Cooperation between Local Actors in Infrastructure Projects. Evidence from Italian Utilities

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Abstract[1]

Several conceptual arguments have recently been developed to enlighten the potential of bottom-up, collaborative approaches to infrastructure realization (CLAIP, cooperation between local actors in infrastructure projects). This paper empirically investigates CLAIP relevance and scope in a sample of Italian water utilities and local transport enterprises. After having conducted some exploratory case studies, a questionnaire has been designed to obtain evidence on the benefits and pitfalls of cooperative institutional arrangements, their structure and organization. Information has been returned by a sample of 85 experienced top managers. Respondents agree that collaborative agreements with local stakeholders help the developers to speed up high-level design activities, to acquire and to transfer knowledge on key elements of infrastructure projects, to increase the public acceptance of facilities. CLAIP impact on economic sustainability is relatively more uncertain instead. Experts recommend to involve local governments and other stakeholders in CLAIP initiatives, but some of them are skeptical about the participation of environmental associations. CLAIP is held to be especially beneficial in smaller communities.

Keywords: infrastructure investment, cooperation, local stakeholders

JEL Classifications: L90, L33

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1. Introduction

During the last 25 years the utility industries in Europe and other industrialized countries have undergone important reforms. While the new ownership patterns, market structures and regulations have generally improved the static efficiency of utilities, results obtained in the domains of service quality and investments are less clear. More specifically, scholars and policymakers are still struggling to identify the mix of policies that is more appropriate to sustain infrastructure investment (Helm and Tindall 2009). The demand for capable, reliable and environmentally-benign infrastructure is expanding due to social, economic, technological and environmental drivers, but neither the traditional forms of public intervention nor the presence of private regulated actors seem to suffice to meet the requirements for new investments (Cowan 2006; Oecd 2008). In other words an infrastructure gap is opening up, and innovative approaches to infrastructure planning, finance and deployment seem to be necessary. Several conceptual arguments have been develop to enlighten the potential of bottom-up, community-based approaches as an alternative way to provide infrastructure (e.g. Ostrom *et al.* 1993; Agranoff and McGuire 2001 and 2003; Alberts 2007). A wider body of empirical evidence is now necessary to improve our understanding of the scope of collaborative institutional arrangements.

This paper will contribute to this emerging stream of research by empirically exploring the increasing role played by cooperation between local actors in the investment projects (CLAIP) in Italian water utilities and local transport providers. In recent decades, investments in local infrastructures (LI) like the modernization of suburban railways, the realization of new underground systems, the refurbishment of obsolete water pipelines or the deployment of new wastewater treatment plants have encountered problems with planning, finance and public acceptance, which has had a negative effect on the supply of efficient, reliable and environmentally-friendly services. This paper aims to identify what typologies of institutional arrangement foster LI investment and how they meet the challenge. CLAIP benefits and costs and CLAIP structure and organization have been analysed in this paper. Particularly a survey has allowed to identify the channels through which CLAIP affects the success of LI renewal, extension and modernization initiatives and the arrangement characteristics that make it more effective (see Section 3.2).

It should be emphasised that recently the topic of bottom-up, community-based solutions in developing countries has been widely analysed (Ostrom *et al.*, 1993). When considering industrialized countries, some theories and empirical analyses have addressed traditional user cooperatives and newly established non-profit utilities (e.g. Bennett *et al.*, 2003; Birchall, 2002; Greer, 2003; Hansmann, 1996; Thomas, 2001; van Dijk and van Winden, 1997). However, the results of these analyses focus primarily on individual enterprises, rather than on cooperative agreements between public and private local independent actors. At the same time, the pre-existing analyses tend to investigate the efficiency and performance of cooperative and non-profit enterprises, and therefore offer little evidence on the advantages (or disadvantages) of these institutional solutions in the domain of infrastructure investment. So the topic of cooperation between local stakeholders in infrastructure development is a rather untapped field of analysis with the possible exception of Agranoff (2008) and Agranoff and McGuire (2001; 2003).

The empirical analysis illustrated in this paper is mainly exploratory (see Section 4) and the main problems addressed are the following. Firstly, is CLAIP recognized in the utility industry as an effective means for supporting infrastructure investment? Secondly, through which channels is CLAIP seen as improving the effectiveness of infrastructure design and construction? Thirdly, which structural and organizational features are considered to enhance the value of bottom-up infrastructure investment solutions? And, lastly, can it be argued that CLAIP plays different roles in different contexts, e.g. is it more effective when the infrastructure is developed by larger public utilities than by small private utilities?

This paper is organised as follows: after a survey of relevant studies (section 2) we will present a number of Italian Case Studies and the conceptual model (section 3) that has provided the guidelines for the empirical analyses (section 4) . Conclusions and some managerial implications are provided in secton 5.

2. Literature survey

This section, which aims at providing the conceptual arguments that motivate our focus on CLAIP, is divided into three parts. The first begins by defining LI, and then goes on to illustrate two crucial attributes of LI, namely open access requirements and usage rivalry, as it is the joint presence of these elements that creates the risk of infrastructure congestion and degradation over time and makes expansion, renewal and modernization investments so necessary. The second part discusses the information and coordination costs that plague a key investment stage, that is, the high-level design activities (i.e. planning, finance, engineering). The third part of the survey examines the strengths of CLAIP as a potential remedy to transaction costs arisen by high-level design efforts. And the section ends with a discussion of public acceptance, a dimension that is having an increasingly strong influence on LI deployment, and is as well further motivating CLAIP.

2.1. Defining LI

When discussing infrastructures the first difficulty is the lack of clear, unequivocal definitions and taxonomies. In this paper, the term “infrastructure sectors” refers to all the economic and social sectors characterized by the presence of diffuse physical assets, in the form of networks and other facilities (Grigg, 2010): public transport, energy, water and waste water, waste management, and communications. More specifically, we assume that the term LI includes all the facilities that provide a community (i.e. people, households and firms) with utilities for daily activities, such as gas and district heating pipelines, low voltage electricity distribution grids, water pipes and sewers, wastewater treatment plants, public transport equipment and networks (roads, railways, undergrounds, tramways, airports), waste collection and treatment plants, communication networks etc.

All these asset systems play an important role in local development by contributing to the enhancement of citizens’ quality of life (Graham, 2000; McFarlane and Rutherford, 2008) and sustaining economic activities (Berliant and Konishi, 2000; Ostrom et al., 1993). To a certain extent, they are the backbone of the urban area, interconnecting people and firms in and beyond the town; it is also possible to point out the relevance of the sociological, political and historical dimensions of LI, as argued by Mondstadt: ‘[n]etworked infrastructures […] are both society shaping and shaped by society’ (2009: 1928).

2.2. Qualifying LI: open access requirements, congestion risk, degradation over time

LI are frequently seen as public goods. This is generally not true. They can rather be defined as impure public goods, due to the joint action of open access requirements and usage rivalry.

Künneke and Finger (2009) define LI as common pool resources or “commons”. In particular, they stress LI non-excludibility. LI have to be open access, because of their social and economic role in the community’s daily life and development. LI operations have traditionally been accompanied by universal service obligations. In some cases, excludibility, namely the ability to exclude those users who are not able to pay for received services, is feasible in practice, but seldom desirable. Firstly, LI are intermediary general-purpose goods, i.e. they are essential inputs to an array of services and goods, as well as complementing other infrastructures (Ostrom and Ostrom, 1977; Frischmann, 2007). Secondly, not only they are at the origin of positive externalities for the local territories (Section 2.1), but the exclusion of some users from their provision could also generate damage for the community (Frischmann 2007): typical examples include sanitation problems, or increased pollution and traffic. Indeed, the obligation to serve and the presence of networks that would be too expensive to duplicate (i.e. natural monopoly) are the main reasons why, in several countries, utilities have been traditionally provided by public authorities.[2]

At the same time, LI can be regarded as rival goods. In spite of the fact that they are sharable, they exhibit partial subtractability (Ostrom and Ostrom, 1977). More precisely, they are simultaneous rivals because the consumption of infrastructure services by one user can reduce the potential consumption for others. In other words, LI have a limited capacity to provide users that access the infrastructure at the same time and independently with an acceptable level of service, i.e. users incur a risk of infrastructure congestion. Rivalry in infrastructure usage also arises diacronically. The degradation of LI reliability over time is related to exogenous physical processes (e.g. corrosion), but it is magnified by usage intensity and bad maintenance practices. In other words, inter-generational trade-offs are likely to arise and they get harsher because of open access requirements.

To summarize, LI are rivalrous as they are exposed to the risk of congestion and deterioration; they are open-access, although technically excludible. Consequently, LI are an example of impure public goods (Frischmann, 2007; Massarutto, 2009).

2.3. The role of high-level design in LI investments

In this paper we emphasize that the planning and engineering stages are particularly critical for the realization of LI investments. Firstly, not only the quality of these activities closely determines the construction quality. An appropriate design of facilities slows down the rate of deterioration, and curbs the maintenance expenses, provided that the pattern of use is "reasonable" (Ostrom et al., 1993). Secondly, a high-level design of investments does not limit to engineering activities, it also entails decisions of the investment finance. The economic assessment of infrastructure realization and future maintenance of facility and, relatedly, financial budgeting are indeed central elements for the selection of technical and

[2] Private enterprises have been relatively less present also because investments in urban and suburban networks and plants are highly capital intensive, lump-sum and sunk. When for-profit firms are the main actors (for instance, in a number of US cities), failures in capital and product markets and universal service policies have required authorities to intervene by the means of sector-specific regulations.

organizational alternatives. In a nutshell, it could be said that planning, engineering and finance constitute critical conditions for LI sustainability.

Open access requirements and rivalry in usage converge to motivate the search for institutional arrangements that support in an appropriate way the high-level design of infrastructure facilities (i.e. planning, finance, engineering). In particular, expansion, renewal and modernization investments are necessary to cope with congestion and quality deterioration over time, i.e. two risks that are augmented by open access requirements. In order to reduce the risk of congestion and over-time deterioration, good practices in operation and maintenance (O&M) are of course required, but the expansion and modernization of plants, networks and other facilities is as well necessary to ensure the community an adequate LI capacity. In addition, several key maintenance activities require investment on the grid, i.e. the renewal of pre-existing infrastructures.

2.4. Transaction costs in LI investment projects

A high level design has to take into account some transaction costs which are structurally related to LI investment projects. Ostrom *et al.* (1993) provides a taxonomy of three different typologies of transaction costs that are potentially relevant in planning, finance and engineering.

First of all, transaction costs encompass information costs. This is a very important and peculiar topic for the LI sector. LI are time- and place-specific goods à la Von Hayek. An appropriate design should consider the "local social and physical environmental characteristics", the "various types of production strategies employed in a region" and the "human [social] and physical capital presently underutilized in an area" (Ostrom et al., 1993: 50). Localization of infrastructure facilities implies a comprehensive analysis of all the site-specific variables of the system, because generalization is not possible. As Ostrom et al. (1993) have pointed out, if LI design neglects time- and place-specific conditions, and relies only on scientific codified knowledge it ends in creating "marvels that languish underutilized" (1993: 52).

Secondly, transaction costs include coordination costs, which stem from efforts targetted to obtain information from the many stakeholders involved (directly or not), to negotiate agreements and side payments, to develop a correct information in the community in order to stimulate public acceptance (see also section 2.6).

Finally, adverse selection and moral hazard determine strategic costs in investment projects. On the one hand, contractual relations with both public managers and private providers are likely to result in a low level of quality-enhancing efforts absent competition, because of the poor contractibility of quality performances (Hart et al. 1997). On the other hand, since different networks and infrastructures are interconnected, there is a risk of shrinkage (Künneke and Finger 2009; Ostrom et al. 1993). Players who are in charge of investment activities are aware that they could not be clearly identified if they under invest in deployment and maintenance activities (and generate congestion and quality degradation problems). In addition, in case of direct involvement of the State or local authorities, strategic costs could increase due to the risk of corruption and rent-seeking practices by bureaucrats (Shleifer and Vishny, 1994).

2.5. Bottom-up arrangements in LI projects

Which are the institutional arrangements which better face the transaction costs that stem from LI investments, and namely, from high-level design? Traditionally, the answer to this question has implied the choice among sharply defined alternative patterns in utility ownership and governance.

Generally speaking, the debate between privately and publicly-owned utilities has brought to no clear conclusion about the most effective ownership model of infrastructure utilities (Helm and Tindall, 2009). Sunk costs, lumpiness, natural monopoly are essential attributes of LI, which may result in under investment and excessive cost cuts LI in privately-owned companies (Hart et al. 1997, Cowan 2006, Sappington 2005). Aside from current constraints in public expenses, the State-owned enterprises have to deal with other problems, which can be traced back either to political interference (Shleifer and Vishny, 1994) or to management discretion and weakness of bureaucrats' incentives to supervise managers (Dixit 2002).

Ostrom has suggested that it is high time to go beyond the dichotomy public vs. private ownership and to look for new institutional arrangements (1990). As Section 2.4 has discussed, the three typologies of transaction costs arise in both the mainstream models. In particular, the information costs implied by local time and place specific LI attributes, imply that "a 'bottom-up', normative and citizen-centred theory of entitlements is necessary in conjunction with a goods-centred top-down theory in order to redefine the role of public services" (Clifton et al., 2004: 11).

This is even more important when considering LI high level design. An approach of governance is particularly necessary to foster LI investment projects. All the stakeholders should accept a shared responsibility for an investment project because they recognize that the necessary resources are spread among them (Green, 2009). Thus, the investment project should be based on multiorganizational arrangements for solving problems that cannot be achieved, or achieved easily, by single organizations (Agranoff and McGuire, 2001: 296). More precisely, the bottom-up agreements take the form of a "collaborative "groupware" based on social capital, shared learning and a culture of problem-solving among role-based actors; and power balances and disparities based on knowledge, technical skill, organizing skill, and leadership" (Agranoff and McGuire 2003: 1403). Going beyond the conventional wisdoms based either on hierarchical relationships led by the State or on the not always trust-worthy autonomy of market forces, this approach has also been defined as "policentricity" (Ostrom V., 1972): all the actors play their role, but the effectiveness of their action needs coordination and collaboration among them. This is the case suggested for "governing the commons" (Ostrom, 1990): although in this paper LI are only partly considered "commons" (i.e. excludibility is technically feasible, but open access is socially desirable), similarities between these two groups of goods make a polycentric approach interesting also for LI investment projects. Agranoff and McGuire identify collaborations as an alternative institutional arrangement model based on State hollowness: government by bureacracies is only one aspect of a wide network of relationships in order to achive public goals (1998). Focussing on the cases of 237 cities in the USA, they distinguish project-based intergovernmental networks (related to the design of LI) and resource exchange networks (related to the finance dimension of LI investment project). They point out that local utilities have been involved in both the models, showing a positive experience for all the players involved. More recently, illustrating 12 cases of collaborative projects, Agranoff has deepened previous results of the effectiveness of collaboration in achieving goals, as "[n]etworks raise the potential for more rational decision making […] overcome information and resource asymmetries […] create synergistic learning and problem solving" (2008: 326).

Collaboration among local actors in LI investment project do not necessarily imply to alter ownership patterns (i.e. privatization or nationalization programs). CLAIP limits to open the way to a set of governance and management practices which affect transaction costs. In fact, coordination, strategic and information costs, in such a way, are drastically reduced because all main actors are involved into collaboration and bring information which can help LI realization.

2.6. Bottom-up arrangements as a condition for public acceptance

Infrastructure investments are generally regarded as locally-unwanted investments (i.e. they are at the origin of the so-called Nimby situation). The location processes are becoming increasingly controversial due to the complexity of relations between developer, citizenship, and authorities. In general terms, infrastructure siting involves distinctive difficulties (Vajjhala and Fischbeck 2007), because of the project scale, techno-engineering requirements, and geographic constraints. More particularly, the utility networks and facilities generate benefits for the whole community, but they are at the origin of concentrated environmental externalities (e.g. visual disamenities, safety risks, polluting emissions, additional traffic or noise). The neighbouring residents are thus likely to oppose the investment project. The attitude of local community is at the origin of a wide range of siting costs, e.g. monetary payments or in-kind transfers that should compensate the environmental damages, side effects of protest, as the slowdown of construction and operation timelines, litigation costs, requirements of design modifications. According to the Coasean paradigm, a market-based siting decision is likely to be efficient. Local community costs also not homogeneous across sites, because the environmental damages vary with sites (e.g. due to differences in factors such as population density, demography, bio-diversity, tourism intensity, and so on). As a consequence, cost-minimizing developers could autonomously decide to locate the new infrastructure in the neighborhood that receives the least environmental damage, other things being equal (Minehart and Neeman 2002). At the same time, the attitude of host communities towards the investment project does not only reflect the intensity of environmental costs, it is also related to its voice potential. Capabilities to appraise environmental damages, to foster a political representation of local interests, and to offer an effective opposition vary highly across communities (e.g. Hamilton, 1993). Since communities that face similar environmental costs could differ in their potential for collective action the intensity of local opposition ceases to be an efficient driver of location decisions. The solution traditionally proposed to tackle the Hamiltonian effects consists in centralized political mechanisms (Feinerman et al., 2004). Nevertheless political and administrative decisions are also biased by the voice potential of communities, because they are influenced by political lobbying and mobilization capabilities.

In summary, neither market-based siting processes nor top-down political approaches offer a universal remedy to the location problems. By contrast, the involvement of local stakeholders in the early stages of investment decision process could enhance the efficiency of siting decisions. On the one hand, collaborative arrangements are likely to reduce the transaction costs that hamper the market-based location decision, by favouring the negotiation of compensations and design modifications. Even more substantially, collaboration among local actors favours the transfer of knowledge from the utility to the citizens (e.g. a better understanding of the reasons why environmental impact and safety risks are limited), and from the citizens to the utility firm (e.g. a more detailed representation of the reasons why certain sites are unsuitable for the investment). On the other hand, collaborative solutions can prove to be more neutral than centralized siting processes with respect to local interests, due to a greater variety of local actors. Stakeholders that take part into cooperative agreements do not limit to the community leaders that traditionally dominate lobbying actions and political representation. They could include user committees, chambers of commerce and business organizations, environmental and heritage associations.

3. Conceptual framework and research questions

During this research some case studies that show how cooperation between local actors has produced satisfactory results have been conducted in order to preliminarily assess the explaining strength of CLAIP theories, and to contextualise them in the Italian utility industry. This section shortly reports three examples, and then illustrates the conceptual blocks of our empirical analysis (the main drivers of LI realization potentially affected by CLAIP, the CLAIP typologies, the CLAIP context) and the relations that link such constructs.

In late 2000, a municipality with around 2,300 inhabitants located in a mountainous region of Northern Italy has fostered the deployment of a medium and low pressure gas pipeline. Previously, diesel oil had been the main energy source used in the area, but this was both costly and inconvenient as it involved considerable storage and supply problems. The pipeline development was a considerable investment that was difficult to justify on account of the municipality being both small and quite far from high-pressure main pipelines. The cost of energy supplies, however, was putting considerable pressure on the local economy which consists mainly of small craft businesses specialized in metal manufacturing, a energy-intensive production process. This situation was further complicated by an unstable legislative framework for local public budgets. Despite all this, however, owing to the joint initiatives of local administrators and local multi-utility company (an entirely publicly-held company) the local institutions succeeded in financing the laying of a 20 km long pipeline specifically for the municipality and another 120 km of pipeline for other municipalities. This is expected to slow down depopulation and and to support the traditional local economy. The intervieweed people have pointed out that the substantial absence of negative environmental externalities made it much easier to gain the consent of all the stakeholders.

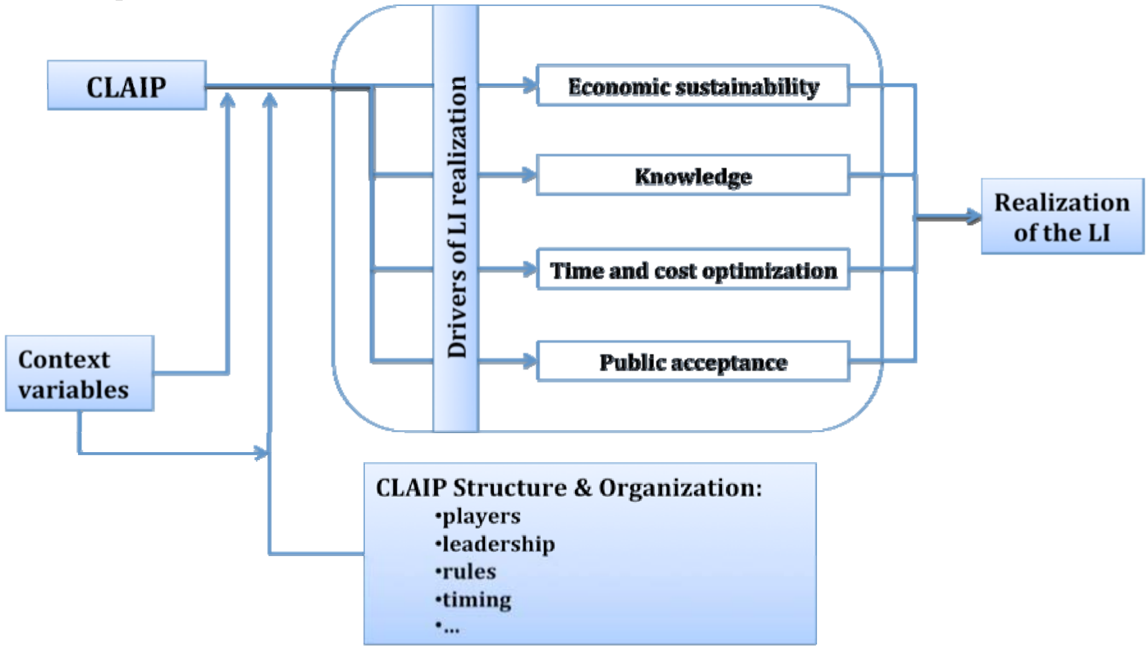
Another interesting example consists in the re-launch of an old railway between a big northern city, and smaller towns and rural villages, which also took place in late 2000. One of the principles that local governments were willing to safeguard was the so-called "territorial balance": while it would be clearly uneconomic to provide certain rural locations with modern and efficeint transport services, depopulation and urbanisation towards the bigger city have their own risks. The bigger urban centre would have increased its size but not its life quality, and this would have increased social spending for the entire community. In addition, the involved rural areas provided unique contributions to the whole territory (for example, biomass production, traditional crafts, tourism) , which were worth being preserved. Very few people used the railway also because the trains were old and slow. This situation, however, created considerable traffic jams when buses and private traffic entered the greater towns, especially at peak times. In order to relaunch and to modernize the railway line, a special team was put together with representatives from the various sectors affected and with the aim of preserving territorial balance, By way of example, if the railway were been assessed purely in terms of the number of tickets traditionally sold, the project would have undoubtedly been abandoned as the per-existing demand patterns were really low. Instead a decision was taken to improve the service between rural and urban areas by investing in the refurbishment of rail lines (e.g. along the network of 103 km new tunnels have been deployed) and in the procurement of new trains (2 trains have been bought, and other 8 trains are on the way). In order to encourage people to change transport modes, an agreement with bus providers has been made, and the bus services were shifted to connect local villages to closer railway stations, while connections to the city have been downsized. The total investment amounted to approximately 180 million euros, and the bulk of financial resources has been provided by the State, Region and Provincial Authorities. The project was managed by a consortium specifically created by Provincial Authorities. Today 150,000 people use this service. Trains leave from the small town every 2 hours and there is an urban service every 15 minutes. The results in terms of travel time efficiency are reported to be impressive. This case study has shown quite clearly that considerable benefits can be obtained by involving all the stakeholders, and by taking into account all the established interests, including the related environmental costs and benefits.

Our third case study regards the renewal of a water supply network that is used by more than 50 municipalities, and by a total of around 122,000 inhabitants in a highly industrialised area. It is a well-known fact that one of the major problems in Italian water industry is the considerable water loss in upstream systems, with several operating problems in terms of water pressure and shortage risks. Unfortunately, the municipality-provider franchising contracts do not help in establishing clearcut responsibilities for the network maintenance and renewal. While it seemed apparent that most stakeholders were interested in network refurbishment, the terms of a potential agreement were far from being well understood. Following a proposal made by the local utility top management, an agreement was signed at the Chamber of Commerce by all the parties interested in improving the service (including major companies and business associations). A redefinition of franchising clauses and a discussion fo financial schemes have accompanied the network re-powering.

The potential relevance of CLAIP theories and analyses that have been surveyed by Section 2 (particularly: Agranoff, 2008; Agranoff and McGuire, 1998; 2001; 2003) has been sketched against investment practices currently in place in the Italian utility and transport industries through the exploratory case studies. We are now in the position to identify the main barriers that currently hamper infrastructure realization in Italian utilities. They can be traced back to the following costs and risks: high siting costs and scarcely predictable project timelines; limited economic and economic sustainability of investment, related to tariff regulation, franchising terms, relations with financial backers; design difficulties in matters such as the project scale, location and technology; mobilization of neighbouring residents and harmed establisked interests against the development. At the same time the previous research and our case studies have hinted to certain conditions that are likely to be necessary for the effectiveness of CLAIP arrangements (e.g actors involved, rules of decision-making process).

The conceptual model illustrated by Figure 1 summarizes the vision that we have now developed on CLAIP, its main effects and the moderating role of context, structure and organization.

Figure 1. Conceptual model



First, CLAIP is argued to increase the success probabilities in LI realization, insofar as it affects the main drivers of the process:

1. the economic sustainability of infrastructure investment;
2. the knowledge about the potential uses and characteristics of infrastructure;
3. the public acceptance of infrastructure (i.e. control of Nimby syndromes)
4. the time and cost optimization in infrastructure project.

All these drivers are strictly related to some occurrences of transaction costs which characterize the LI (see 2.4). CLAIP, in fact, is expected to improve at least some of them and to favour the project implementation.

Second, the relationship between CLAIP and the drivers of LI realization varies with structural and organizational aspects, namely the involved actors, the responsibility of each player, the role of leadership, the formal or uninformal structure of the collaboration, the decision-making timing and so forth. Obviously, as in Agranoff and McGuire (2003), different actors have been involved for different cases and different aims, achieving, consequently, different goals, but it is not possible to generalize how CLAIP is structured and organized. CLAIP structure and organization, as shown in the figure 1, influence its effectiveness by gradually and differently affecting one or more drivers. For instance, the involvement of environmental associations can improve both the knowledge of local specific territorial and environmental issues and, consequently, the public acceptance of a LI; at the same time, it can negatively affect efficiency by protracting the time of decisions, with an unclear net impact on effectiveness.

Finally, context variables do play a role. They are likely to be mainly related to the utility structure (e.g. ownership, number of customers, location), though other external factors could be considered by further analyses. It is not so hard to imagine that the impact of collaboration on the public acceptance of a project concerning water management can be harder when the utility is privately-owned; at the same time, a publicly-owned utility could take for granted the knowledge of the local characteristics, contributing to create useless infrastructures or increasing public opposition to the project.

In conclusion, it is possible to identify a positive relationship between CLAIP and the realization of a LI project, through the impact on different CLAIP drivers. However, this relationship can change whenever the structure and the organization of CLAIP change. At the same time, all these impacts can have different results according to the utility characteristics. In principle our analyiss should address the following research questions:

- Does CLAIP enhance the effectiveness of high-level design in infrastructure projects through an increase of time and cost optimization, economic sustainability, knwoledge and public acceptance?
- Which structural and organizational features are required to draw the most from bottom-up institutional arrangements?
- Is CLAIP uniformily effective or does it play different roles in different contexts?

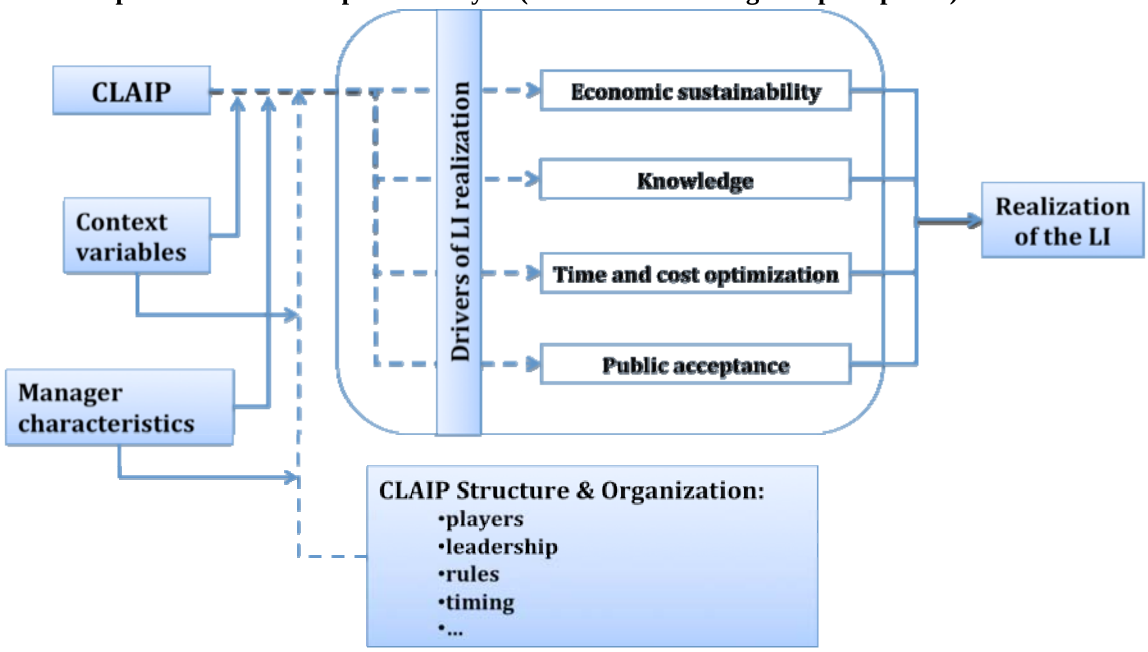
4. Empirical analysis

Ideally, the exploration of CLAIP conceptual model (Figure 1) and the analysis of our research questions should rely upon a sample with two characteristics. First, in order to obtain results that can be generalized, it should closely reflect the universe of Italian utilities and managers (stratification). Second, it should also include a control sub-sample. In order to be able to observe the effects due to CLAIP, and not to other factors, the sample should also include a number of infrastructure projects that have not been realised through cooperative initiatives, but with other types of institutional arrangements. Moreover, both the characteristics and effects of CLAIP should be represented through objective indicators. Finally, in order to learn about the effectiveness of different governance solutions, the bottom-up cooperative agreements should be classified according to structural and organizational elements (e.g. the identity and role of involved local actors, the decision rules, the collaboration scope).

Unfortunately this at present seems to be a too ambitious goal. Public domain information on collaborative practices among local actors in infrastructure projects is practically non existent, and available sources (e.g. press news, sector publications) are unlikely to provide detailed information on CLAIP actors, objectives and characteristics.

In the empirical analysis, presented in the following section, these relationships have been observed indirectly through the managerial perceptions of the sample, as the dashed arrows show. As a result, we have decided to conduct a novel field analysis, which explores CLAIP from the viewpoint of sector experts. Despite certain limitations of our empirical approach, the most relevant of which are the reliance upon subjective perceptions and the lack of a control sample (see Section 4.1), one relative strength of our methodology should be emphasised. Traditional objective indicators could at their best reveal to what extent CLAIP initiative have an impact on infrastructure realization but do not tell us how. The importance of disentangling the relations through which CLAIP modifies the investment project implies that depth is a necessary dimension of the analysis, requiring information that is typically beyond publicly available data sources.

Figure 2. Conceptual model and empirical analysis (dashed lines: managerial perceptions)



As put in evidence in the figure 2, not all the relationships can be identically observed. Among the research questions we essentially focus on the two main groups of relationships: 1. the effective impact of CLAIP on the realization of a LI through the impact on the four drivers previously analyzed; 2. the influence of the structure and organization of the CLAIP on its effectiveness. Characteristics of the management and firm in general are objective indicator, so that their analysis is differently represented in the figure.

4.1. Description of the data: sample and questionnaire

In order to explore the relationship between CLAIP and the drivers of LI realization and the role of CLAIP structure and organization, we have designed a structured questionnaire. While the first part of the questionnaire was targeted to ask information on firm and manager characteristics by the means of categorical indicators, the second part has allowed to collect qualitative data on the different elements of Figure 2 model[3]. First of all we have validated the questionnaire by the means of some direct interviews. This has allowed us to improve the clarity and consistency of survey. Then we have delivered by email the questionnaire to more than 450 managers in early 2010. The potential respondents have been identified by consulting the yearly census of water utilities and public transport utilities associated to Federutility and Asstra, the major sector industry associations, and by direct telephone queries. The two industries have been selected because the are widely recognized to suffer an investment gap, and during personal conversations several experts have documented that a consolidated body of experiences and attempts in the field of collaborations with local actors have been cumulated.

We have selected respondents among Presidents of Boards, Chief executive officers, Operations or network managers as people better informed on high level decisions on infrastructure development. Assistance has been provided by email and by phone when required. At the end 85 questionnaires have been returned (i.e. a 19% return rate). Table 1 illustrates the sample composition with respect to some firm characteristics. Large publicly-owned utilities dominate the sample. In addition, transport enterprises and utilities located in Northern Italy have provided the majority of cases.

[3] A third part of the questionnaire addressed public service motivations of respondents. Here we do not present this part of survey, which is the subject of a companion paper.

Table 1. Sample distribution: Firm characteristics (N=85)

Binary variable	*Definition*	*Nr Questionnaires*	
Industry			
WATER	water and sewerage	28	32,9%
TRAIN	transport	57	67,1%
Location			
CENTRE	Central Italy	8	9,4%
SOUTH	Southern Italy	14	16,5%
NORTH	Northern Italy	63	74,1%
Size			
POP_50_149	50-149,000 users	12	14,1%
POP_150_499	150-499,000 users	46	54,1%
POP_500	More than 500,000 users	25	29,4%
OTHP	Less than 50,000 users	2	2,4%
Public ownership			
PUB_0_24	0-24%	6	7,0%
PUB_25_49	25-49%	2	2,4%
PUB_50_99	50-99%	30	35,3%
PUB_100	100%	47	55,3%

The relevance of final sample should be assessed against the universe of Italian utilities and transport enterprises. In order to get some sense of the significance and limitations of our sample we have referred to a recent survey of utilities realized by the Italian Union of Commerce Chambers (Unioncamere, 2008)[4] This report focuses on those utilities that are fully or partly owned by local governments (i.e. municipalities, provinces, or regions), the most relevant component of sector industry associations (i.e. of the addressed utilities). In Italy, there are, respectively, 328 public transport enterprises and 523 water, electricity, and gas utilities that are controlled by local governments. As to the utility size, the survey reports information on sales. In addition in order to compare our sample with the universe we have collected manually information on the sale figures for all the individual respondents and firms. Larger enterprises (i.e. sales equal to or greater than 50 million euros) account for 9% of this universe, while enterprises with sales smaller than 50 million euros and greater than 10 million euros account for another 23% of the whole sector. Our sample is not stratified with respect to this universe. Among the questionnaire respondents, larger utilities are overrepresented: the top enterprises (i.e. sales greater than or equal to 50 million euros) account for 43% of the sample, while the second class size (i.e. sales smaller than 50 million euros and greater than 10 million

[4] Unfortunately the official census of enterprises prepared by the Italian Institute of Statistics is not appropriate to our aim because the adopted industrial classification does not allow to distinguish utilities that provide access to infrastructure services to rural and urban citizens from firms that are active in other parts of the water and transport sectors (e.g. tourist buses, cabs, suppliers of special water services to agricultural or industrial districts and so on).

euros) account for 50% of observations. The geographic location is more aligned to the universe, because water and transport utilities located in Southern Italy account for 17% of the sector.

As far as the respondents are concerned, Table 2 illustrate their individual characteristics. The majority of interviewees are chief executive officers. As to education, people with an engineering background is the most relevant group.

Table 2. Sample distribution: Manager characteristics (N=85)

Binary variable	***Definition***	***Nr Questionnaires***	
Job (not reciprocally exclusive)			
PRESB	president of the board	18	21,2%
CEO	chief executive officer	50	55,3%
OPER	operations manager	20	23,5%
OTHJ	other jobs	3	3,5%
Sector experience			
SEXP_5_14	5-14 years	30	35,3%
SEXP_15	more than 15 years	48	56,5%
OTHSE	less than 5 years	7	8,2%
Education (not reciprocally exclusive)			
LAW	degree in law or political science	9	10,6%
ENG	degree in engineering	39	45,9%
BUS	degree in business studies or economics	14	16,5%
OTHED	other education	23	27,0%

Three strength points of our survey should be emphasised.

First, while we rely on managerial perceptions, that is, on subjective measures, we have controlled the competences and expertise of interviewed people through a sector experience indicator and a question on past experience in collaboration with local actors. Managers with a long experience in the sector (i.e. more than 15 years) make up the majority of our observations (i.e. 56.5% of the sample, Table 2). In addition, only 13 out of 84 respondents have reported that they have a null experience of collaborative initiatives with local actors in the realization of investment projects.

Second, some reversed questions have been included in order to be able to strengthen the consistency of collected information. As will be illustrated in Section 4.2 the statements proposed by reversed items have generally obtained a weaker agreement. Similarly the order through which items have been presented was random, in order to reduce the common bias problem.

Third, although the survey sample is rather small, the data obtained provide in-depth information about cooperation in infrastructure projects. In particular, the questionnaire, after having provided the respondent with a definition and some examples of CLAIP initiatives, has proposed a number of statements on the different drivers through which CLAIP is expected to foster the infrastructure realization. The group of questions is expected to underlie the following conceptual constructs, previously introduced in section 3.2.

- *Time and Cost Optimization.* Each item describes an element through which CLAIP may or may not decrease the costs and times of infrastructure project.
- *Economic sustainability.* Each item describes an element through which CLAIP may or may not improve the financial and economic sustainability of investment.
- *Knowledge.* Each item describes an element through which CLAIP allows the developers to obtain a more detailed knowledge of inputs especially relevant for high-level design of facilities (for instance, the demand potentially expressed by citizens for infrastructure use, or project alternatives), or allows the citizens to overcome suspects towards the new facility by getting a greater acquaintance with the infrastructure characteristics.
- *Public acceptance*. Each item describes an element through which CLAIP may or may not reduce the opposition of neighbouring residents to infrastructure.

Table 3 reports the complete sets of items for each of the mentioned conceptual constructs. Two items have been preliminarily associated to two different constructs because they are potentially related to both of the conceptual constructs. The respondents have been solicited to express their agreement or disagreement. The interviewees could select their answers from a 5-point Likert scale: 1 (strongly disagree), 2 (moderately disagree), 3 (neither agree nor disagree), 4 (moderately agree), 5 (strongly agree).

The survey also asks questions about the local actors that should or should not take part into CLAIP initiative (i.e. Structure conceptual construct). At the same time the survey proposes statements that describe the organization of CLAIP initiatives (i.e. Organization conceptual construct): organizations that should lead the collaboration, potential biases brought in by different actors, reliance upon institutional formalized committees and so on. Table 4 reports the complete sets of items for the two dimensions.

Table 3. CLAIP benefits and costs: Descriptive statistics

Items	*Nr Obs*	*Mean*	*Median*	*St. Dev*
Time and cost optimization of infrastructure project				
CLAIP simplifies the authorisation and permitting process	83	3.76	4	0.99
CLAIP reduces planning times by involving the major actors	83	3.14	4	1.29
The utility can autonomously undertake high-level investment design (reversed)	83	3.12	4	1.26
CLAIP is complex and create additional costs (reversed)	83	3.00	2	1.11
CLAIP does not improve success chances of investment realization (reversed)	83	3.01	2	1.15
Economic sustainability of infrastructure investment				
New backers can be identified and attracted through CLAIP	83	3.31	4	1.00
Resorting to the CLAIP system reduces the economic risks of the project	83	3.50	4	1.11
CLAIP facilitates the redefinition of tariff and franchising conditions	83	3.19	4	1.13
CLAIP does not simplify relations with backers (reversed)	83	3.08	4	1.08
Knowledge about potential uses and characteristics of infrastructure				
CLAIP offers extra important information for feasibility analyses and planning	83	3.75	4	0.88
Planning alternatives emerge better if the project is shared	83	3.93	4	0.95
CLAIP help spread correct information about systems and technology	83	3.78	4	1.00
If citizens are involved in CLAIP through their representatives, they will have less objections	83	3.73	4	1.00
The utility can autonomously undertake high-level investment design (reversed)	83	3.12	4	1.26
An investment cannot be planned effectively without involving the local actors	83	3.57	4	1.04
CLAIP does not help in identifying user requirements and problems (reversed)	83	2.69	2	1.12
Public acceptance of infrastructure				
CLAIP helps in spreading correct information about facility characteristics	83	3.78	4	1.00
If citizens are involved in CLAIP through their representatives, they will have less objections	83	3.73	4	1.00
CLAIP is fundamental for identifying compensation, if necessary	83	3.64	4	0.93
CLAIP does not resolve environmental opposition problems (reversed)	83	3.11	2	1.18

Table 4. Items, CLAIP structure and organization: Descriptive statistics

Items	*Nr Obs*	*Mean*	*Median*	*St Dev*
CLAIP structure				
Local governments should take part in CLAIP.	83	4.34	4	0.80
Local business associations should be involved in CLAIP.	83	3.31	4	0.99
Consumer representatives should be involved in CLAIP.	83	3.77	4	1.04
Local environmental associations should be involved in CLAIP.	83	3.48	4	0.90
It is wise to limit the number of local governments involved.	83	3.36	4	1.30
When consumers are involved their input is not very constructive.	83	2.99	2	1.19
The presence of local stakeholders among the utility partners encourages investment and improves level of service performances.	83	3.91	4	0.89
CLAIP organization				
CLAIP processes should be given a formal structure.	83	3.34	4	1.00
CLAIP leadership should be taken by local governments.	83	3.43	4	1.23
CLAIP leadership should be taken by the utility.	83	3.05	4	1.19
“Service committees” are an ideal sphere for CLAIP.	83	3.30	4	1.19
Involving public administration means intensifying bureaucracy.	83	3.28	4	0.98
The decision-making process in CLAIP is exposed to interferences by parties	83	2.93	2	1.08
The CLAIP should not alter the decision-making process, it should have a purely advisory capacity.	83	3.19	4	1.19
If the length of negotiations is predefined they will be more successful.	83	3.67	4	0.81
CLAIP require informal meetings.	83	3.91	4	0.81

4.2. Results from individual questions

The respondents have expressed a general consensus on the benefits that are created by CLAIP as an institutional arrangement. Table 3 reports the sample mean and median for each item. Firstly, with the exception of reversed items, half of the interviewees agree or strongly agree with all the proposed statements but one (i.e. the median value is equal to 4). An exam of reported mean values show that *Knowledge* and *Public acceptance* are the conceptual dimensions that have attracted a greater agreements. Aside from a reduction of costs and timelines or a more effective relationship with financial markets and intermediaries, cooperation with local actors seems to create conditions for a more effective high-level design of facilities and for a siting process that increases the public acceptance. The sector experts seem to highly value CLAIP especially because it simplifies authorization processes and permitting activities, it elicits a response from local stakeholders that vehicles relevant information on design alternatives, project sustainability and potential infrastructure usage, and, finally, it curbs the residents' oppositions to the development by easing the transfer of relevant pieces of knowledge about the technological and environmental characteristics of plant and networks.

As to the actors who should be involved in bottom-up initiatives (*Structure* dimension), the descriptive statistics reported in Table 4 seem to indicate that CLAIP strongly requires the participation of local governments and other local stakeholders, while the convergence of experts on environmental and user associations is slightly weaker. Among the items that describe CLAIP organization, the single most shared statement concerns the relevance of informal coordination structures, while the consensus on other questions is not so strong as it is for the other dimensions.

4.3. Results from synthetic indicators

As was mentioned earlier, the questionnaire comprises a large number of specific questions relating to the relationship between CLAIP and time and cost optimization of the project, economic sustainability of investment, creation and transfer of knowledge on infrastructure characteristics, public acceptance of the infrastructure (Table 3). Another group of items represent CLAIP structure and organization (Table 4). We will rely on such information to build a series of (quantitative) synthetic indicators through principal component analyses of the groups of individual answers concerning each of the above mentioned aspects.

While it is not possible to eliminate all subjectivity from these measures, the principal component technique extracts information from various questions in the questionnaire simultaneously, somewhat alleviating this problem through the diversity of questions. Such a richness of descriptive elements was necessary to cope with the variety of the impacts of CLAIP on investment realization and the complexity and multi-dimensional nature of infrastructure projects. We decided to extract principal components from the original questions to provide a more parsimonious description of the phenomena at hand. Answers from the questionnaires were codified through binary variables. In order to obtain meaningful indicators, we have subdivided the whole set of questions into the two groups shown respectively by Tables 3 and 4, and ran a principal component analysis for each group.

The results of the principal component analyses on, respectively, CLAIP costs and benefits and CLAIP structure and organizations are summarized, respectively, in Tables 5 and 6. The internal consistency of each group has been tested by the means of Cronbach's alpha statistics. The items that decreased the group Cronbach's alpha have been excluded from the Principal component analysis (see the legend of Tables 5 and 6). The reported principal components have been extracted only from the final sets of items, and final Cronbach's alpha has been reported for each construct. The final factors have been obtained after a rotation of factor loadings. The first column groups the individual questions while other columns reports the factor loadings for the resulting principal components.

It is possible to identify 3 factors which show that respondents perceive a positive impact of CLAIP on the realization of the LI; a fourth factor concerns some problems related to this approach (Table 5). Firstly, some managers underline the impact of CLAIP on the simplification of authorization processes and the reduction of the economic risk (Table 5, third column, BC2 factor). Secondly, the traditional separation between developers and citizens is held to be a crucial target of CLAIP. Particularly, consensus seems to emerge that a polycentric arrangement speeds the acquisition of more balanced information on the facility by the citizenship, and symmetrically it favours a better comprehension of user needs and problems by the other project players (Table 5, second column, BC1 factor). Finally, the relationship with local stakeholders results in a more complete evidence on project alternatives, a piece of knowledge that is valuable for the facility design (Table 5, fourth column, BC3 factor). Those experts which are, on the contrary, more sceptical on the opportunity to launch collaborative agreements with local actors, think that CLAIP is too complex and, in particular does not favour agreements with environmental oppositions (Table 5, fifth column, BC4 factor).

Fifth, as far as the structure of bottom-up initiatives is concerned, a group of experts emphasises the opportunity to involve local environmental organizations (Table 6, fifth column, SO4 factor), while another group considers the role of local business associations (Table 6, sixth column, SO5 factor): both agree on limiting the number of local governments. According to other respondents, the presence of user representatives and the extension of ownership rights to local stakeholders should qualify CLAIP (Table 6, third column, SO2 factor). Finally, as to the organization of cooperative agreements around infrastructure investments, there are experts that suggest that CLAIP is a political process, requiring informal meeting (Table 6, fourth column, SO3 factor). Others suggest conditions for CLAIP to be successful: a predefined duration and only an advisory function (Table 6, second column, SO1 factor).

Table 5. CLAIP benefits and costs: Principal component analysis

	Factor loads(#)			
Definition: CLAIP… ***Items(^)***	***BC1*** …creates new knowledge for high-level design activities	***BC2*** …reduces economic risk and optimizes authorization procedures	***BC3*** …fosters the transfer of knowledge from and to users	***BC4*** … is complex, particularly in managing environmental oppositions
Knowledge				
CLAIP offers extra important information for feasibility analyses and planning			0.595	
Planning alternatives emerge better if the project is shared	0.688			
CLAIP help spread correct information about systems and technology			0.631	
An investment cannot be planned effectively without involving the local actors	0.795			
CLAIP does not help in identifying user requirements and problems (reversed)			-0.829	
Public acceptance				
If citizens are involved in CLAIP through their representatives, they will have less objections				
CLAIP is fundamental for identifying compensation, if necessary		0.575		
CLAIP does not resolve environmental opposition problems (reversed)				0.816
Time and cost optimization				
CLAIP simplifies the authorisation and permitting process		0.692		
CLAIP reduces planning times by involving the major actors	0.499			
CLAIP is complex and create additional costs (reversed)				0.732
Economic sustainability				
Resorting to the CLAIP system reduces the economic risks of the project		0.779		
CLAIP does not simplify relations with backers (reversed)	-0.592			

*Note (#)*Only factors with eigenvalues greater than 1 are retained; the cumulated variance accoutned for by these factors is equal to 56%. Only factor loads larger than 0.5 are reported. (^) The questionnaire included a larger number of benefits and costs items (see Table 3). Some items have not been included in the Principal component analysis, after a preliminary assessment of the internal consistency of each set of items (i.e. they decrease Cronbach's alpha). The reported principal components have been extracted only from the final sets of items, which exhibit a Cronbach's alpha equal to 0.729.

Table 6. CLAIP structure and organization: Principal component analysis

	Factor loads(#)				
Definition: CLAIP… ***Items(^)***	***SO1*** …should have a predefined duration and exert an advisory function.	***SO2*** … should involve local stakeholders	***SO3*** … is a political process and requires informal meetings	***SO4*** …should involve local environmental associations	***SO5*** …should involve local business associations
Structure					
Local governments should take part in CLAIP	-0.599				
Local business associations should be involved in CLAIP					0.812
Consumer representatives should be involved in CLAIP		0.556			
It is wise to limit the number of local governments involved				-0.524	0.501
Local environmental associations should be involved in CLAIP				0.888	
When consumers are involved their input is not very constructive					
The presence of local stakeholders among the utility partners encourages investment and improves level of service performances		0.839			
Organization					
"Service committees" are an ideal sphere for CLAIP			0.547		
Involving public administration means intensifying bureaucracy		-0.582	0.503		
The decision-making process in CLAIP is exposed to interferences by parties			0.732		
The CLAIP should not alter the decision-making process, it should have a purely advisory capacity	0.629				
If the length of negotiations is predefined they will be more successful	0.794				
CLAIP require informal meetings			0.645		

*Note (#)*Only factors with eigenvalues greater than 1 are retained; the cumulated variance accounted for by these factors is equal to 63%. Only factor loads larger than 0.5 are reported. (^) The questionnaire included a larger number of benefits and costs items (see Table 4). Some items have not been included in the Principal component analysis, after a preliminary assessment of the internal consistency of each set of items (i.e. they decrease Cronbach's alpha). The reported principal components have been extracted only from the final sets of items, which exhibit a Cronbach's alpha equal to 0.631.

An additional analysis has been conducted to investigate whether the expert perceptions are sensible to the context (Table 7). In particular, the t-ratio tests of mean differences have allowed us to explore the moderating role of utility size and ownership with respect to the relationship between CLAIP and project time and cost optimization, economic sustainability, knowledge creation and transfer, public acceptance. In other words, we compare the values taken by benefit and cost factors in two sub-sample: large v. small utilities, public v. mixed or private utilities. Finally a t-ratio test of mean differences has been introduced to verify whether the manager expertise on CLAIP (past experience of CLAIP or not) implies different answers and these differences are statistically significant.

Focussing on the size dimension, a clear difference on the viewpoint on CLAIP emerges between utilities that provide services to less than 150.000 users and those whose service is provided to more than 150.000 users. CLAIP seems to be considered relatively more effective by smaller enterprises. In particular, in smaller areas CLAIP fosters the transfer of knowledge among actors and generates new shared knowledge more intensely than in larger communitites (Table 7, mean difference for BC3). Size is also a relevant discriminant for one CLAIP structure factor, that is the involvement of local stakeholders (Table 7, mean difference for SO2). In addition in larger areas, managers think that CLAIP should have predefined duration and advisory function (Table 7, mean difference for SO1). Ownership entails other differences: mixed and private utilities are more confident that CLAIP reduces economic risks (Table 7, mean difference for BC2) and should involve environmental associations (Table 7, mean difference for SO4), and coherently they do not share with public enterprises concerns about relations with these players (Table 7, mean difference for BC4). Finally, it is quite conforting that managers who had previous experiences with CLAIP do not underplay the potential of these arrangements. They limit to point out that coping with environmental associations is a relatively difficult task.

Table 7. The moderating role of size, ownrship and CLAIP expertise: t-ratio tests of mean differences

		Size			**Ownership**			**CLAIP expertise**		
		Large (150,000 + users)	Small (150,000- users)		Public (50%+ public ownership)	Mixed or private (50%- public ownership)		Yes	No	
		Mean	Mean	Mean difference^	Mean	Mean	Mean difference^	Mean	Mean	Mean difference^
Factors	***Definition: CLAIP…***									
Benefits and costs										
BC1	…creates new knowledge for high-level design activities									
BC2	…reduces economic risk and optimizes authorization procedures				-0.026	0.282	-0.308 (0.203) *			
BC3	…fosters the transfer of knowledge from and to users	-0.070	0.375	-0.444 (0.276) *						
BC4	… is complex, particuarly in managing envirnmental oppositions				0.035	-0.378	0.413 (0 .303) *			
Structure and organization										
SO1	…should have a predefined duration and exert an advisory function.	0.094	-0.507	0.601 (0.358) *						
SO2	… should involve local stakeholders	-0.110	0.591	-0.701 (0 .272) ***						
SO3	… is a political process and requires informal meetings									
SO4	…should involve local environmental associations				-0.063	0.689	-0.752 (0.248) ***	-0.068	0.368	0 .436 (0 .306) *
SO5	…should involve local business assocaitions									

Legend: ^, mean differences (standard errors in parentheses) and p-value of alternative hypotheses (mean differences larger or smaller than 0), * p < .10; ** p < .05; *** p < .01; ns, not significant

4.4. Discussion of empirical results

The hypothesis that CLAIP acts on LI realization by reducing the relevance of four barriers has been substantially confirmed by our empirical findings (costs and time of infrastructure projects; complex access to financial resources; poor knowledge of infrastructure characteristics; opposition by residents to the facility siting). More precisely, the importance of Knowledge and Public Acceptance as drivers of infrastructure projects is particularly great: CLAIP, thus, is considered by managers an opportunity to learn about site-specific elements, to identify relevant planning alternatives, to inform people about usage opportunities and reduced risks related to LI siting, to negotiate an appropriate system of compensations. Most respondents identifies in the project speed up the greatest efficiency impact of CLAIP (e.g. reduced permitting times), while impact on economic sustainability is relatively more uncertain. It should also be said, looking at CLAIP structure and organization, that collaborative arrangements generally seems to be centred around local governments and that the involvement of a wide array of local stakeholders is expected to be fruitful (e.g. business associations), but skepticism towards environmental and user associations is somehow still present. Size appears to be important, insofar as smaller utilities are reported to benefit to the greatest degree from CLAIP.

These results generally seem to be in line with most of the received theories and analyses of bottom-up, cooperative arrangements in infrastructure projects which has been surveyed in section 2. First of all there is a convergence around the collaborative approach in infrastructure sector as an effective alternative institutional arrangement, beyond and even irrespectively the traditional distinction between public and private ownership (Agranoff, 2008; Agranoff and McGuire, 1998; 2001; 2003). To be valid, collaborations should include not only local governments, but also other local stakeholders (Agranoff and McGuire, 1998; 2003). The existence of LI place and time specific characteristics (à la Von Hayek, Ostrom *et al.*, 1993) is documented by the role of CLAIP as a device that fosters knowledge transfer and creation and by the larger propensity of small utilities towards CLAIP. At the same time, the knowledge of these pecularities is safeguarded by a policentric institutional arrangement (Ostrom et al., 1993); also public acceptance is encouraged by collaborative structures (Alberts, 2007). Different models of ownership do not significantly influence results (Helm and Tindall, 2009). The greter propensity of smaller utilities towards CLAIP could be interpreted in several ways, looking forward to further analyses: smaller communities better support cooperative arrangements in the long term, the set-up information costs are relatively more relevant in smaller towns; trust between a small number of users and the utility itself is stronger and the project is more likely accepted (Ostrom et al. 1993; Hansmann 1996, Van Dijk and Van Winden 1997).

5. Conclusions and policy implications

Infrastructures are essential for the supply of local utilities. Several policymakers and experts converge to recognize that an investment gap is emerging in the utility sector. Absent the extension, modernization, and renewal investments, the supply of high-quality, realiable and environmentally benign services is less likely, with direct and indirect negative effects on the economic and social development of communities. Solutions to this problem have been mainly sought for in the debate on public vs. private ownership models. This paper, conversely, refers to a growing body of studies that underline the importance of a specific governance and managerial practice, namely cooperativ arrangements between local stakeholders in infrastructure projects. In order to analyse how and to what extent CLAIP is perceived to affects the realization of LI, a survey has been conducted over a sample of 84 managers that operate in the local transport and water and wastewater sectors.

Answers to individual questions included in the survey have been analysed in their own, and have been elaborated through a principal component analysis in order to identify which are the main drivers of the realization of LI and to what extent they are influenced by CLAIP. Secondly, certain questions focus on what kind of structure and organisation would make CLAIP more effective. Our results confirm the importance of CLAIP in increasing knowledge of the local time and place specific characteristics of the environment where the LI will be constructed. Thirdly, public acceptance is stronger in CLAIP. Finally, considerable differences emerge distinguishing firms on the base of their size, with smaller companies displaying a higher propensity towards CLAIP.

This analysis provides only a preliminary exploration of CLAIP as a means to close up the infrastructure gap, but, to the best of our knowledge, it is one of the really few empirical efforts conducted on this topic in Europe and internationally. The main limitations of this empirical endeavour include the reliance on perceptual indicators and the lack of a control sample, two elements that imply a high relevance of subjective reflections rather than a measure of objective relationships. The main advantage of our approach is the collection of detailed information on institutional arrangeemnts and local actors, something that is typically beyond publicly available data sources. In particular, the depth and richness of survey items has given us the opportunity to disentangle the channels through which CLAIP modifies the investment project. Some features of the analysis are expected to strengthen the robustness of empirical findings (i.e. the sample has deliberately included both top level management and operation managers, in order to guarantee a more comprehensive perspective; ad-hoc items have been included to control for the experience of respondents; objective indicators have been constructed to control for the respondent characteristics).

Despite the preliminary character of this analysis, it still offers a number of managerial and policy implications for the sector, and a successful planning, construction and finance model for LI does emerge. Firstly, special attention should be paid to a detailed knowledgeof site-specific characteristics, community needs and expectations, problems and potential contributions of the whole set of stakeholders. This has been often taken for granted by utility management, determining the problem of LI inadequacy with respect to the destination community and territory, and encouraging the Nimby syndrome. Secondly, the participation of local governments and other local stakeholders in collaborative arrangements is essential in the very early stages of infrastructure projects, namely in the high-level design activities. CLAIP permits developers and local goevrnments to identify the necessary side transfers that include the payment of compensations as well as the negotiation of favourable conditions for affected parties. All in all, CLAIP emerges as a successfull alternative institutional solution beyond the most established dichotomy hierarchy-markets.

Looking at the policy implications, namely after the recent reform of franchise bidding discipline in the Italian utility sector (so called "Ronchi decree", September 2009), two points emerge as particularly relevant. First of all, it is not sufficient to focus only on the ownership dimension, conversely, the involvement and responsabilization of other stakeholders can make the difference. Secondly, the link between utility and territory, in terms of knowledge and trust is an important asset which should be safeguarded.

Possible developments of this work will concentrate on the sample enlargement (e.g. by collecting new questionnaires and by including urban waste utiltiies), on the construction of objective indicators on infrastructureperformances on multivariate statistical regressions to control for the respondent characteristics.

References

Agranoff, R. (2008). Enhancing Performance through Public Sector Networks. Mobilizing Human Capital in Communities of Practice. Public Performance & Management Review, 31 (3), 320–347.

Agranoff, R., and McGuire, M. (1998). Multinetwork Management: Collaboration and the hollow state in local economic policy. Journal of Public Administration Research and Theory, 8 (1), 67-91.

Agranoff, R., and McGuire, M. (2001). Big Questions in Public Network Management Research. International Journal of Public Administration Research and Theory, 11 (3), 295–326.

Agranoff, R., and McGuire, M. (2003). Inside the Matrix: Integrating the Paradigms of Intergovernmental and Network Management. International Journal of Public Administration, 26 (12), 1401–1422.

Alberts, D.J. (2007). Stakeholders or subject matter experts, who should be consulted? Energy Policy, 35 (4), 2336–2346.

Bennett, J., Iossa E., Legrenzi G. (2003). The Role of Commercial Non-Profit Organizations in the Provision of Public Services. Oxford Review of Economic Policy, 19 (2), 335-347.

Berliant, M. and Konishi, H. (2000). The Endogenous Formation of a City: Population Agglomeration and Marketplaces in a Location-specific Production Economy. Regional Science and Urban Economics, 30 (3), 289-324.

Birchall, J. (2002). Mutual, non-profit or public interest company? An evaluation of the options for the ownership and control of water utilities. Annals of Public and Cooperative Economics, 73 (2), 181-213.

Clifton, J., Comìn, F., Diàz-Fuentes, D. (2004). Reconceptualizing Public Services after Integration: State, Markets and Entitlements in the European Union. UNU-CRI e-Working Papers W-2004-8.

Cowan, S. (2006). Network Regulation. Oxford Review of Economic Policy, 22 (2), 248-259.

Dixit, A. (2002). Incentives and organizations in the public sector: an interpretative review. Journal of Human Resources, 37 (4), 696–727.

Feinerman, E., Finkelshtain, I., Kan, I. (2004). On a Political solution to the NIMBY conflict, The American Economic Review, 94 (1), 369-381.

Frischmann, B.M. (2007). Infrastructure commons in economic perspective. First Monday, 12 (6).

Graham, S. (2000). Introduction: Cities and infrastructure networks. International Journal of Urban and Regional Research, 24 (1), 114-119.

Green, R. (2009). The essential role of governance in project development. Proceedings of the Institution of Civil Engineers Municipal Engineer, 162, ME3, 179–185.

Greer, M.L. (2003). “Can rural electric cooperatives survive in a restructured US electric market? An empirical analysis”, Energy Economics, 25 (5), 487-508.

Grigg, N. (2010). Infrastructure finance : the business of infrastructure for a sustainable future. Hoboken [NJ]: John Wiley & Sons, Inc.

Hamilton J.T. (1993). Politics and social costs: estimating the impact of collective action on hazardous waste facilities, The Rand Journal of Economics, 24 (1), 101-125.

Hansmann, H. (1996). The Ownership of Enterprise. Cambridge. The Belknap Press of Harvard University Press, 162-181.

Hart, O., Shleifer, A., Vishny, R.W. (1997). The Proper Scope of Government: Theory and an Application to Prisons. The Quarterly Journal of Economics, 112 (4), 1127-1161.

Helm, D., Tindall, T. (2009). The evolution of infrastructure and utility ownership and its implications. Oxford Review of Economic Policy, 25 (3), 411-434.

Künneke, R. and Finger, M. (2009) The governance of infrastructures as common pool resources. Paper presented on the fourth Workshop on the Workshop (WOW4), June 2–7, 2009, in Bloomington [IA], USA

Massarutto, A. (2009). La regolazione economica dei servizi idrici, IEFE Research Report, 1.

McFarlane, C., Rutherford, J. (2008). Political infrastructures: Governing and experiencing the fabric of the city. International Journal of Urban and Regioanl Research, 32 (2), 363-374.

McGinnis, M. (ed.) (1999). Polycentricity and Local Public Economies. Ann Arbor, The University of Michigan Press.

Minehart, D., Neeman, Z., (2002). Effective Siting of Waste Treatment Facilities. Journal of Environmental Economics and Management, 43 (2), 303-324.

Monstadt, J. (2009). Conceptualizing the political ecology of urban infrastructures: Insights from technology and urban studies. Environment and Planning, 41 (8), 1924-1942.

Oecd (2008). Infrastructure to 2030. Policy Brief. Organisation for economic Co-operation and Development, Paris.

Ostrom, E. (1990). Governing the Commons: the evolution of institutions for collective action. Cambridge: Cambridge University Press.

Ostrom, E., Ostrom, V. (1977). Public Economy Organization and Service Delivery. Paper prepared for the "Financing the Regional City Project" of the Metropolitan Fund. Dearborn University of Michigan.

Ostrom, E., Schroeder, L., Wynne, S. (1993). Institutional Incentives and Sustainable Development. Infrastructure Policies in Perspective. Boulder: Westview Press.

Ostrom, V. (1972) Policentricity (Part 1 and 2), in McGinnis (1999), cit.

Sappington, D. (2005). Regulating service quality: a survey. Journal of Regulatory Economics, 27 (2), 123-154.

Shleifer, A., and Vishny, R. (1994). Politicians and Firms. Quarterly Journal of Economics, 109 (4), 995-1025.

Thomas, D. (2001) Welsh Water: Role Model or Special Case?, Utilities Policy, 10 (2), 99-114.

Unioncamere. (2008). Rapporto 2007. Società controllate dagli enti locali. Roma: Retecamere.

Vajjhala, S.P., Fischbeck, P.S. (2007). Quantifying Siting Difficulty: A Case Study of U.S. Transmission Line Siting, Energy Policy, 35 (1), 650-671.

Van Dijk, F., Van Winden. (1997). Dynamics of social ties and local public good provision. Journal of Public Economics, 64 (3), 323-341.

Von Hayek, F. (1945). The Use of Knowledge in Society. American Economic Review, 35 (4), 519-530.