

Papers

Function and Form in Territorial Planning: the Case of Lens in the Mining Basin in Nord and Pas-De-Calais – France

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Abstract

This article discusses the transformations and restructuring of the city of Lens, located in the department of Pas-de-Calais, in the administrative region of Hauts-de-France, northern France. This discussion pertains to the spatial transformations of the form and function during the evolution of industrial capitalism and, subsequently, globalization. The "Territorial Reconversion" process implemented in the area through state planning from the 1960s to 1990 (the year of the closure of the last coal mine) aimed to change the region's specialization in response to the serious issues of unemployment and economic recession. Thus, through the establishment of infrastructure and urban remodeling, the French state, in association with policies of the European Union, involving private companies and civil organizations in the region, organized itself to transform the area by changing the economic profile linked to mining and textile production to more dynamic and productive activities. These strategies influenced the transformations of the urban space of Lens, reshaping it towards cultural activities (especially music and cinema workshops) and tourism. Among the latter, the installation of a branch of the Louvre Museum stands out. This article aims to reflect on these transformations in Lens, based on the analysis of the introduction of new forms and functions and the re-signification of old forms enveloped by new functions.

INTRODUCTION

The successive transformations of the production process triggered, among other factors, by the implementation of new technologies lead to the reconfiguration of urban space. In this regard, urban space undergoes profound changes and remodeling concerning its form through the shift in present activities and its functions, redefining itself, for example, as new commercial "centers" spread across the urbanized space.

This article aims to conduct a comprehensive analysis of the urban transformations, restructurings, and remodeling that have occurred in the city of Lens, located in the Hauts-de-France region, in the department of Pas-de-Calais, northern France. Historically, Lens has been intrinsically related to the mining industry, with its economy and urban dynamics centered on this sector. However, over the years, the city has experienced substantial economic and territorial transformations, thus influencing the city's urban configuration and function.

The objective is to identify the transformations of the city under study through fieldwork, analysis of local cartography, and a review of studies in the region. This methodological approach seeks to comprehend the territorial dynamics and transformations of Lens, whose functions were exclusively directed towards mining and its dynamics.

THE CITY OF LENS AND ITS REMODELING: FROM A MINING CITY TO A TOURIST CITY

Lens (Figure 1) is situated within the Nord-Pasde-Calais Mining Basin, located in the administrative region of Hauts-de-France in France, an area designated as a UNESCO World Heritage Site. According to UNESCO (2012), the Mining Basin is "[...] remarkable as a landscape shaped over three centuries of coal extraction [...]" and "[...] documents the living conditions of workers and the solidarity to which it gave rise."

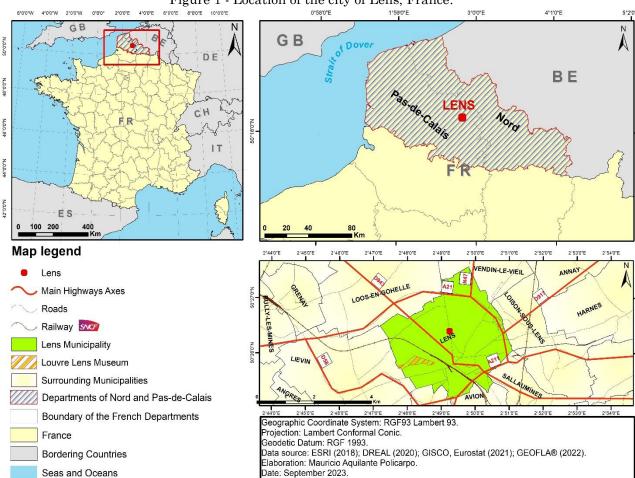
> Le Bassin minier du Nord et Pas-de-Calais correspond à la partie française du filon charbonnier du Nord-Ouest européen. Au sein d'une plaine largement ouverte, il s'étend sur environ 120 km, traversant les deux départements du Nord et Pas-de-Calais. Il présente un paysage culturel évolutif vivant

exceptionnel par sa continuité et son homogénéité. I1donne un exemple important $_{
m et}$ bien conservé des charbonnages et de l'urbanisme qui lui est associé, au cours de deux siècles d'exploitation intensive de la houille, de la fin du XVIIIe siècle au dernier tiers du XXe siècle, par des méthodes industrielles réunissant un grand nombre d'ouvriers. Cette succession de paysages résultant d'une quasi mono-industrie extractive comprend : des éléments physiques et géographiques (terrils, terres agricoles, étangs d'affaissement minier, bois), un patrimoine industriel minier (carreaux de fosses, bâtiments industriels résiduels, chevalements). des vestiges des équipements de transports dit cavaliers (canaux, chemin de fer, convoyeurs), un ouvrier habitat et un urbanisme caractéristique (corons, cités-jardins, pavillonnaire, habitat immeubles locatifs), des éléments monumentaux et architecturaux témoins de la vie sociale (églises, écoles, châteaux des dirigeants, sièges sociaux des compagnies, locaux du syndicalisme ouvrier, gares, hôtels de ville, hôpitaux et centres de soins, salles des fêtes, équipements sportifs), enfin des lieux de mémoire et de célébration de l'histoire du Bassin et de ses mineurs (UNESCO, 2012).

The Nord-Pas-de-Calais Mining Basin corresponds to the French part of the northwest European coal seam. On a broad open plain, it extends some 120 km through the two administrative departments of Nord and Pas-de-Calais. It presents a remarkable cultural landscape in terms of continuity and homogeneity. It provides an important and well-preserved example of coal mining and its associated urban planning throughout the two centuries of intensive coal extraction from the end of the 18th century to the last quarter of the 20th century through industrial methods involving a great workers. This succession of many landscapes resulting from the virtually mono-industry of coal extraction includes: physical and geographical components (slag heaps, farmland, mining subsidence ponds, and woods), a mining industrial heritage (pitheads, residual industrial buildings, and headgear), vestiges of transport equipment, the so-called "cavaliers" (canals, railways, conveyors), worker housing and characteristic urban planning (mining villages, garden cities, detached housing estates, and tenement buildings), monumental and architectural components testifying to community life (churches, schools, manager's châteaux, company head offices, worker union premises, stations, town halls, hospitals and clinics, community halls, and sports facilities), and finally places of remembrance and celebration of the

Basin's history and its miners (UNESCO, 2012, own translation).

Thus, the region constitutes a traditional mining area with a crucial role in the French industrialization of the 19th century. The production of coal and its associated activities, coupled with textile manufacturing, deeply marked the urban development of the city, expressing itself in its forms and functions.



Source: The authors (2023).

Figure 1 - Location of the city of Lens, France.

Within this context, successive urban and territorial planning actions (aménagement du territoire) were implemented to deconcentrate economic activities and population displacement to ensure the balance of urban centers and reverse the trend towards macrocephaly and unemployment (Clavé, 2013).

This strategy engendered distinctive dynamics in the study area, with the service and tourism sectors being chosen for the economic-territorial reconversion plan to address the adverse scenario of unemployment and issues of social and economic inequalities resulting from the crisis of traditional industries (coal mining, steel, and textiles). Since then, there has been a

process of urban renewal/neofunctionalization (reconversion des territoires), and the concentration of services and tertiary sector has been observed. Additionally, new economic and tourist segments have been established, replacing the old mining activity in crisis.

These regional strategies directly impact the urban space of Lens. Essentially, the focus is concentrated on tourism transformation and adaptation, as well as the valorization of the memory of the former mining activity. The spatial transformations linked to the form and function that the area exhibited during industrial capitalism and its modifications for the new globalized context are associated with

the economic and territorial reconversion process.

The industrialization of the Nord and Pas-de-Calais departments in the 19th century, during the French Industrial Revolution, revolved around coal mining in the Nord, giving rise to the Nord-Pas-de-Calais Mining Basin (Bassin Minier du Nord-Pas-de-Calais). The first railways were constructed between 1835 and 1840 to serve the initial mining activities in the

former mining basin (Floirac; Mercier, 2013). The urban morphology related to this economic activity was expressed as industrial cities based on rapid and polarizing population growth within the confines of the mining basin (Dormand, 2001). The legacy of this economic activity and its consequent dense urban development remains notable with the strong population density observed when comparing Figures 2 and 3, even after the end of coal mining activity in the 1990s.



Figure 2 - Nord-Pas-de-Calais Mining Basin – Location.

Source: UNESCO (2012). The authors (2023).

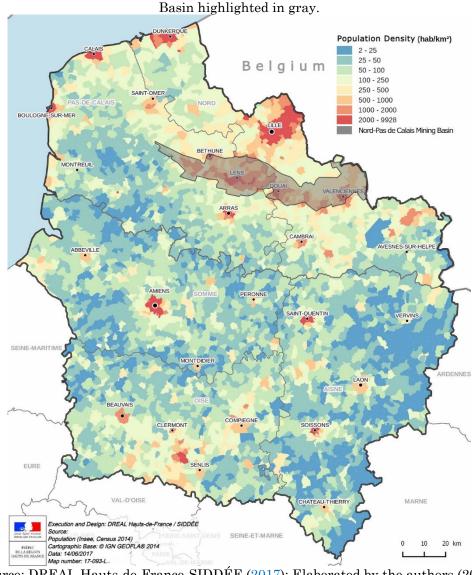


Figure 3 - Population density map in Hauts-de-France (2014), with the Nord-Pas-de-Calais Mining

Source: DREAL Hauts-de-France-SIDDÉE (2017); Elaborated by the authors (2023).

From its inception, Lens has been intricately linked to this productive specialization focused on coal extraction, consolidating the labor force used in mining activities. According to the Institut National de la Statistique et des Études Économiques (INSEE - National Institute of Statistics and Economic Studies of France), in the early 20th century, Lens had a population of approximately 45,000 inhabitants, positioning itself as one of the foremost cities in northern France, second only to Lille, the regional capital. Remarkably, an elaborate urban network emerged in the region due to its specialized connection to mining activities, in contrast with the predominantly rural character of other French areas during the same period, except Alsace-Lorraine and Paris (Clavé, 2013).

During this period, Lens was monocentric, with the central area acting as the nucleus for commercial and service activities. In other words, the central area represented the most valued and dynamic space of the city, hosting a concentration of commercial structures such as theaters, bakeries, bars, confectioneries, cafes, bookstores, barbershops, tailors, and cobblers. As one moved away from the central area towards the peripheral zones housing the mining spaces, the land use and soil valuation experienced a pronounced decrease. The "urban life" of exchanges and commercial functions unfolded in the central area, characterized by churches and boulevards - with commercial activities on the ground floor and high-income housing on the upper floors (Figure 4).

The mining activities occurred in the periphery of Lens, near the mining shafts and the slag heaps (terril in French). A slag heap is an artificial hill composed of mining byproducts, primarily shale, and in smaller quantities, sandstone. In the northern French mining region, 340 slag heaps were identified in the 1970s after the cessation of mining

operations (Dormand, 2001, p. 45). In this city zone, working-class neighborhoods were formed

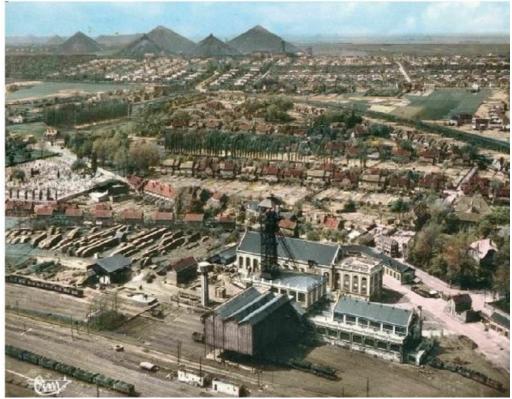
with forms and functions that distinguish them from the central area (Figure 5).

Figure 4 - Illustration of the central area of Lens, highlighting the Church (Église Saint-Léger) and the adjacent commercial areas.



Source: Mission Bassin Minier (2008). Elaborated by the authors (2023).

Figure 5 - Mining area with slag heaps (*terrils*) in the background and the working-class neighborhoods in the vicinity, delineating the city's specialization and its productive organization.



Source: France 3 Hauts-de-France (2012). Elaborated by the authors (2023).

THE DISSOLUTION OF MINING ACTIVITY IN NORTHERN FRANCE: LENS IN THE TERRITORIAL RECONVERSION PROCESS

The Northern French Mining Basin region, during the era of coal mining, was characterized by high population density and the distribution of intermediate-sized municipalities (communes) organized around central cities in the region, namely Lens, Valenciennes, Douai, and Oignies. However, the pronounced economic specialization in the area resulted in a limited degree of innovation and diversification, thereby impeding the potential for responsive actions in the face of contemporaneous crises.

Avec la fin amorcée par l'État de l'activité extractive au milieu des années 1950 (décret Pflimlin) et surtout des années 1960 (plan Jeanneney et Bettencourt), la richesse minière générée pendant deux siècles et demi s'amenuise progressivement pour s'éteindre sur le plan économique en 1990 dans le bassin minier du Nord et Pas-de-Calais. En effet, l'apogée en tonnage de la production est atteint vers 1930 et ne cessera de

diminuer par la suite malgré quelques soubresauts d'après-guerre liés à des intentions politiques de relance (plan Monnet) et la nationalisation de l'activité (Dumont; Debrabant, 2010). Les termes de reconversion, rénovation, requalification, réhabilitation, régénération. reconquête. renouvellement, renouveau vont succéder et se chevaucher, pour tenter d'insuffler, dans l'image et l'imaginaire, ainsi que dans le paysage (« traitement par verdissement» des grandes friches industrielles...) changement. un répondent à des aspirations reconnaissance. de création renaissance de la richesse territoriale dans contexte de crise นท développement (choc pétrolier, faible croissance du PIB...), de mutations (relocalisation économique délocalisation), de répercussions social, environnemental et sanitaire des modes de développement passés (chômage, affaissement minier, ampleur maladies professionnelles...). Sans nul doute que la multiplicité de termes propres au changement témoigne de l'ampleur de la tâche et de la diversité des approches nécessaires (Schmitt; Souza, 2020 p.198-200).

With the gradual cessation initiated by the State of extractive activities in the mid-1950s (Pflimlin decree) especially in the 1960s (Jeanneney and Bettencourt plan), the mining wealth generated over two and a half centuries progressively diminished, economically extinguishing in 1990 in the Nord-Pas-de-Calais Mining Basin. Indeed, the peak tonnage of production was reached around 1930 and continued to decline thereafter, post-war fluctuations despite some related political intentions revitalization (Monnet plan) and the nationalization of the industry (Dumont; Debrabant, 2010). Terms such reconversion, renovation, regualification, rehabilitation, regeneration, reconquest, renewal, and revival follow and overlap each other, attempting to infuse change the image, imagination, landscape ('greening' treatment of large industrial wastelands). They respond to aspirations for recognition, creation, and

the rebirth of territorial wealth in a context of developmental crisis (oil shock, low GDP - Gross Domestic Productgrowth...), economic transformations (relocation and outsourcing), and the environmental, and repercussions of past development modes (unemployment, subsidence, extent of occupational diseases...). Undoubtedly, the multiplicity of terms related to change reflects the magnitude of the task and the diversity \mathbf{of} necessary approaches (Schmitt; Souza, 2020 p.198-200, own translation).

The disturbance of the commercial structure in the face of the new capitalist accumulation process ushered in another framework for capital articulation. This dynamic led to the redistribution of territorial occupation, resulting in the migration of activities and residents to the regional metropolis of Lille in search of new areas with greater valuation. This newly established dvnamic contributed to deterioration and degradation of Lens, alongside a population decline post-1960s (Figure 6).

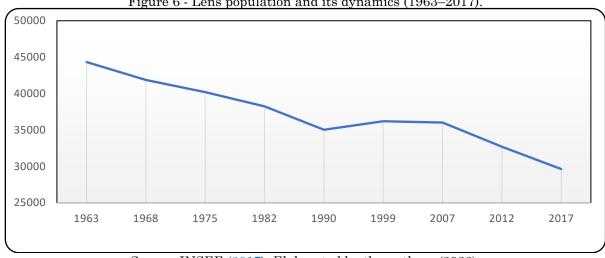


Figure 6 - Lens population and its dynamics (1963–2017).

Source: INSEE (2017). Elaborated by the authors (2023).

The prevailing circumstances demanded intervention from the French state to implement Territorial Reconversion plan through successive stages of spatial planning (1955, 1960, 1968, and 1981 until the official closure of the last coal mine in 1990). The objective was to produce a complete transformation of the Nord-Pas-de-Calais Mining Basin region. This reconversion unfolded across various domains and scales, as delineated by Schmitt and Souza (2020). The authors enumerate the following:

Technocratic Reconversion: This aspect implications through installation of new industrial economic activities and urban area restructuring. Approximately one-third of the buildings and accommodations in the Mining Basin were dismantled, with the population relocated to othereconomic zones Several (littoralisation des activités). actions were implemented during this period: landscape requalification; cultural reconquest to forge a new territorial identity; control and management of vacant lands; organization of local actors to increase the visibility of territories in the globalized economy; development of financial mechanisms to encourage owners of 'empty' lands to explore new wealth generation potentials; experimentation with new forms of development or projects to favor job creation;

- Normative reconversion: actions aimed at addressing the fragility of equipment installations through financial funds (Groupe Interministériel pour Restructuration des Zones Minières GIRZOM - Interministerial Group for the Restructuring of Mining Zones, in 1972; and the Fonds d'Industrialisation du Bassin Minier - FIBM - Mining Basin Industrialization Fund). These funds aim to improve roads, basic sanitation networks, and housing quality;
- Environmental reconversion: a part of this process occurred as a consequence of mine closures; i.e., the dark landscape of coal exploitation has naturally been replaced by the greenery of vegetation. However, since the 1990s, a reforestation policy has been implemented focusing on biodiversity and ecological networks (Trame verte et bleue) in order to integrate biodiversity preservation into framework of everyday life. It is worth noting the integration of the slag heap (terrils) as landscape entities and support for the new biodiversity by local actors, the Association "Chaîne des notably Terrils" (Terril Network, in a free translation), established in 1989;
- Legal reconversion: Legal reconversion is accompanied by the evolution of management modalities and the transfer of management competencies. According to Schmitt and Souza (2020), the combination of legal and management aspects with regional financing encourages the involvement of local actors in territorial planning strategies;
- Political reconversion: The disputes over resources and decision-making power in the Nord Pas-de-Calais region (since 2018, Hauts-de-France) have spurred the independent organization of actors in the Mining Basin, triggering local electoral contests that have secured regional and national mandates. This political effect becomes part of the consequences of the Reconversion process, as the former mining region now asserts new interests related to emerging demands and evolving cultural, economic, and other profiles;

Culturalreconversion: Cultural reconversion is a collective action involving the State, organized civil society, and companies. The establishment of the Louvre Museum in 2012 in Lens, for example, has attracted around 400,000 people annually. The effort to build a memory of the Mining Basin was also evident in the candidacy for UNESCO World Heritage status in 2012. Cultural reconversion implies the construction of a positive memory about the region, as well as the new image of a region integrated into globalization through various cultural activities, developed as part of a cinema and music industry;

The reconversion policy represents a substantial and ongoing investment initiative applied to the entire Mining Basin. Urban concentrations, the mining zones proper, and other areas have all been subjects of this comprehensive initiative. Notably, Lens has emerged as a primary beneficiary of the reconversion policy, even hosting the interactive unit of the Louvre Museum.

Despite the considerable efforts exerted, unresolved matters persist concerning regional spatial planning. A pertinent example is the intense daily migration from the cities within the Mining Basin towards the metropolis of Lille, a pivotal nexus for both individuals and enterprises in a region that directly connects France to the European Union.

Until 2016, the Nord-Pas-de-Calais region encompassed 12,451 km², one of the smallest regions in the country (Jean; Vanier, 2008). The population in 2013 was estimated at 4,052 million inhabitants - one of the highest population densities in France – approximately 326 inhabitants per km², compared to the national average of 115 inhabitants per km2 in Metropolitan France (France Métropolitaine) (INSEE, 2013). This region assumes a pivotal role in the structuring of the French territory and its economic integration with the European Union. Furthermore, since the 1990s, it has been actively engaged in a comprehensive policy of territorial planning (aménagement du territoire) and reconversion of degraded areas, particularly those within the former Mining Basin.

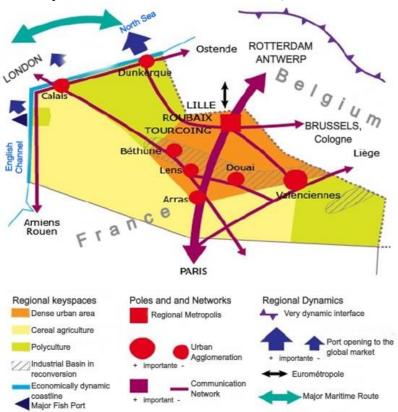
Importantly, the Hauts-de-France region is located in a strategic European space — intersecting major international corridors for the circulation of goods, commodities, and people (INSEE, 2012). The region shares borders with Belgium, and its proximity to the Netherlands, the United Kingdom, and the

national capital, Paris, provides it with a privileged geographical location. This advantageous position is further enhanced by a flat topography, facilitating the development of macro-logistical infrastructures. Therefore, the region becomes a crucial crossroads of transportation routes connecting Northern and Southern Europe.

Benoit and Saussac (2008) reveal that the applied planning in France aims at the territorial reconversion of these regions, highlighting transportation and logistics networks as key infrastructures for this reconversion and capital attraction. This was achieved through the construction of major trade axes, with planning focusing on the creation of network nodes or "carrefours européens" for the French. The characteristic of

being a "Carrefour en Europe," accompanied by strong political discourse, results in the region possessing a dense infrastructure and transport network connected to the vast European market. This feature has favored the fluidity of logistical transportation in the area and the attraction of new commercial activities. With the economic and territorial reconversion policies in the region initiated by the French State and, in part, the European Union (INSEE, 2012), cities in the former mining basin, including Lens-Liévin-Hénin-Carvin, Orchies, Oignies, and Courrières, have benefited from significant infrastructure development followed by the establishment of revitalized industrial areas, such as business parks and modern logistics hubs (Figure 7).

Figure 7 - Diagram of the organization and interconnection of urban zones and networks in the departments of Nord and Pas-de-Calais, France.



Source: Maxicours (2014). Elaborated by the authors (2023).

Following the road axes, particularly highways and expressways, exemplified by the A1 (Lille – Paris, via Lens), there has been and still persists a massive process of establishing commercial and service parks, including stores and hypermarkets, to serve transportation routes.

THE ESTABLISHMENT OF THE LOUVRE UNIT IN LENS: SPECIFIC IMPACTS OF CULTURAL RECONVERSION

According to INSEE (2012), the city of Lens is strategically positioned between the metropolises of Lille and Paris, presenting new prospects for economic and social development geared towards territorial reconversion.

Therefore, this area, historically associated with mining activities, has been designated for a modern and transformative project in the city's central district, specifically the Louvre-Lens Museum. This museum, characterized by modernist attributes, represents a novel infrastructure with a focus on tourism and culture. Concurrently, it serves to perpetuate

the cultural legacy shaped by the historical specialization in coal mining within the region. New job opportunities and tourism-related enterprises emerge, including hotels and restaurants, thus being an important factor in territorial reconversion and cultural valorization (Figure 8).

Figure 8 - Regional Reconversion in Lens: tourism and visits to *terrils* and mining pits; the requalification of the central area of Lens with restaurants and hotels for tourists; and the innovative form – the Louvre-Lens Museum.



Source: Le Point (2022). Elaborated by the authors (2023).

The restructuring of the city, significantly supported by the establishment of the Louvre Museum unit and the enhancement of the "terrils" (waste heaps), mining pits, and housing associated with the former mining activity to compose a tourist complex, has resulted in a cultural landscape recognized by UNESCO. This "reconversion" has given rise to new employment opportunities and activities, including the revitalization of old hotels and the repurposing of restaurants, the creation of new hotels and galleries, etc.

Evidently, the arrival of the Louvre Museum in the center of the former Mining Basin has exerted an influence that extends beyond the confines of Lens. The regional influence of the museum and the density of transportation and communication networks in the city favor the strong attraction of people and services in the region, in France, and in other countries (INSEE, 2012).

At the regional level, the urban conurbation of Lens-Liévin has a robust territorial project dynamic overseen by the Euralens agency. The agency has proposed a development strategy based on the concept of Urban Recycling to allow the renewal of functions and the image of the area, delineating an operational zone referred to as Noroxo. This planning area is located east of the Lens conurbation, covering a land area of 160 hectares within the mining basin.

From the different stages of mining, during 80 years of exploitation, only a few elements remain: roads, railway tracks, crossing points, and a perimeter wall - vestiges of old configurations now supplanted by new forms and functions. The complete dismantling of all industrial buildings in the Noroxo sector erased a painful history for the region's inhabitants. Without the industrial complex, the place has transformed into a vacant expanse, abruptly revealing its connection to the surrounding periurban context. In this sense, the Euralens agency perceives the reconversion of Noroxo, a polluted site, as an opportunity to reshape the image of this area within the urban conurbation. This endeavor is framed as an initiation of a virtuous cycle of development in the field of planning and sustainable development, aiming to convert the site while preserving its memory and history.

In the context of a novel regional territorial organization and the establishment of the Louvre Museum in the central area of Lens, it is imperative to underscore that, beyond the attraction and potential that the Museum can bring to the city, this new economic paradigm is closely related to the interests of local stakeholders and governmental bodies, in the face of a social framework in which the population of economically depressed zones still suffers from socioeconomic problems, such as

high unemployment rates, lack of specialized training, and resource constraints.

FINAL CONSIDERATIONS

From the territorial reconversion of the Nord and Pas-de-Calais Mining Basin region between 1960 and 1990, the cities situated therein underwent a profound metamorphosis in their commercial structures. Redevelopment initiatives were implemented to redefine the type of commerce practiced and their associated activities. The deteriorated structures with the end of mining economic activities, such as former hotels and theaters, were restored and included in a tourist route, marking the rehabilitation of some trade and service. Other including residences. forms. warehouses, and elements of the mining infrastructure, assumed new roles with the opening of hotels, restaurants, and museums, preserving the memory of the mining era.

In the city of Lens, new forms and functions have also been established, exemplified by the inauguration of the Louvre-Lens Museum and the opening of commercial galleries. The inauguration of the sole annex of the Louvre Museum outside Paris and the choice of Lens to house this project have a geostrategic character resulting from the attempt to repurpose the city and the Mining Basin as a whole for new economic activities, such as tourism, and the implementation of other cultural development activities like cinema, for example. These new regional dynamics exert influence on the city's central area, incorporating the mining heritage into these activities. The Lens tourist itinerary aims to interconnect the central area, now dominated by the tourism sector, restaurants, and hotels, with the "terrils" recognized as UNESCO Heritage, former coal mining pits (now inactive), and more, symbolizing the memory of mining activities.

conclusion, $_{
m the}$ repurposing restructuring present in the Hauts-de-France region, with the introduction of new activities into the territory, such as large commercial and service centers, logistical hubs for goods, tourist attractions such as the Lens-Louvre, and the rehabilitation of mining towns and exploration sites, provide opportunities for attraction. However, not the entire population is involved in this territorial reconversion process, with serious internal socioeconomic disparities remaining in the region and the areas of former mining activities.

The establishment of commercial and logistical economic activities may pose potential risks to the area, such as the expansion of soil artificialization. Furthermore, this axis of expansion of services and commercial areas of the former Mining Basin towards Lille, despite bringing new employment opportunities to a vulnerable region, ends up intensifying pressure on land and real estate speculation. The social and economic problems for populations that are not integrated into the reconversion persist, and these issues are essential to be addressed in future studies.

The entire process described regarding the development of territorial planning, as applied to the city of Lens, the subject of our study, but encompassing the entire Mining Basin region, including the revitalization of Lille, over the 30 years from 1960 to 1990, can be associated with the spatial adjustments implemented by the state to align spaces with the interests of market logic. With globalization strongly underway since the 1990s, there is a notable shift towards reshaping the intervention forms, now aligning the interests of the French state with those of businesses and organized civil society. The territorial reconversion policy implemented in the Mining Basin is reflected in Lens as a coordinated policy, in which the reaction of civil society becomes one of the most important elements in the success of territorial planning. Despite the numerous criticisms made about Territorial Reconversion in the Nord and Pasde-Calais Mining Basin, both in the past and present, it remains an established process in which geostrategy stands out. The role that the old and declining coal mining zone, now modernized and adapted to new functions, is expected to play in an area considered a "carrefour européen" is evident.

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AUTHOR CONTRIBUTION

Mauricio Aquilante Policarpo: conceptualization, investigation, data curation, formal analysis, visualization, writing – original draft.

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