Netcom
Réseaux, communication et territoires

29-1/2 | 2015
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Édition électronique
URL : http://journals.openedition.org/netcom/1860
DOI : 10.4000/netcom.1860
ISSN : 2431-210X

Éditeur
Netcom Association

Édition imprimée
Date de publication : 14 décembre 2015
Pagination : 55-78
ISSN : 0987-6014

Référence électronique
Sylvie Occelli et Alessandro Sciullo, « Leveraging ICT for mobility future in a region in transition: the case of Piedmont », *Netcom* [En ligne], 29-1/2 | 2015, mis en ligne le 15 décembre 2015, consulté le 03 mai 2019. URL : http://journals.openedition.org/netcom/1860 ; DOI : 10.4000/netcom.1860

Networks and Communication Studies,
NETCOM, vol. 29 (2015), n° 1-2
pp. 55-78

LEVERAGING ICT FOR MOBILITY FUTURE IN A REGION IN TRANSITION: THE CASE OF PIEDMONT

UN FUTUR DE LA MOBILITE AVEC LES TICS DANS UNE REGION EN TRANSITION: LE CAS DU PIEMONT

OCCELLI SYLVIE[1], SCIULLO ALESSANDRO

Abstract *– Current challenges of mobility in urban and regional areas call for new approaches to the analysis of the transportation system. Technological progress and spreading of Information and Communication Technologies (ICT) provide ground to the idea that a digital-age transportation system can be put in place. The text aims to contribute to the discussion of these changes, thus helping conceiving ICT based initiatives oriented at mobility improvements. A conceptual framework of mobility is proposed which highlights some potentials of ICT impacts and recalls the main determinants of mobility. Using that framework as a background, insights into mobility changes in the Piedmont region are discussed. Building upon previous studies of Internet usage, the results of an investigation into the role of the Internet to relax constraints in social practices are also mentioned as they offer interesting clues for designing new approaches to mobility.*

Key-words *– mobility patterns, digital-age transportation system, Internet use, mobility practices.*

Résumé *– Relever le défi de l'évolution de la mobilité dans les zones urbaines et inter urbaines suppose de faire face à de nouveaux challenges. L'analyse du système de transport ne peut ignorer la variable numérique qui tient désormais une place centrale dans les nouvelles dynamiques de mobilité. L'article propose un nouveau cadre conceptuel mettant en évidence le potentiel de ces nouvelles technologies notamment en lien avec les initiatives numériques locales. Il prend appuie sur la façon dont s'insèrent les dispositifs numériques dans les systèmes de mobilités observés à l'échelle de la région du Piémont. L'article se prolonge par une discussion sur la manière dont le numérique apparaît tel un vecteur de desserrement des contraintes socio-spatiales et offre des opportunités pour repenser les mobilités contemporaines.*

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Mots clés – *Schémas de mobilité, Usages d'Internet, Systèmes de transport, Pratiques de mobilité.*

INTRODUCTION

Last June, Fortune magazine published an article "The end of driving as we know it" in which evidence was given about a new kind of city living and working which entails less driving. Several evidences were mentioned to support the case.

First, is the fact that the average distance driven per person has decreased compared with the level observed in the mid nineties. Second is the observation that, between 2002 and 2012, the rate of change of people who use the bike, walk or take the public transit to go to work far surpassed the growth in drivers. Third, is the acknowledgment that the young generation is less strong-minded about auto brand than previous car-craving generations were: in fact "the car is no longer the gateway purchase to adulthood" (p. 39). For Millennials, the symbolism cars once had is losing ground, being replaced by that of Information and Communication Technologies (ICT) "shiny new toys". Finally, a stronger movement is observed in certain American cities toward living closer to home, whereby not having to drive for moving around is increasingly valued.

Although these evidences may be specific to the American way of life they however raise questions whether the trend of changes they expose is also occurring in other developed countries as well. In this regard, as contended for example by Gay, Kaufmann, Landriève and Vincent-Geslin (2011), they provide thought-provoking stimuli to re-appraise our mobility capability, assess its sustainability and ultimately engage in more aware and collaboratively based ways of moving around.

Eventually, they make us realize that conventional transportation drivers and approaches have to be critically re-appraised in the light also of the untapped possibilities offered by ICT progress (see, for example, Bertuglia, Lombardo and Occelli, 1998, Dovey Fishman, 2012, Mitchell, Borroni-Bird and Burns, 2010, Moriarty and Honner , 2008, UNECE, 2012).

The latter in particular provides ground to the idea that a digital-age transportation system can be put in place, where systems of socio-technical systems are built up, entailing connected transportation vehicles (modes), collaboration among transport users, and partnerships between entrepreneurial and governmental agents.

The text aims to contribute to the discussion of these changes, thus helping providing ground to the development of ICT based initiatives oriented at mobility improvements. For today socio-economic contexts stifled by increasing transport costs and shrinking investments in public transport, the potential of these innovations cannot be overlooked. This is the case for a region like Piedmont, where in addition to the

burdens of the economic crisis, a long-lasting requirement exists to accelerate its transition to a knowledge based economy, also by better exploiting the ICT potential (see PICTO, 2013).

The study presented here is part of the research activity IRES is undertaking as a support to the development of the new Regional Transportation Plan. It also builds upon the results of previous studies of Internet usage conducted by the Piedmont ICT Observatory.

More specifically, the rest of the paper is organized as follows.

The next section outlines a conceptual framework of mobility which highlights some likely impacts of ICT and recalls the main determinants of mobility. The framework also serves as a background of the following sections, where an exploration of mobility changes in a regional context is carried out. Section 3 gives an account of the evolution in mandatory mobility, and namely in commuting, which took place in Piedmont since 1981. Although the total number of commuters did not vary substantially over the years, the analysis shows that mobility pattern changed considerably as a result of modification in the regional economic structure and of the re-configuration in the activity spatial patterns across the regional sub-areas.

Taking advantage of the studies conducted by the Piedmont ICT Observatory, section 4 recalls the results of an investigation meant to address the role of the Internet for relaxing constraints in social practices. Although based on a limited population sample the results of that investigation offers a few interesting clues for conceiving new approaches to mobility issues.

Finally, the last section mentions some research topics which would deserve further insights in future research.

A CONCEPTUAL FRAMEWORK FOR MOBILITY ANALYSIS

Mobility is a core component of the transportation system, along with infrastructure (transport networks and vehicles) and governance (Timms, Tightand and Watling, 2014). Lately, the increasing concerns about climate change, energy and safety have stimulated a renewed attention to the whole transportation system, as well as to its individual components (see Grimal, 2013, Litman, 2015). In particular, they have spurred a need to revise the interpretive lens for looking at the transport system, making it increasingly apparent that understanding its performance requires to single out the perspective adopted.

In this vein, Litman (2011) points out that measurement of the performance of the transportation system can vary depending on whether the approach focuses on:

- accessibility, that is the possibility to reach desired locations and services, and more generally to partake in the activity system and social practices (interaction opportunities);
- mobility, that is the movements of people and good, as these typically are the spatial counterpart of functional relationships existing in a localized activity system, such as a city or a region;
- traffics, that is the vehicle movements associated with the flows of people and good generated by activity system.

Distinguishing these perspectives turns out to be useful for sharpening the analysis of the transformations of the transport system. Here, however, the mobility component is given priority attention. In particular, the conceptual framework shown in Fig. 1 is meant to highlight a range of impacts that, for a localized activity system such as a city or region, ICT can have in relation to accessibility, mobility and traffic.

It is worth noting that in the proposed scheme the localized activity system is understood as evolving over time. Therefore the issues raised by accessibility, mobility and traffic are necessarily interrelated, although their effects can manifest themselves on different spatio-temporal time scales, which are typically distinguished according to three levels (for a discussion, see Occelli, 2006), and namely:

a) the operational level which is concerned with the everyday management of traffic flows by different transportation means;
b) the tactical level meant to cope with the organization of transport services of a localized activity system, over a medium time span and
c) the strategic level which addresses the expected future mobility drivers of population and activities in an area. It also focuses on action commitment over long term horizon for developing new transport infrastructure and technology.

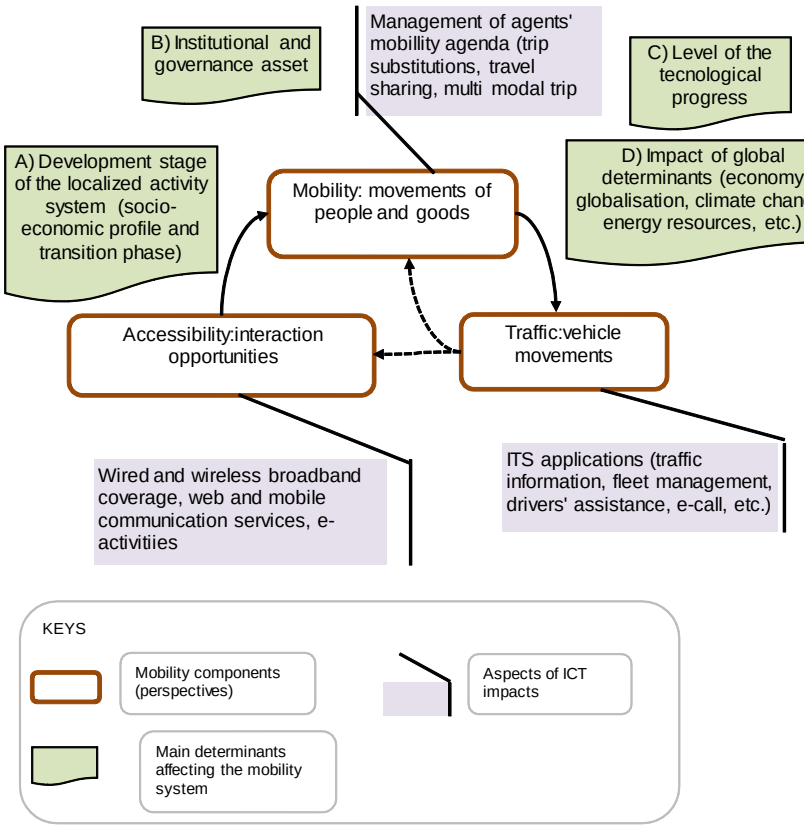


***Figure 1**: Insights into mobility: perspectives, determinants and aspects of the ICT impact.*

The scheme also mentions some main determinants of mobility changes, distinguishing those associated with the situation and/or changes of the localized activity system (development stage and institutional asset) from those produced by technological progress and the impact of global processes, such as climate change, the globalization of the economy and the energy issues.

To some extent, the proposed framework can be considered as a reference for conceiving ICT based mobility projects. It emphasizes that a range of initiatives could be designed, depending on the situation which, in a certain context and at a given time, backs the generation of the mobility determinants in the localized activity system.

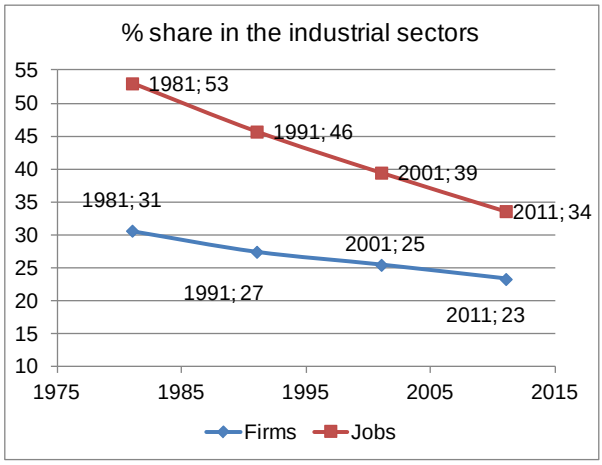
More generally, it summons us to think about the possibility of steering socio-technical transitions [2] (Geels, 2002, 2011) in the mobility component.

[2] As explained by Geels (2002) the transitions consist of major changes in the existing socio-technical pattern. They involve at least a substitution of technology and a modification or/and a breaking of established linkages, as well as a creation of new ones. Also in this case three levels

SOCIOECONOMIC TRENDS AND MOBILITY CHANGES IN THE PIEDMONT REGION BETWEEN 1981 AND 2011

In Piedmont as in many other Italian regions mobility underwent significant changes over the last three decades. Two trends had a main role.

The first stems from the transformations in the regional economic structure from a car-based industry sector towards a service and more globalised economy, which resulted in a steady decline of the share of industrial jobs since 1981, see Fig. 2. In this respect, Piedmont has often been considered as an exemplary case of a so called Post Fordist regional system, which, however has not yet completed is transition (see BOX 1 for a an overview of Piedmont main socioeconomic features).



***Source**: Industry Censuses.*

***Figure 2**: A decreasing share of the industrial sector in Piedmont between 1981 and 2011 (% of total regional firms and jobs).*

are identified, and namely: a) technological niches, that is protected spaces, where variation is generated and novelty emerges; b) socio-technical regime, that maintains the stability of an existing socio-technical systems (e.g. the set of rules that orient and co-ordinate the activities of social groups that reproduce the system's components); c) a socio-technical landscape, that is the wider context which influences niche and regime dynamics.

BOX1 An overview of the Piedmont regional system

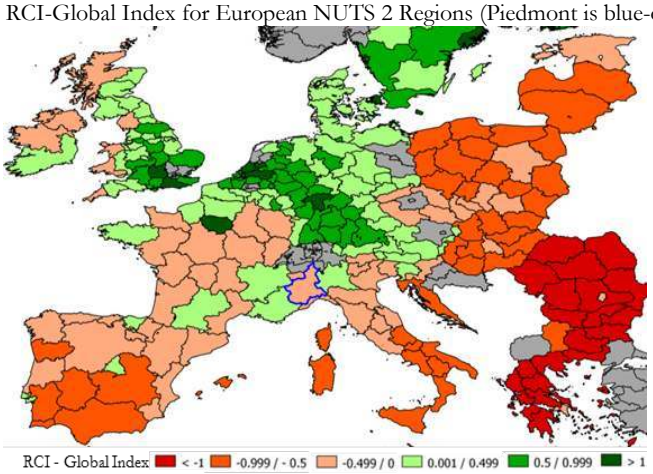
A1. Piedmont situation according to the European Regional Competitiveness Index (RCI), 2013

A1a. Components of RCI and position of Piedmont in the ranking of the 262 European regions

Sub - Index	Components	Piedmont's rank
RCI – Basic Index	Institutions, Macroeconomic Stability, Infrastructure, Health and Basic Education	150
RCI – Efficiency	Higher Education, Lifelong Learning, Labor Market Efficiency, Market Size	155
RCI – Innovation	Technological Readiness, Business Sophistication and Innovation	153
RCI – Global	*(aggregation of the previous by a ewighted linear function)*	152

Source: *Annoni and Dijstra (2013).*

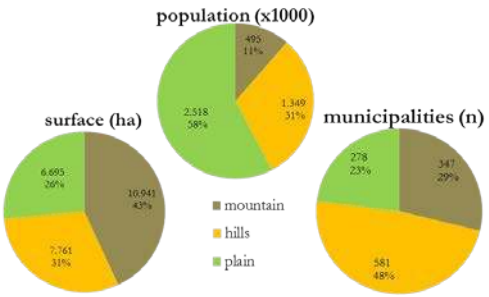
A1b. Value of the RCI-Global Index for European NUTS 2 Regions (Piedmont is blue-outlined)



Source: *developed by IRES upon data available in Annoni and Dijstra (2013).*

A region in transition from an industrial to a knowledge economy, Piedmont (index value -0.198), stands in the 152 position in the ranking of the 262 European regions.
It belongs to the large group of delayed South-east regions (56 regions): its bad performance is caused especially by the weaker endowment of human resources (RCI – Efficiency).

A2. Territory, population and urban structure



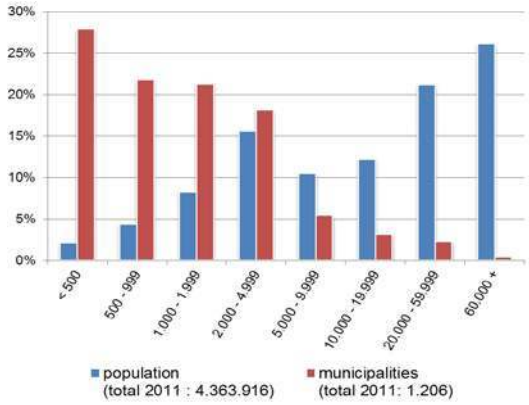
A2a. Population, surface and municipalities by morphology type, 2011

Situated in the North-western part of the country, bordering the French PACA regions, Piedmont owes its name to the mountains which occupy 1/3 of its territory.

Source: *Population Census.*

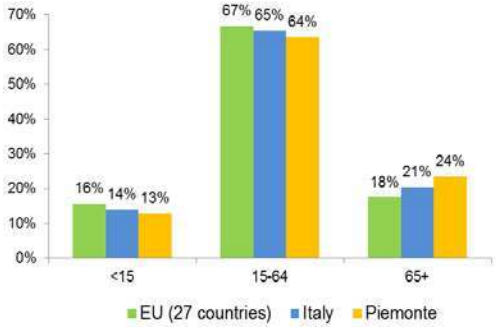
A2b. Distribution of population and municipalities by municipality size, 2011.

Piedmont urban pattern is very fragmented consisting of a large number of small and very small municipalities (nearly half of 1206 municipalities has less than one thousand inhabitants). Cities with more than 10 thousand inhabitants are a minority but concentrate nearly 60% of the regional population.



Source : *ISTAT.*

A2c. Population by age brackets, in Piedmont, Italy and Europe, 2011

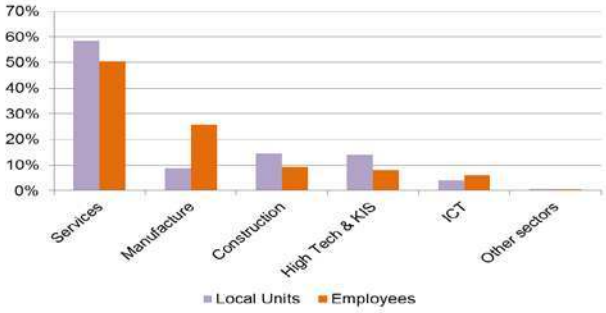


Piedmont is an 'old' region.
The Piedmont population is one of the oldest among Italian regions: the average age is 45,5 (Italy 43,6) with a significant and growing component of aged people (over 65).

Source: *ISTAT, EUROSTAT.*

A3. Business profile

A3a. Regional shares of main economic sectors, 2011



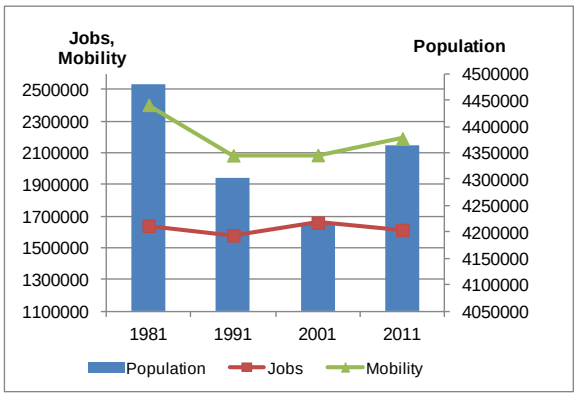
Source: *Industry Census.*

In 2011, services represent the largest share of the regional economy both in terms of local units and employment. While accounting for less than 10% of the production units, the manufacture sector still concentrates more than 20% of the jobs.
High tech/ information and ICT sectors, together, represent about 18% of the total and regional businesses and 14% of the jobs.

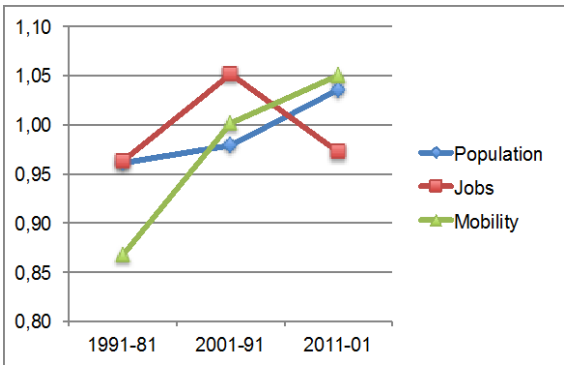
The second trend is associated with the fragmentation in the spatial distribution of both resident population and activities, which caused sprawling phenomena around the main cities, migration to rural small size municipalities and more dispersed settlements' patterns (Bertuglia, Stanghellini, and Staricco, eds. 2002) (see Fig. A1 in the Appendix).

The changes tin population, jobs and mobility over the 1981-2011 period are summarized in Fig. 3. Here reference is made to census years as in Italy Population Census also collects data about journeys-to-work and journeys-to-school. It is in fact a main information source for getting insights into the evolution of mobility phenomena across homogeneous spatial articulations.

Not unexpectedly, the observed trend in mobility is but a combination of the changes which occurred in population and jobs over the study period. Overall, mobility level changed only moderately since 1991.



3a) Levels of population, jobs and mobility.



3b) Variations in population, jobs and mobility.

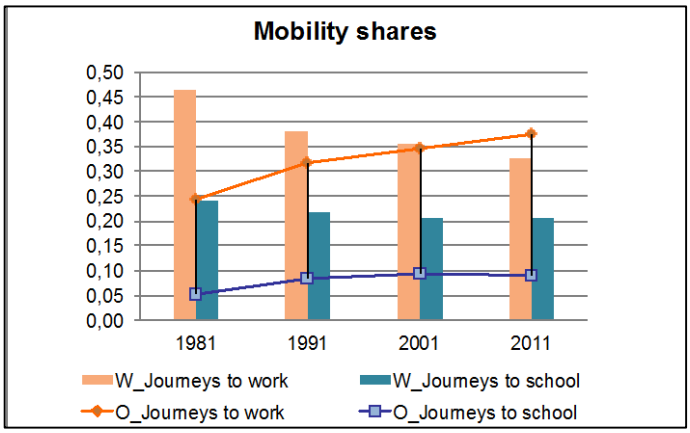
Source: *Population and Industry Censuses.*

Figure 3*: Population, jobs and mobility in Piedmont 1981-2011. Between 2001 and 2011 rate of mobility growth paralleled that of population.*

As a result of the combination of the changes above mentioned, a shift occurred in the spatial distribution of flows: short range journeys within municipality boundaries (the so-called within flows) reduced substantially while outflows (commuters) increased steadily over the whole 1981-2011 period.

The increase in outflows was particularly noticeable for the journeys-to-work. As shown in Fig. 4, in 2011, the share of outflows (representing around 38% of the total mobility) surpassed that the flows which took place within municipality boundaries. In 1981, the shares were 25% and 46%, respectively for the outflows and within flows.

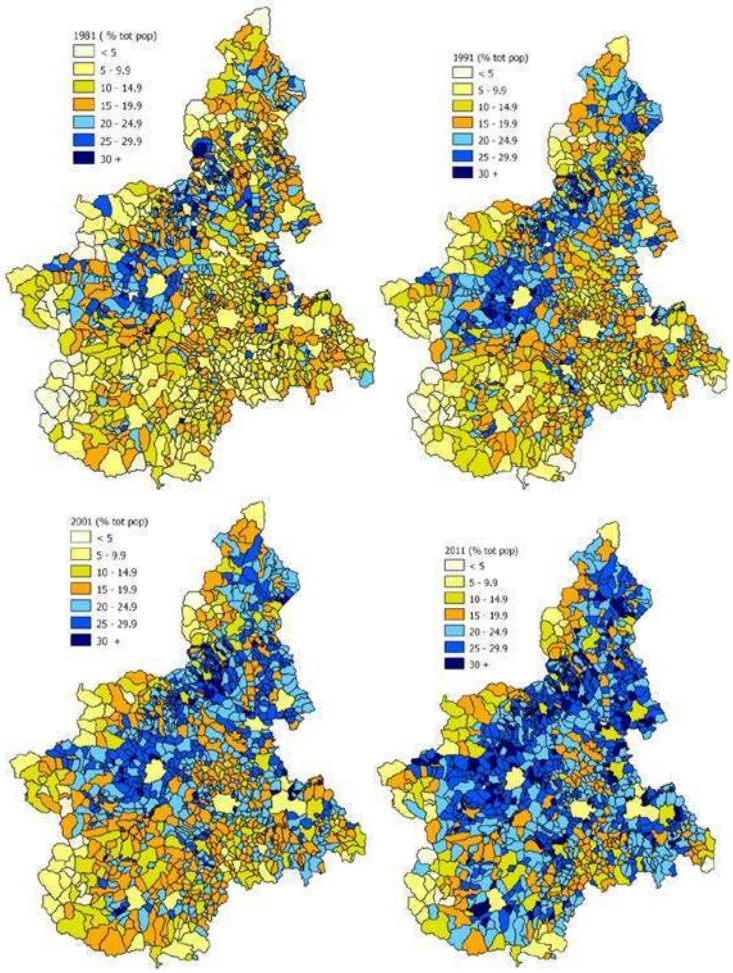
As could be expected, the share of journeys-to-school occurring within municipality boundaries changed very little over the whole period, being almost twice as large as that of outflows.



Source: *Population Censuses.*

Figure 4: *Mobility shares by location (within municipality flows, W, and outflows, O) for journeys to work and to school in Piedmont 1981-2011.*

The evolution of the phenomenon in the Piedmont region can be appreciated by comparing the 1981-2011 maps of the gross mobility rates for commuters, at municipality level, Fig.5. They clearly show how an increase in these rates first occurred in the municipalities belonging to the Turin metropolitan area and North-Eastern provinces and progressively involved the areas surrounding the main regional towns.



Source: *Population Census.*

Figure 5*: Gross mobility rates (ratio of commuter outflows to population) in Piedmont municipalities increased dramatically between 1981 and 2011.*

To get a deeper insight into these changes a statistical exercise was carried out in order to explore the contribution of some local area determinants to generate commuter outflows, as well as their evolution in the 1981-2011 period.

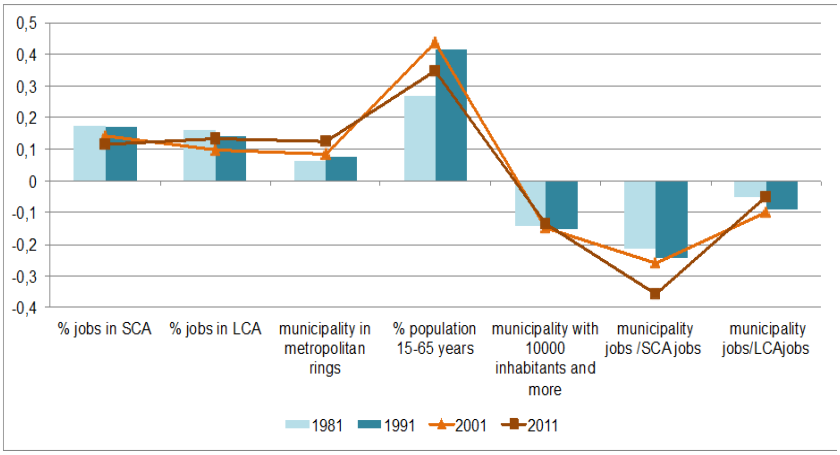
A regression model was estimated to test the sensitivity of municipality gross mobility rates to a set of indicators chosen in order to reflect the spatial changes which occurred in the regional population and jobs during the study period. Given the data availability, the selected explanatory variables (indicators) capture the following sets of local area determinants:

- the attraction potentials which surrounding areas can exert on people living in certain residential zones (indicators a and b);
- the area's own location profile, such as the proximity to main urban agglomerations (indicator c), or the population size of the area, whereby a larger size is usually associated with the a greater endowment of urban activities and services (indicator e);
- the type of population living in an area, such as the existence of a relatively larger share of young and potentially mobile population (indicator d);
- the level of competitiveness likely to exist among areas as a result of their own activity endowment in relation to that of the surrounding areas (indicators f and g).

More specifically, the indicators considered in the regression model are as follows:

a) the share of jobs in the so called Small Catchment Area (SCA) of a municipality; the SCA represents the area consisting of the communes within 15km from the municipality. The share is calculated out of the total jobs in the region (% jobs in SCA);
b) the share of jobs in the so called Large Catchment Area (LCA) of a municipality; the LCA is defined as the area including the communes situated within a distance between 15km and 30Km from the municipality. The share is calculated out of the total jobs in the region (% jobs in LCA);
c) the fact that a municipality belongs to a metropolitan ring, this being defined as the municipalities surrounding the (8) province main towns;
d) the share of population in employment age out of the municipality total population (% of 15-65 population);
e) the municipality size, and namely that a commune has at least 10000 inhabitants or more;
f) the ratio between the share of jobs in a municipality and that in its SCA (municipality jobs /SCA jobs);
g) the ratio between the share of jobs in a municipality and that in its LCA (municipality jobs /SLA jobs).

The values of the regression coefficients are graphically shown in Fig.6, and their numerical values presented in the Appendix.



Source: *Population and Industry Censuses.*

Figure 6: *Contribution of the selected local area indicators to the population gross mobility rates (ratio between commuter outflows and resident population), 1981, 1991, 2001, 2011. (Standardized values) (*).*

(*) These values are found by multiplying the unstandardized coefficients by the ratio of the standard deviations of the independent variables (indicators) used in the regression and that of the dependent one. Such a transformation makes it possible to compare the relative contribution of the independent variables: they all refer to a 1 standard deviation change, rather than a 1 unit change.
All the coefficients have a 0.0000 P value except for the indicator municipality jobs (firms) / SLA jobs (firms).

Let's comment the main findings.

First, the sign of the coefficients are as expected. A larger share of population in employment age, the availability of jobs in the surrounding areas, and the location in a metropolitan ring have a positive effect on increasing the number of journeys-to-work outside municipality boundaries. On the contrary, the fact that a municipality has a large population size and a relatively higher share of jobs compared with its surrounding areas tends to smother the outflows.

Second, the antagonist role of these two groups of local area determinants holds over the whole 1981-2011 period. However, a number of modifications above all in the last decade are revealed which, together, provide evidence that changes in mobility determinants are taking place.

Interestingly, between 2001 and 2011, the relative importance of the share of jobs in the Large Catchment Area (LCA) increases, while that in the small one reduces. The variation is paralleled by the fact that the negative contribution of the ratio between the share of jobs in a municipality and that in its SCA (municipality jobs /SCA jobs) is enhanced as well[3].

[3] The result does not hold (as one might have expected) for the indicator municipality jobs /LCA jobs, but its coefficient is not significant in 2011.

Overall, this would suggest that because of a greater availability of activities across municipalities, employees tend to be increasingly sensitive to the surrounding (relatively more distant) job opportunities. In other words, as the recent crisis might summon, commuters are more likely to go (travel) farther away to get a job. In this respect, it is interesting to note that even the share of population in employment age, the explanatory variable having the biggest impact on mobility rates, reduces its contribution influence between 2001 and 2011 (although its raw coefficient has been increasing during the whole 1981-2011 period, see Table 1 in the Appendix).

Finally, the regression results show that being located in a metropolitan is positively associated with mobility rates and that this relationship becomes stronger over time (interestingly, in 1981 the coefficient was not significant). This tendency probably reflects the impact of the spatial diffusion processes of which have occurred around the main cities (as well as along main transport axes) in the past decades. The results also highlight the fact that these areas are likely to deserve specific attention as for the future development of mobility services.

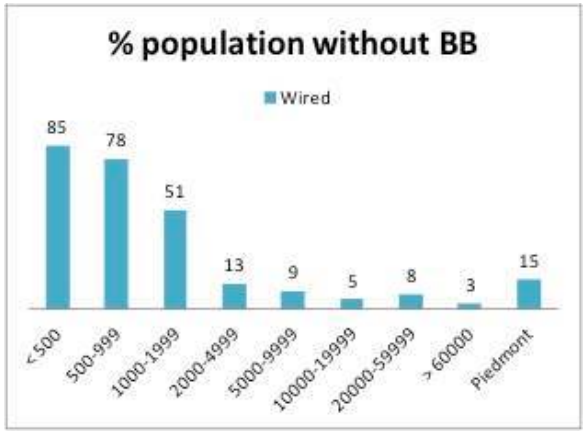
To enrich the empirical investigation, two additional regression applications were carried out for 2011, in which jobs and firms in the definition of some indicators were tested separately. They both took advantage of the introduction of an additional set of indicators not available in the earlier periods. These are:

a) per capita income (2012), as specified at the municipal level by the MEF (Ministry of Economy and Finance);
b) average immigration rate in the 2002-2011 period (computed using ISTAT population registry data);
c) percentage of population without broadband (2012), estimated at municipal level by the Italian Department for Development and Economic Cohesion (DPS). Here broadband means a wired connection speed greater than 2 MB.

As indicated in Fig. 7, in 2012, 15% of the regional population has no access to broadband. The percentage rises considerably for the resident population living in the less populated municipalities (see PICTO, 2012, 2013).

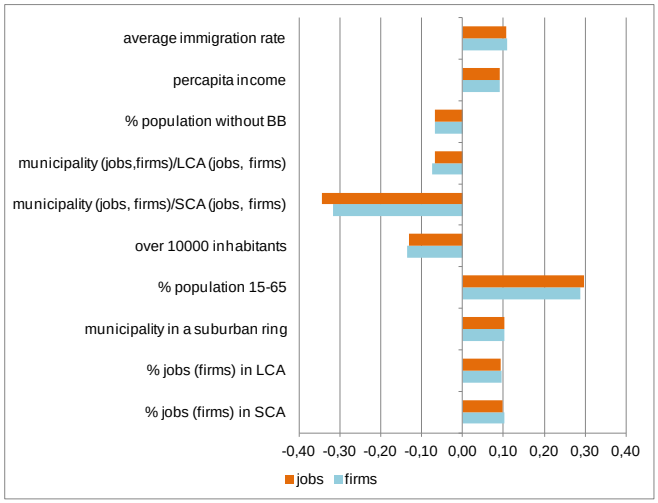
The standardized values of the coefficients obtained from the regression analyses are shown in Fig. 8. Overall, the general results for the indicators already introduced in the previous applications are confirmed. The differences between the results obtained considering jobs and firms are modest, although worth being inquired further.

As expected, income and immigration have a positive effect on mobility rates. Their contribution is as important as that of the majority of the other mobility enhancers: their weight, in fact, is approximately one third of that associated with the most influential determinant represented by the share of population in employment age.



Source: *DPF*

Figure 7*: Share of population not having access to wired broadband connection by size of Piedmont municipalities, 2012*



Source*: Population and Industry Censuses, DPF, Population registry*

Figure 8*: Contribution of the larger set of local area indicators to gross mobility rates (ratio between commuter outflows and resident population), 2011. (Standardized values) (*). The regression analysis is refined by considering separately jobs and firms and introducing three additional indicators: per capita income, average immigration rate and broadband diffusion.*

(*)As in the previous regression, all the coefficients have a 0.0000 P value except for the indicator municipality jobs (firms) /SLA jobs (firms).

Regression application shows that situation of broadband scarcity affects negatively commuter outflows. The finding lends itself to a twofold interpretation.

On the one hand, it may indicate situations of digital divide which in some regional sub-areas tend to co-exist with more general problems of ageing and/or

socioeconomic deprivation. In these areas employment rate is likely to be low and commuting demand weak.

On the other one, it may also suggest that broadband availability helps people to access a larger share of job opportunities, which may be at a distance from home, thus stimulating them to commute longer distances. The increase observed for the 2001-2011 period in the importance of jobs in the Large Catchment Area (LCA) seems to give support to this interpretation.

AN ANALYSIS OF THE IMPACT OF INTERNET USE ON SOCIAL PRACTICES

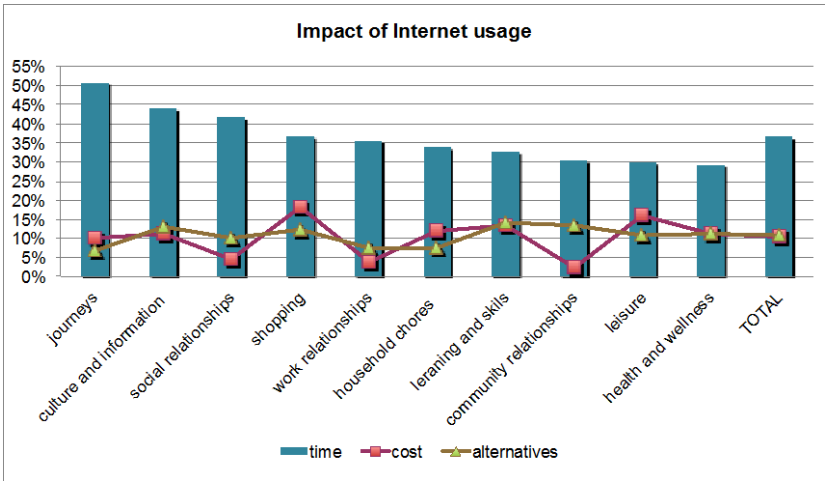
In September 2012, the Asti Province with the Piedmont ICT Observatory (PICTO) launched a crowd sourcing project (called MIDA project, Monitoring Ict Divide Asti), which asked the resident population to provide information about the quality of their broadband connections and their daily practices in using ICT (see PICTO, 2012).

An online questionnaire was prepared which also made an effort to elucidate the perceptions of the benefits obtained by individuals in using the Internet in their daily practices. In particular, citizens were asked to choose whether the perceived positive impact in using the web was a result of: a) relaxed time constraints (time saving), b) reduced costs of carrying out an activity (economic resources) or c) of the possibility to have access to a wider range of alternatives in carrying out a certain activity (variety of alternatives).

For more than 60% of the respondents, the most significant impact was felt with regard to time-savings, while the other two constraints accounted for a lower and about a similar share (20%). Overall, the effect was relatively more important for adults (between 50 and 60 years).

The graph of Fig. 9 details the results by social practices. It shows that time-savings (time) has a positive impact on all the social practices and above all on travels and socio-cultural activities. Not unexpectedly, shopping, leisure and education are relatively more sensitive to a reduction in the cost constraints (cost).

Having the opportunity to access a greater variety of alternatives (alternatives) is perceived to have a relatively higher positive impact on the relationships with the local community.



***Source**: MIDA project.*

***Figure 9 :** Impact of Internet usage in relaxing time and cost constraints and in accessing a wider set of alternatives in social practices, in the Asti Province, 2012 (% of Internet users).*

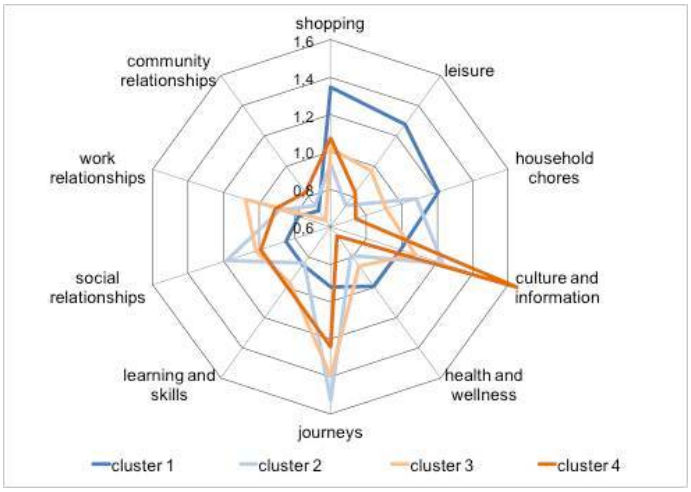
The questionnaire gave also the possibility to probe into a domain never addressed in earlier PICTO surveys, concerning the relationships between patterns of Internet usages and the perceived benefits of these usages.

Building upon the collected data a cluster analysis was carried out whose results give support to well known findings about the existence of positive relationships between certain socio-demographic features (such as high education level, younger age, and larger household size) and higher rates in the utilization of Internet services (Occelli and Sciullo, 2013). This is clearly apparent in the two Clusters collecting the respondents who use the Internet more intensely (Cluster 1 and 2). One (Cluster 1) consists of a relatively larger share of younger population. The other (Cluster 2) concentrates the larger majority of individuals who use e-government services.

The remaining two groups (Cluster 3 and 4) consist of individuals who have a lower familiarity with the web. Interestingly one of these clusters includes people whose age profile is polarized towards the young and older age brackets. The other has the lowest percentage of graduates and the highest share of retired people (Cluster 4).

Not unexpectedly, the advantages resulting from Internet utilization are not uniform across the different population groups. Although the benefits of time-savings are those most widely perceived in all groups, those depending on the possibility to access a wider set of alternatives are more apparent in the cluster, which concentrates individuals with a higher propensity to exploit the web (Cluster 1). Economic benefits are more appreciated by the individuals in the cluster where the appropriation of the Internet is relatively lower (Cluster 3).

When analysing the time benefits accrued to the different social practices, some further differences can be detected across the groups, Fig. 10.



Source: *MIDA project.*

Figure 10: *Perceptions of time benefits for the social practices within the groups of MIDA respondents (*).*

(*) The index values shown in the figure are computed as the ratio between the percentages of the answers "yes to time benefit" for each activity and the total share of these yes answers in each cluster.

For respondents in Cluster 1, shopping, leisure and household chores are the social practices, which most take advantage from time-savings. Reducing travel time in daily journeys is a benefit widely perceived by all the other clusters. Time-savings in accessing cultural activities and information are particularly appreciated by people in Cluster 4.

The results of this study support the claim that the more people use the Internet, the greater and more diversified are the benefits accrued to them in their social practices. Although this is not unexpected on a conceptual ground, the MIDA project gave the opportunity, at least for the Piedmont region, to support it on an empirical basis.

An additional aspect is gauged by the benefit profile observed in the group where Internet utilization is more widespread. It points out that by reducing economic costs and time constraints, Internet usages can help people to engage in their daily practices more efficiently and effectively.

As for the issues addressed in this paper these findings allow us to make two main remarks.

First, they reveal that ICT usages in social practices enable people to better assess their action space, then increasing their capability to cope with their own mobility requirements. In fact, Internet usages are a way for empowering individuals in their daily undertaking, i.e. helping them to establish new patterns of relationships and new types of socio technical systems which on their turn make it possible to engage into social practices in novel ways (Whitworth and Whitworth, 2010). In this respect the access perspective mentioned in Fig.1 is directly concerned.

Second, the MIDA project can be viewed as an initiative meant to create a sort "protected space" to back innovative governmental action courses, which in the recent literature about socio-technical transition management is called technological niches (Geels, 2002). By enabling government and citizens to exchange information more effectively, such a space is likely to be conducive to the development of innovative mobility project.

CONCLUDING REMARKS

Mobility can be broadly understood as an activity making it possible for humans to side their networks of manifold relationship with the spatial locations across which these relationships are deployed, e.g. anchoring individual travels onto settlements, connecting residential with production places, accessing services, participating in social practices, as well as enjoying leisure activities. It is, therefore, a space adjusting activity which takes advantage of the time saving opportunity offered by technologically empowered transportation means. Nonetheless mobility also stems from an intrinsic attitude of humans to search for novelty, explore new places, empower one's social practices, and ultimately develop new ways of living (Colonna, 2009).

In approaches (scenarios) meant to anticipate future mobility trends, and which recognize the possibility of individuals (and collective actors) to use and share ICT based information, ICT applications and their usages are conducive of socio-technical innovations which make it possible for localized activity systems to implement tailored mobility initiatives in a collaborative way.

These socio-technical innovations are likely to re-shape the relationships among accessibility, mobility and traffic in ways, scientists, practitioners, planners and travellers have still have to conceive (Shuldiner and Shuldiner, 2013).

As a speculative suggestion to the question, we propose the diagram of Fig.11 which emphasizes that exploiting ICT potential for sharing information among different mobility stakeholders helps collaboratively designing and finding solutions to mobility problems (see, Dovey Fishman, 2012, Mitchell, Borroni-Bird and Burns, 2010). The idea is not new but awareness about its feasibility is still low. As Mitchell, Borroni-Bird and Burns (2010, p.196) underlined: "The codependencies underlying today's

personal mobility solutions make it clear that no one company, industry, or government working alone can bring about transformational change".

In this regard this paper made an effort to put forward a conceptualization of ICT-supported mobility along with an exploration of mobility changes in a regional context through an empirical analysis of available data.

Although no definitive evidence is provided by the Piedmont case study, nonetheless its findings show that several changes in mobility are taking place which allow us to formulate the following general remarks.

First, as already argued in PICTO studies, ICT uptake and usages in social practices are likely to yield something more than organizational or functional adjustments. As mentioned in the introductory part of the paper, developing expectations and visions about the mobility future desired by a city, a region or a community is a necessary undertaking, which itself can benefit from using ICT tools.

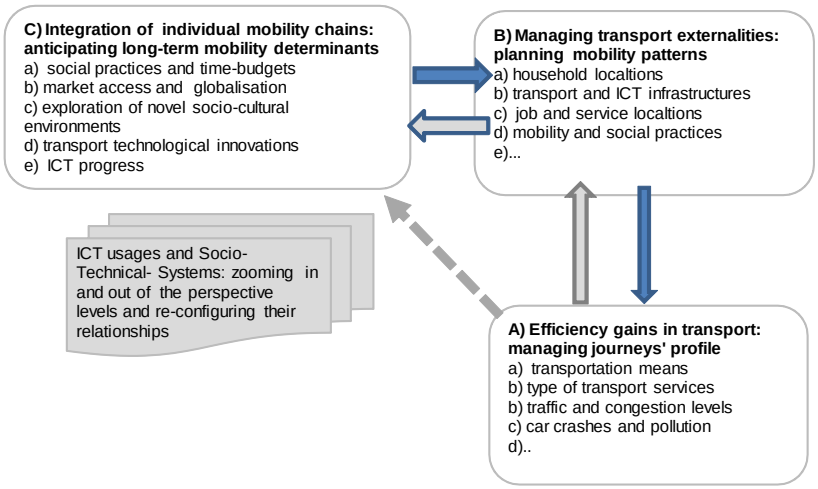


***Figure 11**: Leveraging ICT for exploration and management of multi level mobility issues.*

Second, although this undertaking is fraught with uncertainty, nonetheless, we realize that different initiatives have to be developed in an integrative way in order to cope with mobility needs in more efficient and sustainable ways. Furthermore, we are also aware that for those initiatives to be successful, information sharing among transport agents, local governments, experts and citizens should take place. But the process itself needs to be nurtured and progressively learnt.

The difficulties encountered in the MIDA project support this evidence. They recommend that deeper attention should be paid at better aligning the views experts and decision-makers have about mobility problems/solutions and the understanding people build up in their from their mobility practices.

To some extent, they echo the dilemma encountered in experimental projects meant to favour the necessary socio-technical transitions for achieving the desired goals of sustainable mobility (see the discussion in De Bruijne, van de Rie, de Haan and Koppenan, 2010). But, then, the need to pay attention at how those socio-technical transitions can be designed, developed and managed, turns out to be a challenge we cannot help engaging in.

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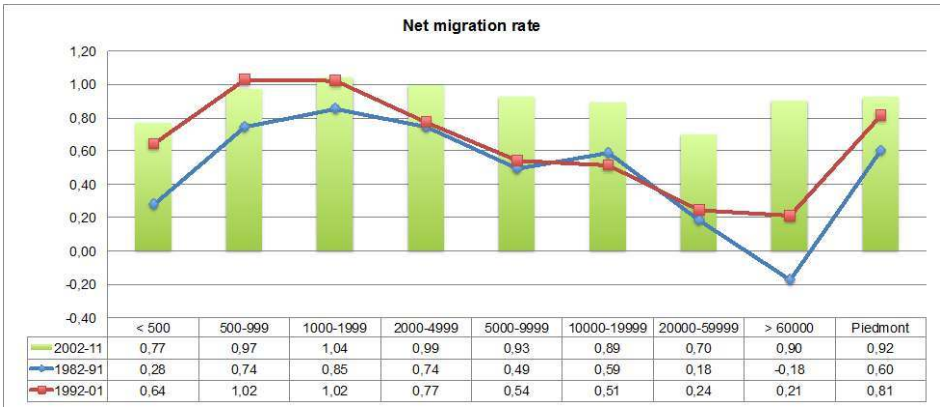
APPENDIX



	< 500	500-999	1000-1999	2000-4999	5000-9999	10000-19999	20000-59999	> 60000	Piedmont
2002-11	0,77	0,97	1,04	0,99	0,93	0,89	0,70	0,90	0,92
1982-91	0,28	0,74	0,85	0,74	0,49	0,59	0,18	-0,18	0,60
1992-01	0,64	1,02	1,02	0,77	0,54	0,51	0,24	0,21	0,81

Source: *ISTAT Population Registry.*

Figure A1. Net migration rate by municipality size in Piedmont 1982-2001. During the whole period positive migration rates have been higher in smaller municipalities, but in the last decade increased significantly in the larger municipalities

Table A1. Results of the regression analysis, 1981-2011.

	1981	1981	1991	1991	2001	2001	2011	2011
	Beta	P.value	Beta	P.value	Beta	P.value	Beta	P.value
% jobs in SCA	0,269	0,000	0,264	0,000	0,222	0,000	0,179	0,000
% jobs in LCA	0,125	0,000	0,111	0,000	0,077	0,000	0,107	0,000
municipality in metropolitan rings	1,449	0,020	1,643	0,002	1,735	0,000	2,542	0,000
% population in the 15-65 age	0,421	0,000	0,513	0,000	0,529	0,000	0,541	0,000
municipality with more than 10000 inhabitants	-4,091	0,000	-4,173	0,000	-3,867	0,000	-3,501	0,000
municipality jobs /SCA jobs	-3,932	0,000	-4,625	0,000	-4,865	0,000	-6,852	0,000
municipality jobs/LCAjobs	-2,578	0,111	-4,782	0,001	-4,959	0,000	-2,513	0,080