



Sustainable Transportation Planning, A New Academic Specialization in the USA

Balsas, C. (2015). Sustainable Transportation Planning, A New Academic Specialization in the USA. *International Journal of Transportation Science and Technology*, 4(1), 1-15. <https://doi.org/10.1260/2046-0430.4.1.1>, <https://doi.org/10.1260/2046-0430.4.1.1>

[Link to publication record in Ulster University Research Portal](#)

Published in:

International Journal of Transportation Science and Technology

Publication Status:

Published (in print/issue): 01/03/2015

DOI:

[10.1260/2046-0430.4.1.1](https://doi.org/10.1260/2046-0430.4.1.1)

[10.1260/2046-0430.4.1.1](https://doi.org/10.1260/2046-0430.4.1.1)

Document Version

Publisher's PDF, also known as Version of record

Document Licence:

CC BY-NC-ND

General rights

The copyright and moral rights to the output are retained by the output author(s), unless otherwise stated by the document licence.

Unless otherwise stated, users are permitted to download a copy of the output for personal study or non-commercial research and are permitted to freely distribute the URL of the output. They are not permitted to alter, reproduce, distribute or make any commercial use of the output without obtaining the permission of the author(s).

If the document is licenced under Creative Commons, the rights of users of the documents can be found at <https://creativecommons.org/share-your-work/licenses/>.

Take down policy

The Research Portal is Ulster University's institutional repository that provides access to Ulster's research outputs. Every effort has been made to ensure that content in the Research Portal does not infringe any person's rights, or applicable UK laws. If you discover content in the Research Portal that you believe breaches copyright or violates any law, please contact pure-support@ulster.ac.uk

Sustainable Transportation Planning, A New Academic Specialization in the USA

Carlos J.L. Balsas

Department of Geography & Planning, AS 210, 1400 Washington Avenue,
University at Albany, Albany, NY 12222, USA, cbalsas@albany.edu

ABSTRACT

Recent efforts have helped to augment the knowledge base, the public policies, professional practices and funding required for sustainable transportation. I argue that the progress made is laudable but caution that it may vanish rapidly if, due to a number of factors and events, including the need to ameliorate the consequences of the global financial crisis, attention is redirected at resuming a nation building project centred on land development and automobility. This paper uses a fourfold-criterion to analyse the new specialization in non-motorized transportation planning and to discuss the dilemma of technology transfer among communities and countries.

1. INTRODUCTION

Transportation is critical to the functioning of society. People and goods move according to socio-economic, geospatial, cultural and legal constraints and possibilities. Due to its magnitude, the transport sector generates major impacts and externalities, both positive and negative. The positive impacts of a car-based transportation system have grown to the point where they create incremental reductions in mobility and accessibility for cities, and especially for certain segments of society. Congestion, air and noise pollution, traffic accidents, sprawl, and consumption of finite resources are examples of what has been termed the unsustainability of transportation [1]. As a response to this trend, we have observed the emergence of major attempts at greening the transportation sector [2, 3]. As primary goals, one finds the need for safer walking, bicycling and public transport ridership levels. For a while, this movement in transportation had generated a slim body of knowledge [4]. However, recent efforts in different segments of society - including at the national, state and local government levels, in academia and nonprofit organizations - have helped to augment the knowledge base, the public policies,

professional practices and funding needed to build additional infrastructure and to improve the existing situation.

The objective of this paper is to analyse whether the increasing attention to sustainable transportation planning is beginning to represent the emergence of a new academic specialization. In this paper, I argue that the progress made to date in the U.S. is laudable but caution that it may vanish quite quickly if due to a number of factors and events, including the need to ameliorate the consequences of the global financial crisis, attention is redirected at resuming a nation building project centred on land development and automobility, as it occurred for more than 75 years.

As a road map, I reflect on my own academic trajectory (research, teaching and service) in order to chart the evolution of the sustainable transportation planning specialization, especially in what pertains to non-motorized modes, in the United States during the last three decades or so. A review of key players, laws and funding appropriations, major studies, scholarly works and main research centres, among other issues is provided. Also, the current state of the art in terms of theoretical concepts and approaches (e.g. transit oriented development - TOD, walkable urbanism, complete streets, safe routes to school, context sensitive design, healthy and active living, energy efficiency, carbon neutral strategies and (sub)urban retrofitting), and in terms of professional and university research opportunities is identified. Also, the paper uses a fourfold-criterion to analyse the added attention to non-motorized transportation (NMT) planning and to discuss the dilemma of technology transfer among communities and countries in need of proven solutions.

The conclusion states that initial inter-professional competition for the generation of knowledge and collaboration in its implementation is critical to the emergence and continuity of professions. In more practical terms, I conclude that each mode of transport (i.e., light-rail, high speed rail, transit, greener cars, electric bicycles, bicycling and walking) has its own advantages and limitations and land development and city building will forever influence not only the type of built environment and urban form created but also the range of future transport possibilities.

2. A SLIM BODY OF KNOWLEDGE: TOWARD PROFESSIONAL EXPERTISE

Contrary to a living body, which is conceived by the merger of two cells, evolves, leaves the protective womb, grows, matures and eventually ceases to exist, professions and specializations are born somewhat quietly from unnamed parents, are conceptualized and theorized, initially only by a few people working from different angles, who attempt to address common interrelated issues and soon thereafter begin to add up to a substantive body of knowledge. The genealogy of the sustainable transportation planning field has evolved over the last forty years. Its origins can probably be traced back to the social and environmental movements of the late 1960s and to the energy crisis of the 1970s [5].

Growing awareness of environmental problems caused by industrialization, mechanization of agriculture, urban and transport-related infrastructure development and reliance on motorized vehicles for daily transport needs of people and goods led to community action, rudimentary theorizations of alternative ways to resolve existing

problems and to the formulation of public policies. The initial scholarship of that era was quite slim and resulted mainly from voluntary and dedicated actions by committed advocates who believed that a different, more ecological, just and efficient world was possible.

However, as time progressed, the processes of knowledge generation and diffusion led to “claims of jurisdiction” with its own audiences, settlements, internal structure and implications of exclusion [6]. Such exclusionary practices on the part of the engineering profession may have led to the unsustainability of the transportation sector in the first place. As the new sustainable transportation planning specialization evolves, new legitimate professional opportunities for collaboration and mutual benefit are likely to emerge.

It is well known that almost everyone in the U.S. walks, a small group of people take public transport, ride bicycles and motorcycles and the majority of the population drive automobiles¹ [7]. In transportation, walking is the *par excellence* sustainability mode. People walk from a very early age and unless they become mobility impaired, they will (almost unconsciously) keep walking throughout the rest of their lives, however, not necessarily for transportation purposes. Most cities are infrastructured to accommodate pedestrians and to allow almost one hundred percent unconstrained movement. Bicycling was important at the turn of the twentieth century, but it was almost immediately annihilated by engine vehicles, which were able to cover longer distances in less time, while carrying heavier loads. Planners and engineers catered to automobiles and attempted to maximize opportunities to serve emerging societal needs in the transportation realm; that was where the nation building project was headed during and after World War II.

Massive financial resources coupled with economic and political pressures resulted in the building of the National Highway System, which directly shaped the way America was going to move its people and goods. This automobile infrastructure had both positive and negative externalities. Initially the positive externalities outnumbered the negative, despite localized opposition to the destruction of neighbourhoods and to the building of freeways in certain cities and towns.

Once the highway system was basically completed, national attention was then redirected to “green transportation.” This included not only the expansion and upgrade of existing public transport systems, but also the implementation of other modes, such as light-rail systems in places like Los Angeles, Houston and Phoenix. An additional boost was also given to bicycle and pedestrian planning within federal transportation appropriations, the National Bicycling and Walking Study, the American with Disabilities Act (ADA) and the Universal Design framework. This reorientation has been greatly influenced by the emergence of sustainability science and the use of innovative triple-bottom line sustainability metrics [8].

¹According to the Alliance for Biking & Walking, the mode of travel in the US as percentage of commuters was: walking – 2.9; biking – 0.6; bus – 5; car – 91.5. According to the same source, the mode of travel in the US as percentage of all trips nationwide was: walking – 10.5; biking – 1.0; bus – 1.9; car – 86.6.

We can question if this is a paradigm shift, a temporary movement, a trend or the result of effective planning. For the sake of brevity, a personal reflection on the author's professional trajectory will help to illustrate the development and growth of the sustainable transportation field. In academic terms, professional development includes research, teaching and service. In the author's case, the first learning of the use of bicycle and pedestrian infrastructure to complement, and even to create alternatives to automobile-related transportation, occurred in Holland, a small, flat and progressive country in central Western Europe in the mid-1990s. The concrete outcome was a small research project, which involved the transfer of mainly public policies, strategic plan formulations and methodologies, and the surveying of the civil society in a mid-size coastal city in southern Europe.

The author experienced a very different (spatial, socio-economic and legal) context in North-America, more specifically in New England, where living almost car-free was relatively possible. In addition to walking and bicycling almost everywhere, occasionally, I shared and rented cars. From progressive and liberal Massachusetts, the author had an opportunity to work in transportation planning in central California, and several years later in the Southwest.

Following the footsteps of McClintock who had surveyed the skills and competencies of walking and cycling professionals in the UK [9], the teaching offerings of educational opportunities in north-American universities were researched, only to find a limited set of graduate level courses in different parts of the country.

The author studied the infrastructure and planning of sustainable transportation on eight pre-selected college campuses [10]. He also offered a graduate level course on non-motorized transportation planning based on a pioneering endeavour led by the federal government to augment the skills set of future transportation professionals [11]. The main assumption was that there was a lack of professional training in this particular subfield, which was contributing towards the development of pedestrian and bicycle unfriendly cities. Such realization had been documented in the early 1990s during the development of the National Bicycle and Walking Study. By creating a bicycle and pedestrian planning curriculum and making it readily available to professors throughout north-America, policy makers hoped to demonstrate a long-term commitment to more sustainable transport modes.

The author's NMT research activities included reviewing plans, policies, and published literature, surveying existing planning and engineering programs, analysing the effectiveness of planning and design efforts to better accommodate users on college campuses, and reaching the conclusion that successful cases were exceptions to the rule and that there was limited formal teaching of this sub-field being accomplished in urban planning schools in the United States [12].

With that in mind, I volunteered to teach the FHWA's bicycle and pedestrian planning curriculum to planning and landscape architecture students and, several years later, I taught a slightly different and broader course to graduate students during my probationary period at Arizona State University. Class enrolments reflected the small but growing interest in the field. The scope was narrow at the beginning and much broader several years later, covering a comprehensive spectrum of transportation issues, well beyond what was initially part of the FHWA's curriculum.

And finally, I serviced this emerging field by participating in professional and community meetings at multiple scales, including participation in neighbourhood advocacy meetings in New England and at the national meeting of the Transportation Research Board (TRB) in Washington DC, including membership in TRB's bicycle committee, professional meetings and research projects and events in Brazil. I was the co-principal investigator in a community grant from the Catholic Healthcare West – St. Joseph's Hospital and Medical Center. This grant was aimed at analysing pedestrian and bicyclist safety in downtown Phoenix [13].

The uncovered realities² and fundamental principles of this emerging field of specialization raise several questions, including the nature and extent of the political impacts in terms of energy independence, national security and social engineering. The results seem to be mixed with positive advantages for some already better-off communities (e.g., better quality of life, healthier citizens, inclusiveness and smaller footprints), and less positive impacts for others (e.g., fewer auto-related jobs in traditional car manufacturing geographic areas, such as Detroit, Michigan). These negative impacts should be monitored and reduced through the use of appropriate holistic solutions. Financially, the so called green infrastructure is often cheaper and simpler to design, build and maintain than car-based infrastructure, which makes investing in this emerging specialization a reasonable allocation of public and community resources.

3. THE DIFFERENCE RESOURCES MAKE (OR NOT)

The availability of resources contributed to the emergence of this growing field of knowledge, but for a specific set of reasons its impacts on the ground are somewhat limited, given the magnitude of (sub)urbanized areas in the United States and the limitations inherent to sustainable transportation modes. This argument is expanded upon later in the paper. Table 1 identifies major players, laws, funding appropriations, major studies, scholarly works, researchers and research centres, which have in one way or another influenced the development of this emerging field in the United States.

Obviously, it is a limited, succinct and incomplete portrait of more than three decades of events, laws, practices and publications, which have been shaped by an undetermined number of committed professionals and volunteers within multiple realms of the government, universities and civil society. But it illustrates that the practice of transportation planning has evolved from issues of road capacity and congestion mitigation measures to traffic calming, neighbourhood preservation, transport enhancements and social equity, among others [15, 16].

This brief synthesis raises at least three implications. The first is whether endowed communities (and even countries) are better able to design, plan, build and pay for the maintenance of facilities than less richer ones. The second is the realization that standards, innovations and accumulated learning (i.e., knowledge) take time and require

²For Gunder and Hillier, Sustainability is a "master signifier deployed as an authoritative illusion in name of competitiveness" [14].

Table 1. Brief synthesis of the US sustainable transportation planning field, with special emphasis on non-motorized transportation

	1970s/1980s	1990s	2000s
Major players	Professionals, politicians, environmentalists, leaders and members of non-profit organizations, etc.	Professionals, politicians, and bicycle committee members and members of non-profit organizations, consulting firms, etc.	Individuals, professionals, politicians, TRB pedestrian and bicycle committees, leaders and members of non-profit organizations, consulting firms, associations, etc.
Laws	Federal-Aid Highway Act of 1987 and earlier federal transportation appropriations	American with Disabilities Act of 1990 (ADA); Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA); Transportation Equity Act for the 21 st Century, 1998 (TEA-21)	Transportation Equity Act for the 21 st Century, 1998 (TEA-21); Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users, 2005 (SAFETEA-LU); Moving Ahead for Progress in the 21 st Century Act (MAP-21)
Funding	State and city governments, advocacy and charitable organizations	Federal, state and city governments, Center for Disease Control and Prevention (CDCs), advocacy and charitable organizations	Federal, state and city governments, Center for Disease Control and Prevention (CDCs), Robert Wood Johnson Foundation (RWJF) and other advocacy and charitable organizations
Studies and innovations	First generation of city bicycle master plans made during the 1970s	National Bicycling and Walking Study, 4Es Framework, State bicycle and pedestrian coordinators	Walking and bicycling audits, walking safety manual (PEDSAFE), bicycling safety manual (BIKESAFE), pedestrian and bicycle crash software (PBCAT)

Books and research articles	Brambilla & Long (1977) [44], Untermann (1984) [45], Susan Hanson, Allan Black, Ralph Gakenheimer, Martin Wachs, etc. John A. Volpe National Transportation Systems Center	Forester (1994) [46] McClintock (2001), Newman and Kenworthy (1999), Beatley (2000) Patricia Mokhtarian, Robert Cervero, William Black, David Banister, etc. Federal Highway Administration's (FHWA), Bicycle and Pedestrian Program, National Center for Bicycling and Walking, walkinginfo.org, bicyclinginfo.org League of American Bicyclists, Pro walk/Pro bike conference, Rails-to-Trails Conservancy, etc.	Tolley (2003), Banister (2005), Black (2000) [47] John Pucher, Susan Handy, Peter Newman, Jeff Kenworthy, Kevin Krizek, Todd Litman, etc. Federally sponsored university-based transportation research centres (TRC)
Researchers*			
Research centres			
Others	Models and computers in transportation planning, etc.		Geographic Information Systems (GIS), Intelligent Transportation Systems (ITS), new positional technologies (GPS), Association of Pedestrian and Bicycle Professionals, International Journal of Sustainable Transportation Planning, AICP CTP – Certified Transportation Planner, etc.
*The work of many of these researchers spans multiple decades and several of the researchers mentioned perform work outside of the US.			

professional, governmental and civic commitment and investment [17]. And finally, the third implication is centred on the question of how planners can “extend” resources to communities in need, in order to be more inclusive and to help create more sustainable communities.

Within this context, Evans, Simon and Marvin have found that “technological and institutional innovations are inversely related so that radical technological innovation[s] often serves to reinforce existing social relations of power and exclusion” [18]. And Stein has documented this assertion with his study of how bicycle lanes in New York City seem to be contributing to gentrification processes by “feed[ing] the pressures displacing working class communities of colour” [19] and amplifying citywide transportation injustices.

4. CURRENT STATE OF THE ART AND DISCUSSION

The current sustainable transportation innovations involve theoretical concepts and approaches (e.g., transit oriented development - TOD, walkable urbanism, complete streets, safe routes to school, context sensitive design, healthy and active living, energy efficiency, carbon neutral strategies and (sub)urban retrofitting), which have emerged mainly in the last decade and a half and are still influencing transportation policy, practice and scholarly research opportunities. According to Kennedy et al. [20] sustainable transportation requires four pillars: effective governance of land use and transportation; fair efficient and stable funding; strategic infrastructure investments; and attention to neighbourhood design.

It is well known that governments are responsible for setting policies towards a harmonious and coherent development of the territory. Governmental institutions at different levels of the administration use different incentives and disincentives in attempts to steer development toward collectively agreed upon goals and objectives [21]. Land use decisions in the US are mainly made at the local level. The location of transportation infrastructure, and the surrounding built environment, is influenced by local decisions.

Transport standards are usually proposed by specialists working within the scope of professional organizations but the ultimate decisions about which standards to implement is the responsibility of state, regional and local authorities. These standards reflect cultural and normative preferences for certain types of built environments and urbanized landscapes. This clarification is required at the onset because the outcomes of policy decisions, which lead to urbanization processes, have a serious influence on subsequent public and private investment decisions, individual and collective behaviours, socialization practices and the perpetuation (or extinction) of traditions, rituals and inherent levels of safety, comfort and happiness of the population.

The National Highway System was mainly a nation building endeavour, which catered to the motorization needs of the country. In name of progress and modernization ideals, the new road infrastructure allowed cities, and mainly suburbs, to grow exponentially. It allowed economic activities and residential developments to relocate to peripheral areas of cities, quite often in the country side. Immediately, and many times well before any other constructions were built, commercial areas anchored

by shopping malls and business parks were sited in proximity to highway interchanges. Obviously, these developments were designed, built and maintained primarily with the needs of motorists in mind. Alternative modes of transport were purposefully (or accidentally, in certain cases) neglected because of their perceived low social status and limited potential in terms of satisfying the needs of large numbers of people. Although this is part of the historical credo, a more careful observation reveals that the building of transportation facilities was augmented by large amounts of land available for development and that without the latter the former would not have been possible and the rapid suburbanization processes would not have occurred with the same intensity.

The current attempts at reducing the less positive aspects of the road transportation system through more ecological and sustainable policy priorities are laudable but of very limited scope, given the magnitude, scale and proportional impact on the country's natural, economic and politico-administrative structure and organization. These impacts can be seen in the most urbanized megalopolis throughout the country, but especially in the Sunbelt states, which have experienced a late urbanization process. Their extensive urbanization patterns, mainly based on single-family homes, automobile dependent developments and shopping malls has led to difficult to run and maintain public transit systems and very long distances between central places, which preclude people from fully utilizing true sustainable modes of transport.

Several theories have been conceptualized to explain the evolution and form of urbanization processes. Even though they are too numerous to name here, their main emphasis has been either on physical elements of the territory (geomorphology and topography) or on the economic and institutional processes used by different members of society to benefit and prosper from developmental policy orientations and societal trends.

The transportation field has been dominated mainly by engineers. Their emphasis on rigorous technical and scientific approaches to facility building and maintenance has allowed the design and building of superior infrastructure that caters primarily to vehicles, their motorists and occupants. However, the socio-ecological aspects of transportation facilities and developmental processes were quite often overlooked in detriment of those who cannot drive and/or prefer not to drive because they are too young, old and/or do not have enough money to own and/or maintain a car. To this end, it has been recognized that skills in applied ethics, public participation and sustainability needed to be added to the skills set of transportation engineers [22].

4.1. Building a New Professional Praxis

According to Newman and Kenworthy, the new principles of professional praxis include: recognizing values, maximizing diversity, crossing boundaries and facilitating organic processes [23]. On the other hand, Forsyth and Krizek have recognized that the NMT field has greatly expanded in the last two decades and that two alternative paths seem plausible: 1) NMT becomes a subset (i.e. specialization) of the larger transportation planning area, or 2) bicycling and walking become mainstreamed in the overall field of transportation [24]. Although, the benefits of an integrated and holistic

perspective are real, the work of Friedmann shows that the planning genealogy can be traced according to traditions of thought and intellectual influences, and in the case of sustainable transportation, those seem to include primarily policy analysis, social learning and mobilization [25].

A theory of professional and scientific determinism can be used to explain past motorization trends and their associated infrastructure development practices, usually well-funded with governmental investments and with collective benefits for the majority of society. Professions compete for knowledge development and once recognized for their uniqueness, they evolve scientifically and tend to progress from general to the particular³, and they specialize as the amount of produced knowledge increases. But once a stage of independence is obtained, professionals in the new area might choose to collaborate with other professionals in order to increase their visibility and impact. Collaborative efforts in the sustainable transportation planning area can be observed in the active living and public health programs jointly implemented by planners and public health officials during the last decade.

The sustainability framework has partially altered previous professional attitudes and procedures by steering public and private attention and some investments towards alternative modes. The greening of transportation in the United States has been touted as a major national priority. This includes among others, less reliance on foreign oil and the self sufficiency of internal (renewable) energy sources. Obviously, in an interconnected and globalized world, national attempts at minimizing automobile dependence and at reducing green-house-gas (GHG) emissions are of little avail if they are not coordinated at a global scale. Nonetheless, complex political geostrategic and national energy security policies point towards ambitious conservation goals.

Within this strategic reference program, non-motorized transportation planning is twofold: 1) it occupies a privileged and esteemed place in political discourses at the local level, and 2) it is looked down due to its limited potential as a real alternative to private motorized transportation, especially in certain states of the country, where the car has had priority over all other modes. The first reason is easy to explain given the extensive reach of the sustainable development paradigm, and its malleability to hide - more than it reveals - real conflicts among competing societal goals [27, 28]. In the end, why should anybody be opposed to promoting more environmentally conscious modes of transport? However, the reality on the ground and at the discussion tables across multiple jurisdictional levels is often quite different, with the traditional mode of transport (the road and motorized sector) still receiving the lion's share of budget appropriations [29].

From a professional development standpoint, the number and scope of opportunities at multiple scales (international, national, state, regional and local) has increased considerably in recent years. The number of non-governmental organizations engaged in the promotion of sustainable transportation grew rapidly during the late 1990s and

³Collins and Evans characterize levels of knowledge according to a continuum ranging from ubiquitous to specialist tacit knowledge [26].

early 2000s (e.g. Pro walk/Pro bike, Velocity Conference). The most representative associations of transportation professionals (i.e., Institute of Transport Engineers - ITE, American Planning Association – APA, American Association of State Highway and Transportation Officials – AASHTO) have dedicated increased attention to the so-called green transportation modes⁴. The Transportation Research Board – TRB based in Washington DC has had standing committees on pedestrian and bicycle planning issues for at least two decades. Federal, state and local funds have been dedicated to a number of programs and facility improvements aimed at increasing ridership and walkability levels, as well as to reducing fatalities and crashes involving the most vulnerable street users [30].

Given the somewhat limited opportunities for in-house design, planning and engineering of projects, quite often business opportunities have grown for consulting firms. The federally sponsored university transportation centres have also helped to generate research and service opportunities mainly for faculty members, researchers and students. Finally, community and advocacy groups have also had an important role in advocating for additional non-motorized facilities and programs. Individual daily practices require a “walk the walk, and talk the talk” approach not only among professionals but also among all members of society. Obviously, professionals and transport experts have additional knowledge and responsibilities to advocate, formulate and execute policies and comprehensive programs capable of reaching a large number of people. Convenience and comfort tend to favour motorized transportation at the expense of the safety of non-motorized modes.

4.2. A Fourfold-Criterion

The added attention given to non-motorized transportation planning in recent years can be analysed according to a fourfold-criterion centred on the following dimensions: 1) scientificity, 2) profitability, 3) creativity, and 4) educational scope⁵ [31]. First, the scientific and technical aspects of non-motorized transport planning (revealed in adequate standards) need to be assured not only for safety precautions but also for structural integrity, longevity and co-existence of management systems. Second, the profit motive exists for a few technically competent firms but there is no comparison with prior eras of massive road design and construction. Third, effective non-motorized transportation planning needs to be creative, in order to deliver enticing solutions, which are capable of increasing existing ridership and walking levels. This includes imaginative skills and an ability to reflect in action. Fourth, the educational component includes not only teaching, research and service opportunities for those in higher education, but also continuing education opportunities for professionals.

⁴The recently created American Institute of Certified Planners (AICP-CTP) Certified Transportation Planner designation is an attempt at claiming and legitimizing jurisdiction over transportation planning in a more holistic approach than in previous decades.

⁵Sanyal used a different four-pronged criterion to analyze the role of planning in society: 1) methodological rigor, 2) service function, 3) struggle over values, and 4) intellectual capital formation.

However, all these potential opportunities will go awry if there is a global disconnect between what is written, researched and taught in the universities and elsewhere (i.e., “espoused theory”) and how we as individuals choose to behave on a regular basis, while members of real communities (i.e., “theory in use”). In fact, Banister states that “all people like talking about sustainable transport, but there is little enthusiasm about changing the ways in which travel is actually undertaken” [32].

It is quite well known that each mode of transport has its advantages and limitations along a continuum of possibilities. For transportation to become fully sustainable, innovations are required in all modes of transport and they all should complement each other [33]. This might mean de-marketing certain modes in favour of promoting others. Although markets are autonomous from governmental institutions, governments are responsible for setting and executing public policies aimed at healthier, safer and more efficient territories. This requires a systems approach and intermodal solutions, among others. The late twentieth century has presented us with a wide panoply of opportunities and possibilities, ranging from ubiquitous telecommunication and information systems to long distance intercontinental travel and global exchanges of products, ideas, knowledge, and technologies. In face of such vast opportunities, one may question the effectiveness, long-term relevancy and technology transfer potential of the sustainable development framework and its associated innovations. Do they represent lasting trends or mere passing fads?

Finally, it is important to discuss the issue of technology transfer among communities and countries in order to achieve a more global impact towards increasing alternatives to automobility. In the twenty first century, there are many communities in need of tested and proven solutions [34]. Should the logic be one of enabling others to skip steps in the ladder towards a better life or should we use a different criteria? Communities are shaped by many forces and realities, some endogenous and many exogenous. Should we learn with our own successes and failures? Should we let others do the same or speed it up? Marsden et al. [35] have concluded that technology transfers are usually initiated by local officials and politicians as a result of strategic needs.

Universities and other institutions of higher education and research are important repositories of accumulated knowledge but they might not be the only possibilities for generating, communicating and applying knowledge to the resolution of specific transportation problems [36]. The reduction in vehicle miles travelled (VMTs) registered in the last decade has multiple explanations⁶ [37]. Among the most plausible ones, we find a combination of governmental policies (e.g. higher prices and new licensing laws), coupled with a more technologically advanced civil society impacted by a real financial crisis, which temporarily changed travel values and behaviours. However, the number of single occupancy vehicles (SOV) on the road is still very concerning and not a good prognostic for the sustainability of the transportation sector in the United States.

⁶In 2011, the average American was driving 6% fewer miles per year than in 2004 and VMT driven by young people decreased by about 23% in the period 2001-2009.

5. CONCLUSION

The progress made in the field of sustainable transportation planning in the US is laudable but cautioned that it might vanish quite quickly if, due to a number of factors and events, including the need to ameliorate the consequences of the global financial crisis, attention is redirected at resuming a nation building project centred on land development and automobility, as it occurred for more than 75 years. Ultimately, one has to realize that each mode of transport (i.e. light-rail, high speed rail, transit, greener cars, electric bicycles, bicycling and walking) has its own advantages and limitations and that land development and city building will forever influence not only the type of built environment and urban form created but also the range of future transport possibilities. Evans, Simon and Marvin have concluded that “the choice is not just between a sustainable and an unsustainable transport future, but also between different forms of sustainability” [38], [39].

Whitehead uncovers what he calls an assault on sustainable urbanism within the context of the financial crisis, “which asserts that when economic decline takes hold in a city, environmental concerns must recede in the hierarchy of policy priorities.” And he goes on arguing that, “it is precisely in the context of the purported economic necessity for more growth that sustainable development can become a powerful tool for charting alternative ways out of the urban recession” [40]. A similar argument is put forward by Lee when she defends exerting more efforts toward the promotion of sustainable travel behaviours during troubled economic times, so that the momentum gained during prosperous periods does not get lost [41].

The availability of resources contributed to the emergence of this growing field of knowledge, but for a specific set of reasons its impacts on the ground have been relatively limited, given the magnitude of (sub)urbanized areas in the United States and the limitations inherent to the sustainable transportation modes. Obviously, the work is not done and streets are not complete yet. The disconnect between theory and practice validates Baeten’s [42] decade old argument that,

“the orthodox sustainable transport vision [has led] to the further empowerment of technocratic and elitist groups in society while simultaneously contributing to the further disempowerment of those marginalized social groups who were already bearing the burden of the environmental problem resulting from a troubled transport system.”

Nonetheless, the issue of technology transfer is critical to endowing disenfranchised communities with needed expertise, know-how and resources [43]. Poor communities in the US have experienced disproportional burdens of abandonment and neglect, which will only get worse if no action is taken to counteract the root causes of the transport problem. At the international level, foreign countries are subjected to Western imperialism, which in certain cases uses a car culture as a meme to propagate certain lifestyles. The replication of a US automobile-centric model of development throughout the world does not bode well to achieving green-house-gas emissions reductions. Although some research funded by different levels of government is readily available on the internet, many publications are inaccessible to communities in need. Established practices take time to change and additional collaborative efforts, instead of the traditional competition for professional recognition, might lead to more effective solutions and the sharing of resources.

ACKNOWLEDGEMENTS

This research was conducted during the author's assistantship position at Arizona State University. An earlier version of this paper was delivered to the 2012 STRAND Conference "Role of Universities and Sustainable Development" in Belgrade, Serbia, November, 29–30.

REFERENCES

- [1] Banister, D., *Unsustainable Transport*, Spon Press, London, 2005.
- [2] Beatley, T., *Green Urbanism Learning from European Cities*, Island Press, Washington DC, 2000.
- [3] Nijkamp, P., Rodenburg, C., Ubbels, B. and Veen-Groot, D., Driving forces and threats for sustainable transport, *Built Environment* 26, 3, 2001, 236–257.
- [4] Forsyth, A., Krizek, K. and Rodriguez, D., Non-motorised travel research and contemporary planning initiatives, *Progress in Planning* 71, 4, 2009, 170–183.
- [5] Newman, P., Kenworthy, J., *Sustainability and Cities, Overcoming Automobile Dependence*, Island Press, Washington DC, 1999.
- [6] Abbott, A., *The System of Professions. An essay on the division of expert labor*, University of Chicago Press, Chicago, 1988.
- [7] Alliance for Biking & Walking, *Bicycling and Walking in the United States 2012 Benchmark Report*, Alliance for Biking & Walking, Washington DC, p. 10, 2012.
- [8] Clark, W., Sustainability science: A room of its own, *Proceedings of the National Academy of Sciences - PNAS* 104, 6, 2007, 1737–1738.
- [9] McClintock, H., Practitioners' take-up of professional guidance and research findings: Planning for cycling and walking in the UK, *Planning Practice and Research* 16, 2, 2001, 193–203.
- [10] Balsas, C., Sustainable transportation planning on college campuses. *Transport Policy*, 10, 1, 2003, 35–49.
- [11] Balsas, C., Towards more sustainable transportation: lessons learned from a teaching experiment. *International Journal of Sustainability in Higher Education*, 2, 4, 2001, 316–328.
- [12] Balsas, C., New directions for bicycle and pedestrian planning education in the US. *Planning Practice and Research*, 17, 1, 2002, 91–105.
- [13] Singhal, P., *An Analysis of Non-Motorist Safety in Downtown Phoenix, Arizona*, Master Project in Urban and Environmental Planning, Arizona State University, 2008.
- [14] Gunder, M., and Hillier, J., *Planning in Ten Words or Less*, Ashgate, Burlington, p. 151, 2009.
- [15] Handy, S., Weston, L., Song, J., Lane, K. and Terry, J., *The Education of Transportation Planning Professionals*, Research Report SWUTC/02/167522, Center for Transportation Research, Austin, 2002.
- [16] Boschmann, E. and Kwan M., Toward socially sustainable urban transportation: Progress and potentials, *International Journal of Sustainable Transportation*, 2, 3, 2008, 138–157.
- [17] Pucher, J., Dill, J. and Handy, S., Infrastructure, programs, and policies to increase bicycling: An international review, *Preventive Medicine* 50, S106–S125, 2009.
- [18] Evans, R., Simon, G., and Marvin, S., Views of the city: Multiple pathways to sustainable transport futures, *Local Environment* 6, 2, 2001, 121–133, p. 122.
- [19] Stein, S., Bike lanes and gentrification, New York City's Shades of Green, *Progressive Planning* 188, 2011, 34–37, p. 34.
- [20] Kennedy, C., Miller, E., Shalaby, A., Maclean, H. and Coleman, J., The four pillars of sustainable urban transportation, *Transport Reviews* 25, 4, 2005, 393–414.
- [21] Cervero, R., Transport infrastructure and global competitiveness: Balancing mobility and livability, *Annals AAPSS* 626, 2009, 210–225.
- [22] Khisty, C., and Kikuchi, S., *Urban transportation planning education revisited: Reading the dials and steering the ship*, TRB Annual Meeting CD-ROM, Washington DC, 2003.

- [23] Newman, P. and Kenworthy, J., *Sustainability and Cities, Overcoming Automobile Dependence*.
- [24] Forsyth, A. and Krizek, K., Promoting walking and bicycling: Assessing the evidence to assist planners, *Built Environment* 36, 4/5, 2010, 429–446.
- [25] Friedmann, J., *Planning in the Public Domain: From Knowledge to Action*, Princeton University Press, Princeton, 1987.
- [26] Collins, H. and Evans, R., *Rethinking Expertise*, University of Chicago Press, Chicago, 2007.
- [27] Marcuse, P., Sustainability is not enough, *Environment and Urbanization* 10, 2, 1998, 103–111.
- [28] Gunder, M. and Hillier, J., *Planning in Ten Words or Less*.
- [29] Johnson, B. and White, S., Promoting sustainability through transportation infrastructure? Innovation and inertia in the Kansas City metropolitan area, *Journal of Urban Planning and Development* 136, 4, 2010, 303–313.
- [30] Pucher, J., Buehler, R. and Seinen, M., Bicycling renaissance in North America? An update and re-appraisal of cycling trends and policies, *Transport Research Part A* 45, 2011, 451–475.
- [31] Sanyal, B., Planning's three challenges, In: Rodwin, L. and Sanyal, B. (Eds.) *The Profession of City Planning: Changes Images and Challenges 1950–2000*, Rutgers, New Brunswick, 312–333, 2000.
- [32] Banister D., Planning for sustainable transportation: An international Perspective” *Projections MIT Journal of Planning*, 9, 2009, 121–124, p. 121.
- [33] Forsyth, A. and Krizek, K., Promoting walking and bicycling: Assessing the evidence to assist planners.
- [34] Khisty, C., A systemic overview of non-motorized transportation for developing countries: An agenda for action, *Journal of Advanced Transportation* 37, 3, 2003, 273–293.
- [35] Marsden, G., Frick, K., May, A. and Deakin, E., How do cities approach policy innovation and policy learning? A study of 30 policies in Northern Europe and North America, *Transport Policy* 18, 3, 2011, 501–512.
- [36] Toor, W. and Havlick, S., *Transportation and Sustainable Campus Communities: Issues, examples, solutions*, Washington, DC: Island Press, 2004.
- [37] Davis, B. and Dutzik, T., *Transportation and the new generation, why young people are driving less and what it means for transportation policy*, US PIRG Education Fund and Frontier Group, p. 1, 2012.
- [38] Evans, R., Simon, G. and Marvin, S., Views of the city: Multiple pathways to sustainable transport futures, p. 121.
- [39] Agyeman, J. and Evans, T., Toward just sustainability in urban communities: Building equity rights with sustainable solutions, *Annals AAPSS* 590, 2003, 35–53.
- [40] Whitehead, M., The sustainable city: an obituary? On the future form and prospects of sustainable urbanism, In: Flint J. and Raco M. (Eds.) *The Future of Sustainable Cities: Critical reflections* Bristol, Policy Press, 29–45, 2011, p. 41.
- [41] Lee, S., Transport and the recession: An opportunity to promote sustainable transport, *International Planning Studies* 15, 3, 2010, 213–226.
- [42] Baeten, G., The tragedy of the highway: Empowerment, disempowerment and the politics of sustainability discourses and practices, *European Planning Studies* 8, 1, 2000, 69–86, p. 69.
- [43] Geerlings, H., Shiftan, Y. and Stead, D., *Transition Towards Sustainable Mobility, The Role of Instruments, Individuals and Institutions*, Ashgate, Burlington, 2012.
- [44] Brambilla, R. and Longo, G., *For Pedestrians Only, Planning, Design and Management of Traffic Zones*. Whitney Library of Design, New York, 1977.
- [45] Untermann, R., *Accommodating the Pedestrian: Adapting Towns and Neighborhoods for Walking and Bicycling*. Van Nostrand Reinhold, New York, 1984.
- [46] Forester, J., *Bicycle Transportation, a Handbook for Cycling Transportation Engineers*, 2nd Edition, the MIT Press, Cambridge, 1994.
- [47] Black, W., *Sustainable Transportation: Problems and Solutions*, Guilford Press, New York, 2000.