Evaluation of a project for the radical transformation of the Port of Genoa – Italy - according to Community Impact Evaluation (CIE)

Evaluation of a project for the radical transformation of the Port of Genoa-Italy

According to community impact evaluation (CIE)

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Abstract
Purpose – The purpose of this paper is to illustrate the evaluation of three innovative project options for the transformation/upgrading of the Port of Genoa-Italy according to the community impact evaluation (CIE).
Design/methodology/approach – This takes the form of a comparison of two different methodological approaches: on the one hand, that developed by Lichfield for CIE and, on the other, an experimental type variation to CIE, defined here as "weighted evaluation approach." The first approach is based on the hypothesis that the community sector determines the preferential sector only to the extent to which the impact in which the sector is directly involved occurs. According to the second approach, all the impacts deriving from implementation of the project are considered, also according to the importance (assigned according to a percentage weight) attributed by each sector according to its interests.
Findings – It is possible to measure the importance of application of the transformation project as, also for community sectors that could apparently oppose this and are favourable to the hypothesis of non-intervention, the evaluation highlights that the benefits outweigh the costs for these sectors. Lastly, although based on different hypotheses, both the methodological approaches adopted establish a preference for the same design solution as it generates benefits with regard to socio-economic aspects, also with due attention to environmental issues. In both approaches, the preferred solution is the number three, according to which the quayside of the Port of Genoa is transformed into an island connected via an underground gallery to the tunnel in the Apennines.
Originality/value – Application of the "weighted CIE" method illustrated here represents a proposed variant to Lichfield's method, in an attempt to consider all the impacts generated by a project on each community sector; although it requires further testing and tuning, this variant may lay the basis for comparing possible evolutions of the method.
Keywords Project management, Town planning, Italy
Paper type Research paper

1. Introduction

The project for the transformation of the Port of Genoa developed by SiTI[1] in cooperation with a group of Genoa shipping operators has been developed to feasibility study level and is now being examined by the public authorities involved.

Obviously, the proposed transformation of what is now the largest non-hub Italian port involves transport-related, environmental, logistic, financial, socio-economic, and town planning aspects.

This paper is therefore intended to evaluate the various transformation scenarios of the Port of Genoa developed by SiTI through a community impact evaluation (CIE) (Lichfield, 1988, 1996) with two specific objectives: first of all, establish the expected effects and impacts on the various community sectors affected by the transformation programme, and second, define the design alternative most consistent with the goals of the sectors.

According to the steps of the CIE method, the paper identifies the effects and impacts of five aspects considered essential to evaluate the three different design solutions proposed for the Ligurian port, analysing in particular town planning, environmental, socio-economic aspects, impacts on employment and the costs of implementing each design hypotheses.

The paper proposes a comparison of two different methodological approaches: on the one hand, that developed by Lichfield (1988, 1996) for CIE and, on the other, an experimental type variation to CIE, defined here as "weighted evaluation approach." The first approach is based on the hypothesis that the community sector determines the preferential sector only to the extent to which the impact in which the sector is directly involved occurs. According to the second approach, all the impacts deriving from implementation of the project are considered, also according to the importance (assigned according to a percentage weight) attributed by each sector according to its interests. In both cases, the CIE models have been developed on the basis of a literature review, a series of informal discussions with various academics and researchers, and some interviews to various experts.

Examining the results of the evaluation, it is possible to reach authoritative conclusions and to comply with the requirements defined at the outset. In particular, it is possible to measure the importance of application of the transformation project as, also for community sectors that could apparently oppose this and which are favourable to the hypothesis of non-intervention, the evaluation highlights that the benefits outweigh the costs for these sectors. Lastly, although based on different hypotheses, the two methodological approaches adopted both establish a preference for the same design solution as it generates benefits with regard to socio-economic aspects, with also due attention to environmental issues.

This paper is divided into four sections. Section 2 illustrates the case study: three project options for the transformation/upgrading of the Port of Genoa based on an innovative concept of infrastructure in which the seaport and dry port are linked by a

tunnel dedicated to fully automatic TEU rail haulage. Section 3 illustrates application of a CIE to the case study concerned, adopting two different procedures: the first complying with that proposed by Lichfield, and the second with a modification, introducing a method of weighting that takes into account the impacts on all the community sectors involved. Section 4 sets forth the conclusions of the paper.

2. Transformation scenarios of the Port of Genoa

Compared with North European ports, the Port of Genoa offers two major advantages:
(1) a reduction of five-seven days of navigation (via Gibraltar) for goods arriving via Suez on the Asia-India-Mediterranean-Europe route; and
(2) sufficient draught to construct berthing facilities aligned with the new dimensions of ships.

Despite these advantages, there is a risk, in the short-medium term, that Genoa will remain a marginal port of call for major shipping companies, as global carriers tend to concentrate a large swathe of their traffic at terminals that offer first-rate berthing and suitable facilities, large inland stacking areas and frequent, high capacity land transport systems (Musso, 2008).

Considering the above parameters, SiTI has drafted a number of project proposals for transformation of the Port of Genoa.

The context to which these project proposals refer is of great interest both to the Regions involved and to those Far East operators who consider not only the 2,000 mile reduction in navigation compared with North European ports, but are also interested in port and interport integration and the technological solutions these intend to adopt.

Applying CIE, three project options (plus the "do nothing" option) based on different interpretations of the same innovative idea have been analysed: the setting up of a suitably equipped seaport linked via a dedicated railway line to a dry port located in the plain beyond the Apennines. From this point onwards, the goods can be stocked or routed to their destination via rail or motorway (Figures 1 and 2). The aim of the port

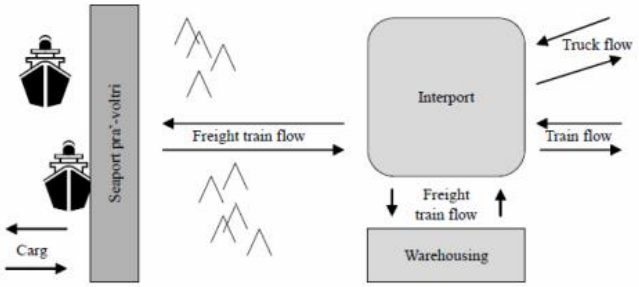


Figure 1.
Functional outline and flow of goods of the new Port of Genoa

Figure 2.
Location in the territory

transformation project is to set up a terminal able to manage transit of 10 million TEUs per year (more than five times the present volume).

2.1 Proposal 1: re-organisation of berthing facilities and railway link with the dry port[2]

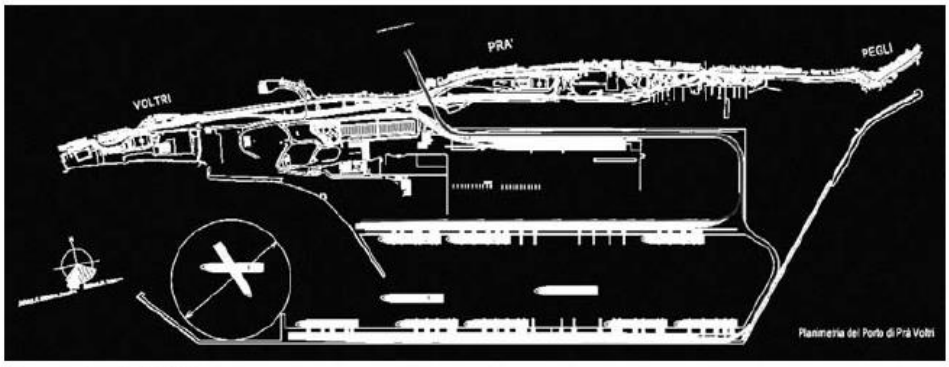
Adopting the first option, berthing capacity would be doubled, preserving the inlet to the West as in the current configuration and constructing two around 2,000 meters long parallel sections of berth facing each other (one located on the present Voltri quay and the other on the outer breakwater) for concurrent mooring of ten large ships (Figure 3). The containers are unloaded from the ship onto shuttles that move below the cranes for correct positioning.

The seaport is linked to the dry port beyond the Apennines via an around 20 kilometers) tunnel reserved for goods transport in which the TEUs travel on special, fully automatic, diesel, and electric powered shuttles. The area of the dry port, located in the Province of Alessandria, has been calculated considering 1 square meter per TEU (the same value as in the current configuration of the Port of Genoa) and, according to this index, is equal to 1,000 hectares. A continuous system, a sort of "conveyor belt," is created that guarantees continuous connection between the quayside and the stocking parks beyond the Apennines.

2.2 Proposal 2: project option of the port considered as an "island" and railway link with the dry port

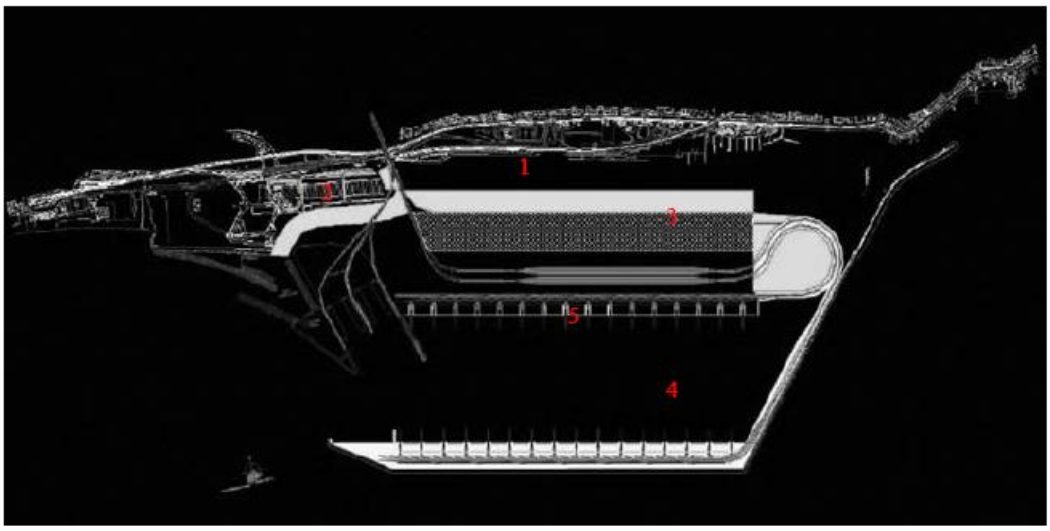
According to the second scenario, the port is configured as an "island," linked to the connection tunnel between the two ports by a viaduct. This concept has been translated into design terms (Figure 4) through various operations that envisage extension of the channel between the mainland and the new port (1) and continuation of the channel to the West (2) in order to establish an "island" type configuration and to permit transit by small pleasure craft.

The new port is constructed exploiting the possibility of utilizing the space towards the sea, restoring the spaces of the old port to the city of Genoa; this would free the zone of the old waterfront (3) which would be "returned" to the city as areas to be reconverted and where to install new city services. This idea was received enthusiastically by the public administration, favourable to exploiting this new urban planning space.



Source: Lami (2007)

Figure 3.
H1. The new seaport



Source: SiTI (2008)

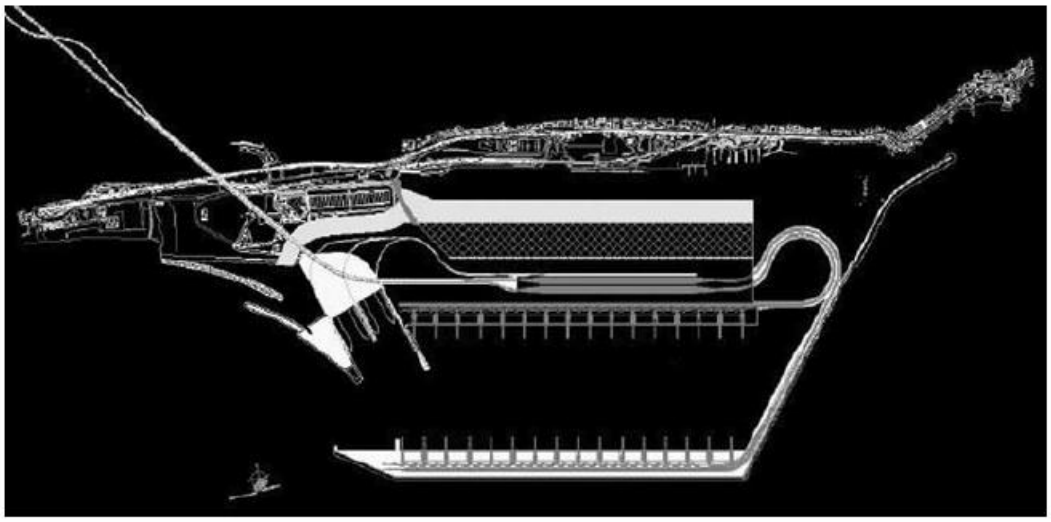
This project option envisages various modifications in relation to the first scenario also as regards the berths, one of which is obtained expanding the breakwater towards the outside (4) while the other is constructed on that already present in the current configuration (5). Further attention is also dedicated to configuration of the railway lines at the port and the automatic ship and shuttle loading/unloading system: while the first option envisages a system consisting of a stable crane and mobile shuttle to position under the crane for unloading of the container, the new system consists of a crane that unloads the container onto a storage platform/buffer close to the crane; a bridge crane then loads the goods onto the shuttle with, in this case, the advantage of not moving. In this case, the shuttles would be electrically powered only. The area of the dry port is reduced by around half (around 500 hectares).

2.3 Proposal 3: project option of the port considered as an "island" and underground railway link with the dry port

The only substantial difference between the third project option (Figure 5) and the previous option is the idea of linking the quayside (still configured as an island and described in the second option) to the tunnel not via an external viaduct but via an underground gallery with a consequent noteworthy mitigation of environmental impact and also eliminating the need to demolish certain buildings, as envisaged by the first option.

3. Application of CIE to Port of Genoa transformation scenarios

To assess the various transformation scenarios of the Port of Genoa, CIE has been applied. The CIE is an evolution of the planning balance sheet (PBS), a method of plan evaluation elaborate by Lichfield in the 1960s. Following earlier hesitation as to whether PBS was best described as "cost-benefit analysis in planning," which carried with it the disadvantage of association with the form of cost-benefit analysis which had been rejected for planning, PBS emphasized the concern with impacts, and it was:



Source: SiTI (2008)

[. . .] the whole array of impacts on the whole community which are under consideration and not simply particular impacts (economic, social, etc.) on particular sectors, or only those which are measured in money. PBS was accordingly adapted and renamed Community Impact Analysis (CIA), both in order to show that it is more comprehensive than order kinds of impacts analysis (e.g. energy, transport, economic, social, . . .) and also to show that it is non simply the impact as output which is important (as in impact assessment proper) but the effect of that output on people, i.e. on a community. Furthermore, since the end-purpose of impact analysis in planning is not just assessment but also evaluation as an aid to choice, CIA is seen as a step towards aiding choice in alternatives, and so become Community Impact Evaluation (CIE) (Lichfield, 1996).

The CIE has been applied to the transformation proposals of the Port of Genoa observing in particular the following aspects (more detailed in Table I):

. quantitative data TEUs per year handled at the port;
. urban planning aspects;
. employment levels;
. socio-economic aspects;
. environmental issues; and
. implementation costs of the project option.

3.1 Objectives

The objectives defined at the start of the evaluation are intended to answer four questions regarding economic and planning aspects:

(1) What are the overall impacts of the transformation of the Genoa Port system and in particular those on employment and the environment?

(2) How are the costs and benefits accruing to the sectors considered distributed amongst the stakeholders involved?

	Option 0 (status quo)	Proposal 1	Proposal 2	Proposal 3
Quantitative data				
Handling TEUs/year (million)	1.8	10	10	10
Urban planning aspects				
Berths	2 (total length 2,000 meter)	2 (total length 4,450 meter)	2 (total length 3,200 meter)	2 (total length 3,200 meter)
Surface of the inland storage area (hectares)	184	1,000	500	500
Surface restored to the city	0	0	X (where $X > 0$)	X (where $X > 0$)
Link between seaport and dry port (kilometers)	0	20	35	35
Employment levels				
Creation of "manual" places of employment	p	$\ll$ p	$\ll$ p	$\ll$ p
Creation of "intellectual" places of employment	q	$\gg$ q	$\gg$ q	$\gg$ q
Socio-economic aspects				
Economic growth of the zone	s	$\gg$ s	$\gg$ s	$\gg$ s
New positioning in the shipping market	t	$\gg$ t	$\gg$ t	$\gg$ t
Economic impulse for the existing activities in the district	v	$\gg$ v	$\gg$ v	$\gg$ v
Environmental aspects				
Air pollution	x	$<$ x	$<$ x	$\ll$ x
Water pollution	y	$>$ y	$>$ y	$>$ y
Alteration of the landscape	z	$>$ z	$>$ z	$\ll$ z
Implementation costs				
Berths	–	535 million	Lower value *H1*	Lower value *H1*
Tunnel	–	400 million	Higher value *H1*	Higher value *H2*
Connection railway line	–	470 million	Higher value *H1*	Higher value *H1*
Dry port	–	495 million	Lower value *H1*	Lower value *H1*
Total	–	1.9 billion	–	–
Governance costs	r	r	$>$ r	$\gg$ r

Notes: As some of the data indicated are qualitative, a representative letter (x, y, z, etc.) and the $>$ and $<$ sign (according to whether the result improves or worsens the option 0 – status quo) is used as unit of measurement/index to indicate the hypothetical scope of the impact

(3) What are the town planning impacts of each transformation option?
(4) Do the project options considered give rise to conflicts between the stakeholders involved? What is the preferred solution for each sector of the community?

3.2 Definition of the data required

The tables provide data intended to highlight both differences and similarities between the three project options and data that describe the current situation. According to the method, the new project hypotheses must be compared with the "datum,", i.e. with "Option 0" according to which current conditions are maintained (Lichfield, 1996).
All the data recorded during the evaluation study are shown in Table I.

3.3 Evaluation of alternative scenarios

Alternative scenarios for transformation of the Port of Genoa have been evaluated adapting the general method to the case study, according to Lichfield (1996, p. 104): "it is not a standard process, it may differ from project to project."
Before indicating the results of the evaluation, the following should be noted.
The project is expected to impact two different areas: the urban area of Genoa, with regard to expansion of the seaport, and Lower Piedmont for construction of the dry port. As the consequences will inevitably differ according to nature and "scope," the evaluation has been made distinguishing between the two zones and providing the related tables for each. However, the end result of the final evaluation considers the joint results of both zones.
Here, the term "dry port area" indicates both the zone where the storage park is established and also the connection line with the seaport, whereas the term "Port area of Genoa" includes only the extension of the port.
When making the evaluation, it is necessary to identify and distinguish between "on site" elements and impacts, i.e. in the area bordering closely on that of the project, and "off site" elements and impacts, i.e. areas where the effects of the transformation are propagated and encountered in the territory. In the case study concerned, as there are no substantial differences between the two areas, the "off site" has been considered as englobed in "on site," establishing the effects and impacts also with broader spillover.
Lastly, the effects are identified only for the operating phase and not for the site construction phase as it is considered that the former will be decisive in selecting the alternative to be adopted:
Application envisages identification of plan variables as it is considered that each plan solution generates a change in the existing system and that these modifications depend on a certain number of variables (Lichfield, 1996, p. 114).
As Lichfield provides very little information, this identification phase is particularly delicate because, in view of the limited information available, the various, decidedly subjective interpretations that may be attributed to the term "plan variables" may result in identification of dissimilar variables.
In the application, the following plan variables have been considered:
. quantitative data TEUs per year handled at the port;
. urban planning aspects;
. employment levels;
. socio-economic aspects;

. environmental issues; and
. implementation costs of the project option.
These variables chart the changes that occur after implementation of the project and start-up of the related activities.
As the aim is to establish the effects of the Port of Genoa project on the various stakeholders involved, the evaluation identifies the various community sectors. Generally speaking, as proposed by Lichfield (1996), these can be divided into two macro-sectors: producers/operators (also called active subjects) and consumers (or passive subjects). Rather than simply listing the community sectors involved, we have tried to highlight the type of interest of each of these in the project and, therefore, whether they can be classified as facilitators or opponents of the project. The conclusions reached adopting the stakeholders analysis matrix (Freeman et al., 2007), reveal that, at the Genoa Port estate, the community sectors aim to achieve objectives such as improved efficiency of the zone, improved well-being and upgrading of the berthing capacity of the port whereas, in Lower Piedmont, the aim is to protect the territory or, possibly, to exploit this opportunity to procure mainly economic benefits (as in the case of the farmers who own the land where the dry port will be constructed, which will tend to generate speculative phenomena).
The objectives of the various community sectors are summed up in Table II.
The evaluation then identifies the effects ("the physical and natural changes resulting, directly or indirectly, from development," Lichfield, 1996, p. 120) and impacts:
[. . .] consequences or end products of those effect on which we can place on objective or subjective value [. . .] the consequence of the effects on people which will lead to a change in their way of life, on which the sector's valuation can be based," (Lichfield, 1996, p. 124), on community sectors and distribution of these in the project alternatives identified, making it possible to establish whether, in one alternative, the impact occurs more or less in relation to Option 0, i.e. doing nothing. Table III provides an example of only three items of impact assessment for the dry port.
After identifying the impacts, the evaluation determines the preferred option of each community sector affected by the transformation project.
Here, these sectoral preferences have been analysed adopting two different approaches in order to compare the results and to establish the most suitable method for identifying the project option that best complies with the objectives of the community sector.
The first approach, complying with the method developed by Lichfield (1996), establishes sectoral preference considering that the community sector determines its project option only according to the extent to which the impact in which the sector is directly involved occurs. On the contrary, the second approach, applied experimentally to the case study concerned, establishes the preferred project option considering all the impacts generated by the project and according to the importance (established with a percentage weight) attributed by each community sector to each impact according to its specific interests.

Community sectors	Objectives
Producers/operators	
Local authorities of Genoa	Re-launch of the port economy of Genoa Economic growth of the area Increase in employment Improved welfare and wealth of the population Competitiveness in the European context Interconnection with TEN networks
Local authorities of Alessandria	Economic growth of the area Increase in employment
Shippers terminalists	Upgrading of port capacity Improved offer of services Higher returns on their activities Interception of new commercial traffic
Owners of the agricultural areas where the dry port will be constructed	Increase in value of land owned Requests for any compensation
Credit institutes	Good return on their investment
Production activities of Lower Piedmont	Higher earnings; economic development of the area
Logistics operators	Improvement of port logistic conditions; search for TEN interconnections; improved management of the transport cycle
Consumers	
Users of the new urban areas of the city of Genoa	Improved urban quality
Residents of the urban area of Piedmont	Economic growth of the zone Protection of natural environments Safeguarding of environmental quality Protection of own welfare
Residents of zones bordering on the site of the dry port	Economic growth of the zone Avoid downgrading of present pollution
Environment protection associations	Protection of the environment and of the territory (flora and fauna)
Work force of the urban area of Genoa	Increase in employment and/or maintenance of own employment situation
Work force of the urban area of Piedmont	Increase in employment Creation of new jobs
Users of the Genoa road node	Road safety and reduced risks of accidents Decongestion of road networks

One can summarize the first approach corresponding to CIE (Lichfield, 1996) as follows:

(1) framework decision;
(2) effect evaluation and impact evaluation;
(3) decision analysis; and
(4) evaluation report.

Effect on community sector	Impact on community sector	Unit of measurement/ index	Option 0	*H1*	*H2*	*H3*
Alteration of the landscape	Loss of the landscape resource	Environmental impact (i)	i	i++	i +	i +
Acoustic disturbance caused by transit of the shuttles between the seaport and dry port	Increase of sound level dB	Sound level (dB) (i)	0	i	i −	i −
Impacts on atmospheric pollution due to transit of heavy vehicles in the zone	Increase in pollutants in the air and production of particulates	Air quality index (i)	i −	i++	i++	i++

Notes: Dry port area; as the data indicated are qualitative, a representative letter (i) and the + and − sign (according to whether the result improves or worsens) is used as unit of measurement/index to indicate the hypothetical scope of the impact; personal processing of the "Impact evaluation of option by plan variables" scheme (Lichfield, 1996)

The second approach, the "weighted" CIE method, adds two other passages (1.1 and 2.1) to those listed above:

(1) Framework decision:

1.1 Attribution of a percentage weight to each consequential impact from the project by each community sector, according to its specific interests.

(2) Effect evaluation and impact evaluation:

2.1 Multiplication of the weights for the effect/impact evaluation. When the measurement/index to indicate the hypothetical scope of the impact is qualitative, it is necessary to transpose it on a cardinal scale.

(3) Decision analysis.

(4) Evaluation report.

The introduction of these two additional passages should allow to consider both the direct effects/impacts and the indirect, for each community sector.

3.4 Evaluation of sectoral preferences: approach corresponding to CIE

In the first application, the impacts identified occur to a different extent for each option envisaged; the community sector therefore prefers the project option that most effectively meets its objectives and which, at the same time, involves the lowest impact in the case of application of this option.

Therefore, in this case, all the other impacts generated by the project are not considered as it is assumed that each community sector does not attribute any importance to this when selecting its preferred project option.

The above approach has been adopted for each community sector; some items only for consumers in the area of the Port of Genoa have been provided, for example, purposes in Table IV which illustrates the effects, impacts, the sector involved and the related sectoral objective, the extent to which the impacts occur for each solution and lastly the preference.

Effect on the community sector	Impact on the community sector	Community sector concerned	Sectoral objectives	Unit of measurement/ index	Option 0	Proposal 1	Proposal 2	Proposal 3	Sectoral preference[a]
			Consumers						
Improvement of air quality due to reduction of heavy vehicle traffic	Reduced production of particulates	Residents of the urban area of Genoa	Improve welfare	Air quality index (i)	i −	i++	i++	i++	(3, 2, 1), 0
Acoustic disturbance created by transit of shuttles	Increase of sound level dB	Residents of the urban area of Genoa	Improve welfare	Sound level (dB) (i)	i++	i	i	i++	(3, 0), (2, 1)
Effects on atmospheric pollution caused by transit of the shuttles	Increase of pollutants in the air	Residents of the urban area of Genoa	Improve welfare	Air quality index (i)	i++	i	i++	i++	(3, 2, 0), 1
Higher production of waste oils and waste water (ships)	Increased production of waste	Residents of the urban area of Genoa	Improve welfare	Volume of waste produced (i)	i++	i	i	i	0, (3, 2, 1)
Return of new spaces to the city	Opportunities for installing new services and green areas	Residents of the urban area of Genoa	Improve welfare	M^3 restored (i) [a]where $i > 0$	0	0	i++	i++	(2, 3), (1, 0)

Notes: Personal processing according to "Impact evaluation of option by plan variables" scheme (Lichfield, 1996); the project proposals considered at the same level of preference are among parenthesis

The data obtained for the entire system (port þ dry port) are summarized in a more comprehensible, easier to interpret matrix (Figure 6).

3.5 Assessment of sectoral preferences: “weighted” CIE method

As already mentioned, the second approach is intended to establish sectoral preference by assigning a weight to the impact generated by implementation of the project.

This step is fairly complex in the case study concerned as most of the information gathered is of a qualitative type and does not therefore lend itself to the necessary reasoning; if numeric data were available, this step would be much simpler and more immediate as numbers are more explanatory.

The evaluation considers that preference for one alternative rather than another depends on the objective the community sector intends to achieve with regard to application of the project: “in planning you cannot please all the people at all the time, so that some must suffer for the grater good, in the public interest” (Lichfield, 1996).

Community sector	Options rating*				Sectoral preferences
	0 Option	Proposal one	Proposal two	Proposal three	
Producers/operators					
Local authorities of Genoa					3,2,1,0
Shippers Terminalists					3,(2,1),0
Production activities					(3,2,1),0
Credit institutes					3,(2,1),0
Consumers					
Residents of the urban area of Genoa					3,(2,0),1
Users of the new urban areas of Genoa					(3,0),2,1
Environment protection associations					0,3,2 1
Manual work force					0,(3,2,1)
Intellectual work force					(3,2,1),0
Users of the Genoa road network					(3,2,1),0
					3,2,(1,0)

Source: Personal processing according to “Summary of sectorial preferences” (Lichfield,1996)

* The levels of preference are colour coded as follows:

- Not preferred
- Little preferred
- Average preferability
- Preferred

Therefore, a weight must be assigned that reflects the relative importance of the various types of impacts considered for the social groups; various methods exist for estimating the weights, but Voogd (1983) proposes the rating method frequently applied in planning practice. In these methods, the representative of the community sector concerned is asked to rate the impact indicated so that the value assigned reflects its importance (Table V).
The underlying idea of this second approach is that the score equal to the percentage impact is assigned to the option that best complies with achievement of the objective. This approach does not introduce only a weight, but when the measurement/index to indicate the hypothetical scope of the impact is qualitative, it is also necessary to transpose it on a cardinal scale. Once effected the product between the weights and each impacts/effect evaluation, it is possible to identify the partial numbers which, added together, make it possible to establish the project option that best meets the sectoral objectives. In the evaluation tables (Table VI, Figure 7 referring only to the zone of the port and to the active community sector), only the result is indicated for reasons of simplicity and improved understanding.

4. Conclusions

The paper has developed two applications of CIE (one according to Lichfield's method and the other with an experimental variation) to the transformation proposals of a major transport infrastructure with repercussions not only on logistics but also on environmental, town planning, and socio-economic aspects.
In conclusion, the idea of flanking the traditional CIE method with an experimental assessment approach has permitted more in-depth investigation of the alternatives.
In both approaches the preferred solution is the number three, for the reasons already underlined. The third project proposal entails more limited impacts on the environment with regard to the Genoa Port area (due to construction of the underground railway link) and the zone of Lower Piedmont (as the dimensions of the logistic platform are reduced). This result is also explained thanks to the fact that not only the projects direct costs have been considered, but also the indirect costs. Particularly, we have introduced an item of "cost of the governance" of the project, tied up to the additional costs for the extension of the times, caused by the local population oppositions to the realization of the infrastructure. In this sense, the proposal 3 results preferable to the others, although financially more expensive, because more acceptable for the local population, considering the environmental and urban advantages that it introduces.
But the other solutions are rated differently in the two areas (Table VII).
With the approach complying with CIE in the area of Genoa the zero option is to be considered on the same level as the first project, while the second approach makes it possible to establish that the option of not implementing the project is certainly the least satisfactory, both in Genoa and in Piedmont. If all the impacts for each single community sector deriving from implementation of the project are considered (second evaluation approach), the analysis highlights that the project has noteworthy beneficial effects on employment levels, an extremely important factor in such a highly depressed zone as Lower Piedmont, to such an extent that the community sectors look favourably on implementation of the territorial transformation project. Furthermore, the "weighted CIE" approach underlines the worries about the environmental spillover generated by construction of the new bigger port.

	Active community sector					Passive community sector					
Sectoral objective	Genoa local authorities Re-launch of the local economy; increase in employment; improved welfare; and access to new shipping market	Shippers Upgrading of berthing capacity and improved offer of services	Terminalists Upgrading of berthing capacity and improved offer of services	Production activities Economic growth of the area and higher earnings	Credit institutes Good success of the investment	Residents of the urban area of Genoa Improved welfare	Users of the new urban areas of Genoa Improvement of urban spaces and improved welfare	Environment protection associations Safeguarding of the environment and territory	Manual work force Increase in employment and/or maintenance of own employment	Intellectual work force Growth in employment	Users of the Genoa road network Road safety; reduced risks of accidents and decongestion of road network
Impact						*Weights (%)*					
Reduced production of particulates	5	0	0	5	0	10	10	15	0	0	15
Increase of sound level dB	5	0	0	5	0	10	10	15	0	0	5
Increase of pollutants in the air	5	0	0	5	0	10	10	15	0	0	5
Increased production of waste	5	0	0	5	0	5	5	15	0	0	5
Increased pollution of port waters	5	0	0	0	0	5	5	15	0	0	5
Economic growth of the zone	20	5	5	20	10	10	10	0	5	10	5
Increased berthing capacity, offer of new mooring services, facilities, increased spaces of the port	10	20	30	0	0	0	0	0	5	10	0

(*continued*)

	Active community sector					Passive community sector					
Sectoral objective	Genoa local authorities Re-launch of the local economy; increase in employment; improved welfare; and access to new shipping market	Shippers Upgrading of berthing capacity and improved offer of services	Terminalists Upgrading of berthing capacity and improved offer of services	Production activities Economic growth of the area and higher earnings	Credit institutes Good success of the investment	Residents of the urban area of Genoa Improved welfare	Users of the new urban areas of Genoa Improvement of urban spaces and improved welfare	Environment protection associations Safeguarding of the environment and territory	Manual work force Increase in employment and/or maintenance of own employment	Intellectual work force Growth in employment	Users of the Genoa road network Road safety; reduced risks of accidents and decongestion of road network
Economic return	10	10	0	0	50	0	0	0	0	0	0
Effects on employment	5	5	5	5	0	10	5	0	80	70	0
Opportunities to develop own business	0	15	15	35	0	0	0	0	0	0	0
Improved fluidity of the Genoa road network	5	0	0	5	0	20	10	5	0	0	50
Opportunity to take advantage of new services	5	0	0	5	0	10	35	0	0	0	10
Handling TEUs per year	10	25	25	10	0	0	0	0	10	10	0
Implementation costs	5	10	10	0	20	5	0	10	0	0	0
Governance costs	5	10	10	0	20	5	0	10	0	0	0

Notes: Genoa Port estate; the weights attributed are expressed hypothetically in percentage terms and indicate how the various sectors are affected differently by an impact; adding the weights assigned, the value 100 percent is obtained as it is assumed that if a project option meets all the objectives of a community sector, this option achieves (Table VII) the maximum score (100)

	Genoa local authorities				Active community sector															
					Shippers				Terminalists				Production activities				Credit institutes			
	Option				Option				Option				Option				Option			
Impact	0	*H1*	*H2*	*H3*	0	*H1*	*H2*	*H3*	0	*H1*	*H2*	*H3*	0	*H1*	*H2*	*H3*	0	*H1*	*H2*	*H3*
	Score																			
Reduced production of particulates	0	5	5	5	0	0	0	0	0	2, 5	5	5	0	5	5	5	0	0	0	0
Increase of sound level dB	5	1, 25	1, 25	5	0	0	0	0	5	2, 5	2, 5	5	5	1, 25	1, 25	5	0	0	0	0
Increase of pollutants in the air	5	1, 25	5	5	0	0	0	0	5	0	2, 5	5	5	1, 25	5	5	0	0	0	0
Increased production of waste	5	1, 25	1, 25	1, 25	0	0	0	0	5	2, 5	2, 5	2, 5	5	1, 25	1, 25	1, 25	0	0	0	0
Increased pollution of port waters	5	1, 25	1, 25	1, 25	0	0	0	0	5	2, 5	2, 5	2, 5	0	0	0	0	0	0	0	0
Economic growth of the zone	5	20	20	20	1, 25	5	5	5	0	5	5	5	5	20	20	20	2,5	10	10	10
Increased berthing capacity, offer of new mooring services, facilities, increased spaces of the port	2, 5	10	10	10	15	20	20	20	10	50	50	50	0	0	0	0	0	0	0	0
Economic return	0	10	10	10	0	10	10	10	0	0	0	0	0	0	0	0	0	50	50	50
Effects on employment	3, 12	3, 12	3, 12	3, 12	3, 12	3, 12	3, 12	3, 12	5	2, 5	2, 5	2, 5	3, 12	3, 12	3, 12	3, 12	0	0	0	0
Opportunities to develop own business	0	0	0	0	3, 75	15	15	15	0	15	15	10	8, 75	35	35	35	0	0	0	0
Improved fluidity of the Genoa road network	1, 25	5	5	5	0	0	0	0	0	0	0	0	1, 25	5	5	5	0	0	0	0
Opportunities to avail new services	0	0	5	5	0	0	0	0	0	0	0	0	0	0	5	5	0	0	0	0
Handling TEUs per year	0	10	10	10	0	25	25	25	0	0	0	0	0	10	10	10	0	0	0	0
Implementation costs	5	2, 5	1, 25	0	10	5	2, 5	0	0	0	0	0	0	0	0	0	0	5	5	10
Governance costs	5	1, 25	2, 5	5	10	2, 5	5	25	0	0	0	0	0	0	0	0	0	5	5	10
Sectoral preference	41, 87	72	80	85, 62	33, 12	85, 62	85, 62	88, 12	35	82, 5	87, 5	92, 5	33, 12	81, 88	90, 62	94, 38	2, 5	70	70	80

Note: Port area of Genoa

Community sector	Options rating*				Sectoral preferences
	0 Option	Sectoral preferences	Hypothesis two	Hypothesis three	
Producers/operators					
Genoa local authorities					3,2,1,0
Shippers					3,(2,1),0
Terminalists					3,(2,1),0
Production activities					3,2,1,0
Credit institutes					3,(2,1),0
Consumers					
Residents of the urban area of Genoa					3,2,1,0
Users of the new urban areas of Genoa					3,2,1,0
Environment protection associations					0,3,2,1
Manual work force					0,3,2,1
Intellectual work force					(3,2,1),0
Users of the Genoa road network					(3,2,1,0
					3,2,1,0

Source: Personal processing according to "Summary of sectorial preferences" (Lichfield,1996)

* The levels of preference are colour coded as follows:

- Not preferred
- Little preferred
- Average preferability
- Preferred

	First approach: assessment according to CIE	Second approach: CIE with "weighted assessment" of preferences
Genoa Port area	3, 2, (1, 0)	3, 2, 1, 0
Urban area of Lower Piedmont	(3, 2, 1), 0	(3, 2), 1, 0
Result	3	3

As Moroni (2006) underlines, Lichfield (1994, pp. 66-7) thinks that CIE is a tool for helping the decision makers to make a choice that is in the public interest in a specific circumstance. CIE is in fact built on the following ideas:

[. . .] planning is carried out for the people; it recognizes that people are not homogeneous but must be seen as sectors with conflicting interests in any project proposal or plan; the sectors cannot all be beneficiaries, since some must lose.

planning, therefore, "aims not at a consensus solution, but at one which does the maximum good or at least harm. That would serve the public interest."

Application of the "weighted CIE" method illustrated here represents a proposed variant to Lichfield's method, in an attempt to consider all the impacts generated by a project on each community sector; although it requires further testing and tuning, this variant may lay the bases for comparing possible evolutions of the method.

Notes

1. SiTI is a non-profit association, set up by Turin Polytechnic and Compagnia di San Paolo in order to produce research and training orientated towards innovation and socio-economic growth.
2. For a more detailed description of the first hypothesis, see Lami (2007).

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