

Comparative Study



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FINAL STUDY

1. Introduction

The 3Cs project has the goal of combining the promotion of sustainable mobility with that of an active, healthy lifestyle. The context in which such goals are to be pursued are universities themselves, as these are institutions constantly shaping the future of their societies by educating younger generations to scientific, cultural and civic values that students will bring with them after graduation, and spread among all citizens. Universities are therefore one of the most fertile and productive grounds on which to work towards a cleaner, more sustainable and caring world.

For these reasons, *active mobility* - including all the ways of moving around in space using the energy produced by our own physical effort - was identified as a virtuous intersection between sustainability and health, to be promoted at all levels and with all means.

To this end, four European Universities - University of Coimbra, University Camilo José Cela in Madrid, University Paul Valery in Montpellier and University of Torino joined forces to pursue this goal in synergy, exploiting skills and competencies of all in the same direction. A fifth partner was involved in the effort, i.e., FISU, the International University Sports Federation, a useful partner with a general expertise on multifaceted physical activity for young people.

The concept of active mobility was translated into three related modes: walking, cycling and riding an e-bike. The latter is of course a combination of physical effort and the energy produced by the electric assistance, but it was considered to be still active in the sense that one could not move with an e-bike without putting in at least some continuous effort. The use of e-scooters was instead excluded for the concept of active mobility, since with them you can travel without any substantial muscular effort. Therefore, the project wouldn't be involved with *all* sustainable mobility, a large and vaguely defined macro-category where normally for example, public transport is rightfully included.

The project translated its main goal into a wide range of different activities, namely:

- Study the mobility choices of the four academic communities, with specific - but not exclusive - focus on the home to university commuting. The target community would therefore be not only students, but also everyone with a job of any kind in university - professors, technicians, administrative staff
- Perform an in-depth analysis of the modal split for active mobility, including the multimodal combination of active mobility with other modes for the commuting





- Study the physical benefits of riding e-bikes through state-of-the-art methodologies. This was important also since the leading university in the project - Coimbra - has many university branches located on steep hills, so that the potential of e-bikes could be crucial
- Produce multimedia material - web site, videos, leaflets - that could raise awareness of the personal and collective benefits of active mobility, targeted both at the academic community but also at the general population
- Document and compare the experiences of its international partners in planning and put into practice policies to improve the sustainability of mobility choices of university communities, allowing cross-fertilisation to produce fruitful collaboration
- Review and evaluate the policies and implemented infrastructure for active mobility of local and national administrations in each country involved
- Engage as many members of the academic community in the effort, though he use of the “gamification” mobile platform MUV, transforming active mobility in a fun challenge but also recording useful georeferencing data on the routes travelled by students and personnel
- Based on the results recorded during the gamification activities regarding the routes most travelled to and from the campus, perform a detailed evaluation of the issues making active mobility unsafe, uncomfortable or inefficient on such routes to produce a *Route study* containing proposals and suggestions of improvement
- Create a real, concrete network among the four universities through the planning and execution of a Bicycle Ride on a long-range route From Coimbra to Torino, passing through Madrid and Montpellier. This was made possible, notwithstanding the very large distances, by the virtuous combination of bike and train travel, leveraging the possibility of carrying bicycles on train, especially foldable bikes. A varying group of representatives from each university did actually ride the three stages, accompanying the travelling with workshops at each stop on the themes of the project
- Finalize the effort into a comprehensive Manual where all the experience acquired in the previous activities and initiatives would be summarised, with the university governance and local administrations as main recipients.

Although the focus is, as detailed, on active mobility, the project title refers explicitly to the “cycling” part of it. This is not accidental, as the larger emphasis on it is motivated by the fact that in the countries of the project cycling is slowly gaining ground but it is still practiced by a minority, so that it can still have wider margins of improvement.

2. Sustainable mobility: why and how

Modern Universities, often large organizations and frequently characterized by a dispersion of their campuses throughout the metropolitan area, induce in their daily





activities a significant share of the movements that influence urban mobility. With university communities of several tens of thousands of people, in fact, the total distance covered each day for home-university travel is considerable in absolute terms and may exceed 100,000 km.

At the same time, the mobility choices prevailing in the countries involved in the project still favor the use of private motor vehicles, with significant energy inefficiency and use of space (vehicles designed to transport 4-5 people traveling with an average load of 1-2 people), as well as using almost exclusively non-renewable fossil fuels. For these reasons, in the urban environment, mobility is today one of the main factors of air pollution, noise pollution, congestion. Furthermore, the scarcity of stringent speed limits (30km/h zones) and the frequent disrespecting of the most basic rules of road codes make the circulation of private motorized vehicles a serious risk factor for the safety and health of citizens (in Italy, for example, there are many more deaths due to road accidents than due to homicides or other crimes). Added to this, of course, is the impact of general externalities linked to global pollution of the planet (greenhouse effect).

Due to this, there is now widespread awareness that the planning of government strategies for urban areas cannot ignore the activation of policies that aim to shift the modal share of journeys made by private cars to less polluting (both in terms of atmospheric emissions and noise emissions), less cumbersome and dangerous for "weak" road users means of transport. Such urgency is not only justified as necessary to improve quality of life in our cities, but also in terms of mere efficiency in the use of space in densely populated areas.

In this context, universities, as positive and virtuous actors in the territories that host them, are called to a strong commitment to reduce the environmental impact of mobility induced by their activities. Several countries in central-northern Europe, in line with these considerations, have been for decades pursuing urban planning policies aimed at facilitating and incentivizing more sustainable mobility choices, with significant and indisputable success: this is demonstrated by the modal split in cities in which the private car has a secondary or limited role, while the use of the bicycle takes on an important or even dominant role. In more recent years, this approach has become a fully shared policy of the European Union in the context of community strategies on mobility (see for example the Joint Declaration of the EU Transport Ministers of September 2015¹).

It should not be overlooked that scientific consensus has grown on the prevalence of the benefits of cycling for individual health (Oja et al., 2011²), even if considered net of the negative effects linked to exposure to pollutants in urban traffic environments,

¹ <https://www.eu2015lu.eu/en/actualites/communiqués/2015/10/07-info-transports-declaration-velo/07-Info-Transport-Declaration-of-Luxembourg-on-Cycling-as-a-climate-friendly-Transport-Mode---2015-10-06.pdf>

² Oja, P., Titze, S., Bauman, A., de Geus B., Krenn P., Reger-Nash B., Kohlberger T. (2011), *Health benefits of cycling: a systematic review*, «Scand. J. Med. Sci Sports» 4, pp. 496–509





compared to other modes of travel (De Nazelle et al., 2017³; Tainio et al., 2016⁴). Even cyclists' associations use these issues as an advocacy tool. This gives rise to a further push to promote cycling, which in fact offers synergic advantages in improving the quality of life in both collective and individual terms, while at the same time reducing the social costs of mobility from the point of view of management and construction of road infrastructures as well as from that of foreseeable expenses for the health service.

The urban and road context in which the cyclist travels is obviously the main element on which the debate on the promotion of cycling has been centered. While not forgetting the importance, often overlooked, of socio-cultural and educational factors in determining individual mobility choices, obviously the difficulties and advantages linked to the choice of cycling as an alternative to other modes of transport are strongly dependent on the territorial organization, on the level of risk to one's safety that the road system implies in relation to each mode of transport, as well as on the speed and efficiency of movement that bicycles allow.

To date, however, there is no unanimous agreement on what is the best overall strategy for an urban planning that favours and enhances cycling mobility in the city. In extra-urban environments, in a context oriented towards medium-long range travel, the use of the bicycle takes on a predominantly tourist role, and the choices are clearer: if a route has significant tourist value and motorized traffic is intense, it will be appropriate to create a physically protected cycle path detached from the road. In a context that combines high speed and high frequency of motor vehicles, in fact, other types of solutions become impractical. In urban environments, however, the reduction in the speed of motor vehicles and the reduced availability of space make traffic moderation solutions more plausible than separation. The evaluation of which is the best choice therefore depends strictly on the specific case.

Finally, it should be remembered that segregated cycle paths play a different role in today's urban planning: they must be chosen and preferred by the user, as an alternative to normal roads. Thus, while the motorist must take the existing road system as valid, the cyclist chooses the cycle path if the overall utility (safety + usability) is higher. And while the concept of safety, albeit with some nuances, is clear and unequivocal, that of usability is much more complex, and can involve both aspects of detail (radius of curves, precision of the junctions between raised sidewalks and road surface, etc.) and more structural aspects, linked to the continuity of the cycling network.

As an example, let's consider a hypothetical group of ten "typical" cities and evaluate two types of intervention with identical costs for the construction of:

- a) ten cycle paths in a single city and none in the remaining cities;
- b) one cycle path for each of the ten cities.

³ De Nazelle, A., Bode, O., Orjuela, J. P. (2017), *Comparison of air pollution exposures in active vs. passive travel modes in European cities: A quantitative review*, «Environ. Int.», 99, pp. 151–160

⁴ Tainio M., de Nazelle A.J., Götschi T., Kahlmeier S., Rojas-Rueda D., Nieuwenhuijsen M.J., de Sá T.H., Kelly P., Woodcock J (2015), *Can air pollution negate the health benefits of cycling and walking?* «Preventive Medicine», 87, pp. 233-236





It is quite likely that a greater overall shift in modal shares from cars to bicycles will be achieved with strategy a), where, even if in a single city, an organic network is created that make an alternative mobility choice seem natural to the citizen.

However, it is precisely the second type of intervention (hypothesis b) that has been the case: substantially residual and ineffective, but with a low rate of controversy and above all low cost for the local administration that would otherwise have to obtain the necessary consensus to support the decision to move significant shares of resources in that direction.

However, in recent years an increased awareness on the role of two-wheeled pedal-powered vehicles as virtuous mobility tools in cities can be clearly perceived, and the 3Cs project is moving along these widely shared lines. In open contrast to this tendency, however, are the policies to support economic growth in the automotive manufacturing sector and the related supply chain in terms of employment support.

It is thus common experience to read in the press comments that positively describe the benefits of sustainable mobility alongside news that equally enthusiastically report the growth in sales in the car market and the resulting increase in industrial production. Added to this is obviously the commercial and advertising dimension, where the huge revenues of the automotive industry create a strong imbalance between the limited impact of the messages on the urgency of environmental issues from organizations, associations and institutions and the hyper-realistic and dreamlike imagery of car manufacturers' commercials, typically populated by deserted cities, endless roads and vehicles that hover in suspension. These contradictions are still struggling to find a sensible recompositing.

It is in this seemingly insoluble contrast that universities, as a center of knowledge not subservient to short-term political and economic interests, can and must play a leading role in the definition of scientifically balanced sustainability objectives and strategies. This is even more true where local administrations have experienced years of strong spending limits that often force them to put on the back burner works and programs that do not meet with immediate and majority approval from the population. On the topic of cycling and active mobility in general, therefore, it is appropriate for our universities to play a proactive role by fuelling the debate but also by identifying and promoting concrete actions to increase its adoption both within their own community as well as externally. It is in accordance with these ideas that the 3Cs projects has been devised and put into action.

3. Main results from the Impact and Route Studies

The vast activity of data collection put in place for the 3Cs project has offered numerous insights on the active mobility perspectives; among those deserving more attention:

- Not everybody owns one or more bicycles nowadays - but the prospects look good, based on the declared purchasing intentions, especially regarding e-bikes, for which a relevant growth is to be forecasted. There is, however, the increased competition of e-scooters to be considered. Also, students tend to use very cheap bicycles if compared with personnel





- Also, incentives/bonuses to foster bicycle purchase do work
- Students are not everywhere the keenest bicycle users; in Montpellier and Torino professors and staff boast a much higher modal share than students
- Bicycle modal share in university commuting is in fact stronger in those two cities, while remaining quite low in Coimbra and Madrid
- The unimodal versus multimodal nature of travel depends significantly from the environment - in very large cities multimodality is stronger, since distances are often too big to be wholly covered by bike, let alone walking
- Walking is right now much more widespread than cycling, especially in small cities, where unimodal walking commuting is adopted by a large share on the community
- There appears to be no strong substitution effect between bicycle and car: in other words, those who own a car that they could use to commute to university, choose the bicycle with an incidence that is similar to those who do not own a car
- The MUV gamification initiative has met with considerable success, and the indication of participants suggest that at least more careful consideration for active mobility will be triggered
- Thanks to the recent improvements of the MUV dashboard, specifically requested by 3Cs, it is now possible to isolate and study all routes to/from a certain location rationally helping in identifying the preferred routes to the campuses.

Regarding the infrastructural issues examined in each city through the Route study and the Survey 2 of the Impact study, the main highlights are:

- Bicycles go where there is a network of itineraries, not isolated ones that force the cyclist to suddenly dig into dangerous traffic
- Cycle paths must be well surfaced and maintained - if the cycle path is full of holes and irregularities, and the road is perfectly even, cyclist will go on the road, or not go by bike at all
- Cycling routes must be reasonably efficient - if to follow the cycle path you have to lengthen your journey significantly, cyclist will choose the road instead
- Signposting is important. Tell cyclists where they will get to when following a certain route, and how long it will take, and they will be happy
- Bike lanes, i.e., corridors along streets which are not separated from the rest of the road, but just signalled with horizontal painted stripes are welcome, too. Just make motorists respect them, avoiding systematic invasion both when moving as well as when parking abusively
- Safe bike parking matters, since one cyclist in 5 has had at least one bicycle stolen, and universities are not exempt from the risk

