

Paper to be presented at the DRUID Academy, PhD Winter Conference  
Aalborg, Denmark, January 16-18, 2003

## **Objects and production systems: opening the resource black box**

(First draft)

Leïla Kebir

Visiting graduate student,  
DRUID Academy,  
Copenhagen Business School  
Department of industrial Economics Strategy  
Howitzvej 60  
2000 Frederiksberg  
Denmark  
[lk.ivs@cbs.dk](mailto:lk.ivs@cbs.dk)

PHD Student  
Institute for regional and economic research  
University of Neuchâtel,  
Pierre-à-Mazel 7  
2000 Neuchâtel  
Switzerland.

### ABSTRACT

This paper explores the relation between resources and economic development at the regional scale.

It proposes a conceptual framework based on the idea that resources are more than production factors ready for allocation. They consist in a process that makes the connection between objects (knowledge, raw material, etc.) and the production intentions drawn up by would-be producers. In other words, it is an evolving relation between objects that have their one life cycle and production systems trying to maintain competitiveness.

The aim of this paper is to understand how objects and production systems affect each other, interrelate and co-evolve. It investigates also these relations in the specific context of economic development at the regional level.

The paper is organised as following. Section II presents the analytical framework. Section III proposes a theoretical discussion on the interrelations between objects and resources as described in some selected literature on regional development. Section IV presents, as an illustration, the Swiss case of the Asphalt mines of La Presta. Finally, the paper concludes with some findings on the link between resources and regional development.

JEL: O14, O18, O15

Keywords: production systems, resources, asphalt mine

## 1. INTRODUCTION

This paper explores the relation between resources and economic development at the regional scale.

Resources are central to number of contemporary economic issues such as natural resource depletion and the deterioration of resources in general. For some these phenomena put to question the durability of life modes, technical models, and modes of management and appropriation of resources. Behind these preoccupations lies, the issue of the forms and perspectives of economic development.

This paper proposes a conceptual framework based on the idea that resources are more than production factors ready for allocation (see for example (Hunker 1964; Raffestin 1980; De Gregori 1987; De Mongolfier and Natali 1987). They consist of a process that makes the connection between objects (knowledge, raw material, etc.) and the production intentions drawn up by would-be producers. In other words, it is an evolving relation between objects that have their one life cycle and production systems trying to maintain competitiveness.

The aim of this paper is to understand how objects and production systems affect each other, interrelate and co-evolve. It investigates these interrelations in the specific context of economic development at the regional level. That is, it aims at understanding the connection between the forms of these interrelations and regional development.

In the recent regional economic literature, resources appear as a central factor in regional development. As competitive pressures become increasingly direct, the identifying and reinforcing of resources is an important issue for regions wishing to maintain their position in the international markets. The geographical distribution of production is transforming and spatial economic hierarchies are being redefined (OCDE 1993, 1995; Veltz 1996; Piore and Sabel 1984; Rallet, 2000; Storper 1992). It appears increasingly necessary to maintain territorial specificity and this requires continual adaptation. This comes in line with the question of competitiveness in general. The same issue can be found at the level of the firm where building specificity through continual adaptation is needed (Resource-based approach (Foss 1997).

In this context the successful regions are the one capable of making themselves stand out in the spatial competitiveness and therefore find their place in the spatial hierarchy. Most of all they know how to renew and generate the resources on which they rely (Maillat, Quévit et al. 1993; Maillat 1996; Crevoisier and Camagni 2000), (Courlet and Pecqueur 1992; Camagni 1995), (Morgan 1997; Maillat and Kebir 1999). From this perspective, what is at stake is to develop the resources (mainly non-material) required for innovation with a view to specialising, specifying itself and differentiating within the global market. Beyond the issue of the resource creation, that is the creation of the connection between the object and the production system, lies the questions of the maintaining of the relation, of its organisation, its evolution, and of its economic potential.

The paper is organised as following. Section II presents the analytical framework. Section III proposes a theoretical discussion on the interrelations between objects and resources as described in some selected literature on regional development. Section IV presents, as an illustration, the Swiss case of the Asphalt mines of la Presta. Finally the paper concludes with some findings on the link between resources and regional development.

## 2. THE RESOURCE PROCESS: TOWARDS A THEORETICAL FRAMEWORK

### 2.1 Input, production factors, competitive advantages, etc. Same resources different perspectives

The term resource can be understood in many different ways. It is an input when transformed in a production process. It hides behind a “production factor” when it comes to the question of allocation (as the very broad concepts of capital and labour knowledge stand for all raw material, artefact such as machines, building, etc.). It is brought up as a factor of wealth, when it refers to the raw material one possesses and can use (country, region, firm, person, etc.). It is also an instrument of power, as it gives to the owner a dominant position over the others. It is, under certain conditions, a competitive advantage as it gives the owner an advantage over the others on a market.

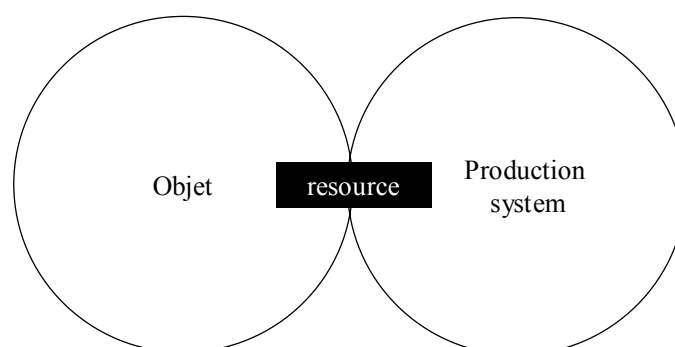
If the first four meanings are quite coherent as they all express the same idea of input, (although at different level). The last one is more problematic as it mixes up inputs as well as coordination modes (see the resource based approach of the firm, as well as literature on spatial competitiveness for example). As we will see latter the coordination modes should not be considered as resource. In the following discussion, resources will express the idea of input, coordination modes will be considered separately.

Each of the five meanings mentioned above is related to specific questions or issues. In other terms it refers to a certain state, or moment of the resource (when it’s only a raw material, when it’s clearly identified, when it enters the production process, when it has to be optimally allocated, etc.). If we want to understand the relation between resources and regional development (which is what is wanted here) we need a “more open”, perhaps more generic definition in order not to exclude, *a priori* any of these moments.

### 2.2 Proposition 1: resource as a relation process

The resource as proposed here consists in a relation process between objects and production system (figure 1). The linkage (the resource) is created as soon as a production intention is projected on the object. This happens when some actors of the production system identify the object as being a potential input for the production of a good or a service. This proposition comes in line with Hunker 1964, Raffestin 1980, De Gregori 1987 and De Mongolfier and Natali 1987.

FIGURE 1: THE RESOURCE AS A LINKAGE BETWEEN OBJECT AND PRODUCTION SYSTEM



From the linkage between an object and a production system emerges a meta-system<sup>1</sup> (the resource) composed of two elements<sup>2</sup> interacting: the object and the production system. The objective now is to define the boundaries of the resource process, or meta-system.

#### *a) Objects*

Objects consist in all the elements. They become resource when identified as being potential input. That is when potentially involved in the *technical* process of production (such as raw materials, technical know-how, artefacts, expertise, energy, etc.).

The object follows its own life cycle going from its creation (emergence) to its destruction (death). The stake here is of the maintaining, the reproduction or the renewing. Objects are produced by the major natural cycles (material objects), by learning and forgetting processes (immaterial resources) and by the combination of both (artefacts). Every object exists as a whole before being incorporated inside any production system. Under no circumstances can it be reduced to a mere economic end. A tree is a tree before it becomes a plank of wood. This is true even when planted for this specific purpose.

#### *b) Production systems*

Production systems gather all the actors in production (such as industrial and service companies, research and training centres, public institutions) as well as their relationships with internal elements within the system and with the external environment (Németi and Pfister 1994). The production system constitutes an area of relationships between technology, markets, productive capital, skills, technical culture and representation (Crevoisier and Maillat 1989). The issue for the production system is to stay competitive on the market to maintain itself.

The production system is where the production intentions that drive the identification of resources emerge. It is also where the created resources are used, transformed, and implemented. Strictly speaking, this is where they enter the production system and become inputs.

#### *c) Interrelations*

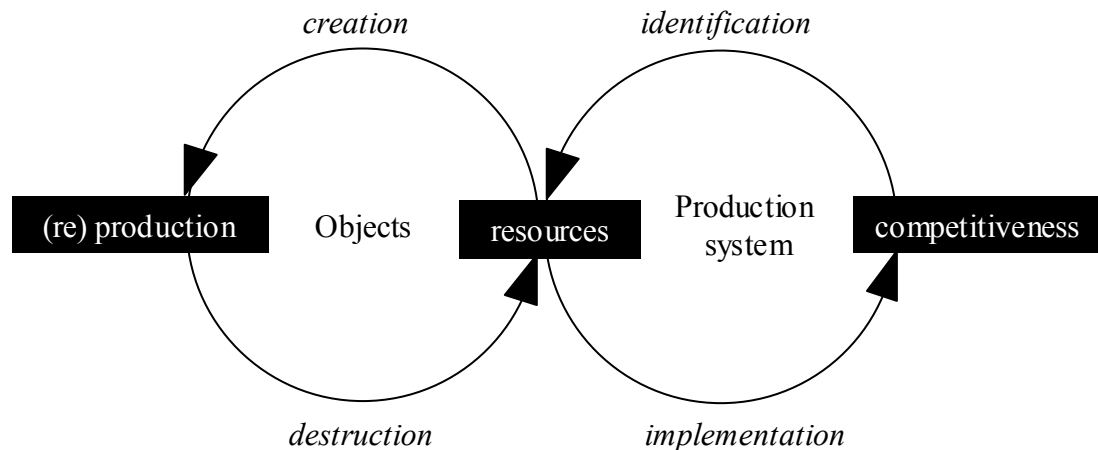
Objects and production system when connected through the resource process affect each other, they interact (figure 2). Object can either be destroyed or created through the implementation process. Identification can enhance the creation of object (if findings in biotechnology are needed by the production system, a specialised research centre could be created), the destruction of objects, modifies changes the opportunities and affect the identification process, and so on and so forth. The questions are then how these processes interact (what are the senses of the arrows)? How they affect the resource that is the linking between the object and the production system?

---

<sup>1</sup> A meta-system is a system resulting from the mutually transforming and enclosing interrelations between two former existing systems (Morin, 1977, p.139, authors own translation).

<sup>2</sup> An element is here more than a « simple unity ». It is an element relative to the whole it is part of. It is a part of a system though being a system itself. But as a part of a system, it is considered as an element (derived from Morin, 1977, foot note p.102). For example, the fish is, as an individual, a complex system as well as an element of the eco-system of the lake.

FIGURE 2: THE RESOURCE AS A PROCESS



LK/IRER/2000

### 2.3 Proposition 2: the resources as a process

The resource as described here above consists in a relation process between objects and production systems. The resource carries a double identity. It is at the same time a useful item for economy and an object. In fact the resource is a property given by economic actors to some selected objects. They project production intentions on these objects. They create a link: the resource rises. As the link stops either because the object disappears or loses its usefulness: the resource falls. Considering resources as an object on which a production intention is projected has three consequences.

#### a) *The resource as a human construct*

The resource is considered here as a human construct. It no longer exists per se, that is outside man's mind. The resource derives from the perceptions and representations actors have of the production system and of the environment in general<sup>3</sup>. Its existence depends on actor's constant capacity to re-invent, reconsider the opportunities as well as the constraints. In other terms, it depends on actor's capacity to identify potential inputs.

#### b) *The resource not being considered as a stock anymore*

In this perspective the resource is not a stock anymore, but a process (De Gregori 1987). The resource is a relation process between objects and production systems. It's a specific articulation between two different bodies (or systems) that have different rhythms and logic. The objects rhythm is given by its life cycle. That is its creation (first emergence) and destruction (death) rhythms. The production system is organised to produce goods and services that can be sold on the market. Two processes give its rhythm: the identification of opportunities/objects and the implementation of the object inside the production process.

<sup>3</sup> We distance ourselves here from the hypothesis of perfect rationality that implies complete appropriateness between the information (from the environment) and the reality of this environment. Perceptions and representations are the determining factors in identifying what is and what is not a resource.

In this perspective, the resource consists in a process of relation between two entities that follow different objectives and have different rhythms: sometimes complementary (they both foster each other), sometimes antagonist (one constrains the other). The evolution, or the dynamic (the way it evolves) of the resource depends precisely on the way these rhythms and objectives articulate and are articulated through modes of coordination (price, law, convention, etc.).

*c) The resource as a collective process*

The resource is a collective process. The resource is not just a production idea. It's also the implementation of this idea. The organisation and the shaping of a production process require the intervention of different actors (financers, partners, etc.). They will not involve themselves unless they identify the resource and consider the opportunity. In fact many projects suffer from the lack of identification when it comes to develop economic activities from a new resource. For example it can be difficult to develop tourism in regions traditionally industrial or agricultural. Not enough people (politicians, investors, potential workers, etc.) perceive tourism as a "real" activity or perceive existing objects as touristic resources. Therefore it is very difficult for the ones believing in the potential to gather the forces needed to develop the new activity.

## **2.4 Proposition 3: the resource as an evolving process**

The linking between object and production system evolves as the conditions change over time. Both objects and production systems are interconnected with each other as well as with other systems such as ecosystems, social system, other objects, concurrent production system, etc. A fish can be connected, at the same time, to the ecosystem of the lake (as a predator) to a production system (as a fishery resource), to a second production system (as a touristic resource) to a social system (as symbol of the coast region). The fishery production system is connected to the fish, to the fish import production system, to the national market (maybe to international market), to the touristic system, to the social system (through the workers), etc. These relations affect more or less the object and the production system as they integrate (or not) and adapt (or not) to the signals they get from it. This, of course, has implications on the resource relation for example if a new predator is introduced (accidentally for example) in the lake, the fish stock might diminish down to the point where fishery activity becomes of no more interest. Inversely, if the activity becomes more lucrative (increasing demand) the production system might switch to an intensive form of exploitation of the resource, which may threaten the fish reproduction. All this to say that the resource is not established once and for all. It is a continuous renegotiation (rearticulation) between the object and the production system according to changes. That is changes occurring inside the object or the production system as well as in their relation with each other and with other systems.

## **2.5 The tricky case of coordination modes**

Coordination modes are not considered here as a resource as they do not act as *input* in the production process. Nevertheless they shape the resource process, as they are part of the organisation of the link between the object and the production system (for example fishing rights fix the quantity of the resource that can be used). Some of the coordination modes emerge inside the production system (if we think of all contract, agreements, rules, conventions created by the actors themselves to coordinate the resource process). Some

emerge from the object system (if we think for example of forms of organisation of the matter itself). Some are imposed to the resource (national law, agreements with other production systems, market price, etc.).

The coordination modes are part of the organisation. They shape the resource as much as they are shaped by the resource itself. The coordination modes interesting here are the one dealing with the articulation of the creation, destruction, identification and implementation processes. They are attempts, strategies, ways of managing the complementarities and the antagonisms of the resource process.

The distinction between coordination modes and resource is not always obvious, and certain cases such as : cultural specificities and property rights. One can argue for example that the banking secret is a coordination mode but also a resource for the Swiss financial production system. This of course is hard to deny. But for the purpose of the analysis one must distinguish these “two sides of the same coin”, that is the input dimension on one side and the coordination mode dimension on the other.

The next step of this paper is to confront this idea of the resource process to regional development. That is to see whether this idea makes sense and if some findings regarding the way objects and production systems interact and co-evolve can be found in the literature.

### 3. REGIONAL DEVELOPMENT MODELS AND RESOURCE

#### 3.1 Three approaches of the resource in regional development models

Three different approaches of resource can be found in regional development literature: the *flow approach*, the *structuralist approach*, the *dynamic of actors approach*. These approaches differ in the world vision they propose, in the role they attribute to resources, and the main issue related to the latter.

FIGURE 3: REGIONAL DEVELOPMENT AND RESOURCES

	FLOW APPROACH	STRUCTURALIST	DYNAMIC OF ACTORS
WORLD VISION	World of exchange	Polarised world made of centres and peripheries	Mosaic of production systems competing against each other
ROLE OF RESOURCES	Factor of production	Potential factor of production and power instrument	Potential factor of production and factor of competitiveness
RESOURCE ISSUE	Optimal allocation	Not equally distributed	Creation and renewing

Schematically, the *flow approach*, which can be found in the *neoclassical model of regional growth* (Ohlin 1933; Borts and Stein 1964) and the *model of geographic concentration* (Krugman 1991) is based on the idea that resources are initially unequally distributed over space. The mobility and trade of factors (or goods) brings optimal

allocation and therefore convergence of growth between regions. In this perspective resources appear as production factors.

The *structuralist* approach, based on Perroux's Pole theory, (Perroux 1955) and pursued in the *centre periphery analysis* (Friedmann 1972), the *spatial division of labour analysis* (Aydalot 1976; Aydalot 1985), in the works of the *regulation school* (Swyngedouw and Kesteloot 1989) as well as in the works on the *global city* (Sassen 1991), shows a polarised world made of centres and peripheries. The structure of the hierarchy is fundamental as it shapes the development path. Resources here, because concentrated and attracted by centres consist in potential production factor, more, in a power instrument of domination over peripheries.

The *dynamic of actors approach* can be attached to the *theories of endogenous development* (Courlet and Pecqueur 1992; Garofoli 1992; Camagni 1995; Maillat 1998; Crevoisier and Camagni 2000), as well as to the recent *learning region* approach (Lundvall 1992; Florida 1995; Maskell and Malmberg 1995; Macleod 1996; Morgan 1997; Simmie 1997). The actor's dynamic approach proposes a vision of the world composed of a mosaic of specialised production systems competing with each other, free of any centre hegemony. In this perspective, endogenous development is proclaimed. It relies on local actors dynamic, which organise to generate new resources, innovate and maintain its position on the market.

### 3.2 Shapes and forms of the resource process: theoretical findings

Even though these approaches address the questions of regional development: why spatial disparities? How do they evolve? Do they increase or decrease? What can we do? The models focus on different issues and stand into different economic perspectives. Therefore their approach to resource varies and offers more or less clues on the way the resource process is articulated (Figure 4).

FIGURE 4: THE RESOURCE PROCESSES AS SEEN IN REGIONAL DEVELOPMENT THEORIES:

	FLOW APPROACH	STRUCTURALISTS	DYNAMIC OF ACTORS
CREATION	Exogenous	Endogenous to the structure	Endogenous (learning)
DESTRUCTION	Exogenous		Endogenous (forgetting, obsolescence)
IDENTIFICATION	Exogenous		Endogenous (Innovation)
ACTUALISATION	Optimal allocation issue		Endogenous (Innovation)

#### a) *The flow approach*

In the models related to the *flow* approaches, the resources, as production factors are exogenous to the models. The issue here is the allocation through space of the initial

endowment. This means that resources are inherited from the past and that implementation follows creation and identification processes. The flow approach is concerned with the implementation process of the resource. The identification has already taken place (the production function is determined). In these models production factors are considered perfectly mobile; they can fit in any production function, no matter where located. The issue is to have the best allocation possible given constraints such as transport costs, increasing returns, etc. (Krugman, 1991). This vision is of interest if we consider for example certain resources such as low qualified labour force, raw material, etc., which are *a priori* mobile.

*b) The structuralist approach*

The *structuralist* approach doesn't really address the question of the resource. The central issue being the structure of economic organisation through space. Not much is said about the resource processes in themselves (why they occur, how?). The crucial point here is where they occur, where they remain: schematically, resources are distributed through space according to the needs and the strength of the centres (often to the detriment of peripheries). Natural resources appear first as an explanation for the historical location of big industrial centres (close to ore mines). Second, resources contribute to the power of the centre. They are used (material, psychological, coercive) to innovate and repress the peripheries (Friedmann 1972). Third resources appear given (centres inherit of the resources created in the past) but also constructed and built in the present. The centre constantly attracts the resource it needs and generates resources through innovation. Fourth, the resources processes are endogenous to the structure of economic organisation (not to the production system). The regulation school shows how accumulation regimes (fordism for example) can be favourable to the reproduction of the needed resource (Boyer 1986; Swyngedouw and Kesteloot 1989).

*c) The dynamic of actors approach*

The dynamic of actors approach, describes through various models (industrial districts, innovative milieus, local systems of innovation, etc.) how actors and institutions shape the development beyond the structure. Uneven development exists but is transcended by the actor's dynamics as well as by the resources the latter creates (see for example the literature on *innovative milieus*, as developed by the GREMI group: Aydalot 1986; Maillat and Perrin 1992; Ratti, Bramanti et al. 1997; Crevoisier and Camagni 2000). Even though central to the discussion, the resource is not clearly defined: the emphasis being on the understanding of the processes relative to the actors dynamic. It is seen as a factor of innovation and therefore competitiveness. Resources are endogenous to the production system, objects are created through learning and destroyed (sometimes it's need) through forgetting (see for example the literature on the *learning economy*, or the *learning region*: Lundvall 1994; Maskell and Malmberg 1995; Morgan 1997).

Resources are identified (created) through the innovation process (which consists in the making of a new relation between the production system and the object realm). The implementation is organised, developed through this same process. Resources are given (inherited) as well as created and constituted in the present. They are locally controlled (otherwise it's a centre/periphery situation). In this perspective the interrelation between object and production system is made explicite. First, knowledge is created and destroyed through the production process. Second, innovation, seen here as a situated process, brings up the creation of resources (not object which are created through learning). The creation

of objects as well as information coming from the environment changes the perceptions of actors. This allows ideation process to take place, which opens up identification and innovation possibilities (Crevoisier 1993).

### **3.3 Summing up**

The actor's dynamic approach is probably the most relevant for the purpose of this paper since it gives us hints on the way object and resource can co-evolve. Phenomena such as learning and innovation indicate in a way that the proposition of a process approach of resources can be of relevance. This approach raises the question of the role of proximity and distance as well as coordination modes. It is acknowledged that certain forms of learning take place through proximity relations. These relations help the constitution of innovative networks as they reduce transaction costs and favour collective problem solving and therefore innovation and resource creation. Is this still true if we consider it on the side of the resource process? Is the resource process as a whole depending on proximity relations? Innovation is one specific case, what about cases where there is no innovation? Where the production system is just exploiting a pre-established resource?

Another element raised here concerns the form of organisation and the forms of "social" organisation of the actors involved in the production system. These appear important as they allow more or less the emergence of innovation and resource creation. They are also important as they determine how control over resource is organised and structured through space.

The last step of this paper is to confront the conceptual framework developed here above to an empirical case and to see whether or not, proximity relations and organisation forms play role in this resource process. The next section presents, as an illustration, the analysis of the Asphalt mines of La Presta.

#### **4. RESOURCE DYNAMICS, SPACE AND COORDINATION MODES: THE SWISS CASE OF THE ASPHALT MINES OF LA PRESTA<sup>4</sup>**

The asphalt mines of La Presta are located in the Val de Travers, 20 km close to the city of Neuchâtel. Their story is the one of ruptures: rupture in the use of the object: from an extractive resource to an industrial touristic resource. A rupture of the scale of the resource: from global to local. A rupture in the organisation form: from large firm to networking.

##### **4.1 From the extractive resource to the touristic resource**

The asphalt ore was discovered and first exploited in the 18<sup>th</sup> century. From 1879 until the end of the extractive activity, the exploitation of the mine will be successively in the hands

---

<sup>4</sup> The case study presented here has been carried out from 2001 to 2002 by L. Kebir and O. Crevoisier, Institute for regional and economic research, University of Neuchâtel, in the context of the 6th survey of the GREMI group (Research group on innovative milieu) "Développement et création d'emploi à partir des ressources territoriales: milieux aux ressources naturelles, milieux aux ressources culturelles". It is based on in depth interviews with the key actors involved in the resource process as well as bibliographic research on the history of the mine (Jelmini, 1987). The Final publication of the project is expected in 2003.

of two large foreign multinationals (the last one absorbing the first after the second world war).

In 1986 the mine was shut down and the visits started. The mine (object) was not exhausted but the resource was. Economically speaking. Because of the diminishing quality of the extracted ore (due notably of anarchic former exploitation), as well as the development of synthesised asphalt, the profitability became too low. The firm stopped the activity. The visits of the galleries forbidden until then, started as some local groups asked for it. The firm invested to secure and convert the galleries. The public administration (Canton) participated to a small extent to the global investment. In the early nineties, the exploitation of the locus came into the hands of a local entrepreneur active in the tourism *milieu*. The site was gradually developed. The museum part was enlarged and a restaurant was opened. The latter serves local specialities and ham cooked in asphalt – the Christmas dinner of the minors. Today a project of revision of the museography is being prepared.

This form of so-called eco-museum offers a kind of “exotic” spectacle, a form of experience. During the visit, the visitor gets confronted to the world and working conditions of the mine life – in a very smooth way compared to the rough reality of the minors. The visitor learns something while entertaining. What is at stake here is to articulate authenticity/discovery, historical patrimony and profitability. The next museography should go further in this direction.

The development of the site is constraints by the calcareous nature of the galleries. First for security matter the authorities regularly control the galleries. The expenses devoted to geological studies and to the works of maintenance are quite high in respect to the size of the enterprise. If these expenses were to increase too much, the visits could stop. Second, the disposition of the galleries (huge dangerous labyrinth) makes the organisation of all kinds of happenings (parties, concerts) not possible for security reasons.

#### **4.2 Actors and organisation**

In terms of actors dynamic, one can distinguish two distinct periods. The first period corresponds to the one of ore exploitation, which has been largely dominated by foreign actors (large firms). Both identification and implementation processes have been set by foreigners. During the mining period, the site of the Val de Travers was one of the biggest in the world. The asphalt was exported all over the world (above all in English colonies). The mine was managed and controlled by actors (financers, controllers, geologist, etc.) located outside the region (England). The economic and financial circuits went beyond national frontiers. The relation with the region existed essentially through the negotiation of the concession with the Canton State of Neuchâtel.

Today, the situation is quite different. The mine is locally identified and used as a touristic resource. The development of the site mobilises a innovative network based on interpersonal and proximity relations. It is structured around the exploiting firm. It includes notably of the Director of the Ethnographic Museum as well as the former director of the Art and History Museum of the City of Neuchâtel. Both have brought, voluntarily, their expertise and know-how in museography and conservation of patrimony. These contributions (in addition with some public financial support) help highlighting the patrimony, which gives the museal dimension of the site. The firm could never afford such services if they where to be paid directly.

The number of visitors is increasing, the majority comes from other regions of Switzerland. The Asphalt mines site is one of the major attractions of the Val de Travers region and the Canton of Neuchâtel, which is essentially industrial (watch making and microtechnic). It fits in the production systems of the region, which is still no very well structured. Tourism being an emerging activity.

### **4.3 One object, two resources, three ruptures**

The mine has contributed successively to two different activities. Both the extractive activity and the touristic activity have developed in fundamentally different configurations in terms of spatial scale and forms of organisation.

First we have an industrial period based on the extraction of a non-renewable resource. Then comes a phase of rupture with the development of the touristic activity. The resource is re-invented, re-identified. The objects (galleries, patrimony) are re-affected to radically different usages. The galleries are a visited place and no more an access to ore. Know-how and machines become cultural patrimony. They loose their status of industrial production factor.

The territory of the resource has dramatically shrunk from the first to the second period of activity. During the first phase, the spatial scale is the world. A multinational foreign firm makes the exploitation. The main coordination mode is hierarchy. In the opposite the touristic exploitation is local (in term of supply) and relies on an innovative network. The size of the market has diminished: the demand is essentially national.

From the same object, two activities have been developed. The passage from one to another has brought considerable change. Change in the type of activity, in the spatial scale of the resource and in the forms of organisation associated. The innovative process of developing a touristic activity from the past necessitates an innovative network composed of person deeply involved in the project as it represents a part of the history of the region. This local innovative network allows the exploiting enterprise to develop the site, step by step.

## **5. CONCLUSION**

The aim of this paper was to understand how objects and production systems affect each other, interrelate and co-evolve in the specific context of regional development.

The first section has proposed an operational definition of resources integrating both object and production systems. Resources appear as an evolving relation process between two elements, which have their own logics (renewing for objects, competitiveness for production systems) and rhythms. The resource process consists precisely in organizing and coordinating the complementarities and antagonisms emerging from the relationship.

The second section confronts this operational definition with three approaches of resources developed in the regional development literature: the *flow approach*, the *structuralist approach* and the *dynamic of actor approach*. The dynamic of actor approach gave us hints on the way object and resource co-evolved notably through the process of innovation and learning. It also suggested that proximity relations and forms organisation such as networks where important in this building up of the resource process.

In the last section the illustrative case of the Asphalt mines of La Presta has been presented. It showed that throughout time, the use of the mine changed (from extractive

activities to tourism). The switch from one activity to the other needed the creation of the touristic resource, which went through an innovative process. This necessitated a dramatic change in the spatial scale of the resource (from wide global to broad regional) as well as in the production organisation exploiting it (from the hierarchy of a large foreign company to a small local innovative network). In term of regional development analysis, one could say from an exogenous to an endogenous form of development.

The resource process as suggested earlier is not given once and for all; it is a constant re-articulation of opportunities, of constraints, and most of all, of organisation forms and spatial scales. This suggests that the relation between the resource and the region is not immutable. Its form and content is also re-negotiated and re-articulated as the resource process evolves.

### *Acknowledgement*

*This paper comes in line with a PHD research. Helpful comments and supervision on the research from Denis Maillat and Olivier Crevoisier Institute for Regional and Economic Research, University of Neuchâtel, are greatly acknowledged as well as comments and discussions on the structuring of this paper given by Peter Maskell, Department for Industrial Economics and Strategy, Copenhagen Business School.*

### REFERENCES

- Aydalot, P. (1976) "Contribution à l'analyse de la division spatiale du travail." Dossiers du centre "Economie-espace-environnement", Université de Paris I no 7.
- Aydalot, P. (1985) *Economie régionale et urbaine* Paris, Economica.
- Aydalot, P. (1986) *Milieux innovateurs en Europe*, Paris, GREMI.
- Borts, G. H. and J. L. Stein (1964). *Economic growth in a free market*. New York et Londres, Columbia University Press.
- Boyer, R. (1986). *La théorie de la régulation: une analyse critique*. Paris, La découverte.
- Camagni, R. (1995). *Global network and local milieu: towards a theory of economic space. The Industrial Enterprise and Its Environment: Spatial Perspectives*. S. Conti, E. J. Malecki and P. Oinas, Avebury: 195-214.
- Courlet, C. and B. Pecqueur (1992). *Les systèmes industriels localisés en France: un nouveau modèle de développement. Les régions qui gagnent - Districts et réseaux: les nouveaux paradigmes de la géographie économique*. G. Benko and A. Lipietz. Paris: 81-102.
- Crevoisier, O. (1993). *Industrie et régions : les milieux innovateurs de l'Arc jurassien*. Neuchâtel.
- Crevoisier, O. and R. Camagni, Eds. (2000). *Les milieux urbains: innovation, systèmes de production et ancrage*. Neuchâtel.
- Crevoisier, O. and D. Maillat (1989). *Milieu, organisation et système de production territorial: vers une nouvelle théorie du développement spatial*. Neuchâtel. IRER, Université de Neuchâtel.
- De Gregori, T. (1987). "Resources Are Not; They Become: An Institutional Theory." *Journal of economic issues* XXI(3): 1241-1263.
- De Mongolfier, J. and J.-M. Natali (1987). *Le patrimoine du futur*. Paris, Economica.
- Florida, R. (1995). "Toward the learning region." *Futures* 27(5): 527-536.
- Foss, N. j. (1997). *Resources firms and strategies*. Oxford, Oxford University Press.
- Friedmann, J. (1972). *A general theory of polarized development. Growth centers in regional economic development*. N. M. Hansen. New York.
- Garofoli, G. (1992). *Les systèmes de petites entreprises: un cas paradigmatique de développement endogène. Les régions qui gagnent - Districts et réseaux: les nouveaux paradigmes de la géographie économique*. G. Benko and A. Lipietz. Paris: 81-102.
- Hunker, H. L., Ed. (1964). *Erich W. Zimmermann's Introduction to world resources*. New York, Evanston, London, Harper & Row Publishers.

- Jelmini, J.P. (1987). "Les mines d'asphalte du Val-de-Travers." *Nouvelle revue neuchâteloise*:14.
- Krugman, P. (1991). *Geography and trade*. Leuven, Cambridge (Mass.), London, Leuven University Press, MIT Press.
- Lundvall, B. A. (1992). *National systems of innovation*. Londres, Pinter Publisher.
- Lundvall, B. A., Johnson, B. (1994). "The learning economy." *Journal of Industry Studies* I(2): 23-42.
- Macleod, G. (1996). "The cult of Enterprise in a Networked, Learning Region? Governing Business and Skills in Lowland Scotland." *Regional Studies* 30.8: 749-755.
- Maillat, D. (1996). *Du district industriel au milieu innovateur: contribution à une analyse des organisations productives territorialisées*. Neuchâtel. IRER, Université de Neuchâtel.
- Maillat, D. (1998). "From the Industrial District to the Innovative Milieu: Contribution to an Analysis of Territorialised Productive Organisations." *Recherches Economiques de Louvain* 64: 111-129.
- Maillat, D. and L. Kebir (1999). "Learning region et systèmes territoriaux de production." *Revue d'économie régionale et urbaine* 3: 429-448.
- Maillat, D. and J.-C. Perrin, Eds. (1992). *Entreprises innovatrices et développement territorial*. Neuchâtel.
- Maillat, D., M. Quévit, et al., Eds. (1993). *Réseaux d'innovation et milieux innovateurs : un pari pour le développement régional*. Neuchâtel.
- Maskell, P. and A. Malmberg (1995). *Localised learning and industrial competitiveness*. Berkley.
- Morgan, K. (1997). "The Learning Region: Institutions, Innovation and Regional Renewal." *Regional Studies* 31.5: 491-503.
- Németi, F. and M. Pfister (1994). *Aspects de la compétitivité de l'industrie microtechnique suisse*. Neuchâtel, EDES, IRER, Université de Neuchâtel.
- OCDE (1993). *Développement territorial et changement structurel*. Paris, OCDE.
- OCDE (1995). *Economies locales et globalisation*. Paris, OCDE.
- Ohlin, B. (1933). *International and Interregional Trade*. Harvard, Harvard U.P.
- Perroux, F. (1955). "Note sur la notion de pôle de croissance." *Economie appliquée* VIII(1-2): 307-320.
- Piore, M. and C. Sabel (1984). *The Second Industrial Divide*. New York.
- Raffestin, C. (1980). *Géographie économique du pouvoir*. Paris, Librairie technique (LITEC).
- Ratti, R., A. Bramanti, et al., Eds. (1997). *The dynamics of innovative regions. GREMI IV*. Singapour, Sydney, Aldershot Brookfield USA.
- Sassen, S. (1991). *The Global City : New-York, London, Tokyo*. Princeton, New-Jersey, Princeton University Press.
- Simmie, J., Ed. (1997). *Innovation, Networks and Learning Regions?* Londres.

- Storper, M. (1992). "The Limits to Globalization : Technology Districts and International Trade." *Economic Geography* 68(1): 60-92.
- Swyngedouw, E. and C. Kesteloot (1989). "Le passage socio-spatiale du fordisme à la flexibilité: une interprétation des aspects de la crise et de son issue." *Economie et société* 54-55: 243-268.
- Veltz, P. (1996). *Mondialisation villes et territoires : l'économie d'archipel*. Paris, Presses Universitaires de France.