Institution: University of Huddersfield (UoH)

Unit of Assessment: UoA17 – Business and Management Studies

Title of case study: Advancing Sustainable Urban Mobility Planning: The Case of Bike-sharing and Walking School Buses in Greece

Period when the underpinning research was undertaken: 01.02.2014 – 31.12.2020

Details of staff conducting the underpinning research from the submitting unit:

Name(s):	Role(s) (e.g. job title):	Period(s) employed by submitting HEI:
Dr Alexandros Nikitas	Reader in Smart Transport	01.05.2015 – present

Period when the claimed impact occurred: 01.11.2015 – 31.12.2020

Is this case study continued from a case study submitted in 2014? No

1. Summary of the impact

In a world where unsustainable urban development threatens to undermine the future of our cities and the wellbeing of our local societies, research that guides clean transport policy-making, planning and management, is critical. Huddersfield Business School (HBS) research has inspired authorities in Drama, Greece, to prioritise cycling, create its first Bike-Sharing scheme (BSS) and implement the first Walking School Buses (WSBs) in Greece. Twelve Greek cities, including Athens, are using the research findings to develop their EU-funded Sustainable Urban Mobility Plans (SUMPs) and more than five million people benefit from the policy changes initiated by this work. The Hellenic Ministry of Environment and Energy (HMEE) has adopted the research and its applications as a policy guidance tool and is implementing HBS-influenced sustainable transport planning interventions in every Greek city. As examples of sustainable travel, the BSS and WSB projects described in the case study, have improved health and wellbeing and reduced traffic congestion (by 30% from the first week of the WSB scheme), air pollution, noise nuisance, road accidents and social exclusion.

2. Underpinning research

According to the United Nations' Sustainable Development Goals agenda, future urban planning must be underpinned by a new brand of sustainable thinking because the current pace, nature and patterns of economic growth and the strategic policy-making tied to it are threatening the future of our climate, eco-systems, cities and livelihoods. Car-centric urban planning is widely recognised as unsustainable, but non-motorised mobility initiatives like Bike-Sharing schemes (BSSs) and Walking School Buses (WSBs – groups of children walking to school along a set route, supervised by adults), which could replace automobiles for short trips, are still severely understudied. This is particularly true in the context of countries like Greece that have, thus far, never been at the forefront of socio-technical innovation.

The research underpinning the impact presented in this case study was carried out by Dr Alexandros Nikitas, Reader in Smart Transport at HBS, in Greece, the UK and Sweden.

A quantitative survey of 640 local road users in the Greek city of Drama (3.1) investigated their attitudes to bike-sharing and its introduction to their city. The results indicated that 87% of the respondents would like to see their city introduce a local BSS and 62.8% would then use it at least once a week. The sample size was more than 1% of the total population of the city (approx. 59,000), making the results representative of the local community and potentially generalisable to a wider context, indicating that a BSS can be a publicly acceptable investment for smaller cities interested in shared-use mobility.

Research (3.2) was carried out with 25 parents of primary age children in the UK city of Bradford. Four focus groups were used at two schools, and attitudes to WSBs and whether these could be an effective way to introduce sustainable mobility to children were subjected to a

thematic analysis. The research revealed six core critical decision-making factors: logistics; safety; health and wellbeing; emotional needs; trust; and educational opportunities. Mechanisms that helped WSBs prosper in the longer term included: school and authority engagement; customised schemes that recognised the special characteristics of each school; participant incentives for students and adult supervisors; positive branding; and enhanced road safety initiatives. This work provided a new theoretical acceptance framework and a knowledge exchange platform to support the introduction of WSBs in Greece as well as a template for how WSB interventions could be successfully implemented.

Research with the National Technical University of Athens (NTUA) (3.3) used a mixed-methods approach, including secondary data analysis, field observations and a quantitative survey completed by 534 BSS users, to study the usage and acceptance patterns of the first dockless (and biggest electric) BSS in Greece, Rethymno's Bikeazy. The findings suggested that the BSS was used primarily for short-distance trips and very short rentals. The usage of the scheme was adversely affected by traffic safety concerns and limitations in the existing cycling infrastructure. The majority of both frequent and occasional users of the scheme thought that it was affordable, easy to use and suitable for both tourist and local populations. The study proposed an expansion of the Bikeazy scheme, better bike fleet distribution and ways to improve its attractiveness.

Research in Gothenburg, Sweden (population approx. 571,000) (3.4) used an online questionnaire to survey 558 users and non-users of the local BSS (Styr&Ställ). The results of the paper (3.4) showed that the BSS was approved by 92.4% of the respondents even if only 23% of them were actual users. The paper disconnected, for the first time, 'scheme success' from a strict usage rate perspective showing that people supported the BSS for sustainability reasons but also provided evidence for a massive, at the time, untapped usage potential. Critically, the research found that further investments in cycling and BSS initiatives (including BSS expansion) were approved by 88.6% of the respondents. The study was among the first to indicate the suitability of BSSs beyond the environment of a large city and was used as a template for the BSS research in Drama. This is still the only academic paper written about Styr&Ställ.

In 2019 a two-stage methodology was adopted to generate widely applicable evidence-based BSS findings (3.5). It combined the lessons reported in earlier research (3.1, 3.4) and a literature review of BSS successes and failures across the globe to create a systematic roadmap of best BSS practice. The resulting 'toolkit for policy-makers' emphasised the need for city-specific system design and expansion strategies, more bike-friendly infrastructure and legislation, pro-active cultural engagement, anti-abuse measures, enhanced fleet management and realistic scheme profit expectations. It argued that the key value of a BSS is its ability to yield sustainability benefits by promoting a modal shift in travel and supporting the creation of liveable built environments where humans are actively prioritised over cars.

3. References to the research

The research on the implementation and acceptance of BSSs, as well as the work supporting the case for WSBs has been published in international, highly rated peer reviewed journals, and has been widely cited in further academic work around the world.

3.1 **Nikitas, A.** (2018). Understanding bike-sharing acceptability and expected usage patterns in the context of a small city novel to the concept: A story of 'Greek Drama'. *Transportation Research Part F: Traffic Psychology and Behaviour,* 56, 306-321. https://doi.org/10.1016/j.trf.2018.04.022

3.2 **Nikitas, A.,** Wang, J. Y., & Knamiller, C. (2019). Exploring parental perceptions about school travel and walking school buses: A thematic analysis approach. *Transportation Research Part A: Policy and Practice,* 124, 468-487. https://doi.org/10.1016/j.tra.2019.04.011

3.3 Bakogiannis, E., Siti, M., Tsigdinos, S., Vassi, A., & **Nikitas, A.*** (2020). Monitoring the first dockless bike sharing system in Greece: Understanding user perceptions, usage patterns and adoption barriers. *Research in Transportation Business & Management*, 100432. https://doi.org/10.1016/j.rtbm.2020.100432. (*corresponding author)

3.4 **Nikitas, A.,** Wallgren, P., & Rexfelt, O. (2016). The paradox of public acceptance of bike-sharing in Gothenburg. *Proceedings of the Institution of Civil Engineers – Engineering Sustainability,* 169(3), 101-113. https://doi.org/10.1680/jensu.14.00070.
3.5 **Nikitas, A.** (2019). How to save bike-sharing: An evidence-based survival toolkit for policy-makers and mobility providers. *Sustainability*, 11(11), 3206. https://doi.org/10.3390/su11113206

4. Details of the impact

The research findings have influenced policy and practice at the national, regional and local government levels across Greece and in Gothenburg, Sweden. Local societies and especially school authorities, parents and children have benefitted from the eco-friendly travel initiatives instigated as a result. Impacts have been generated in three areas: supporting policy and planning; supporting the development of a new sustainable mobility ethos for the young; improving liveability and guiding urban infrastructure investments.

Supporting policy and planning

The research findings (3.1-3.5) directly influenced the policy and planning of the municipality and region of Drama in Greece (5.3, 5.4). As an 'adviser' to the authorities, Nikitas informed and guided the development of a new EU-funded Sustainable Urban Mobility Plan (SUMP) (5.7) and subsequent investments in cycling and walking. The research was a key reference point and inspired the initiation of a new BSS and the launch of the first region-wide WSB programme in Greece. The success of these initiatives in Drama led the two key players in sustainable transport strategy-building in Greece to use the research findings to develop their work: the primary national policy-maker on sustainable transport, the Hellenic Ministry of Environment and Energy (HMEE); and the Sustainable Mobility Unit of the National Technical University of Athens (NTUA SMU), which designed SUMPs for cities, funded by the European Commission's budget for local authorities.

HMEE, as the Ministry responsible for the nation's urban planning and sustainable development management, used Nikitas's research as a policy guidance tool for its transport, land use and built environment strategies. HMEE recognised that planning efforts, enriched by HBS research on cycling, BSSs and WSBs, can contribute greatly in re-inventing Greece's mobility culture, building a sustainable city model and crafting an ethos of responsibility and awareness for Greeks (5.1). It also stated that the initiatives established as a result of this research are examples of best practice, which it is actively working to replicate in every Greek city (5.1). The HMEE Secretary General wrote, on behalf of the Minister, about the impact of the research across Greece. He stated that HBS research "has been a source of inspiration and guidance for the Ministry and for multiple city and regional authorities across Greece", adding "Nikitas's studies have an invaluable impact on our policy-making, strategy-building and implementation approach when it comes to sustainable mobility initiatives. We now have the research evidence and real-life proof, the latter based on the success story of Drama, to support, plan, design, implement, manage and sustain BSS and WSB interventions across Greece. These interventions have positive life-changing consequences for our societies in multiple cities" (5.1). The Secretary also named Nikitas as a valuable collaborator who "actively co-create(d) policy agendas (with HMEE) designed to generate real impact for our societies and support positive city transformation (…) directly associated with socio-economic, environmental, health and well-being benefits for our country" (5.1).

The NTUA SMU is responsible for designing the majority of SUMPs in Greece. Twelve Greek cities, including Drama and three of the country's largest cities (Athens, Piraeus and Heraklion), are using the policy lessons of HBS research (3.1 to 3.5) for the delivery of their SUMPs. The regions affected by and benefitting from these SUMPs cater for a total population of five million people. Rethymno, which used the findings for its SUMP, was one of three finalists in the European Mobility Week Awards 2019. The Director of the NTUA SMU wrote: "Dr Nikitas's reviewing and evaluating services (…) have been of paramount importance for helping us to prepare Sustainable Urban Mobility Plans that are genuine game-changers for cities all across Greece including Tinos, Nemea, Halandri, Alimos, Athens, Piraeus, Heraklion, Rethymno, Loutraki, Lavrio, Kythera and Drama. Nikitas's research work has positively influenced our

planning and designing of sustainable transport strategies and has been a consistent point of reference for us" (5.2). Nikitas acted as an external reviewer for the 12 SUMPs of the cities listed above helping the authorities involved to make better policy and planning decisions especially about their capacity to adopt cycling, BSSs and WSBs.

The Deputy Regional Governor of Drama suggested that the immediate policy and planning impact of the featured work on his region was beneficial. He wrote to Nikitas: "Your previous and on-going research work, your valuable policy intervention impact and the real-life applications of your strategic recommendations are helping our region and its people prosper. Without your research contributions and interventions our sustainable mobility policy and planning strategy could not have been of the same high quality that it is today". He added, "Our transport strategy now, based on your policy recommendations, has been significantly reshaped" (5.4).

Supporting the creation of new sustainable mobility initiatives and ethos for the young and reducing road traffic around schools

Drama's Primary Education Directorate joined forces with the Municipal and Regional Authorities of Drama to co-create with HBS, Greece's first ever WSB programme with seven participating schools (2019/20). The plan was to extend this to 40 schools in the 2020/21 academic year (5.5). The level of collaboration made the impact of the programme particularly significant. It was developed, initiated and managed by a broad range of authorities under the scientific guidance and supervision of a University and launched simultaneously in multiple schools (5.3). The Director of Primary Education stated that information on the scheme was communicated region-wide to 100,000 people, with 20,000 engaged (5.5).

The WSB programme has been monitored and evaluated and has yielded measurable impacts. According to the Director of Primary Education (5.5), "the WSB is an amazing concept that is working brilliantly, the children and the parents really love it and has actually created, from the first week of its adoption already (16-20 September 2019), a massive 30% reduction in numbers in the typical school traffic meaning less air pollution, noise and congestion for our local society". The headmaster of a participating school reported (based on a series of one-to-one interviews and focus groups with the programme participants (5.6)) that children like to walk more, feel more included, safer, healthier, more energised and are more appreciative of nature. They also actively encourage their families to walk more. Their parents saw the WSB programme as a good alternative to driving children to school that made them more flexible and less likely to pollute the environment (5.6). Local drivers were more cautious after the WSB introduction and traffic safety improved. Teachers noticed that students were more engaged in the classroom because of the WSB morning exercise, have bonded more, behaved more responsibly inside and outside the classroom, and worked more effectively together (5.6).

Improving liveability and guiding urban infrastructure investments

The adoption of BSSs and WSBs led to a reduction in traffic congestion, environmental degradation, noise nuisance and health-related problems and to improvements in terms of social inclusion and traffic safety. Commenting on the HBS work's aftermath, (i.e. the promotion and adoption of BSSs and WSBs across Greece), HMEE recognised that this "is directly associated with socio-economic, environmental, health and well-being benefits for our country" and that Nikitas's "efforts, without any doubt, help our transition, as a nation, to more liveable urban futures". HMEE also stated that the research can "help other countries too" (5.1). The Mayor of Drama reported local liveability impact: HBS research "help(ed) us to reduce traffic congestion, environmental degradation, noise nuisance (...) health-related problems and battle transport-related social exclusion" (5.3). The Director of Primary Education in Drama stated: "students in participating schools on average missed less school days" and that "WSBs reduced traffic congestion in the region during peak times" (5.5).

To encourage new, more environmentally friendly behaviours, the Municipality of Drama designated its employees as the first beneficiaries of a new electric BSS. A successful bid for funds was made to the HMEE. The Mayor of Drama confirmed the fundamental role that the HBS research played in obtaining a €50,000 grant stating that this "research has been a driving

force behind our successful bid to the Greek government (HMEE) that ensured a funding of €50,000 for implementing in Drama an alternative electric BSS" (5.3, 5.8).

The findings referring to the first dockless and largest electric BSS in Greece, Rethymno's Bikeazy (3.3), helped to inform the 12 listed SUMPs (5.2) in terms of how to successfully promote and reinforce bike-sharing usage and uptake. The results have particularly influenced Rethymno's SUMP-related activities (5.2). Its BSS is to be recalibrated to fit the policy instructions of (3.3) regarding implementation and promotion so that it becomes even more successful and attractive to groups that have not yet adopted it on a frequent basis.

The BSS research in Gothenburg, Sweden (3.4), is the only focused BSS study conducted in the city. On that basis, it has inspired Gothenburg to deliver a new extended BSS (in place from summer 2020) since it provided unique evidence that local tax-payers were supportive of an investment that could maximise the potential of the original scheme (5.10).

Finally, the research has been popularised for non-academic audiences, translated and broadly discussed (5.9). Press coverage raised awareness about BSSs and WSBs especially in the cities where the research took place, but beyond them too. In Greece, the findings directly informed the national policy work of HMEE and NTUA SMU. The policy toolkit produced in (3.5) is also applicable to BSS implementation and management beyond the Greek context.

5. Sources to corroborate the impact

5.1 HMEE (Testimonial Letter from the Secretary General of Spatial Planning and Urban Environment) – stating that Nikitas's research and follow-up activities have been adopted by the Ministry as a tool for mobility policy-making, strategy-shaping and investment prioritisation.
5.2 NTUA (Testimonial Letter from the Director of the NTUA SMU, Greece's larger SUMP developer) – confirming that SUMPs across Greece have been influenced by HBS research and acknowledging Nikitas as the Unit's external expert reviewer.
5.3 Municipality of Drama (Testimonial Letter from the Mayor) – testifying the positive impact that HBS research and follow-up activities have generated for the city and its residents.
5.4 Regional Authority of Drama (Testimonial Letter from the Deputy Regional Governor) – testifying the impact the research and follow-up activities have created region-wide in terms of policy-making and active transport prioritisation.
5.5 Drama's Regional School Authorities (Testimonial Letter from the Director of Primary Education in Drama) – testifying that Nikitas's research has helped the Directorate of Primary Education in Drama introduce the first WSB programme in Greece at a region-wide scale.
5.6 Participating School Headmaster's Testimonial Letter – recognising the benefits of the implemented WSB to the school, parents and children.
5.7 Policy document (Drama's SUMP) – the city's EU-funded policy document for transport planning specifically refers, on multiple occasions, to Nikitas's research work.
5.8 Policy document – Greek government's funding decision for Drama's electric BSS fleet and the original winning bid naming Nikitas's involvement.
5.9 Media coverage document – summarising media pieces. Video recordings referring to the WSB launch and press conference (in Greek) are available on request.
5.10 Testimony from Gothenburg about the research's impact on the local BSS.