the developing stage. Despite the advanced development of managerial practices and business management, the business creation failure rate is still very high, especially in the areas of small and medium-sized enterprises.

The essence of a company's development strategy is the choice to carry out its activities in a way that is different from that of its competitors. The figures speak for themselves: 90% of companies do not pass the 5-year mark and 99% of them do not pass the 10-year mark.

B. Subject (Subject Posed):

For the case of the exploitation and traditional management of the shrimp fishery of Ambaro in particular, several questions arise such as: Can we apply cognitive modeling in the field of business management? How to cognitively model the traditional management of the Ambaro shrimp fishery? From these questions, the problem arises, How improves the traditional management of shrimp fishing?

C. Structure (Divided Topic):

This study is divided into three distinct parts: the introduction which will present the contact, the subject and the structure; the development will explain the theoretical framework, the methodology, the presentation of the results, and the interpretation of the result; and finally the conclusion will consist in synthesizing the study and the opening towards other subjects.

II. DEVELOPMENT

A. Theoretical Framework/Literature Review/Key Concepts:

➤ Definition of a "business"

The enterprise is an economic and legal unit whose main function is the production of goods and services intended to be sold on a market. ROUX Dominique states that companies are "organizations which consist of a combination of people and means (material, immaterial and financial), with a view to the production of goods and services intended to be sold on a market. (...). To be considered a business, an organization must be an autonomous decision-making center" (ROUX Dominique, 2007). This definition highlights the idea of organization, but also the deep nature of companies, being like a combination of factors in order to achieve production. It also demonstrates that production can be market or non-market in nature. The author also emphasizes the autonomous nature of decisions and the lucrative aspect of companies. The activity of a company can be broken down into two distinct phases: productive activity, ie the creation of goods or services and the activity of distribution of wealth in return for goods or services.

➤ Performance

Several authors tried to evoke what is the development or the performance by many approaches, none is false but they are never complete. But we were able to collect a few of these works.

The company constantly seeks performance through the choice of its objectives, its lines of action and the means allocated (JL CHARRON and S.SEPARI, 2001).

The concept of performance occupies a central place in the control and governance mechanism of a company since it is even one of the fundamental mechanisms (G. Charreaux, 1998).

Performance is a polysemic concept whose appreciation depends on its user. According to INSEP Consulting¹, "the major strategic maneuvers carried out by companies are guided by the search for performance vis-à-vis the various stakeholders, namely customers, partners, shareholders..."

Any company or organization seeks to survive in the midst of multiple constraints and under the action of different actors with sometimes divergent objectives such as the search for profits and positioning on the market.

The company's performance is based on the value/cost couple. The two terms are inseparable because it is not a question of minimizing costs or maximizing the value produced, but of optimizing the relationship between the two. Performance in the company is then defined as everything that and only that, contributes to improving the value/cost couple, that is to say, to improving the net creation of value. On the other hand, the action which contributes to reducing the cost or increasing the value, isolation, is not necessarily a performance unless it improves the value/cost ratio or the value/cost balance.²

To determine the performance of a company, our research relies on the need to present a certain variable called "Indicator". This makes it possible to define the nature of the performance and is often presented by numerical data. However, research on measuring the performance and development of companies therefore allows us to focus on two main points: the rate of change in turnover, the period by which the company carried out its exercises. The rate of change in turnover is focused on profitability on sales; it can also determine the growth of the company compared to competitors. Then, the period of activity, it allows making a healthy comparison on the level of growth and the measurement of performance during a given period. Indeed these indicators represent as a dependent variable. To measure the performance of a firm, the following elements can also be analyzed. The first is due to the predominance of recourse to market share. This is the criterion most often used, but also the one with which

significant results have frequently been obtained. This criterion is constantly used insofar as it has the advantage of being easy to obtain in a given period. Then, the second remark relates to the predominance of the use of criteria related to the activities of the firm, we can enumerate here the added value during a period of exercise. From this value, one can evaluate a significance of performance of the exploit of the firm by comparing by the other periods of exploitation.

Measuring a company's performance is always a hot topic for any management team. These few authors offer us their respective apprehension of performance measurement: Michel KALIKA³ in this work has identified several levels of apprehension of company performance:

Economic performance: This is measured by the achievement of objectives, quality compared to competitors and competitive position

Social performance, which is characterized by social satisfaction: good relationship between men and the company, it is measured by the quality of collective decision-making, by the importance of conflicts and social crises, by the level of satisfaction employees, company loyalty, absenteeism and tardiness, the functioning of representative institutions.

Organizational performance: achievement of average and organizational objectives represented by respect for the formal structure, the quality of the circulation of information (Michel KALIKA, 1992).

• *Morin, Savoie A. Beaudin. G⁴, Teach us Four Approaches to Determining Performance:*

- ✓ *The Economic Approach:* This is none other than the achievement of both financial and economic objectives
- ✓ The social approach concerns the human dimension of the organization measured by the cohesion within the entity considered.
- ✓ The systemic approach is the capacity of the organization, the harmonization and the durability of the subsystems with regard to the environment of the company system.
- ✓ The political approach where any individual can have their own criteria to judge the performance of an organization. This conception consecrates the reign of relativism.

³IM marmuse, general policy, ECONOMIA 1992 edition, 592 pages

⁴Morin, Savoie A BEAUDING G, the effectiveness of the organization theories representation and measures, gaétan Morin editor, Montreal 1994

¹www.insep.com, April 2020

²www.performancezoom.com/ performance-entreprise.php, April 2020

According to the Harvard Business Review collection⁵, business leaders increasingly tend to modify their performance evaluation system in order to be able to follow non-financial variables and to reinforce their new competitive strategies.

Christian Marmus⁶ proposes three axes of measurement on the assessment of performance: economic measurement, indicators of social efficiency and finally the field of organization:

- *Economic Performance:*

The first measure that comes to mind is that of the economic measure of the performance or profitability of the company:

The performance and profitability of the company: The economic efficiency of the company can be seen in its results such as the present accounts. The accounts make it possible to apprehend several levels of economic analysis.

- ✓ *Production:*

It represents both the measurement of the importance of the company on the market (which can lead to the calculation of the market share, the assessment of the use of its productive potential and finally the measurement of the efficiency in the use of company resources

- ✓ *Added Value:*

The production of a unit does not really measure the value truly produced by it since this value includes intermediate consumption necessary for the manufacture of goods and services. To measure the exact contribution of a unit to the creation of wealth (GDP), it is therefore necessary to retain the difference between the value of production and the amount of goods and services used in the manufacturing process. This difference is called “added value”

- ✓ *Gross Operating Surplus:*

It measures the overall performance of the company through the exploitation of its human and material resources. It is an indicator of the wealth produced by the company and also measures its financing capacity.

- ✓ *Net Profit:*

This is the final measure of the company's profitability which allows its performance to be assessed from the outside, in particular by shareholders or financial analysts. It represents the distributable profit of capital contributors

- *Social Performance*⁷:

The attention paid to social relations in companies has become an essential factor in the proper functioning of modern organizations. A deeper analysis of the company

would suggest a less academic and more realistic appreciation of the social reality of the company. We can refer to the following evaluation points: the importance of conflicts and social crises (number, seriousness, harshness, etc.) and the level of employee satisfaction (Assessed by internal opinion surveys). Absenteeism and being late for work are signs of demotivation or boring or difficult work. The social climate of the company appreciated by the atmosphere within the company and the groups that make it up. The functioning of institutions representing staff such as the works or establishment committee. And the operation, number and results of actions of quality circles and participation in decision-making

- *Organizational Performance:*

It is a multidimensional and complex concept, not limited to financial results alone and whose evaluation can only be done by measuring several organizational, external and internal results. Performance is a form of achievement, business success

It is therefore a positive result of an action. C. Marmuse (1998) retains four factors of organizational effectiveness: Respect for the formal structure, the relationships between, the quality of the circulation of information and the flexibility of the structure.

- *Modeling*

Modeling is defined by JL LEMOIGNE as "the action of elaboration and intentional construction, by composition of symbols, of models likely to make intelligible a complex perceived phenomenon, and to amplify the reasoning of the actor projecting a deliberate intention within the phenomenon.

Modeling is the art or science, depending on the point of view, of representing or transforming a physical reality into abstract models accessible to analysis and calculation. It is a cognition, construction and projection approach that connects theory and experience

- *Modeling Objectives*

- ✓ Modeling can have three objectives:
- ✓ Describe (summarize) the data;
- ✓ Predict (simulate), make inferences;
- ✓ Explain (understand) have mechanistic objectives.

- *Model Type*

In general, there are three types of models: conceptual models, statistical models and deterministic models.

- *Cognitive Modeling of Performance*

The concept of cognition designates a set of representational processes and states that result from the activity of the central nervous system and which are not, in essence, directly observable.

Artificial neural networks have become an increasingly used tool in various fields.

⁵HARVARD BUSINESS REVIEW, “Performance Measurement Systems” Organization Editions 2001, page 260

⁶Christian Marmus, general policy, Economica 1992 edition

⁷Op cit

➤ *Elements of Business Performance*

To determine the performance of a company, our research is based on the need to present a certain variable called "Indicator" ⁸. This makes it possible to define the nature of the performance and is often presented by numerical data. However, research on performance measurement therefore allows us to focus on two main points: the rate of change in turnover, the period by which the company carried out its exercises. The rate of change in turnover is focused on profitability on sales; it can also determine the growth of the company compared to competitors. Then, the period of activity, it allows making a healthy comparison on the level of growth and the measurement of performance during a given period. Indeed these indicators represent as a dependent variable.

➤ *Cognitive modeling of performance*

We have seen that the economic evaluation of integrated organizations goes from a static measurement to a dynamic and multi-level process estimating effectiveness, efficiency and effectiveness according to specific areas of competence: operational skills, industrial skills and business, financial skills. We have also seen that in a complex and unstable environment, the "value" of an organization depends on its ability to combine specialized skills to react continuously to new external demands. The *factor-company*, which optimizes performance at the physical level according to a static logic of resource allocation limited by the technological horizon, is thus succeeded by the *skills-company*, which integrates non-price components in a dynamic search for performance based on innovation and creativity, and which develops the specificity of its production factors through collective learning which it seeks to encourage⁹.

This movement towards *the company-skills* is considered as a renewal of organizational practices: "the principle of the division of labor would thus be slipping from a logic, technique and performance to logic of competence and learning. We would thus move from a technical division to a cognitive division of labor¹⁰. We will detail this evolution through the progressive modification of the role of learning in productive organizations. We will then show the emergence of the opposition, in terms of performance, between the search for static production efficiency and the search for dynamic innovation efficiency.

➤ *The basic Structure of the Model*

We will first define two elementary modules that we will use repeatedly during the progressive construction of our model. We will then show how these modules combine to form a first-level organizational structure.

⁸Competitiveness and performance of exporting SMEs. Charles Franklin Edmond Ramangalahy 5January 2001. P100 to 102

⁹P. MOATI and E. MOUHOUD : *Information and organization of production: towards a cognitive division du travail*, Cahier de recherche du CREDOC, April 11993, p. 8.

¹⁰Same, pB.

• *Definition of Elementary Modules*

Starting from the idea that a technical or administrative activity can be broken down into a management module and a technological module, we will define a basic structure formed by the coupling of a module that we will call Cognitive Agent (CA) and a module that we will name *Activity Center* (CA):

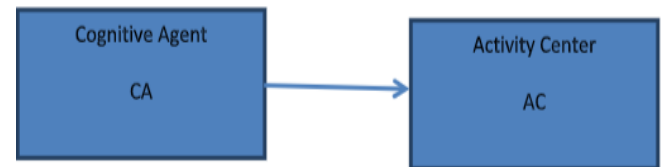


Fig 1 Elementary Module of the Representation Model

• *Activity Center*

A center of activities groups together a set of elementary tasks carried out by an individual or by a group, calling on specific knowledge and providing an output (a milled part, the qualification of a supplier, a budget, etc.) from inputs (labour, machines, information, etc.) ¹¹. A center of activities therefore transforms, through one or more actions, a physical flow or a flow of information.

The flow whose transformation corresponds to the primary mission of the activity center will be called the main flow. It can be supplemented by secondary inputs of a physical nature (tools, energy, etc.) or informational (ranges, etc.), necessary for the transformation activity. IT can also produce physical (scrap, waste, etc.) or informational (validated documents, etc.) secondary outputs.

The tasks grouped together in the same center of activities are moreover oriented towards an internal or external customer, and preferably homogeneous from the point of view of costs and performance, in order to be able to be the subject of relevant global measures. These tasks will indeed consume resources, which can be shared between several centers of activity, and which will induce usage costs. The following diagram summarizes the links between a center of activities and its environment:

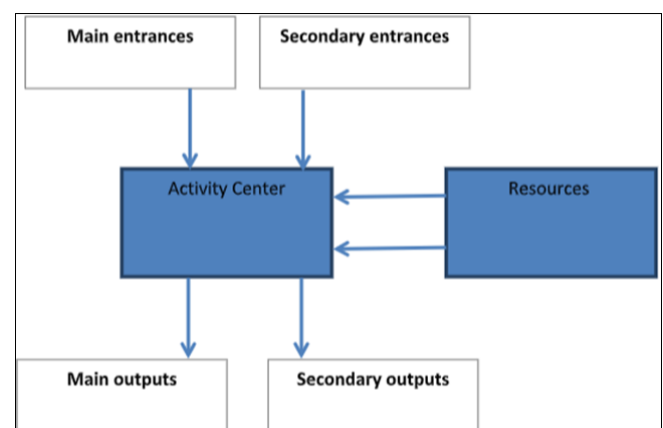


Fig 2 Developed Model of a Center of Activities

¹¹We therefore use P. Lorino's definition of activity.

- *Cognitive Agent*

In our model, a cognitive agent is a decision module that directs the action of a center of activities. He has his own intentions which will intervene in his behavior, a space of knowledge, and an inferring system which constructs decisions applying to the center of activities, from higher level rationalities, his own intentions and his knowledge.

B. Methodology:

Modeling is the action of moving from a perceived reality to a virtual representation. To build this representation, the modeler has tools and must follow specific rules. Only, all the primitives (components or constituents) of a language cannot be assembled randomly. Rules must be respected to obtain the model.

Such an approach leads to the study of different fields of cognition in order to build a method in accordance with the thinking processes of managers in general. In return, the use of the method on the field of the companies makes it possible to highlight certain mechanisms of thought identical or different from those proposed.

The method used consists of setting up a cognitive model that is capable of economically developing the company in Madagascar. Then, after having defined the state of the art on the methods of development of a company and its problems, we present the modeling of development of a company, the improvement of company management as well as the application on traditional shrimp fishery management.

The literature review demonstrated that the modeling rules are entered in a meta model when it is possible to do so. We consider that the modeling rules can be written clearly and accompany the model to explain its construction, because reaching a level of abstraction that makes it possible to obtain a meta-model is not possible with all models.

Thus, an economic modeling methodology describes the entire process that leads the modeler of the real system to a model of this system.

The method we have adopted for the study is based on three sentences:

- Understand the model and distinguish its modeling primitives;
- Write the grammar of the model;
- Study the model validation method

The first two steps fall under the structure of the model. The relevance of the modeling primitives and the clarity of the rules linking these primitives are important criteria for understanding the model.

C. Presentation of Results:

➤ *The Basics Of Fisheries Management In Ambaro Bay*

Principles of traditional management have been established for a very long time by the populations of the coastal villages. These principles, although tacit, are transmitted from generation to generation through the progressive learning of the profession of fisherman lived on a daily basis, once the time has come for the teenager to get started. Alongside this customary law, another type of fishery management rules enacted by formal law has been imposed since the 1970s.

- *Traditional Management*

Based on the definition of traditional management developed by Dyer and McGoodwin (1994), Breton et al. 1997 pointing out that: "Three elements emerge from this definition: the local or localized character of the system, the existence of experimental and internalized practices over time and a parametric dimension, that is to say measures intended to influence the behavior of the fisherman instead of intervening on the volume of catches with a view to preserving the resource". This local character of traditional management constitutes a **delimited spatial dimension**, within which there are **sub-zones where membership** is negotiated by mutual agreement between fishermen (Breton et al. 1997). In our case, **we can cite for example the zone of the "valakira" fishermen and that of the net fishermen.**

The AmpanjakaTsimiharo III of the Antakarana has locally recognized power and a significant authority, especially in the Ambilobe region where most of Ambaro Bay is located. The Ampanjaka is, in a way, the guardian of traditions and traditional practices. This power is highly respected in the region, especially by the "Antakarana" and a large part of the "Sakalava". These two ethnic groups represent half of the population. This power, held by the "Ranga", notables in each village, is often transmitted from generation to generation by inheritance. But in the event of force majeure, the non-existence of a man in the family for example, he can be either appointed by the ampanjaka or elected (Breton et al. 1997).

The "Ragna" act directly or indirectly on the management of fishing because many of them hold their positions within the fishing community. Their **main role, as a representative of the Ampanjaka, is to ensure that taboos and prohibitions are respected.** These will be dealt with later.

✓ *Ampanjaka "Tsimiharo III*

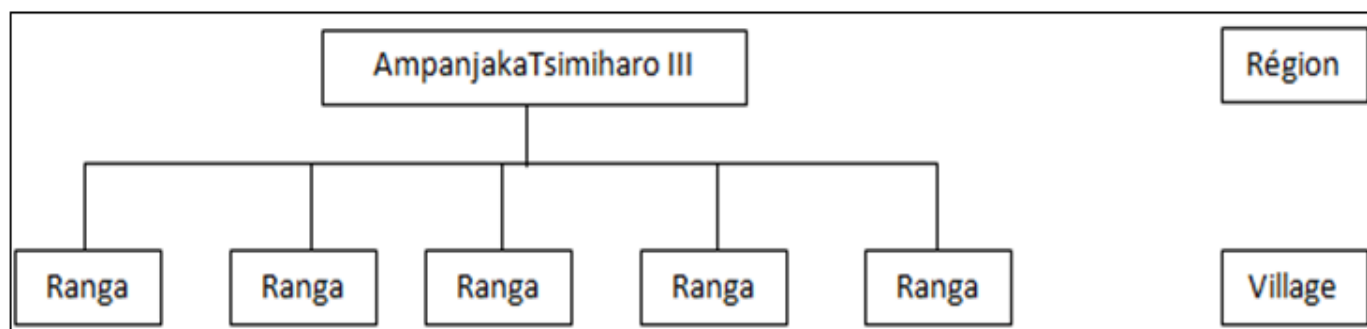


Fig 3 Organization Chart and Level of Intervention of the Power of the Ampanjaka

• *Administrative Management*

Management measures for tropical shrimp fisheries generally aim to regulate the rate of exploitation by controlling the overall fishing effort accompanied by strict supervision of access to the fishery (Dintheer and Gréboval, 1996). In Madagasikara, **the management regimes established by the State are based on technical measures such as the closure of fishing and the limitation of fishing areas.** Without wanting to try to mention right now the efficiency of the administrative management of the shrimp fishery in Madagasikara, this part will only deal with the management measures that concern both traditional fishing and industrial fishing. This type of management began to take hold from the 1970s, a period from which industrial fishing began to take hold (Andriambalotiana, 1996).

Administrative power is exercised by the heads of local neighborhoods who are appointed by the administration according to their level of education. Often, they are village teachers. Their role is to support State delegates in administrative work such as the preparation of administrative papers (residence certificates, census, etc.), the resolution of conflicts (theft, family conflicts or between groups of individuals ...), the call of law enforcement when problems fall within their jurisdiction.

➤ *Study and Modeling of Traditional Management of Shrimp Fishing*

• *Process Mapping*

We will now describe **traditional shrimp fishery management** using the modeling language we have defined. We will represent the main operational processes attached to the strategic axes of development defined by the company, and then we will detail the representation of the production project which transforms these processes.

✓ *Representation of Information Processing and Physical Transformation Processes*

We first identify two key processes, the reconfigurations of which clearly appear as access routes to strategic aims and which are therefore directly concerned by the production project:

- The administrative information processing process that transforms organizations into operating orders,
- The process of physical transformation of raw materials into finished products.

The administrative process of information processing is represented through our modeling language by a couple formed by a chain of activities and a cognitive agent that controls it. The chain of activities is itself made up of lower-level pairs, each consisting of a center of activities and a cognitive agent. We describe by the following diagram the chain of activities which transformed the organizations into operating orders, before the implementation of the production project:

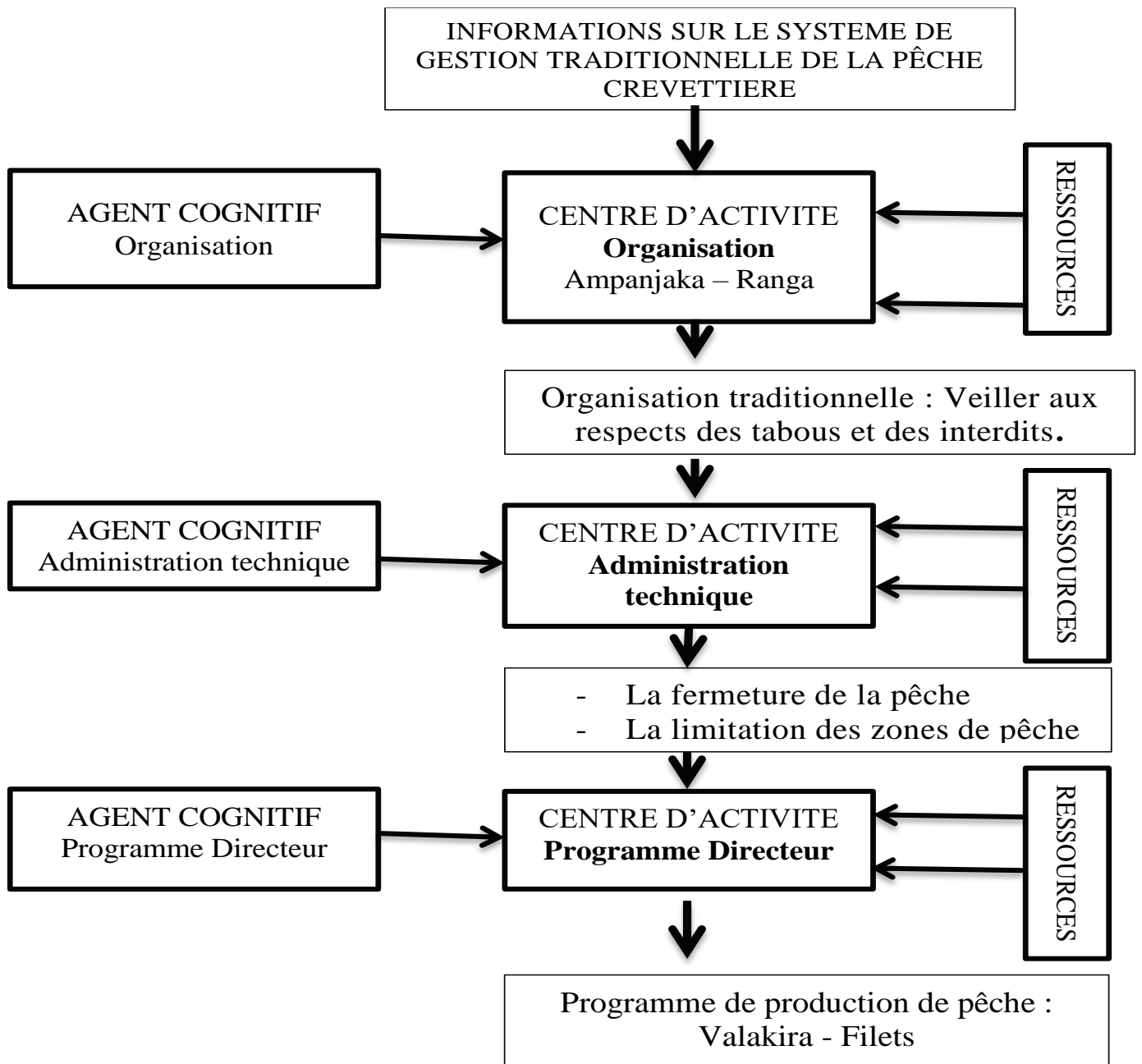


Fig 4 Modeling the Chain of Information Processing Activities

For example, the master program activity center transforms a master program for the production of Valakira peach or nets expressed in quantities of products obtained per day and then per month, according to a list of net customer needs expressed in items to be produce every week or to buy.

In the case of the traditional management of shrimp fishing, this transformation was carried out by a CAPM software package which constitutes the resource of the center of activities. The technical administration cognitive agent, which pilots this center of activities, has a role in configuring the parameters of the technical administration module. In particular, it regulates the opening and closing of fishing as well as the limitation of fishing zones.

This chain of information processing activities is in turn driven by a meta-level cognitive agent, together forming the administrative information processing process that transforms forecasts into decision orders:

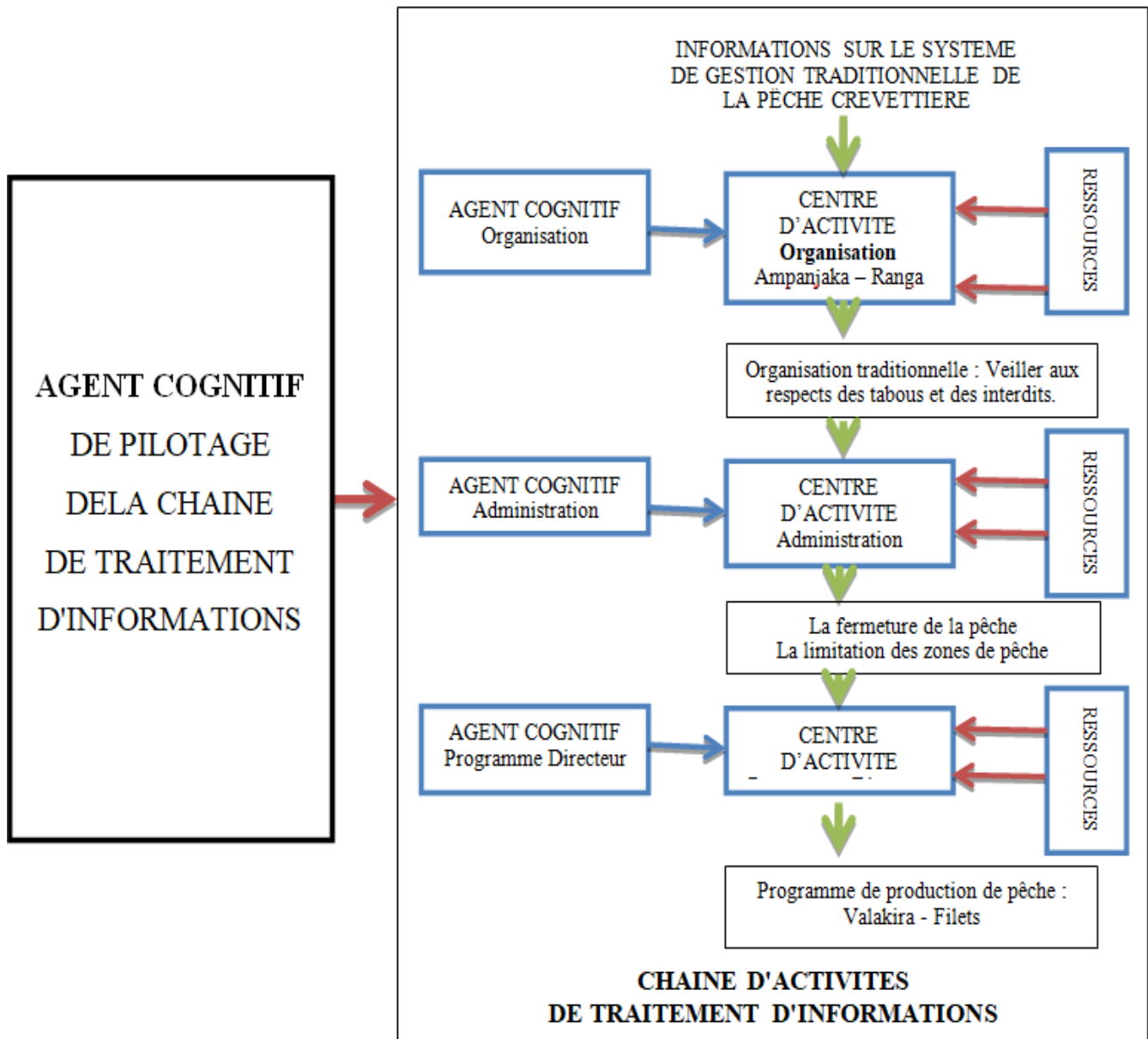


Fig 5 Modeling the Administrative Information Processing Process

This cognitive agent defines the organization of the processing chain that it controls. In particular for the traditional management of the shrimp fishery, he decided that the decision orders would be defined according to a "push flow" type method. It also defines the structural rationalities for the lower levels; for example: "the cognitive organization agent ensures respect for taboos and prohibitions and the cultural traditions of the area in order to access resources". In the old organizational form; this cognitive agent essentially represents the cognitive activity of the Ampanjaka in its function of production management manager.

The production process is also represented through our modeling language by a couple made up of a chain of activities and a cognitive agent that controls it. The following diagram describes the chain of production and marketing activities.

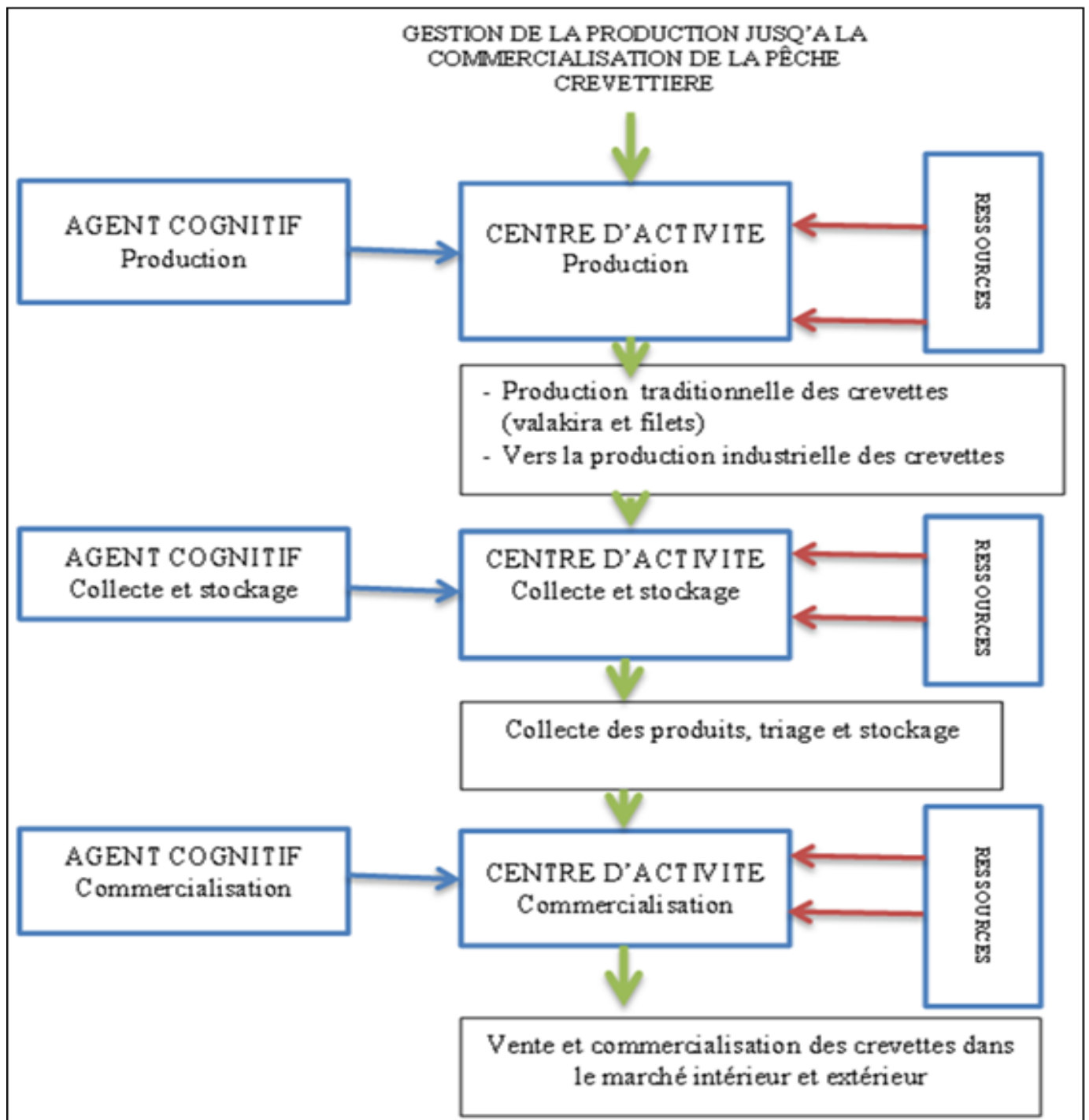


Fig 6 Modeling of the Chain of Activities from Production to Commercialization of the Shrimp Fishery

Each activity center brings together a set of basic operations from production to marketing, according to the three main stages ¹²identified in the company's production process. At each stage is represented the resources necessary for this management, that is to say the machines and the workforce used. Each activity center is piloted by a cognitive agent who conducts management and transformation operations. For example, for the activity of Collection and storage, the cognitive agent represents the individual cognitive activity of the person who controls the collection, for the activity of processing

and sorting, it represents the collective cognitive activity of the group that packs the prawns before marketing.

The chain of production activities is itself driven by a meta-level cognitive agent, the whole forming the process from production to the commercialization of shrimp:

¹²Production, collection and storage, sale and marketing

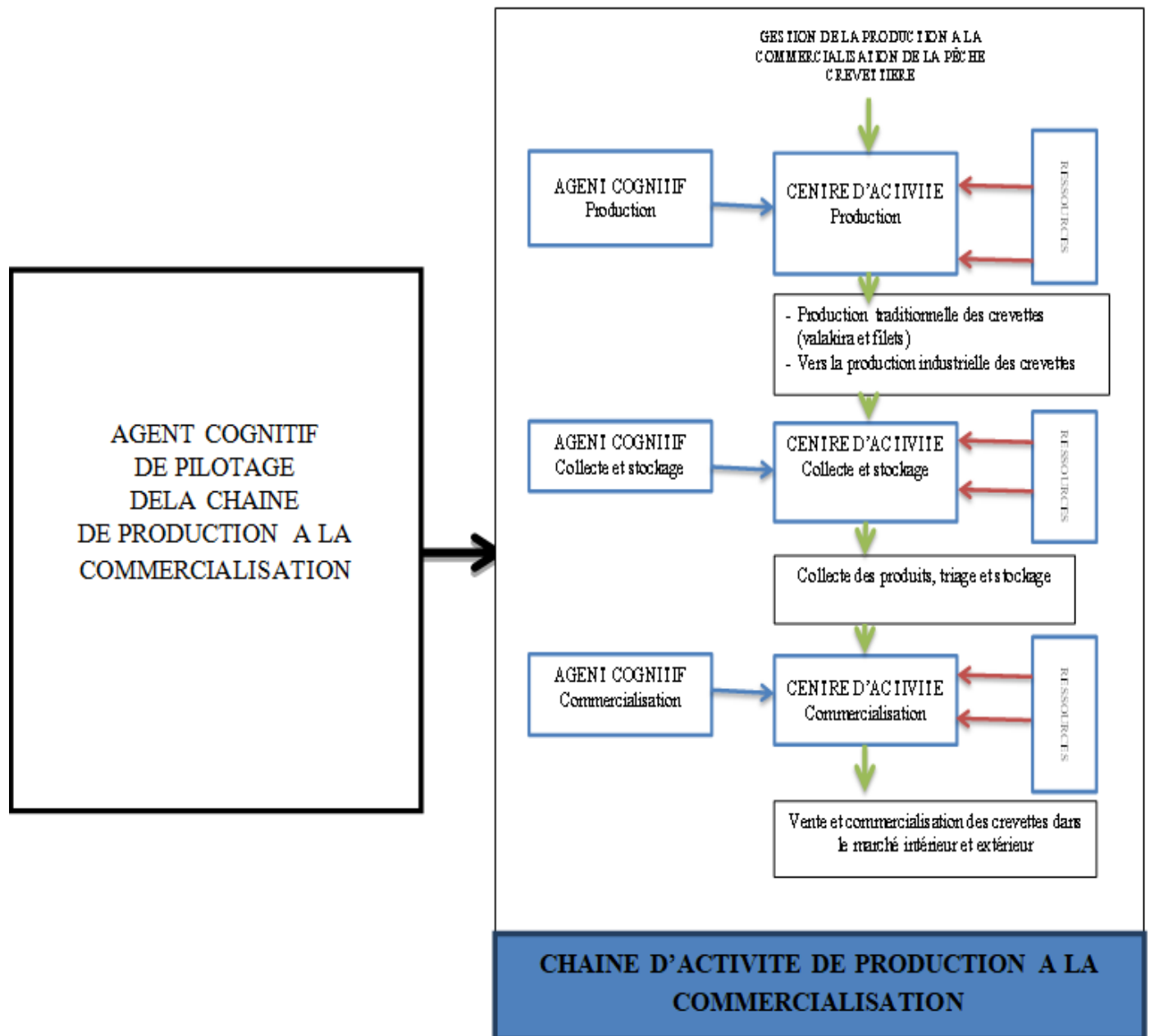


Fig 7 Modeling of the Operational Process from Production to Marketing

In the old organizational configuration of shrimp fishery management, the cognitive agent controlling the production chain represents the cognitive activity from production to marketing. In particular, it possesses meta-knowledge (knowledge on production know-how) and defines the packaging of products as well as marketing ("the cognitive agent driving sales and marketing"). In addition, he perceives the information that constitutes the main output of the information processing chain (clients and collectors) and transmits it hierarchically to the operators after possibly modifying it according to his own intentions. This relationship links the administrative chain from product management to commercialization.

We are now going to describe the higher level, ie the production project, and show how it is represented in our modeling language.

• *Representation of the Production Project*

The production project is represented in the framework of our study by a strategic process aimed at improving the traditional management of shrimp fishing. This strategic process, at meta-level in relation to the organizational processes that it transforms, is formalized by a higher-level cognitive agent acting on two operational processes. Here again we find the idea of a meta-system, corresponding to a higher level of organization which encompasses a specific level and gives it its meaning, according to the definition that we had given of the concept of organization in levels of integration, as opposed to the directive hierarchy: in traditional management, the operational processes justify a higher-level production project, and the project in turn energizes the operational processes and brings them new meanings. The following diagram represents this strategic process:

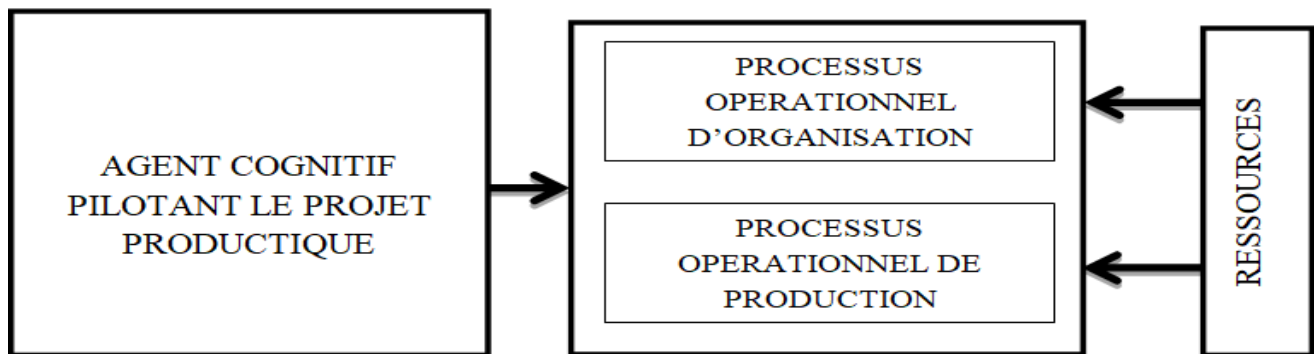


Fig 8 Modeling of the Production Project

The cognitive agent that directs the project does not refer to a level of directive decision-making hierarchy, but on the contrary federates the cognitive activities of individuals located at different levels of the organization and involved in the project. For the traditional management of shrimp fishing, he represents the people belonging to the steering committee¹³, and the people belonging to the think tanks implemented during the project, brought together here by common intentions for change.

➤ From Modeling to Simulation

Simulation is "experimentation on a model"¹⁴. This model will be for us a model resulting from the model of representation of productive organizations that we have established, and on which we will experiment with scenarios describing production trajectories. As a preliminary, we will detail the context of this experimentation by specifying in particular the contributions of simulation as an experimental scientific procedure, and by presenting the simulation model retained as well as the techniques used.

• The Contributions of Simulation

Simulation is "a scientific research procedure which consists in carrying out an artificial reproduction of the phenomenon which one wishes to study, in observing the behavior of this reproduction when one experimentally varies the actions which one can exert on it. here, and to infer from it what would happen in reality under the influence of analogous actions"¹⁵. The use of simulation techniques is used when the experiment cannot be carried out on the real existing system, or when the real system envisaged does not yet exist. In the first case, the experiment will then consist of accelerated operation on an isomorphic system, which will avoid disturbing the normal operation of the real system. In the second, experimentation will make it possible to design a future system that currently does not exist. We see that these two aspects of the simulation refer quite naturally to the two facets of the economic calculation which are the operating calculation and the investment calculation.

¹³Traditional administration (Ampanjaka, Ranga), State administration (Ministry, Commune, district chief)

¹⁴J. P. GREMY: article "Simulations" of the *Encyclopedia Universalis*, 1980, p. 1043.

¹⁵Same

However, the interest and relevance of simulation as a source of new knowledge should be questioned. Indeed, and as H. Simon notes, "how could a simulation ever tell us something that we don't already know?"¹⁶. This question is linked to claims that on the one hand a simulation is no better than the assumptions on which it is based, and on the other hand, in the case of a computer simulation for example, a computer can only do what it is programmed to do¹⁷.

More generally, our approach to simulation is in line with the discourse we held on modeling. In fact, simulation will be for us an extension of modeling, in the sense that it will improve, thanks to its dynamic nature, the capacity of the model to promote communication in order to share problems, and the ability of the model to generate an interpretation that guides behavior. Again, it will therefore not be essential that the elements that make up the simulation experience constitute a faithful and exact image of reality for the model to be valid in the sense in which we understand it.

• Simulation Model and Techniques used

Between the modeling by our representation language of a perceived reality and the exploitation of a simulation model there is an implementation phase which consists in creating the model from a simulation language:

The perceived reality is described from our modeling language, and then transcribed from a simulation language into an executable model. The model was produced using the C++ computer language, which is object-oriented, and which is therefore well suited to translating the agent concepts used in the representation language. The different cognitive agents of the language of representation are in fact programmed in it in the form of objects endowed with the intrinsic particularities which characterize the multi-agent systems used in distributed artificial intelligence: intentions, rationalities, autonomy, communication with other objects, etc.

¹⁶H. SIMON : *The science of systems, science of the artificial*, Epi Publishers, 1974, p. 30.

¹⁷Same

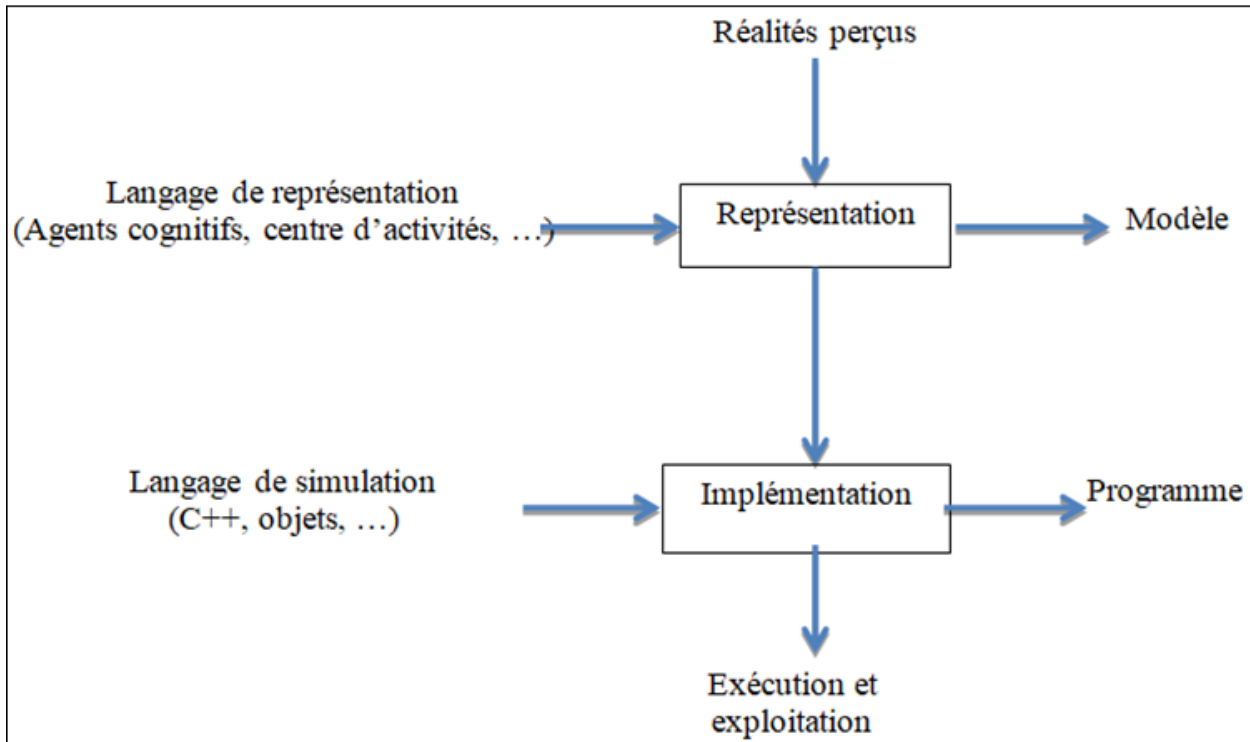


Fig 9 Process for Translating a Perceived Reality into a Simulation Model

In the model that we will present, the internal functioning of the cognitive agents, and in particular their inferential system, will be ensured by the running of an imperative program and not by the implementation of an expert system. It is planned to further develop this functionality to improve the openness of the model and promote the simulation of learning phenomena.

D. Interpretation of Results:

➤ *The Advantages of Economic Modeling of a Company*

In recent years, the cognitive approach has been spreading in the field of Management Sciences and many authors have placed great hopes on its supposed possibilities. It makes it possible to open up "promising avenues" on the condition, however, of (re)placing the processes (and no longer only their content) and more specifically the processes of construction of representations (and no longer the decision-making processes) at the center of their concerns. (Laroche and Nioche, 1998). This work, which leads to an analysis and understanding of the cognitive orientations of individual organizational processes, finds its place in the field of Information Systems. The thematic issue "cognition and IT" of the review *Système d'Information et Management* is an example of this. In their editorial, Rowe and Ziti (2000), insist on "the need to study complex cognitive behaviors that combine information search, understanding and problem solving".

➤ *Limit of the Study*

However, our work has limitations that may affect our results. First, for many developing countries like Madagascar, data is not readily available. Also, the potential of cognitive science is enormous to solve a problem.

However, a process orientation is not sufficient and it is necessary to reconsider the role of the leader in the processes (Laroche and Nioche, 1998). By cognitive approach, we mean an approach placing the analysis of actors' behavior at the center of studies carried out on organizations: it is a question of understanding why and how the actors make their decisions and, in this case, their management decisions. Strategic.

➤ *Other Business Performance Factors*

Apart from the factors internal and external to the company, there are factors that cannot be circumvented, assets for it. These factors can be specific features or even values created by the client in return for the services provided by the company. Flexibility and adaptability are the most apparent characteristics of a business. Flexibility can be defined as a means of coping with uncertainty. The diversity of adaptation behavior gives rise to a diversity of types of flexibility (technological, labor, organizational, social and tax charges, time, remuneration, contractual legal). The quality of service is manifested by the values created by the customer as well as the quality of the service rendered to the latter together constitute a dimension of competition and which allows the company to differentiate itself from others. The power continuity strategy can be broken down into two types: control continuity (the company remains in the hands of the same group) and management continuity (when the leaders come from the same group). To maintain the continuity of power, business transfer is essential and succession is one of the foundations of this continuity. And finally, the project's sustainability strategy, which is divided into two foundations. On the one hand, the sustainability of activities (downstream the products, services and brands and upstream, the necessary resources and skills). Whole organization).

III. CONCLUSION

A. Summary:

We have studied the theme: “Corporate Economic Cognitive Modeling”. Despite the advanced development of managerial practices and business management, the business creation failure rate is still very high in Madagascar.

We have seen that over the course of the study, the hypothesis was confirmed. Indeed, the exploitation of the shrimp fishery management model will in particular confirm the impact of cognitive processes on the performance levels of productive organizations. It shows to what extent the integration of the cognitive dimension in representation models can improve our interpretation of the behavior of organizations and how economic evaluation as an active and dynamic process can rely on simulation tools to promote the processes of emergence and creativity and to guide action.

B. Opening:

Cognitive Sciences therefore constitute a new field of multidisciplinary research, a place of interactions between works on the functioning of the brain, on the mechanisms of mental life, on computational models of the functioning of the mind. From this attempt at economic modeling, is it possible to cognitively model the economic development of Malagasy households?

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B. Webography

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