



HAL
open science

Does the "Channel tunnel effect" still remain after twenty years?

Odile Heddebaut, Jean-Marie Ernecq

► **To cite this version:**

Odile Heddebaut, Jean-Marie Ernecq. Does the "Channel tunnel effect" still remain after twenty years?. *Revue Histoire des Chemins de Fer*, 2018, 48-49, pp385-417. hal-01824739

HAL Id: hal-01824739

<https://hal.science/hal-01824739>

Submitted on 27 Jun 2018

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Article paru en mai 2018:

Heddebaut, O., Ernecq, J.M., (2018), "Does the "Channel tunnel effect" remains after twenty years?", *Revue Histoire des Chemins de Fer*, "Twenty years under the Channel and beyond/ Vingt années sous la Manche et au-delà", N° 48-49, pp. 385-417.

**Does the "Channel tunnel effect" still remain
after twenty years?**

**20 ans plus tard, l' « effet tunnel sous la Manche » se fait-il
toujours ressentir ?**

Dr. Odile HEDDEBAUT¹

Researcher, (IFSTTAR) Université Paris Est, IFSTTAR, AME DEST
The French Institute of Science and Technology for Transport, Development and Networks

Dr. Jean-Marie ERNECQ²

Deputy Chairman of the European Metropolis Lille-Kortrijk-Tournai
Chief Executive of Nord-Pas-de-Calais Region (1996-2001)

Abstract – The Channel tunnel and the Eurostar TGV have been a great chance for the Nord-Pas-de-Calais Region replacing it in a European and French geography. The accompanying "Transmanche plan (Cross Channel)" has provided new infrastructures, regional integration and new opportunities. Channel tunnel, TGV and Transmanche Plan permitted the openness to Europe and neighbourhood regions and replace definitely the Region in a European dynamic. Nevertheless, the present changing economic context, new political philosophy and the wear dried up the driving forces. If the development conditions are there it lacks a new vision and a new engine. The restructuration around the Channel tunnel concession, the Port of Calais and the rail market with new operators could be the challenge for a new development for the Kent – Nord-Pas-de-Calais maritime region.

Keywords: Channel tunnel, high speed train network, HST, cross Channel back-up strategy, Nord-Pas-de-Calais Region, regional development.

Résumé – Le tunnel sous la Manche et le TGV Eurostar ont été une grande chance pour le Nord-Pas-de-Calais, le remplaçant dans une géographie européenne et française. Le « plan Transmanche (Cross Channel) » d'accompagnement a fourni de nouvelles infrastructures, l'intégration régionale et de nouvelles opportunités. Tunnel, TGV et Plan transmanche ont permis l'ouverture vers l'Europe et les régions voisines et de replacer définitivement la région dans une dynamique européenne. Néanmoins, le changement actuel de contexte économique, la nouvelle philosophie politique et l'usure ont tari ces forces motrices. Si les conditions de

¹ odile.heddebaut@gmail.com

² jmernecq@hotmail.com

développement sont là, il manque une nouvelle vision et un nouveau moteur. La restructuration autour de la concession du Tunnel sous la Manche, le port de Calais et le marché ferroviaire avec de nouveaux opérateurs pourraient être le défi pour un nouveau développement pour la région maritime du Kent/Nord-Pas-de-Calais.

Mots-clés : *tunnel sous la Manche, TGV, réseau à grande vitesse, plan d'accompagnement transmanche, région Nord-Pas-de-Calais, développement régional.*

A stimulation effect on all the regional stakeholders

The links between infrastructure realisation and development: the context of the back-up strategy settlement

Studies on the socio-economic impacts of transportation infrastructures take place in the main context of high infrastructure projects assessment which is included in the wider context of public policy assessment. The opening of the Channel Tunnel in conjunction with the creation of the European high speed rail network has highlighted the need to get a clearer view of how all these new large scale infrastructure plans will affect the regions where they are built. It was established, afterwards, that transport infrastructure investments could induce modifications of the behaviour of economic and social agent on a given territory. Nevertheless, they have not been estimated in the cost-benefit analysis and this has led to a new and wider assessment method called “impact or effect analysis” of the large scale transport infrastructure projects (Chervel, Le Gall, 1976). These new appraisal theories rely on the principle of automatic links between infrastructures and regional development based on an investment spreading mechanism (of a Keynesian type) which touches all sectors of the economy.

This process has led to a great number of impact assessment simulations with the help of models which involve traffic flow analysis and the spreading of the new demand for marketed goods necessary for the infrastructure building of all the economic sectors of the involved area (Biehl, 1991). Other macro-economic models can be used to estimate the effects of transport infrastructure expenditure on employment levels, income and other economic variables (Rietveld, 1992). Analysis of the relationship between infrastructures and development leads on to the concepts of the “structural effects” of the transport infrastructures, which were widely studied in the years from 1975-80 (Bonnafous, Plassard, 1974). These researches argue that construction of a large-scale transport infrastructure (especially a motorway or a high-speed rail link) must “automatically” bring about a series of consequences for the economic and social development of the region which receives the new infrastructure. In the case of France, this research, together with the need to respond to the new need for socio-economic assessment of the major infrastructures contained in the LOTI (Law for Orientation of Inland Transport) of 1982, led the Roads Department to issue guides with recommendations for carrying out these evaluation exercises.

The decade of the 1980s also saw a sharp rise in the activities of the Political Sciences concerned with the evaluation of public policy (Nioche, Poinard, 1984). These called into question the methods used to assist decision making, which had always been based on a cost-benefit approach, especially in the transport field (Bloy et al., 1977). During the same decade of the 1980s the principle concerning the automatic nature of the “structural effects” of transport infrastructures was vigorously disputed. Thus far the demonstration of the existence

of this high level of benefits has never been done with a clear explanation of what was due to this transport investment. This relationship between the construction of a transport infrastructure and its “structural effects” has even been considered as a “political myth” and a “scientific hoax” by Offner in 1993 (Offner, 1993).

Researchers noted in fact that discounted effects are not manifested systematically as soon as a new transport infrastructure is constructed. Moreover, they foresaw that the effects can be more or less diffuse, and can depend on the mobilisation of local players to achieve the targets defined at the outset. Thus, the definition of the consequences of the implementation of major transport infrastructures is evolving, and is giving way to a notion of “conditional structural effect” (Gaudard, Jeanrenaud, 1992; Heddebaut, 1997).

This new approach justifies the elaboration of a “back-up strategy” to integrate the implementation of the new transport infrastructure into an overall policy which covers all the social and economic sectors of a given territory. This strategy concerns the building period but first and foremost the operating period and consequently the time of the real influence of the transport infrastructure. The building period of the infrastructure occupies a relative place alongside the processes of the slow development of the effects linked to its opening even if this construction period itself can be observed and studied.

The regional geographical and geopolitical context

In 1985, the Nord-Pas-de-Calais region is a coastal, border and industrial region i.e. a peripheral region, corresponding to a French obvious statement, and a European reality. There is a hexagonal logic that has forgotten the Nord-Pas-de-Calais urban structure inherited from the industrial revolution and has ignored both the need for European integration and the need for national new internal regional balance. The North-South structural axes of the post-war have pushed away the coastal area without giving critical advantages for the Lille Metropolis (Lesort et al., 1996). On the coastal area, the port development was made without consultation or offensive strategy and the regional metropolis was without role or without decisive weight in this unstructured urban network. This development has been enriched with vested interests (such as fishing activities particularly in Boulogne-sur-Mer, cross Channel activities in the three ports of Calais, Dunkirk and Boulogne-sur-Mer) or historically offered (with the steel industry, the wide gauge canal) without effort of conquest of French or Belgian market.

Lille was in a cul-de-sac of the French railway network, which will further open to Europe thanks to two TGV (High Speed Train) lines to Paris, London and Brussels and which will strengthen its regional express train network (TER) (figure 3). A large private project, such as the cross “Channel fixed link”, was expected to deeply modify the existing Channel traffic and must have public support for a good physical integration. The Nord-Pas-de-Calais region had to manage immediately the Channel tunnel consequences in terms of construction, employment and traffic. The ports themselves were not in situation of competing and positioning themselves faced to the Channel tunnel. Effectively, a new territorial competition or the new international vision on the crossing imposed a major improvement in terms of welcome, services, and equipment (table 5).

The TGV project represented a new rail link the financial and technical installation of which was complex, subject of lengthy negotiations both on the route definition and on the financing with a European dimension not fully ensured. Originally indeed, the route itself did

imply neither Lille nor any other regional city to be served. After the decision to pass through and stop in Lille, it necessitated the construction of a new major urban station to be financed and connected to the traditional network and to the Lille Flanders station. A strong interconnection was desired by the Region for direct servicing of the Nord-Pas-de-Calais towns via the TER network already restructured and gradually more efficient since 1978 (when was signed the first French Railways Agreement between SNCF and a Region). Moreover, the passage near Calais required the construction of a "TGV" railway station connected to the traditional and coastal network and the Calais City train station.

Then in the case of the Channel tunnel, a strategic accompanying plan was set up by the regional authorities in order to make the project's spreading greater. In France, the abandonment of the Channel tunnel construction on the 20th January 1975 occurred in a period of strong faith in transport infrastructure structuring effects. This strategy was already sketched at the time of the previous attempt in 1973-1975 and fully in line with the ideas put forward within the guiding framework of "*Organisation d'études d'aménagement de l'aire métropolitaine du Nord*" Nord-Pas-de-Calais (OREAM, 1971; Heddebaut, 1995a, 1995b).

At the early 80s, the Nord-Pas-de-Calais benefited from an exceptional political context which created the opportunity first to realise the "fixed link", to overcome the geopolitical difficulties, to demand to support at national level the private investment infrastructure by the necessary public measures, and to offset, upgrade and structure the coastal area. Pierre Mauroy, Prime Minister, was a visionary leadership in Lille who saw in "the fixed link" and the TGV an exceptional opportunity to raise the Lille regional capital at a rank of European city with the creation of a "tertiary turbine" with the new Euralille neighbourhood. This had led the political, social and economic decision makers to elaborate a genuine strategy in the Nord-Pas-de-Calais region, when the British and French Governments announced their decision to relaunch the fixed link idea in 1981.

During the French British Summit of the 10th and 11th of September 1981, the two heads of State had decided to order a joint study on the interests and the possibilities of a "fixed link across the Channel". This event initiated a dialogue process between the French Government and the Nord-Pas-de-Calais regional authorities regarding this new transport infrastructure (Heddebaut, 1994). This procedure had led to the setting up of a regional group in charge of reflections and studies for elaborating a plan to maximise the regional project's spreading's.

An unprecedented mobilisation of the political and economic world for demanding accompanying plan for the Channel tunnel

The Nord-Pas-de-Calais regional council was a very young institution with new economic and development competencies and wanted to maximise the benefits of such a realisation and avoid negative effects. From September 1981, the regional Council created a "working group on a fixed Channel link and regional development" in charge of mobilizing all regional decision makers and local stakeholders and conceiving the guidelines of a specific back-up strategy. In February 1982, this working group presented a report (Percheron, 1982) which furthermore became the regional accompanying strategy concerning all the fields supposed to be affected by a "Channel fixed link". Since 1984, the regional authorities ordered an impact study of such a link from the American consultant group Bechtel which completed its report in August (Bechtel, 1985). The regional planners and elected members must deal with the disruption of established situations, and the strong impacts on the close or

neighbouring players. Indeed, the infrastructures particularly on the coastal area were under-sized to accommodate the expected growth of Channel traffic as well as the new concentration of flows towards the fixed link and the Calais harbour as predicted in several studies (Braibant, Lyall, 1982; Bechtel, 1985).

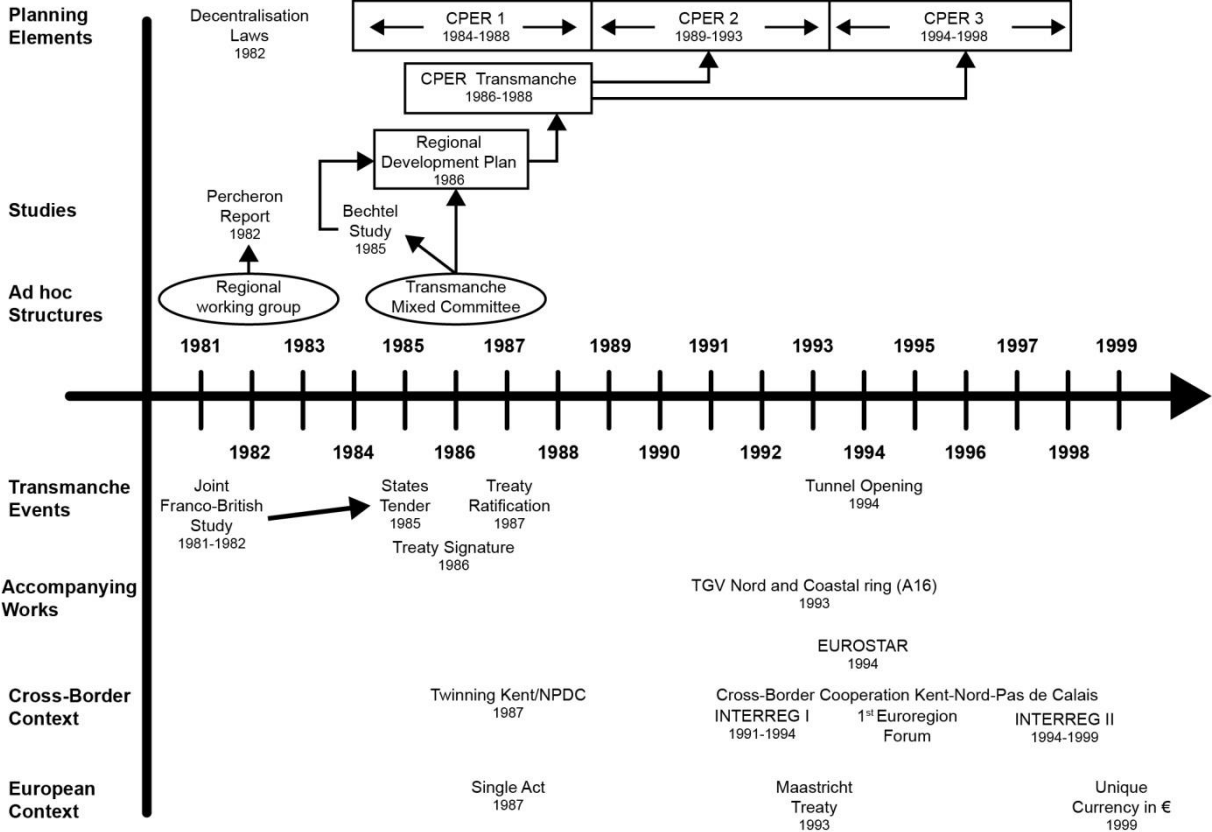


Figure 1. The Nord-Pas-de-Calais mobilisation for setting up a back-up strategy (source: Heddebaut, 1999).

On 2nd of April 1985, the two governments launched their international tender for the implementation and the operation of a fixed link across the Channel. In October 1985, a new working group composed of elected members of the regional Council and members the Regional Social and Economic Committee was set up under the name of “Comité Mixte Transmanche”. This group took on the drawing up of a specific strategy explained in a report dated 16th of December (CRNPdC, 1985) which presented on one hand the different choices of fixed links and their consequences for the regional population, economy and territory and on the other hand the actions to be taken to enhance its expected benefits and also minimize or compensate its negative effects particularly on the coastal area and harbour activity. Furthermore, a specific protocol was signed with the business community the 18th January 1986 to ensure consultation and economic impact of the “Channel fixed link project” at regional level.

The true stake of the fixed Channel link was placed beyond its building period. The report on a regional development plan was elaborated to stimulate and structure the new development of the region beyond the coastal area, including compensation and support measures (CRNPdC, 1986a).

Table 1. The State – Nord-Pas-de-Calais Region Cross-Channel Contract Plan Agreement (source: « Plan Transmanche » State – Région Nord-Pas-de-Calais' agreement, 14 mars 1986, Heddebaut, 1995b).

<p><i>PURSUED OBJECTIVES</i></p> <ul style="list-style-type: none"> - Maximising the effect of the building site on jobs and regional firms. - Worker training to meet the needs of the building site during and after the construction. - Improving the flow of the new traffic by upgrading transport infrastructures. - Facilitating the economic diversification of Boulogne, Calais and Dunkirk harbours. - Favouring tourism and goods transport. 	<ul style="list-style-type: none"> - Electrification of the Calais-Hazebrouck section and study of the servicing of regional coastal harbours by railways in terms of time and frequencies in relation with the Channel tunnel terminal and the regional, national and international railway networks. - Adaptation and promotion of the regional public transport. <p><i>Harbour development</i></p> <ul style="list-style-type: none"> - Development and modernisation of Dunkirk harbour installations. - Eastern extension of Calais harbour. <p><i>Fishing-harbour enhancements, modernisation and transformation of the Boulogne industrial fishing fleet.</i></p> <p><i>Goods transport</i></p> <ul style="list-style-type: none"> - Development of the goods transport function. 	<p><i>III Tourism</i></p> <ul style="list-style-type: none"> - Housing development - Financing of contracts for coastal area actions. - Proposals for specific training for the tourist industry. - Promotion of tourism. <p><i>IV Environment</i></p> <p><i>Housing</i></p> <ul style="list-style-type: none"> - Setting up of housing restoration funds. - Elaboration of experimental management programs like the Construction Plan procedure on the new population welcoming sites. <p>Urban conversion and derelict industrial areas</p>
<p><i>DEDICATED MEANS</i></p> <ul style="list-style-type: none"> - Application of the "Big project site procedure" to the project. - Creation of a coastal Development Fund. <p><i>I Transport infrastructures</i></p> <p><i>Road infrastructures</i></p> <ul style="list-style-type: none"> - Realisation of a coastal highway from the Belgian frontier to Le Havre. - Road and Motorway network improvement and linkage to the hinterland network (A26, RN42, A25) and harbour installations. <p><i>Railway infrastructures and public transport</i></p> <ul style="list-style-type: none"> - Examination of the Northern TGV Project. 	<p><i>II Training and research</i></p> <p><i>Initial training</i></p> <ul style="list-style-type: none"> - Upgrading of initial training facilities and increase in capacity of the organisations. - Creation of professional graduate and post-graduate training, 1st university cycles in Dunkirk, Boulogne and Calais. <p><i>On-going professional training</i></p> <ul style="list-style-type: none"> - Reinforcement of the on-going training machinery and of the AFPAs centres. - Creation of a permanent on-going training centre. <p><i>Research and technology</i></p> <ul style="list-style-type: none"> - Reinforcement of Research-Development action programs which could contribute to the cross Channel Plan. 	<ul style="list-style-type: none"> - Setting up of urban rehabilitation and derelict industrial, commercial harbour area treatment programs in the framework of "Easier living in town" and "Derelict industrial areas". <p><i>Environment</i></p> <ul style="list-style-type: none"> - Acquisition by the Conservatoire du Littoral of sites affected by the Channel tunnel terminal. - Realisation of information and welcoming structures on the Syndicat Mixte du Boulonnais territory by the Parc Naturel Régional. - Protection of fragile sites (sand dunes) sensitive spaces (marshes, watergangs). - Laying-out and improvement of the Cap Gris-Nez and Cap Blanc-Nez sites. - Setting up of a permanent instrument panel for the maritime and coastal environmental following.

Indeed, measures to accompany the construction works were proposed to “facilitate the integration of the works in a long term planning”, and were put as prerequisites to the presentation of the tools and the means to be mobilised or created in the regional strategy. This was incorporated into the new planning decentralisation process begun in 1982. The Region elaborates its own regional plan which includes all the measures to be implemented in all the fields affected by its new decentralised powers. It corresponds to a sort of “territory aspiration” in terms of planning and regional social and economic organisation. The State does the same exercise in order to draw up a national level plan. Then the Region starts a

concertation process with the State to ensure joint financing of certain actions and a Planning Agreement fix their respective commitments on all the measures being at the “intersection” of these two own plans.

The Channel tunnel regional development Plan and the Planning Agreement occurred in a period situated outside the normal planning document concertation and drafting. Indeed the previous plan agreement between the State and the Nord-Pas-de-Calais regional Council covered the 1984-1988 periods. It presents actions which do not include the new regional context introduced by the decision to realise a fixed link. Therefore, they had to find a “common ground” to reach a “new contract” respecting the commitments in the previous planning documents and responding to the new needs linked with this new political decision (figure 1).

The time passed between the redaction and adoption of these two documents was very short. Indeed the “Elements for a regional development plan” report explaining the regional policy and demands to maximise the spreading’s of a “fixed Channel link” was given to President François Mitterrand on the 20th of January 1986, when he came in Lille to announce which tender was to be awarded. The “Cross-Channel agreement” between the State and the Region (CRNPdC, 1986b) was signed on the 14th of March 1986. Its content concerns mainly transport infrastructures to be realised but also describes actions in the domains of tourism, education, research and environment (table 1).

Transport infrastructure investments achieved through the Transmanche Plan

Investments were induced by the realisation of the Channel tunnel. On the one hand, investments directly induced by these new construction such as new roads necessary for the flow of new traffic forecast, the reorganisation of the railway operations related to rail traffic circulating in the tunnel, particularly in Calais, and harbour investments to face new competition expected with the Channel tunnel. On the other hand, the amounts of investments by modes that correspond to measures of “territorial compensation” that have been programmed to win the support of all political, economic and social regional stakeholders on the regional territory for this large-scale infrastructure. This is the real cost in additional infrastructure for the deployment of high-speed railway at the regional level, further work road access to the coastal A16 motorway and aids to diversification of Calais, Dunkirk and Boulogne-sur-Mer ports.

The information was distributed in the various technical and financial services of the different stakeholders funding this transmanche policy (the State, Regional Council, National railway company (SNCF), the Regional Equipment Direction (DRE), the Industry and Commerce Chambers (ICC), the Autonomous Port of Dunkirk (PAD), North and East Motorways company (Sanef)) or held by bodies that financed alone specific investments because of the realisation of the Channel tunnel and the North TGV (Heddebaut, Laudren, 2000).

The road transport infrastructures

For the road transport infrastructures, we examined the physical implementation and the funds actually allocated to the realisation of the coastal ring road name “rocade du littoral”. Then we realised it for other road infrastructures included in the accompanying Channel tunnel strategy. The coastal express

road that became the A16 motorway was planned into the “transmanche strategy”. It was financed by the State (65%), the Nord-Pas-de-Calais Region (28%) the two départements of Nord and Pas-de-Calais (3%) and other contributors (the coastal cities, FEDER...). Its cost was € 461.94 million. The road link on the A25 towards Dunkirk was achieved and ensured continuity motorway between A16 and A25 cost € 5.29 million. The road links between the harbours and their hinterland via the A16 motorway were obtained under the compensation policy. The road link between Boulogne-sur-Mer and the Capécure zone cost more than € 32.2 million. The express road “East ring” between the Calais harbour and the A16 motorway was not included within the “transmanche strategy” however the State agreed to compensate the road program with contribution of the region. It is a road link (with grade separated intersections) between the edge of the port area of the East port of Calais on the one hand, and the intersection of the A26 and A16 motorway on the other. The goal was to allow its simultaneous opening with that of the A26. It costed € 23 million. Doubling the RN 42 linking Boulogne-sur-Mer to the A26 and A25 is an operation which had long been demanded by local officials to promote the opening of Boulogne area. The completion of the tunnel is an opportunity that they seize to give this priority in the agenda. Its cost was € 149.5 million.

Table 2. Roads investments (source: Nord-Pas-de-Calais Region*, DRE*, Sanef* (* data obtained during meetings), (Heddebaut, Laudren, 1998, 2000)).

Transport modes (in € million)	Additional investments to the Channel tunnel directly related to sea crossing link	Investments to “compensate” the negative effects of the Channel tunnel on other territories
ROADS	-A16Coastal motorway 461.94	-Road links to the ports 66.52
	-A26/A16 junction near Calais 80.79	-Inland road links 154.79
		Regional initiatives:
		- Interchange A26 on A16 : 12.95 interchanges 5.33 - Lightning 17.17 (investment)
TOTAL: 799.49	542.73	256.76

The total amount for road investments was € 799.49 million of which one third corresponds to investments in order to “compensate” the negative effects of the Channel tunnel.

One of the main effects on the coastal area is the reduction of time travels.

Table 3. New road accessibility between the cities of the coastal area (source: “Times tested in 1993 by the authors on the A16 motorway sections compared to the previous N1 road same sections”).

travel time	Before A16 construction	After A16 construction
Boulogne-sur-Mer /	1h30	45mn

Dunkirk		
Dunkirk / Calais	45mn	25mn
Calais / Boulogne	45mn	20mn

Railway investments

They are essential complement to the Channel tunnel. Achieving North TGV is decided by the Government in October 1987 and its layout is declared of public utility in September 1989, so as the commissioning of the tunnel and TGV being simultaneous. To recall, the initial SNCF project ensure rapid service to major European centres (Paris, London, Brussels, The Ruhr) by not considering stopping in Lille (the latter increasing journey times between London, Brussels and Paris). Local political and business leaders then seized this project, which if certain provisions were retained, could boost regional economic and industrial fabric. Therefore, after negotiation, the Contract Plan 1989-1993 between the Region and the State (Article 60 “realisation of high-speed train”) integrates the ministerial decision in favour of the passage and stop in Lille and found an agreement between the various parties on a surcharge of € 122 million (including the construction of a new urban rail station, “Lille Europe”), at 1989 price.

From the elements collected from the Regional Direction of SNCF and the Regional Council we have done an “ex post” evaluation of the investments needed for the crossing of Lille by the North TGV including the new station (Heddebaut, Laudren, 2000). We also provide an assessment of the overall cost of the new North TGV track in its infrastructure component (about € 2.05 billion), the cost of rail facilities related to the operation of the North TGV (electrification and connection) and finally, an “ex post” evaluation of railway accompaniment of compensation likely to spread high-speed rail on the whole regional territory.

Table 4. Railway investments (source: Région Nord-Pas-de-Calais*, Regional Equipment Direction (DRE)*, SNCF* (* data obtained during meetings), (Heddebaut, Laudren, 2000)).

Transport modes (in € million)	Additional investments to the Channel tunnel directly related to sea crossing link	Investments to “compensate” the negative effects of the Channel tunnel on other territories
RAILWAYS	- Lille crossing by the T.G.V. and Lille Europe station	141
	- Electrification of the Calais-Hazebrouck line	77.59
	- Investments on the Calais rail network	210.3 7
TOTAL: 515.7	428.96	- Accompaniment railway for T.G.V in the region 86.74
		86.74

Local officials preferred that TGV can be initialised directly from Dunkirk, via the junction of Cassel (line Dunkirk-Lille-Paris). But this option makes the hypothetical possibility of considering one day rise direct freight traffic from Dunkirk (freight railway station of Grande-Synthe) to England, for example for containers. The measures made on the railway lines thus enable the circulation of TGV to Lens, Douai, running on equipped classic lines, and the establishment of correspondence between Douai and Cambrai, Calais and Boulogne-sur-Mer. Arras became a new hub, with a junction to the South for the regional “initialised” TGV to join the main TGV line towards Paris and a North junction towards Lille and Brussels. In order to “initialise” TGVs from the main regional cities, it was necessary to endorse works on the railway lines to allow the TGV to circulate. It consisted in the electrification of the track from Lille towards the Belgian border for an amount of € 8.59 million, the electrification of Douai-Cambrai for € 8.7 million, the electrification of the Boulogne-sur-Mer-Calais track for an amount of € 52.03 million, the junction at Arras to join the high speed line to go to Paris that cost € 7.83 million and the junction between the TER line and the high speed line at Cassel to allow the departure of TGV trains from Dunkirk that are running on the new TGV line to go to Paris via Lille for an amount of € 9.56 million (figure 2).

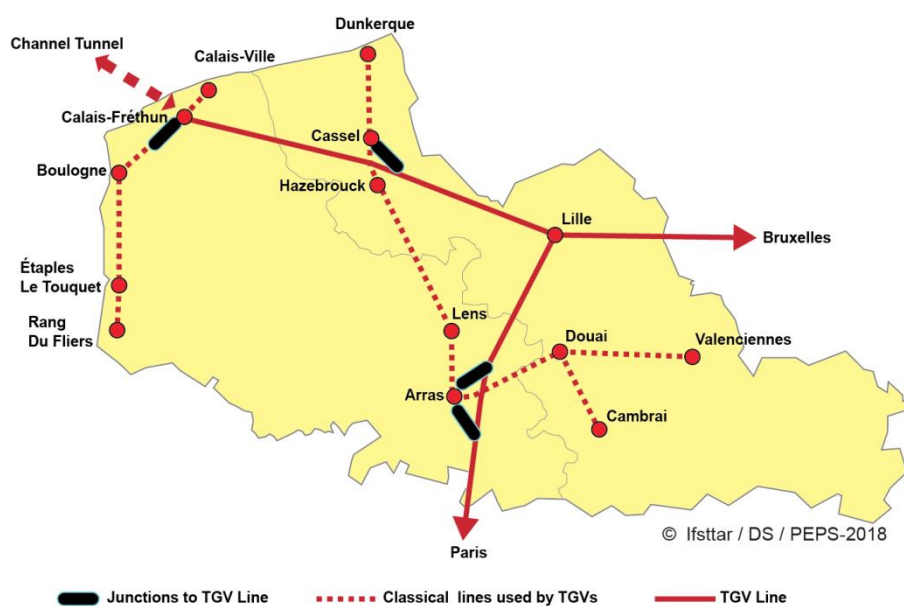


Figure 2. The regionalisation of the high speed towards the main regional towns (source: D. Bourbotte, Ifsttar realisation, based on the avril 2012_map _dessertes-à-grande-vitesse-du-territoire régional-Carthotèque-SIGALE).

In total, thanks to these investments of € 86.7 million (table 4), the North TGV has three functions in the Nord-Pas-de-Calais region: first it is used as a new national link to go rapidly to Paris with the “initialisation” in the main cities on the coastal area and in the former coal mining area, to spread over the French national network with direct TGV from Lille towards all French regions. Second it is also used as a regional transportation system called TER-GV, high speed regional express trains circulating partly on the new high speed tracks that have put the coastal area until Rang du Fliers closer to Lille (Figure 2). Third it gives international access to London and Brussels with Eurostar and Amsterdam with Thalys via Lille stops (Figure 3).



Figure 3. The place of the Nord-Pas-de-Calais region on the TGV railway network (source: D. Bourbotte, ifsttar realisation based on the French railway network in 2017 on sncf-reseau.fr).

The realisation of the Nord TGV and its junctions on the high speed tracks has replaced the Nord-Pas-de-Calais region in a hub position on the French national and the North European networks.

The realisation of the Euralille business centre (about € 792 million) is one of the main visible consequences of the coming of TGV in the Lille Europe station. This ambitious project, which bets on TGV spreading effects, has received thus determinant supports of official members that illustrate their desire to give the region a European dimension.

Harbour development

Competition caused by the cross-Channel traffic of the tunnel has accelerated efforts to modernise and rationalise ports. They have sought to diversify, modernise and have

implemented very significant investments that are mostly included in the “Transmanche strategy”. We assessed an “ex post” evaluation of harbour compensation investments registered under the Channel support policy in planning documents. These investments are reported in table 5.

Table 5. Harbour investments (source: Région Nord-Pas-de-Calais*, DRE*, Coastal ICC* and PAD* (* data obtained during meetings)).

Transport modes (in million €)	Additional investments to the Channel tunnel directly related to sea crossing link	Investments to “compensate” the negative effects of the Channel tunnel on other territories
HARBOURS	Calais: Warf VI (jumbo-ferries) 13.86	-Dunkirk 34.63
	Warf VII (Transmanche) 19.74	-Calais 78.70
	Warf for catamarans 6.55	-Boulogne-sur-Mer 62.09
TOTAL: 215.57	40.15	175.42

The construction in 1987 of a new wharf (wharf VI) for a cost of € 13.86 million, to accommodate the jumbo ferries (and therefore absorb in the best conditions the steady increase in passenger traffic) reinforces the position of Calais in the field Channel traffic. The wharf VII for maritime Channel crossing was funded entirely by the Calais ICC, its ex-post cost is € 19.74 million. It was open in June 1990. A new wharf for catamarans ships in the East port was conducted by ICC in 1989 for a total cost of € 6.55 million.

In Boulogne-sur-Mer, port works programs conducted by ICC and funded in collaboration with other local institutions (including the Region), enabled the port to cope with the growth in fishing related activities, the commercial port, and particularly those relating to channel traffic by upgrading the wharf 13. The restructuring of fishing industry activities was realised to compensate the predicted fall of Channel crossing activities (enhancement of the artisanal fleet, creation of unloading refrigerated halls and development of the tide station). In Dunkirk, measures were financed to modernise the steels wharf; to extend the West harbour container quay, to develop the container traffic; to develop the West bulky Wharf (for bulk cargo) and to create a true maritime terminal with a quay, bridges and embankments and a completely new berth for a global amount of € 48.89 million. Other investments of € 32 million were programmed for realising freight and logistic centres. € 9.63 million were invested near Calais in a centre called “Transmarck”, € 21.69 million near Boulogne-Sur-Mer in the “Garromanche” centre and € 0.77 million in Dunkirk for the “tertiaire centre”.

All these accompaniment investments had a heavy impact in the State and Region planning process (CPER) (figure 4). Particularly financing the A16 motorway with its numerous interchanges has increased the participation of the Region for road investments.

From 1989 to 1998, the Region invested for the first time in railway tracks, prefiguring its future role as a transport organizing authority for railway passenger traffic.

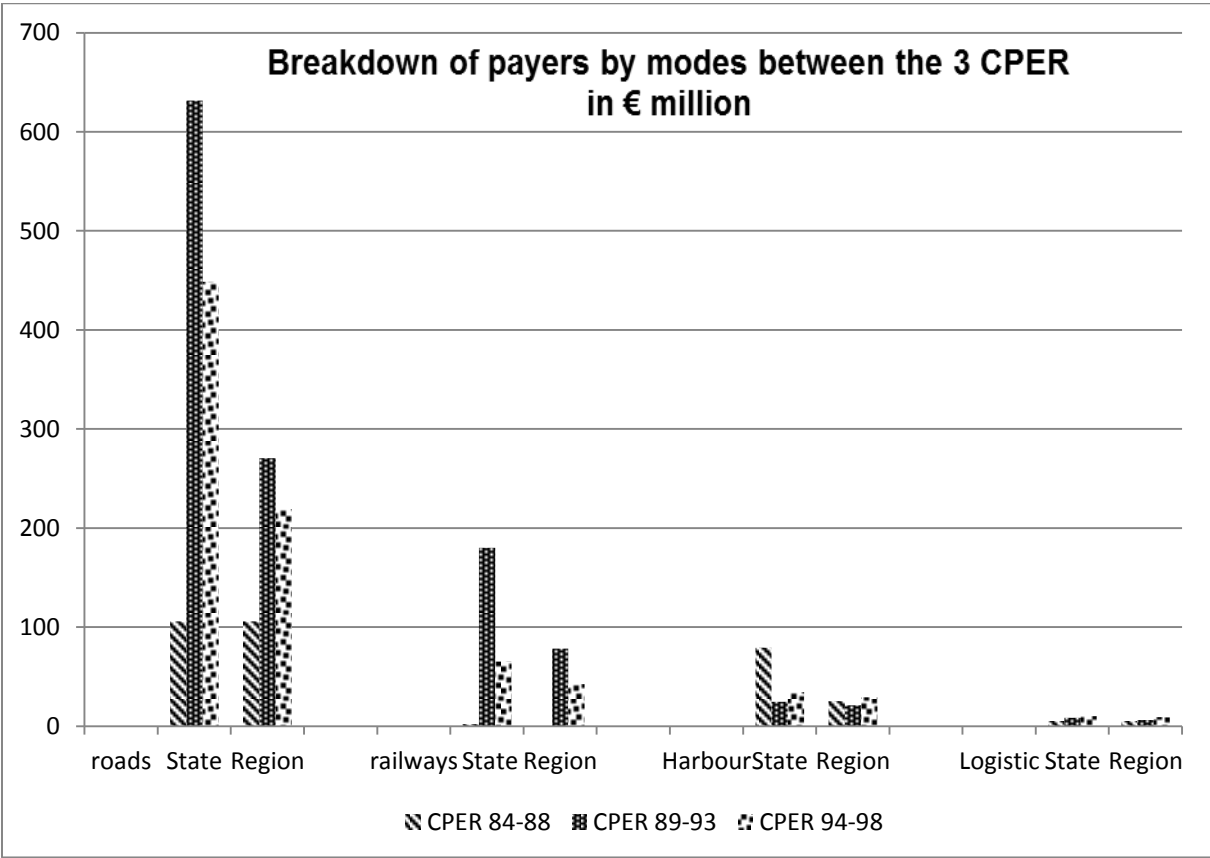


Figure 4. The weight of the infrastructure back-up strategy in overall planning between the State and the Region from 1984 to 1998 (source: CPER, Contracts Plans between the State and the Region between 1984 to 1999, Planning and finance executive documents).

A complex and slow process of regional development

What accessibility, new or renewed, are we talking about?

Eurotunnel is a railway tunnel for “express trains connecting the capital cities” of commercial companies, which combines high frequency crossings for conventional trains, trucks and car shuttles. It is a new rail concept the “Eurostar” that looks like more an airport system than a traditional rail network innerving a territory, except in Lille, which became a true “hub” located at the north of Paris. It also represents a coastline road lorry corridor almost extraterritorial from Belgium to the tunnel using a new ad hoc coastal motorway network, the A16 motorway and leading to a system of highly specialised frequent shuttles. The Eurotunnel rail system combines direct conventional trains and shuttles that authorise users, car passengers, and bus and lorry drivers to cross the Channel and arrive “well-rested” and propels them to their final destination, which therefore do not encourage them to stop at the exit.

The combination of the tunnel and the port of Calais operates a flows concentration and thus a formidable competition from terrestrial Channel flows for Belgian ports but also

Boulogne-sur-Mer and Dunkirk, to the benefit of Calais. But now the emergence of a new kind of “Berlin border wall” – that of Schengen – reduces the Channel-North Sea interface and seriously disrupts the development of the coastal area while strengthening relationships with medium distance areas (Lille) and more.

The articulation of all northern infrastructures (ports, roads and rail) repositions the Nord-Pas-de-Calais region and puts its Lille European Metropolis (MEL) on the network of northern Europe as well as it is for the UK through the up-grading of the European asymmetrical access to northwest European mainland.

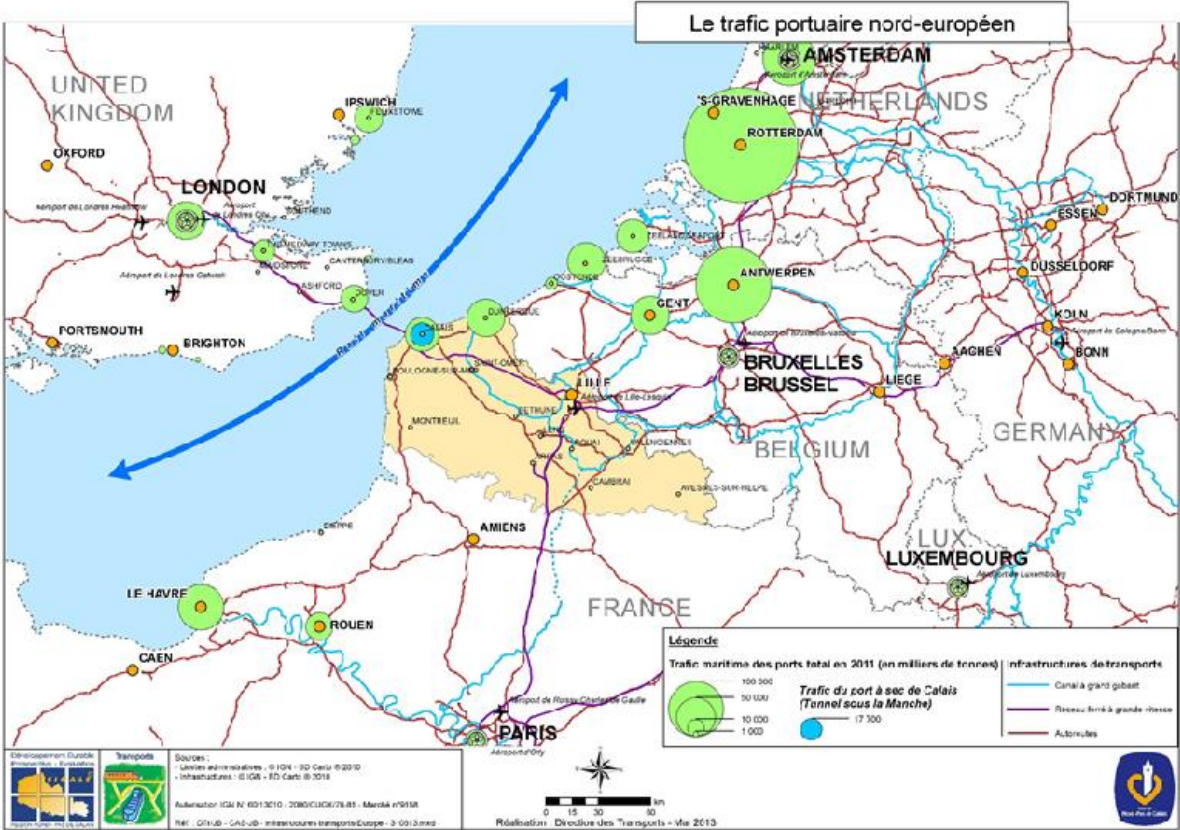


Figure 4. North European maritime transport and traffic (source: CRNPdC, 2013).

The TGV to Lille changes the role of the Lille metropolis within its hinterland and Northwest Europe, and its accessibility has improved dramatically to be one of the best in Europe (MIT, 1999).

The accompanying program has been an incredible boost to all regional infrastructures and the port cities and creates an integrated coastal area and participates in structuring the region in depth. But the power of the train operators, without regulations or territorial political counterparts; today is weakening the TGV stations, reducing the economic impact of the tunnel and can eventually threaten the quality of accessibility to the territories for travellers.

The infrastructure is a facilitator of a new development exceeding a generation

The tunnel has multifaceted impacts because it is question of economic and social development, spatial planning, European integration, international exhibition, new centrality, mental and actual positioning in Europe, changes in mentality and cultural openness... For example, with the accompanying strategy (table 1) it was the occasion of raising the level of education with the creation of the Littoral Côte d'Opale university, strengthening the structure of secondary education and “grandes écoles” (Engineers school in Calais, Commerce school in Dunkirk). The creation of industrial zones has attracted private industrial investments on the coast such as Coca Cola, Ajinomoto, and Continental Can in Dunkirk.

It was the occasion of strengthening the tourism structure of the coastal area with the valuation of natural spaces (natural park “Marais Côte d'Opale” and the State decision to classify the “site of the 2 caps” with the Blanc-Nez and Gris-Nez cliffs as “French big site”), the rise in quality of tourist accommodation and hotel infrastructures.

The progressive strengthening of the Calais harbour platform and highway accessibility was realised. The structuring of a new sustainable governance on the coastal area with the creation of the “Syndicat Mixte de la Côte d'Opale” in April 1996, representing extensions and successive transformations of the “Dunkirk Calais Studies Syndicate” of late 80s to gather now, under this new name, all the actors of the Nord-Pas-de-Calais coastal area in a triangle from the Belgian border to the border of the Picardy region and to Saint-Omer. This new representation of the coast should enable a better overall understanding of the planning problems for the territory in this space. As regards the transport sector, for example, the development of the Travel Master Plan was done at this level of territorial representation and involved all the stakeholders. The State, the Region, the Départements, municipalities and local policymakers are systematically involved in the same meetings and this should, in principle, result in a concerted and complementary land planning.

Next to that, the creation of the ephemeral Euroregion (Heddebaut, 2004) (but long remained rooted in the collective citizen imaginary); after his disappearance it allows the creation of the European Grouping of Territorial Cooperation Belgian Western Flanders – Dunkirk. The upgrading in reception and cultural facilities in the cities of the Côte d'Opale, Calais, Dunkirk and Boulogne-sur-Mer was reached. An unexpected sport impact of the London 2012 Olympic Games was the trainings in the Côte d'Opale area of many Olympic foreign teams...

The effect is seen on a vast territory: interconnected or connected by the TGV and therefore the national, international rail networks and TER Nord-Pas-de-Calais. The tunnel has provoked the acceleration of the TGV building on the Paris-Lille line in order to be open when the tunnel is achieved. At the same time the creation of a Brussels-Lille TGV line put these two towns at 38 minutes, and in 2013 a Thalys Amsterdam-Lille was inaugurated, therefore these railway infrastructures progressively anchored the Nord-Pas-de-Calais region to the European rail connection. Lille became a major hub for rail intersection in the North of France (Heddebaut, Di Ciommo, 2017), leaving Amiens without a direct London access. There was a strong regional willingness to interconnect many cities and even boot TGV in the three port cities and then help the creation of the regional concept of TERGV (Regional Express High-Speed Train, with TGV rolling stock) (figure 2). Or the increasing saturation of the south entrance to the Brussels South station owes much to it.

With the nomination of Lille as European cultural city in 2004 and its aftermath under every three years “Lille 3000” program consisting in hosting cultural manifestation under

international themes, the Eurostar and TGV network has enabled the creation and amplification of a market for accommodation, catering and conferences in Lille and therefore also looking for quality, a better environment to the size of a European challenge.

Curiously the impact of English tourists on Lille metropolis seems more important than on the coast. Indirectly, it also enabled the implementation of the Louvre in Lens with TGV access and due to the reputation of the Nord-Pas-de-Calais railway accessibility. But it also strengthened the development of logistics activities around the Greater Lille and Dourges, the Lille southern multimodal freight platform.

A modulated development over the time: the short-term effects were related to the construction period (not to be mentioned directly) which have mobilised the economic world, helped to structure itself, and allowed workers training for the construction needs. The medium term effects are seen with the impact of these exceptional global investments that places the Channel Tunnel and its coast sides (British and French) on the European map or even worldwide for many large traditional investors thanks to this new accessibility and gain in visibility. The region became able to obtain public or private amenities and utilities for residents and numerous people in transit. The long term effects, like the psychological impact, the cultural openness, changing attitudes are difficult to measure, but real with the arrival of tertiary activities as English law firms, logistic companies or for responding to the English weekends demand and on the “Braderie” fair of Lille (sellers and buyers).

Does the new accessibility still produce growth?

Conditions for development?

The Channel tunnel produces regional planning and creates better conditions for development but not growth per se. we must distinguish the transport modes, the economic and urban environment, the geographical positioning and consider the time of creation.

The reality is very different on each side of the Channel because of the strong asymmetrical picture: Nord-Pas-de-Calais was at the France periphery, very much in a cul-de-sac position (for rail), and ignored very much its maritime dimension; the United Kingdom, after joining the EEC in 1973, was facing a growing exchange of goods with the continent. The Nord-Pas-de-Calais region was on the pathway for British trucks and tourism. The historical backwardness of infrastructure in Nord-Pas-de-Calais was a development issue for the internal integration of the 4 million inhabitants and economic fabric; the fierce competition between the three ports had no reason to cease apart strong external pressures. The success story of the Channel tunnel came unexpectedly, was used in the same direction both by central and regional levels to overthrow resistance, to get agreements, to open new economic opportunities in front of local partners unarmed, some with high unemployment, to decide on some planning strategy and new (needed) transport investment.

The city of Calais was unable to take advantage of the new stake due to the political environment, (from 1986 to 1994) apart from the Chamber of Commerce led by a very strong and talented President, Henri Ravisse, who resisted as much as possible to get larger investment compensation. But to have a real winning strategy on the long term, it took more than twenty years: since 2007 the Nord-Pas-de-Calais region owns the ports of Calais and

Boulogne-sur-Mer but the ICC of Calais only launched in 2004-2006 an important reflection on the future and a new master plan for 2015 as the facilities were close to saturation.

	Freight		Passengers		Vehicles		Employees	
	<i>millions Tons</i>		<i>millions</i>		<i>millions</i>		<i>thousands</i>	
	All	TM	All	TM	cars	trucks	All	direct
Dunkirk	58		2.2		0.6	0.6	28.6	3.7
Calais	40	.	11		2	1.8	12.1	3.6
Boulogne	0.5		0.6		0.2		9.7	1.9
Total of 3 ports	98.6		13.8			2.4	50.3	9.2
Tunnel (TM)		1.2		16.1	2	1.3		2.5
Dover			13.3		2.7	2.3		

Table 6. Main economic and transport statistics between the 3 port cities in 2009 (source: CRNPdC, 2009).

		2006	2012		2013	2014	2015	2020	From 1994 to 2014
								Objective	
<i>Shuttle - cars</i>	<i>millions</i>	2.0	2.42		2.48	2.57	2.614	3	
<i>Shuttle - trucks</i>	<i>millions</i>	1.3	1.46		1.36	1.44	1.483	2	23
<i>Sh - Eq goods</i>	<i>millions Tons</i>	16.9	19		17.7	18.7	19.3		300
Passengers(cars+ TGV)	<i>millions</i>	15.7	20.4		21	21			366
Passengers TGV	<i>millions</i>	7.85	9.91		10.13	10.40	10.40	13.5	163

Table 6. Cross Channel figures Tunnel (shuttle) and ports (source: Eurotunnel Group).

The tunnel came right on time to absorb a fast growth of passengers and goods. New train operators (Air France, Deutsche Bahn, Virgin?) will continue to increase the passengers traffic as new ways to transport mail and packages will increase and stir cross-Channel freight.

The tunnel system does mix shuttles (with road on rail) and direct trains; it experiences no real transport competition on the location. It added to the attraction of the port itself as a safety capacity and a complementary way for specific trucks (dangerous products, extra-large or heavy loads). Continuous improvement in equipment and service helped the tunnel to take a 50% share of the traffic.

From new accessibility to new perspectives

New accessibility for the French Nord-Pas-de-Calais coastal area

In the context of the new accessibility, the first collective agreement was easy to obtain in principle, and most of the battles for new transport investment were a success for the public partners and local authorities. After seven years of construction of the tunnel, some early investors were dead because of too early investments, most others realised that it was time to go ahead but first positive changes and results tended to slow down their initiatives. In between the duty free system disappeared in 1999 and near 10 millions of passengers disappeared for ever.

The tunnel system allowed setting up through a generation a new network of regional infrastructures, strengthened the coastal area and imposed compensation on old ports and affected cities for better services, for improved economic efficiency and new quality of life. There was a rapid increase of traffic after the opening in 1994, then the World crisis in late 2000's have clean up the overestimates of real traffic increases, passengers, stopovers, economic benefits as usual. New operators arrived (Europorte freight trains between Lille-Dourges and Barking, East London) but even with some success, freight remains much lower than expected.

The real impact from the use of the tunnel on the sea side has been much less than expected because no daytrip connection were possible using Eurostar on both side (up to recently), and very expensive crossing (Heddebaut, 2001). Today the difficulties have been dramatically increasing with the human drama of the migrants. On the continental side there is no nearby capital city like London on the UK side. The TGV network favours rare exchange points and Lille is the only attractive stop for passengers on the London Brussels route. So, most of the benefits went to Greater Lille.

New accessibility certainly, but it needs time to adapt

It was necessary that “public authorities and moneys” compensate before or simultaneously with the concomitant negative effects it produces during the new constructions; it is generally extremely expensive while allowing an upgrade or enhancement of secondary elements, even if they in turn contribute to the development.

It took at least 20 years for the Channel tunnel to reconcile the Nord-Pas-de-Calais with its coastal area. It initiated cooperation between both sides. The Regional Assembly decided to develop links with Kent, and formalised the signing on 24th April 1987 in Leeds Castle a “Memorandum of Understanding on cooperation” between both authorities. This gave rise to the “Transmanche Region”, with a “permanent forum for dialogue and common, mutual information and entertainment” which took the name of “Joint Commission Kent / Nord-Pas-de-Calais”. This body was responsible for preparing common economic issues for asking European aid as part of cross-border inter-regional cooperation policies (CRNPdC, KCC, 1987; Heddebaut, 2015).

A first structuring effect on regional research, with the existence of the twinning of regions on both sides of the Channel Tunnel, was materialized in June 11th 1987 with the signing of a cooperation agreement between the Universities of Lille II and Canterbury in Kent. This cooperation lasted from Interreg 1 (1991-1994) to Interreg 4 A “2 seas cooperation” mainly in 2015 in tourism domains.

The innovation effect or the real change of image blunted with time; just look at the communication/promotion of Eurotunnel over the past 20 years. The discovery effect for new tourist flows also tends to disappear over time for lack of renewal in the territorial attraction.

It opened new perspectives for the Lille Metropolis

In the positioning on the European high-speed network (because of the lack of an efficient airport, Lille-Lesquin stuck between Paris and Brussels) it gives a new credibility and visibility. The TGV network offered new international accessibility by London and Brussel servicing with Eurostar, Amsterdam servicing with the Thalys, accessibility to the Charles de Gaulle-Paris, Zaventem-Brussels and Schiphol airports. The quality of leadership, of expertise, of services brought more fallouts in tourism... than it may have been expected.

The current economic environment impedes the long potential effects

The negative effects of restructuring after the opening of the tunnel are still being felt when the absence of growth from 2006 to 2017 is still beating down the arrival of new public investment.

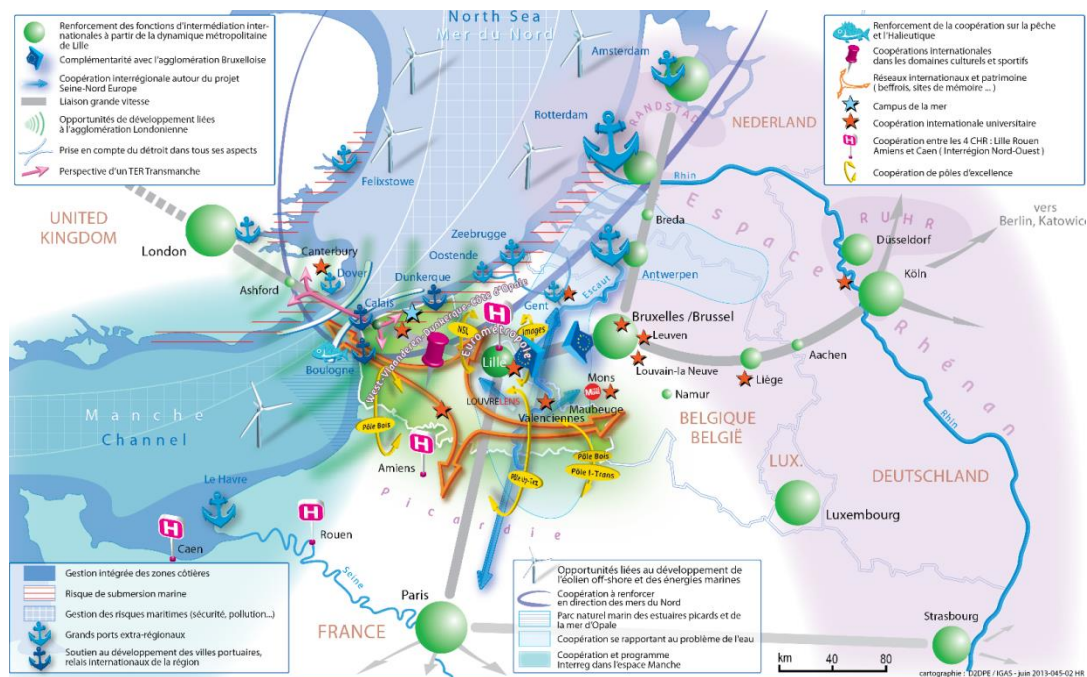


Figure 5. The regional stakes in the Nord-Pas-de-Calais development scheme (source: CRNPdC, 2013).

The change in the French public intervention philosophy deprives the coastline for new public investments. The new French governance and the creation of the new greater French Regions (with the MAPAM & NOTRe Laws) open new behaviours, territorial knowledge and may lead to new priorities in the Region Nord-Pas-de-Calais-Picardy, (now Hauts-de-France) for their authorities. The fate and future of the “Calais Port 2015” programme must be followed in this context.

The political and institutional context hinders the current development

Unexpected Schengen effects are a human and economic disaster for the coastal area more to neighbouring areas than for the Channel tunnel itself. This is even more unfortunate as the political context determines new priorities on other territories. In the long term political will and the partners' capacity may quickly dull in time and face new difficulties. The overall impoverishment of public finances in the European Union, in France and in Nord-Pas-de-Calais adds constraints.

The Calais driving forces at work

Today the Tunnel is definitely part of the Channel landscape. The port of Calais or the Tunnel been blocked once a while for technical or social reasons, the necessary complementarity appears even more obvious today as the link cannot be cut. These two major actors shares almost 50% each of the traffic (table 6 and table 7). Inevitable adjustments were long and painful. A balance seems to be found. The duty to accommodate always more freight and passengers is in itself the bearer of progress and stabilisation. Indeed the ports were not able after 1994 to cope with the fantastic growth of all kinds of traffic but fortunately absorbed these increases. Yet it took time for the fine tune of the Tunnel, financially or technically and that allowed the ports and particularly Calais to upgrade their services and to put on the table a vision and a strategy. On each side, regional authorities work on a dramatic improvement of rail services between London and Lille servicing their territories (CRNPdC, KCC, 2009).

Conclusion

After many attempts, the fixed link project came through in 1986 (Heddebaut, 1994). When evaluating today, we may see three critical points of success: it came right in time to cope with traffic surge, apparently unforeseen; it led to major territorial development on greater Lille, unexpectedly; it helped significantly to improve governance on the coastal area.

When reading the Transmanche program, it can be observed the importance of transport infrastructure investment because decided by public authorities in a very traditional way; with the "Ponts et Chaussées" lobby thinking development in these terms, and followed by most regional and national leaders and politicians. They framed the most obvious needs and absences in that coastal territory. The other key factors were more orientated towards training, education and many other decisions were spread over time, between many actors.

This unforeseen "grand project" may have had the most important impact for the region in terms of stepping in modernity, getting European transport connections, positioning greater Lille in the region, in France and in Europe (visibility, accessibility...); all things not directly planned or looked for.

In 2016, a new context, major economic changes, a new public policy philosophy, and the fact that it is 20 years later may explain why the original effects are gone. But these infrastructures are part of the future stakes for the regional development as seen in the 2013 Nord-Pas-de-Calais development scheme (CRNPdC, 2013).

Visionary public key actors and decision makers are no more there; the easier decisions have been taken; but public money becomes rare nowadays... however the maritime cross Channel market is settled and the new operators as Eurotunnel with its private governance shows its competences, flexibility and innovations to face new stakes and look forward for new development and improvement.

While Eurotunnel has been affected by Brexit and Europe's migrant crisis in recent years – the group has annual revenues of more than €1 billion and provides good returns to shareholders in 2016. Freight traffic started recovering at the end of 2016 after implementation of effective security and the first intermodal freight train arrived in January 2017 coming from Shanghai (13,000 km in 18 days). For its part, Eurostar has overcome the impact of the terrorist attacks with a significant rise in traffic at the end of 2016 to remain above 10 million passengers; and it opens in April 2018 a new connexion between London and Amsterdam with a potential of 4 million passengers.

Brexit, voted on 23 June 2016, has yet not led to economic consequences for the Fixed Link, vital for the UK: 25% of all trade in goods between the United Kingdom and continental Europe are transported through the Channel Tunnel (Eurotunnel, 2016), and its position in the “just-on-time” and e-commerce segments is overwhelming as up to 1 million express delivery parcels are transported through the tunnel each day, and the development of these flows is increasing. With more than 390 million passengers and 77 million vehicles since its opening in 1994, the Channel Tunnel, built to be an economic and ecological link, is the quickest, simplest and most environmentally-friendly way to cross the Channel.

This infrastructure has been an historical step and remains a source of the Nord-Pas-de-Calais' rebirth.

References

- Bechtel-France. (1985). « *Impacts et perspectives pour la région Nord-Pas-de-Calais du lien fixe transmanche* », conseil régional Nord-Pas-de-Calais, Lille, août, 217 p.
- Biehl D. (1991). “The role of infrastructure in regional development”. In Vickerman RW (eds), *Infrastructure and Regional Development*. London, Pion Ltd, 209 p.
- Bloy E, Bonnafous A, Cusset M, Gérardin, B. (1977). *Évaluer la politique des transports*, Paris, Economica, 102 p.
- Bonnafous A, Plassard F. (1974). « Les méthodologies usuelles de l'étude des effets structurants de l'offre de transport », *Revue Économique*, n° 2, p. 215-221.
- Braibant G, Lyall A. (1982). *Manche : quelles liaisons ?*, Rapport du groupe de travail franco-britannique sur la liaison transmanche, Documentation Française, Paris, 137 p.
- Chervel M, Le Gall M. (1976). *Méthodologie de la planification : Manuel d'évaluation économique des projets, la méthode des effets*, ministère de la Coopération, 204 p.
- CRNPdC (Conseil Régional Nord-Pas-de-Calais). (1985). *Rapport du Comité Mixte régional sur le lien fixe transmanche*, Comité économique et social régional, Lille, 16 décembre, 8 p.
- CRNPdC (Conseil Régional Nord-Pas-de-Calais). (1986a). *Lien Fixe Transmanche. Éléments pour un plan de développement de la région Nord-Pas-de-Calais*, Lille, 20 janvier, 35 p.

- CRNPdC (Conseil Régional Nord-Pas-de-Calais). (1986b). *Plan Transmanche*, Protocole d'Accord État/région Nord-Pas-de-Calais, 14 mars.
- CRNPdC (Conseil Régional Nord-Pas-de-Calais). (2009). « Calais Port 2015 », dossier du Débat Public, juillet 2009.
- CRNPdC (Conseil Régional Nord-Pas-de-Calais). (2013). « Schéma régional d'aménagement et de développement durable ».
- CRNPdC-KCC. (1987). « Cooperation Agreement - Protocole d'Accord between Kent County Council and le Conseil Régional du Nord-Pas-de-Calais », Maidstone, 24 Avril 1987, 7 p.
- CRNPdC-KCC. (2009). "Memorandum of understanding regarding the setting up of a European network of High Speed Regions", 13th February 2009.
- Eurotunnel. (2016). "Groupe Eurotunnel Se Annual Review & Corporate Social Responsibility Report", 62 p. (See p. 22 reference to the Ernst & Young study published in November 2016 on the economic impact of the Fixed Link).
- Gaudard G, Jeanrenaud C. (1992). « Méthodes d'analyse des effets structurants des grandes infrastructures de transport ». Study carried out within the framework of the COST 317 project "*Socio-economic effects of the Channel tunnel*", University of Fribourg, University of Neuchâtel, May, 52 p.
- Heddebaut O, Laudren E. (1998). « La rocade du littoral participe-t-elle à une transformation du littoral du Nord-Pas-de-Calais ? Évaluation ex-post du programme d'accompagnement routier transmanche », *Cahiers Économiques de Bretagne*, n° 4, décembre, p. 17-48.
- Heddebaut O. (1994), « Histoire d'une idée fixe : le tunnel sous la Manche », *Recherche-Transports-Sécurité*, n° 43, juin, p. 35-50.
- Heddebaut O. (1995a). « De l'échec de 1975 à l'ouverture du tunnel sous la Manche. Quelle politique de l'accompagnement transmanche ? », *Hommes et Terres du Nord*, 2^e trimestre, p. 149-155.
- Heddebaut O. (1995b). "The reaction of the Nord-Pas-de-Calais region faced with the implementation of a fixed link. The Strategic transmanche Plan", Colloquium on "Eurotunnel: social and economic implications" Calais, *Digest*, n° 1995/173, The Institution of Electrical Engineers Publisher, p. 1-10.
- Heddebaut O. (1997). "The usual methods of evaluation of major infrastructures", p. 33-117 Part II. In "*Socio-economic effects of the Channel tunnel*," final report COST 317, September, 216 p.
- Heddebaut O. (1999). « Le tunnel sous la Manche facteur d'intégration des régions ? », *Revue Administration, L'Angleterre une île ?*, n° 184, décembre, p. 113-122.
- Heddebaut O. (2001). "The Binational cities of Dover and Calais and their region", *Geojournal*, vol. 54, n° 1, p. 61-71.
- Heddebaut O. (2004). "The Euroregion from 1991 to 2020; An ephemeral stamp?", Chapter 4 p. 70-87. In Kramsh O, Hooper B (eds), *Cross-Border Governance in the European Union*, Routledge Research in Transnationalism, London, Routledge, 236 p.
- Heddebaut O. (2015). "Has the construction of the Channel tunnel been a factor of rapprochement of the cities of Calais and Dover and of their respective regions?". In « Vingt années sous la Manche, et au-delà : Géographie et économie des transports », colloque

organisé par Rails et Histoire, Association pour l'Histoire des Chemins de fer, Jeudi 19 mars 2015, 20 p.

Heddebaut O, Laudren E. (2000). « Le plan transmanche : analyse rétrospective des politiques mises en œuvre », rapport de convention Région, n ° 98 34 0035, 126 p.

Heddebaut O, Di Ciommo F. (2017). “City-Hubs for smarter cities. The case of Lille ‘Euraflandres’ interchange.” Topical collection on “*Smart Cities and Transport infrastructures*”, *European Transport Research Review* (Online), Springer, p. 14.

Lesort Ch, Agur *et al.* (1996). « Littoral côte d’opale : une démarche en réseau », dans *Changement régional et dynamique des territoires*, journée d’étude, fév. 1996, V.A, Fré-Ville.

MIT. (1999). Dean’s introduction to Erneq JM, presentation, MIT City Design Department Conference, MIT, November.

Nioche JP, Poinard R. (dir.), *L’évaluation des politiques publiques*, Paris, Economica.

Offner JM. (1993). Les effets structurants du transport : mythe politique, mystification scientifique, *L’espace géographique*, n° 3, p. 233-242.

OREAM-Nord. (1971). « Aménagement d’une région urbaine : le Nord-Pas-de-Calais », juillet, 422 p.

Percheron D. (1982). Rapport du groupe de travail sur « *la liaison fixe transmanche et le développement régional* », Conseil régional Nord-Pas-de-Calais, 9 février, 9 p. + annexe.

Rietveld P. (1992). “Spatial economic impacts of transport infrastructure supply”, Faculty of Economics, Vrije Universiteit, Amsterdam, December, 27 p.