



3rd Conference on Sustainable Urban Mobility, 3rd CSUM 2016, 26 – 27 May 2016, Volos, Greece

## Sustainable mobility and physical activity: a meaningful marriage

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### Abstract

Since 2008 more than half of world's population lives in cities some of which grow bigger every day. The number of people requiring all transport modes is also increasing rampantly, with all possible consequences such as pollution, lost useful working or leisure hours, etc. Combined with climate change this can create an unbearable situation as was evident in Beijing, in December 2015. One of the major responses to these has been the effort to create compact cities and sustainable transport. Combining both, means the use of public transport, or physical transport modes (walking, cycling, etc.)

This paper in the context of a wider international research, SPaCE (Supporting Policy and Action for Active Environments) deals with the latter specific case of the physical transport modes, considering them as offering much more than just a version of sustainable transport. In particular, the paper highlights the merits of physical mobility not only from the aspect of transport sustainability but also from the point of view of physical activity and exercise that, in addition, has a multitude of positive impacts on human health. The positive effects of physical exercise on health have been well-documented to prevent several diseases and to decrease relevant risks. Further on, a physically active lifestyle enhances feelings of energy, well-being and quality of life (American College of Sports Medicine, 2011).

Drawing from the examples of two major interventions in Greek metropolises, the Acropolis promenade in Athens and the Thessaloniki waterfront redevelopment, the paper shows how these major urban interventions have created spaces used for a variety of purposes ranging from mobility needs to clear leisure, and investigates how transport restructuring towards non-motorised means and physical activity are integrated in this context of urban regeneration.

The paper raises the question of how these two good practices of a combination between urban regeneration and sustainable mobility including physical exercise can be adopted from other cities in Greece or elsewhere, adding experience to the international terrain of modern active healthy environments.

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Peer-review under responsibility of the organizing committee of the 3rd CSUM 2016.

**Keywords:** sustainable mobility; non-motorised transport; physical exercise; physical activity; Thessaloniki waterfront redevelopment; Athens archaeological sites unification; sustainable transport

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### 1. Introduction

Mobility is generally treated as a critical and universal challenge faced by cities all over the world. As the population of urban areas increases the challenge of meeting rising demands for efficient mobility within the constraints of existing infrastructure and available land becomes more difficult. At the same time, people's

expectations and preferences are changing, affected by technological innovation and environmental concerns. Large urban areas are the centre of intensive economic and social activity, at various spatial levels (regional, national and international).

The above factors, combined, lead to increasing demand for urban travel (between city centres, suburbs and peri-urban areas) and this demand affects, besides the volume of urban transport, its quality and overall conditions (speed, safety, gas emissions, noise etc.). Failure to meet this demand can result in restricted urban mobility, congestion, polluted environment and an overall unpleasant experience for urban citizens (ARUP, 2015).

So, the challenge of meeting transport needs has to be addressed, not only in an effective way, but also in a sustainable way, meaning the movement of people (and urban goods) in urban areas in such a way that it is environmentally, economically, institutionally and socially sustainable. Sustainable urban mobility planning should be focused on allowing for efficient mobility, with minimal environmental impact, while being accessible and affordable to users. A common response to this challenge has been to turn to the compact city idea and redefine it focusing on sustainable mobility.

At the European level, increasing demand for urban transport is a challenge for governments and transport authorities in all EU countries. Congestion in urban areas is contributing to pollution and accidents, and is increasing costs while limiting accessibility. These problems negatively affect economic competitiveness, social cohesion and sustainable growth in Europe. Urban mobility issues in Europe have reached such proportions that the EU had to develop and promote new directions and policies in urban mobility (TRIP, 2013). The European Commission supports local authorities across Europe in developing Sustainable Urban Mobility Plans (SUMPS). This support includes technical training and awareness raising initiatives, such as the Sustainable Urban Mobility campaign, that give an award to European cities based on their SUMP's (TRIP, 2013).

This paper, in the context of a wider international research, SPACe (Supporting Policy and Action for Active Environments <http://activeenvironments.eu/>), puts emphasis on non-motorised mobility, highlighting the merits of physical mobility not only from the aspect of transport sustainability but also from the point of view of physical exercise that, in addition, has a multitude positive impacts on human health. Drawing from the examples of two major interventions in Greek metropolises, the Acropolis promenade in Athens and the Thessaloniki waterfront redevelopment, the paper shows how these major urban interventions have created spaces used for a variety of purposes ranging from mobility needs to clear leisure.

The use of case studies as a tool allows an actual insight into already applied measures, policies and approaches while it offers the advantage of comparison between similar practices in different spatial, temporal, cultural, economic or social settings. The paper raises the question of how these two good practices of a combination between urban regeneration and sustainable mobility including physical exercise can be adopted from other cities in Greece or elsewhere, adding experience to the international terrain of modern active healthy environments.

## **2. Sustainable urban mobility, non-motorised transport and healthy urban environments**

In order to achieve sustainability on all levels, i.e. environmental, economic, social, and institutional (Dimitriou, Ward, and Wright, 2013) compact city policies with mixed land use and concentrated urban formations as a sustainable urban form have been increasingly considered and related to sustainable urban mobility including mass transit, such as buses, tramways and metros as well as non-motorised transport (CEC, 1990; Jenks et al., 1996; Newman and Kenworthy, 1999; Stead and Marshall, 2001; Naess et al., 2011). This city concept obviously allows for shorter transport distances encouraging walking and cycling, low energy consumption and reduced pollution (Dempsey, 2010; ACOLA, 2015). These non-motorised transport modes are low cost, have low to medium infrastructure cost, have high accessibility, low complexity and negligible environmental impact. Yet, others claim that there are contradictions between the compact city and other urban concepts (e.g. compact city vs. green city) that cannot be overlooked (Breheny, 1992; Nabeliek 2012). Some of the shortcomings of the compact city commonly cited concern higher densities, congestion, pollution, housing availability and affordability, quality of life, energy and other resources' demands, as well as limitations in (public) open and recreational spaces (OECD 2011). It is clear that the compactness of urban areas highly influences urban mobility sustainability, albeit in many different ways, depending on policy approaches. Yet, by merely applying the compact city policies in terms of transport modes, still remains unclear whether this can lead to physically healthy urban environments and have an overall positive impact on the population. For this a more active urban environment would be required, hence the question is raised whether physical activity

can be accommodated in a compact city.

It is well established that regular exercise and physical activity have a beneficial effect on the prevention of several diseases (ACSM, 2011). Systematic physical activity can have a positive effect on mood and affect enhancement, even facing anxiety and depression (Herring, O'Connor and Dishman, 2010; Ekkekakis and Backhouse, 2014). Additional possible effects have been documented for cognitive functioning, and enhancement of self-perceptions such as self-esteem (Hardcastle and Taylor, 2005; Rasberry, et al., 2011; Chang and Etnier, 2014). Finally, exercise and physical activity can be used in rehabilitation as an adjunct to therapy for various diseases.

Given the unequivocal evidence of the positive effects of exercise and physical activity on various domains of individuals' health and quality of life, it may be effective to examine whether the promotion of non-motorized sustainable mobility is compatible with suggested exercise regimens.

According to the definitions of physical activity, physical exercise and physical fitness by Caspersen, Powell and Christenson (1985), non-motorized transport would be classified as physical activity rather than as exercise, and in any case beneficial for physical fitness. The mere act of daily commuting with non-motorized means of transport may not level the ACSM's (2011) recommendations for exercise (at least five times per week, of moderate exercise, or at least three times per-week of vigorous exercise, of duration 30 to 60 minutes), but it is still conducive to the notion of health-related physical activity for several reasons.

First, the ACSM (2011) has declared that individuals can benefit even from amounts of exercise less than those recommended. This is especially true, if the amount of sedentary time is reduced, something that is achieved when individuals employ non-motorized means of transport.

Second, physical activity may be the basis for enhanced leisure-time physical activity and exercise. That is, there is a carry-over effect of transport related physical activity. This effect may be facilitated by the positive mood created by physical activity and by the availability of respective infrastructure.

Third, the increased energy expenditure caused by non-motorized transport can contribute to weight control.

Finally, as reviewed above, increased physical activity is related to individuals' cognitive functioning and their perception regarding quality of life.

For all these reasons, non-motorized transport can be considered a health-related physical activity that in conjunction with some more structured exercise can have a significant impact on public-health and quality of life.

In order to quantify the positive effects of physical activity on health and economy, the World Health Organization (WHO) has developed a respective instrument, the Health and Economic Assessment Tool (HEAT, <http://www.heatwalkingcycling.org>). HEAT processes physical activity data on expected health benefits such as reduced mortality and economic benefits from reduced medical costs. WHO has reported respective quantitative data from many countries, displaying significant benefits for health and economy. For example, an observed 5% modal share of cycling in Austria with an average trip length of 2 km was tied to saving 412 lives every year and a respective average yearly savings of 405 m.€ (WHO Europe: <http://www.euro.who.int/en/>).

### 3. Regenerating Urban Space: Two Greek Case Studies

Given the context and the rationale discussed above it is worth seeing how some exemplary regenerating urban interventions have changed the transport pattern into a more sustainable one, at least in an area of the city, and what benefits have been reaped from this in terms of physical and cultural activities. For this purpose, we will examine two cases from Greece: a) the Unification of Athens Archaeological Sites and b), the Redevelopment of the Waterfront of Thessaloniki. Drawing from these examples we shall attempt to show how these major urban interventions have created spaces used for a variety of purposes ranging from physical mobility needs to clear leisure. We will then discuss the pros and cons of these interventions.

#### 3.1. Methodology

In order to assess the effect these interventions had on the urban environment especially in relation to the issues researched in this paper, i.e. the broader traffic restructuring, non-motorised transport, physical exercise, and the cultural events, a qualitative research was conducted, based on a review of evidence, that followed the following steps:

- Documents related to the interventions: study of aims, and planning docs related, in order to investigate whether the several goals researched in this paper were intentional;
- Extensive site observation, presence in events to capture the living space experience, including random discussions

with the users of space in both interventions (Athens and Thessaloniki);

- Drawing from the personal experience of one of the authors as member of the executive committee of the Organization for Planning and Environmental Protection of Athens (the supreme planning board of the city);
- Extensive in-depth interview with a chief planner of the region of central Macedonia specialised in Thessaloniki spatial affairs, now an MP adviser, and relevant discussion with the planner-architect of the redevelopment;
- Cataloguing of all possible activities found in the internet, assuming that all activities are at some point uploaded on-line.

As a result, a clear picture was obtained as to the stated aims of each of the two interventions and the positive and negative outcomes were revealed.

### 3.2. Unification of Athens Archaeological Sites

The project venue is in the historical-archaeological centre of Athens, neighbouring “Plaka”, the old part of Athens, an old light industry area (Psyri), a part comprising shops and offices, a fairly densely populated part, as well as the area of old gas factory (Kerameikos).

The target was to complete the unification project in view of the Olympic Games of 2004. The creation of the Grand Promenade, i.e. the pedestrianisation of Dionysiou Areopagitou St., and Apostolou Pavlou St. was completed in 2002 and the Ermou-Kerameikos area in 2004. The budget was financed jointly by EU and the Greek State.

#### *Aims- History*

According to Valakou-Divari, 2014 the objectives of the project have been the

- Creation of a zone in which the natural continuity of the various archaeological sites and monuments will be re-established;
- Restoration, conservation and enhancement of the sites and monuments;
- Re-organization of the areas in their immediate surroundings;
- Improvement of places of special interest in some areas in the wider vicinity;
- Bringing of the citizens or the visitors into contact with the city’s cultural heritage;
- Improvement of underprivileged neighbourhoods;
- Resolution of the intensification of land-use in the central areas;
- Avoidance of further traffic overloading (Valakou-Divari, 2014).

The Athens Olympics Committee (ATHOC) suggested that the main aim was “to improve the living space for the inhabitants of the Greater Athens area” in order to create a better quality of life (President, Gianna Angelopoulos-Daskalaki, cited in ATHOC library.la84.org, undated website).

#### *The Contribution to sustainable transport and urban regeneration*

This was not a traffic plan but the nature of the interventions (pedestrianisation, traffic calming, avoidance of through traffic, etc.) attributed major importance to traffic restructuring that became a factor of the overall success. Supportive has been the metro network, several stations of which are located in the area, one at the beginning of the Grand Promenade and another two at the end. The major evident impact is that the Grand Promenade has become a very popular place for Athenians and tourist to walk and to follow events and activities. The project has brought vibrant life in a place previously occupied by cars, heavy traffic (due to the Acropolis). It constitutes an exemplary coordination between public transport and an urban intervention. Despite this general success, the area is to a limited extent misused (mainly by violation of the pedestrian precinct by cars), something that has been highlighted by many.

#### *The Contribution to physical and cultural activity*

As opposed to the cultural issues, at the time the project was conceived, physical activity was probably not even thought about. Now, physical and cultural activity take place either on an ad hoc individual basis or in an organised events basis; they support the intervention by attracting people and making the place well known. Events have a focus but frequently combine the physical activity and cultural dimension. They are organised by various agencies (including the Municipality of Athens).

Given the priorities of the intervention, there is no specific space provided for physical activity besides the facilitation of walking and the provision of free public space for a variety of events. Yet, the Grand Promenade does not include a bicycle lane which makes it unsuitable for mass organised cycling. Despite this, events directly linked to physical activity have been organised in the area, though many using the area just as a starting point. Cultural events, including City of Athens New Year’s Eve and Xmas events, Book fairs, Street Opera events, as well as political

and environmental movements' events (including of Greenpeace) are many. Despite the success of living space improvement, organised physical activity cannot be accommodated. As cyclists in Greece are not allowed to use pedestrian ways, several cyclists still ask for the creation of bicycle lanes, at least along the Grand Promenade (Podilates, 2008).

#### *Overall assessment- Result of the intervention*

Despite the success of the intervention and its promotion via visitors guides (The City of Athens Official visitors' Guide) and various magazines, and though almost all are familiar with the interventions, the project (as a project) is known to 40-50% of the population in Athens, while only 25-30% think that it has been promoted as it should have been. The people think the pedestrianisation is very successful and better than other similar projects of the same programmes. According to the same study, 94% of Athenians would like the unification programme to be continued to other places in the wider Athens basin (Xydias, 2005). Being very happy with the development, there is not any pressure or more major ideas (besides the observations mentioned above) for the physical development of this particular part of the city. Accordingly, the current policy of the city and /or the Ministry of Planning does not foresee any major changes in the area, focusing at the moment to more problematic areas of the city.

### *3.3. Thessaloniki Waterfront Redevelopment*

#### *Details of the project*

The new waterfront development on the eastern segment of the city came to provide Thessaloniki with a qualitative public space for multiple uses, with multiple meanings with sufficient green and with possibilities for walking, cycling, skating, and jogging.

#### *Aims - History*

The aim of the project has been multiple:

- To improve the urban environment of the city, by creating an upgraded public space, and by increasing green space;
- To create a public space where activities and leisure can co-exist;
- To create a pole for internal and external tourism attraction;
- To increase muscular mobility, thus improving the health condition of the population, by providing an opportunity to walk and cycle which can act as a motivation for doing this also elsewhere (i.e. to create new patterns);
- To raise the aesthetic standards of the citizens in relation to public space which leads to higher respect for public space.

In the "Thessaloniki 2012" visionary programme (ORTH 2010), the waterfront regeneration figures first, among the major projects of the city (p. 17-19). The implemented project has been a result of an architectural competition launched by the Municipality of Thessaloniki (2001), which was won by the architects Prodromos Nikiforidis and Bernard Cuomo and has been awarded several international prizes. It was constructed during 2006-2014, with the financial contribution of the EU (ESPA) with a total budget of 43.2 m.€ (Nikiforidis and Cuomo, undated; Landscape Architects Network, undated).

The realised project, aims: a) to restructure the paved part of the area, b) to create a row of 16 inner gardens, c) to replace and improve urban furnishing (Centre of Architecture, Municipality of Thessaloniki, undated). These aims were materialised in an area of 238,800 m<sup>2</sup> and 3.5 km long, divided longitudinally into three strips: a) the outer one next to the sea, b) the middle one which is planted with trees both sides, and c) the inner thematic gardens (some historical) (Landscape Architects Network, undated).

#### *The Contribution to sustainable transport and urban regeneration*

In terms of transport, the project technically has not brought any changes in the city, as it is realised on a pre-existing waterfront promenade which was not normally allowed for motorised transport. However, it is very possible that it has triggered cultural changes related to transport. As residents crowd to use the new promenade, they come across a new style of movement which is acquiring locally unprecedented dimensions. This experience of non-motorised mobility is inscribed in their minds as a viable option and is affecting their travel behaviour in general. It has not been researched however, though empirically seems almost certain, whether traffic trying to reach area has increased.

#### *The Contribution to physical and cultural activity*

In terms of physical activity, besides the sporting facilities and playgrounds hosted in the inner gardens, the

waterfront re-development has become very popular for walking, jogging, skating, rolling and cycling, fulfilling one of its initial aims. This activity is embraced by the local community and is supported by the authorities, e.g. with various ‘mass athleticism’ programmes launched by the Municipality of Thessaloniki and other organisations. Cultural events are numerous and include art exhibitions, discussions, dancing, performances, photographic competitions, workshops, children activities, musical events and parties, etc. (*Typos Thessalonikis*, 2015). Thus, culturally, the development has created a new conception for the city and a new behaviour of the visitors). It has also become the object of art, by becoming a widely photographed area by very important photographer artists.

#### *Overall assessment- Result of the intervention*

The project seems to be very widely accepted among the city residents and has brought an new life in the seafront of the city having become an attraction pole, an athletic hot spot and a leisure environment, all used with non-motorised modes in an upgraded urban environment. It has even triggered new businesses among which bicycle rental firms. According to ‘Info-Regio’, the development has generated 700 new jobs (‘Info Regio’, 2014).

Another significant outcome has been the international publicity in terms of architecture and prize awards given to the project and its architects, besides the numerous publications in national and international architectural journals. This good fame of the project is vital to the sustaining of a virtuous cycle between culture residents non-motorised transport high urban environment standards. Yet, despite the major success of the redevelopment initiative, the dimension of transport restructuring has been absent.

#### **4. Conclusions: two birds with one stone!**

Finding solutions to increasing urban air pollution, congestion and related impacts on economy and society requires a change in the way planners, decision makers and transport users think. Planners, need to develop a new culture in urban mobility in order to plan and deliver effective sustainable transport, and transport users need to adapt their attitudes and behaviour. Users must play a central role in transport planning because user choices affect the sustainability and efficiency of urban transport systems. The challenge is to find appropriate solutions that promote alternatives to the car and that motivate urban citizens to adopt more sustainable mobility practices (TRIP 2013).

In parallel, besides the social and eco-environmental benefits, the adoption of more sustainable mobility practices, in particular non-motorised transport, leads to the use of the human body, comprising physical activity that can become physical exercise. This, in conjunction with some more structured exercise, can have positive effects on public health and quality of life, as it is a factor of disease prevention, personal health and psychology improvement.

In the context of the compact city, the promotion of non-motorised transport can provide solutions to many of the above challenges. The question is how these are combined in order to become parts of a coherently integrated sustainable urban policy. Is it enough to promote non-motorised transport creating at the same time urban playing fields on the side? Though this could be an advancement compared to worse pre-existing situations, it does not seem to be enough. In order for such interventions not to be two parallel worlds, policies are required, that would integrate the two. Fortunately, such policies were applied in the two cases presented in this paper (Athens and Thessaloniki).

We have shown that both Greek urban interventions were very successful as urban regeneration initiatives. It is clearly shown in our analysis that the interventions were successfully accompanied by relevant policies. Despite this, each one of them was still missing a significant dimension, as shown in the following table:

Table 1: Stated aims and achieved results of the 2 Greek case studies

	Athens (stated) aim	Athens result	Thessaloniki (stated) aim	Thessaloniki result
Broader traffic restructuring	yes	yes	no	deterioration
Non-motorised transport	no	yes	yes	yes
Physical exercise	no	partly	yes	yes
Cultural Events	yes	yes	yes	yes

Source: Authors

In Athens, while a significant urban transport restructuring took place, the dimension of physical exercise was omitted. The emphasis was only on culture and leisure, and a chance for the provision of a terrain for physical exercise was lost. Whatever happened, happened spontaneously. In Thessaloniki, the outcome was more comprehensive: physical exercise, non-motorised transport and culture were intentionally planned and successfully provided. Yet, in

this case, despite the major urban regeneration, there was no urban transport restructuring, and traffic problems arose.

Future interventions (in other or even in the same cities) should have both goals, intentionally from the outset, as even more closely interlinked priorities. Urban regeneration schemes can with marginal effort incorporate both urban transport restructuring toward non-motorised mobility and the provision for the possibilities of physical activity (and exercise if possible). It is a matter of the civil society and the local governments then to devise support policies to take full advantage of what this desired virtuous combination can offer.

## Acknowledgement

The preparation of this paper was co-funded by the Erasmus+ Programme of the European Union

## References

- American College of Sports Medicine (ACSM), 2011. Quantity and quality of exercise for developing and maintaining cardiorespiratory, musculoskeletal, and neuromotor fitness in apparently healthy adults: Guidelines for prescribing exercise. *Medicine and Science in Sports and Exercise*, 1334- 1359.
- ARUP, 2015. Intelligent Connectivity for Seamless Urban Mobility, SF, USA.
- ATHOC (library.la84.org, undated website). Olympic Games – Athens 2004: The Unification of Archaeological Sites (<http://library.la84.org/OlympicInformationCenter/OlympicReview/2001/OREXXVII40/OREXXVII40zg.pdf>, p.49) (accessible August 2015).
- Australian Council of Learned Academies (ACOLA), 2015. Delivering Sustainable Urban Mobility, ACOLA, Australia.
- Breheny, M. (ed.), 1992. Sustainable development and urban form. 292pp. London, Pion Limited (European Research in Regional Science, No.2)
- Caspersen, C.J., Powell, K.E., & Christenson, C.M., 1985. Physical activity, exercise and physical fitness: Definitions and distinctions for health-related research. *Public Health Reports*, 100 (2), 126-131.
- CEC, 1990. Green paper on the Urban Environment, Luxembourg, Office for the Official Publications of the European Communities.
- Centre of Architecture, Municipality of Thessaloniki (undated internet site). “The New Waterfront” ([http://centre-architecture.thessaloniki.gr/index.php?option=com\\_content&view=article&id=7&Itemid=667&lang=el](http://centre-architecture.thessaloniki.gr/index.php?option=com_content&view=article&id=7&Itemid=667&lang=el)) (accessible August 2015).
- Chang, Y.K., & Etner, J.L., 2014. Physical activity and cognitive functioning. In A.G. Papaioannou and D. Hackfort (eds) *Routledge Companion to Sport and Exercise Psychology*. Routledge, UK pp. 705-719.
- Dempsey, N., 2010. Revisiting the Compact City, *Built Environment* 36(1).
- Dimitriou, H., Ward, J., & Wright, Ph., 2013. Mega transport projects — Beyond the ‘iron triangle’: Findings from the OMEGA research programme. *Progress in Planning* 86 (1-43).
- Ekkekakis, P., & Backhouse, S.H., 2014. Physical activity and feeling good. In A.G. Papaioannou and D. Hackfort (eds) *Routledge Companion to Sport and Exercise Psychology*. Routledge, UK. pp. 687-704.
- Hardcastle, S., & Taylor, A., 2005. Finding an exercise identity in an older body. ‘It’s redefining yourself and working out who you are’. *Psychology of sport and exercise* 6, 173–188.
- Health Economic Assessment Tool (HEAT). <http://www.heatwalkingcycling.org/> (accessible April 2016).
- Herring, M.P., O’Connor, P.J., & Dishman, R.K., 2010. The effect of exercise training on anxiety symptoms among patients: A systematic review. *Archives of Internal Medicine*: 170, 321–331.
- InfoRegio, 2014. Regenerating Thessaloniki’s seafront ([http://ec.europa.eu/regional\\_policy/en/projects/greece/regenerating-thessalonikis-seafront](http://ec.europa.eu/regional_policy/en/projects/greece/regenerating-thessalonikis-seafront)).
- Jenks, M., Burton, E. and Williams, K. (eds), 1996. *The compact city: a sustainable urban form?* London, E and FN Spon.
- Landscape Architects Network (undated internet site). “Thessaloniki New Waterfront Creates Spectacular Scenes: Thessaloniki New Waterfront Landscape Design by Nikiforidis-Cuomo Architects in Thessaloniki, Greece”. <http://landarchs.com/thessaloniki-new-waterfront-creates-spectacular-scenes/> (accessible August 2015).
- Nabeliek, K., 2012. *The Compact City: Planning Strategies, Recent Developments and Future Prospects in the Netherlands*, AESOP 26th Annual Congress, 11-15 July, METU, Ankara, Turkey.
- Naess, P., Strand, A., Naess, T. and Nicolaisen, M., 2011. On their road to sustainability? : The challenge of sustainable mobility in urban planning and development in two Scandinavian capital regions, *Town Planning Review*, Vol. 82 (3).
- Newman, P.W.G. and Kenworthy, J.R., 1999. *Sustainability and cities. Overcoming automobile dependence*, Washington, DC/Covelo, CA, Island Press.
- Nikiforidis, P. and Cuomo, B. (undated internet site). “Regeneration of Thessaloniki New Waterfront: in search of a new urban balance by the city’s seafront” <http://www.nikiforidis-cuomo.com/work/awarded/57> (accessible August 2015).
- OECD, 2011. *Compact City Policies: A Comparative Assessment – Final Report*, Public Governance and territorial Development Directorate, OECD.
- ORTH (Organization of Urban Planning & Environmental Protection of Thessaloniki), 2010. *Thessaloniki 2012*. Ministry of Environment, Energy & Climate Change. September.
- Podilates, 2008. <http://www.podilates.gr/node/39175> (Na min pairnoume choro apo tous pezous) (accessible, August 2015).
- Rasberry, C.N., Lee, S.M., Robin, L., Laris, B.A., Russell, L.A., Coyle, K.K., & Nihiser, A.J., 2011. The association between school based physical activity, including physical education, and academic performance: A systematic review of the literature: *Preventive Medicine*, 52, Supplement, S10 – S20.
- Stead, D. and Marshall, S., 2001. The relationships between urban form and travel patterns: an international review and evaluation, *European Journal of Transport Infrastructure Research*, 1, 113–41.

Transport Research and Innovation Portal (TRIP), 2013. Innovation in Urban Mobility: Policy and Planning, European Commission's Directorate-General for Mobility and Transport (DG MOVE).

Typos Thessalonikis, 2015. The subscriptions for free physical exercise in the new waterfront of Thessaloniki continue.

(<http://www.typosthes.gr/topika/article/66356/sunehizodai-oi-eggrafes-gia-ti-dorean-athlisi-sti-nea-paralia-thessalonikis/>) (accessible August 2015).

Valakou-Divari, N., 2014. Unified archaeological sites of Athens: An integrated approach for historic urban landscape

([http://ehhf.eu/sites/default/files/201407/ Unified%20archaeological%20sites%20of%20Athens.pdf](http://ehhf.eu/sites/default/files/201407/Unified%20archaeological%20sites%20of%20Athens.pdf)) (accessible August 2015).

World Health Organization (WHO) [Europe] <http://www.euro.who.int/en/health-topics/environment-and-health/Transport-and-health/activities/guidance-and-tools/health-economic-assessment-tool-heat-for-cycling-and-walking/examples-of-applications-of-heat>

(accessible April 2016).

Xydias, K., 2005. Research and Statistical Analysis for the Attitudes of Residents on the Unification of the Archaeological Sites in Athens"

Master's Thesis, University of Piraeus, Greece (supervisor M.Sfakianakis).