Institute for Climate Change and Sustainable Development

Annual Report 2014-2015

Foreword

This year saw the completion of some of the Institute's major research projects. This has resulted in an upsurge of media outreach to the community and Government alike. From the finalisation of the STREETS Project to the launch of the report on the economic cost of private and commercial vehicle use, the Institute has been most visible throughout the year. There is growing awareness of the importance of interdisciplinary research which not only educates the general public but also informs policy. With the projects and research outputs the Institute hopes that Government and industry take note of concerns, particularly in the areas of sustainability which are proving to be critical challenges for Malta's future. This report will highlight in detail the outreach that the Institute has continued to do in order to raise awareness and publicize the results of research. It will list the contributions made in events, conferences and fora in which academic, government and industry partners were present. The media exposure has also attracted private entities to the Institute with our latest project being awarded from the Vodafone Malta Foundation, but more on that next year as the project unfolds. At the same time we have continued to apply for funding in an attempt to grow our fields of expertise and capabilities further. To this end the Institute now houses a number of researchers, has accepted its first PhD student and is looking at increasing that number in the near future. All this achievement is possible only through hard work and determination. And there is plenty of that!

I take the opportunity to thank our supporters, being the staff at the Institute, industry partners, government and the academic staff that have formally accepted to collaborate with us from the various University departments and international institutions.

Professor Maria Attard
Director, Institute for Climate Change and Sustainable Development

Introduction

The Institute for Climate Change and Sustainable Development was established in 2009. During 2014-2015 the Institute strengthened its research areas and continued with its research efforts to promote interdisciplinarity.

The Board of the Institute met regularly during this year where a number of key decision were taken with respect to the work of the Institute and the development of programmes, projects and events.

This report outlines the work and achievements of the Institute for Climate Change and Sustainable Development during the period October 2014 and September 2015.

THE BOARD OF THE INSTITUTE 2014-2015

Chairman **Prof. Simone Borg**

Vice-Chair and Director **Prof. Maria Attard**

Members:

Prof. Richard Muscat
Mr Godfrey Vella
Dr Gordon Cordina
Dr John C. Betts
Prof. Alex Torpiano
Dr Sandro Lanfranco
Prof. Adrian Muscat
Prof. John A. Schembri
Ms Thérèse Bajada
Ms Margaret Camilleri Fenech
Dr Anton Bartolo

Aims of the Institute

(a) to perform and promote interdisciplinary research on issues related to sustainable development, social sustainability, and climate change including mitigation and adaptation strategies;

(b) to provide consultancy, advice and assistance on sustainable development and climate change including mitigation and adaptation strategies;

(c) to provide continuous education, undergraduate, and postgraduate courses within the scope of the Institute subject to the Statutes and Regulations of the University;

(d) to act as host institution for scholars, professors and chairs of international repute, as well as programmes, networks and fora, that aim to enhance the profile of the Institute within the regional and European research area, in areas related to sustainable development and climate change including mitigation and adaptation strategies;

(e) to use telemetry, IT tools, intelligent systems, and modelling for monitoring, research, decision support and strategic planning;

(f) to engage in knowledge transfer and awareness raising initiatives on sustainable development and climate change with companies, organisations and other institutions outside the University to promote best-practice (e.g. to promote the uptake of cleaner technologies; to mitigate and adapt to impacts of climate change on business operations and markets);

(g) to network and liaise with similar or complementary, university institutions and centres for sustainable development or climate change; and

(h) to disseminate acquired knowledge through online media, publications, seminars, conferences and teaching programmes.

The University of Malta Institute for Climate Change and Sustainable Development

The Administrative Office

During 2014-2015 the Institute was located in Regional Business Centre Triq Achille Ferris Msida. This office housed the administrative as well as the academic staff, whilst also offering space for interns, students and project work which the Institute maintained and ran throughout the year.

The Institute's Human Resources

During this academic year the Institute also engaged a number of Research Support Officers to work on numerous projects funded through local and international funds. **Ms Deborah Mifsud**, and **Ms Nicolette Formosa** continued to support the STREETS Project. **Carlos Canas Sanz** continued to work on a number of projects including SIMIT and STREETS. **Audrey Zammit** joined the Institute briefly to work on the STREETS project final deliverables.

Ms Thérèse Bajada, Assistant Lecturer and **Ms Margaret Camilleri Fenech**, Assistant Lecturer (TR4) have continued to pursue their PhD studies, as well as supporting the growth in the Institute's teaching and administration.

Mr Raphael Mizzi has continued to work on the Green Travel Plan as well as pursuing his Master's research with the Institute.

Ms Boglarka Toth supported the institute's EU funded projects including STREETS and SIMIT.

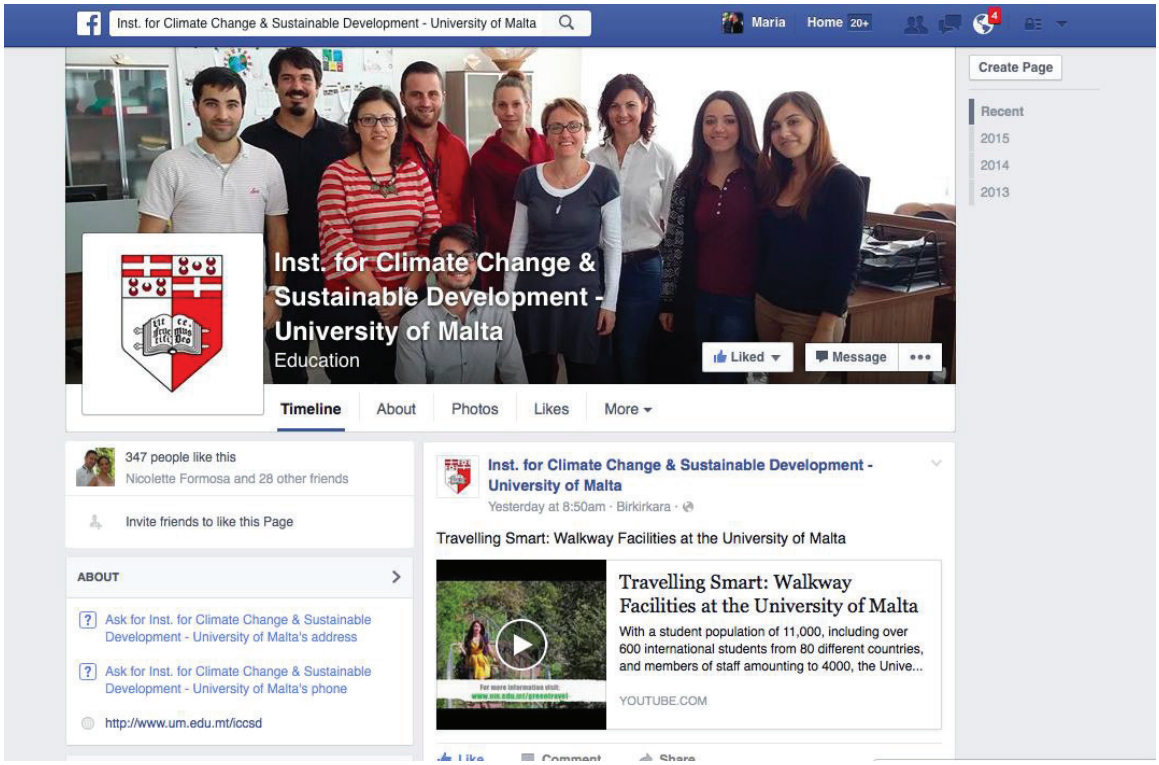
Community Outreach

The Institute on the WWW

The Institute website has continued to act as a medium for communication with the University community and the general public. The Institute's website contains reference to almost all the work that the Institute engaged in since its opening in 2009. Throughout this year, the structure of the website has been changed to reflect the structure and themes of research at the Institute.

In 2014, the Institute also launched its facebook page. A very good response was received from the public, and use of the Institute facebook page remained active throughout with some evident peaks during particular events and uploads.

https://www.facebook.com/uom.iccsd/



The Institute in the Media

maltatoday.com.mt
Free park and ride on Car Free Day
The University efforts on public transport use mentioned during Car Free Day events when park and ride was offered for free (with direct links to University, Msida Campus).
20/09/2014

The Malta Independent

58,000 more cars on the road in the last 10 years: New measures needed to handle traffic flow

Professor Maria Attard is interviewed by The Malta Independent about the surge in car ownership and the impact on traffic.

http://www.independent.com.mt/articles/2014-10-06/local-news/58-000-more-cars-on-the-road-in-last-10-years-New-measures-needed-to-handle-traffic-flow-6736123188

06/10/2014

The Sunday Times of Malta – Business and Finance Supplement

Fill up on Green Interview with Prof. Maria Attard, Director ICCSD

An interview about how more energy efficient vehicles, effective fleet management and green travel plans can make business more eco-friendly.

26/10/2014


12 The Sunday Times of Malta BUSINESS & FINANCE • OCTOBER 26, 2014

TRAVEL

Fill up on green

More energy efficient vehicles, effective fleet management and green travel plans can make businesses more eco-friendly, says **Maria Attard**.

Time of Malta

Malta – Sicily transport project (STREETS)

STREETS Open day organised at the Hotel Excelsior for the general public

http://www.timesofmalta.com/articles/view/20141109/education/Malta-Sicily-transport-project.543312

09/11/2014

Times of Malta

Maltese spend 52 hours stuck in traffic every year

Launch of the study entitled External Cost of Passenger and Commercial Vehicle Use supported by the EC Representation in Malta.

http://www.timesofmalta.com/articles/view/20150130/local/updated-maltese-spend-52-hours-stuck-in-traffic-every-year.553936

30/01/2015

tvm.com.mt

Il-Maltin iqattghu 52 siegħa mwaħħlin

TVM News reporting on the launch of the study conducted by the Institute and supported by the EC Representation in Malta.

30/01/2015

Times of Malta – Environment Supplement

The economic cost of climate change

A feature containing research conducted by Prof. Maria Attard, Director ICCSD, on the implications of climate change and transport.

08/04/2015

Times of Malta

Unclogging traffic arteries Article by Dr Philip Von Brockdorff on the economic cost of traffic and congestion.

http://www.timesofmalta.com/articles/view/20150409/business-news/Unclogging-traffic-arteries.563263

09/04/2015

Times of Malta

Relieving traffic congestion: when planning isn't enough Article by Anne Zammit reporting on the launch of the study carried out by the ICCSD.

http://www.timesofmalta.com/articles/view/20150426/environment/Relieving-traffic-congestion-when-planning-isn-t-enough.565669

26/04/2015

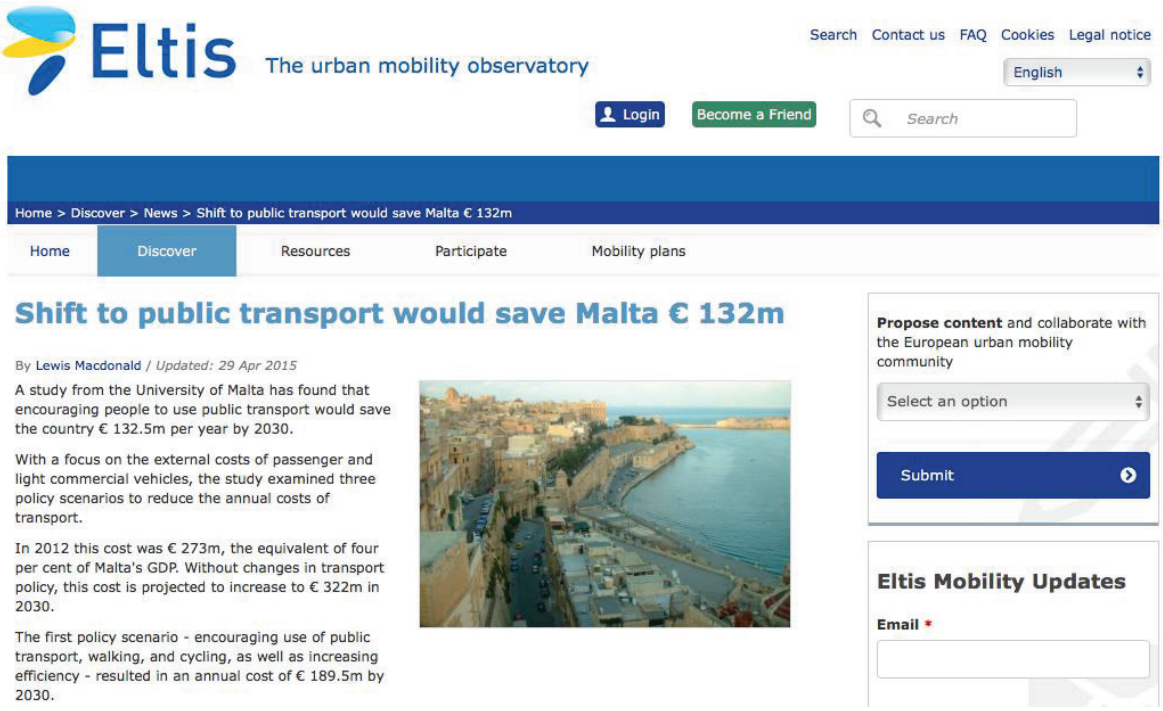
ELTIS Urban Mobility Observatory

Shift to public transport would save Malta €132m

ELTIS portal reporting on the recent study on economic cost of traffic by the Institute.

http://www.eltis.org/discover/news/shift-public-transport-would-save-malta-eu-132m

29/04/2015



tvm.com.mt

Zvelata mappa kulturali ta' Malta u Għawdex

Launch of the culturemapmalta.com and the results of the Cultural Mapping Project conducted by the Institute.

http://www.tvm.com.mt/mt/news/zvelata-mappa-kulturali-ta-malta-u-ghawdex/

05/05/2015

valletta2018.org

Theatres audit launched as part of national Cultural Mapping Project

05/05/2015

maltatoday.com

Theatres audit launched as part of national Cultural Mapping Project

http://www.maltatoday.com.mt/arts/valletta_2018/52594/theatres_audit_launched_as_part_of_national_cultural_mapping_project#.VmmBaITtKkh

05/05/2015

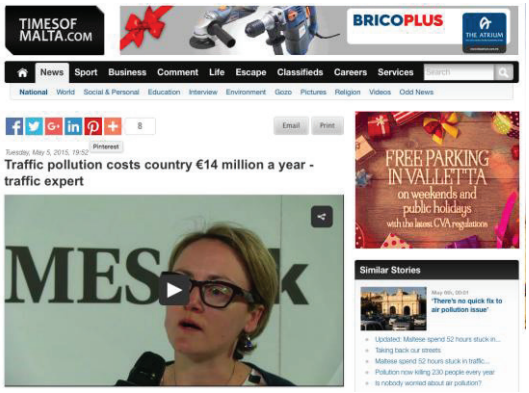
Times of Malta

Traffic pollution costs country €14 million a year

Research by Prof. Maria Attard, Dr Philip Von Brockdorff and Dr Frank Bezzina reported on TIMESTalk

http://www.timesofmalta.com/articles/view/20150505/local/traffic-pollution-costs-country-14-million-a-year-traffic-expert.566916

28/07/2014



Times of Malta

There is no quick fix to air pollution issue

Interview to Prof. Maria Attard by Caroline Muscat on the WHO report on air pollution and its impact on health.

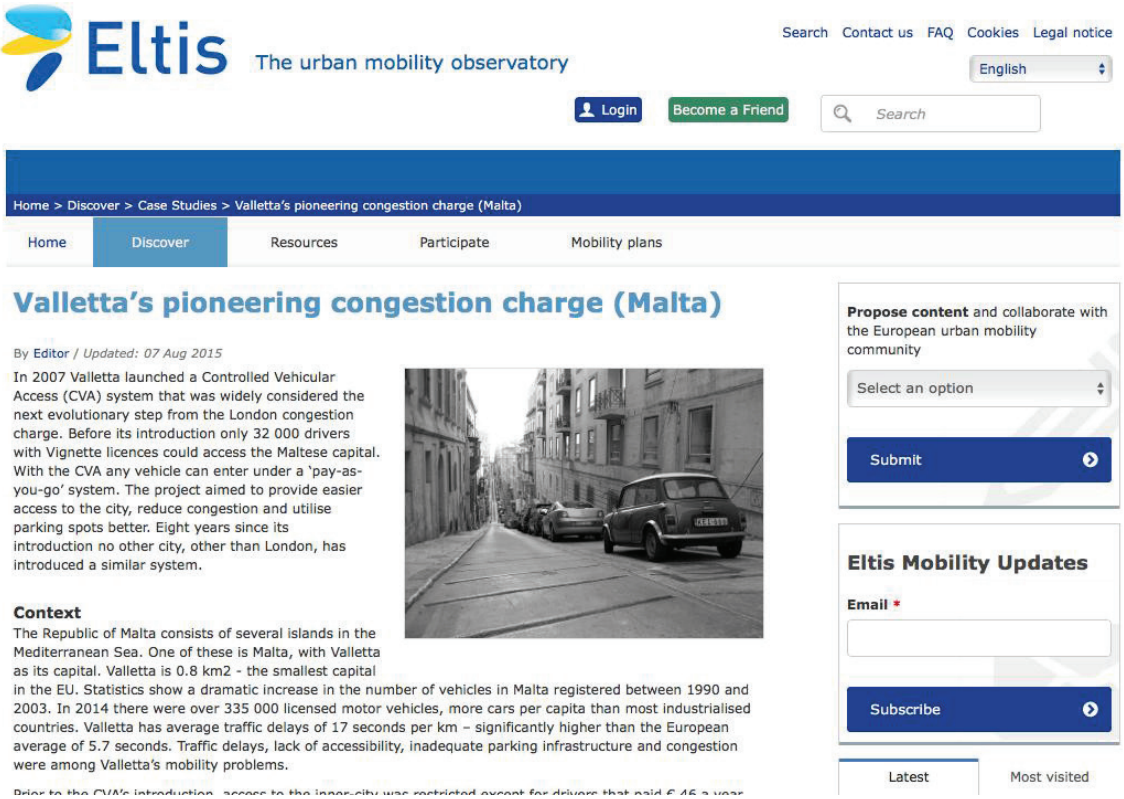
06/05/2015

ELTIS Urban Mobility Observatory

Valletta's pioneering congestion charge (Malta)

http://www.eltis.org/discover/case-studies/vallettas-pioneering-congestion-charge-malta

01/06/2015



News on Campus

University of Malta study makes headlines on ELTIS – The Urban Mobility Observatory

This is the first time that a study by the University of Malta is reported on ELTIS. ELTIS is supported by the European Commission and promotes and encourages sustainable urban mobility.

02/06/15

Times of Malta – World Environment Day Supplement

Taking back our streets

Article by Prof. Maria Attard about the environmental and health problems related to car dependence in Malta.

05/06/2015

NATURE / POLLUTION

Taking back our streets

Our dependence on cars is causing too much damage to our environment and quality of life, says **Maria Attard**

The external costs of transport

newsbook.com.mt

Jitħabbru r-rebbieħa tal-Innovation Challenge: Go Green

Carlos Canas Sanz, Research Officer I at the Institute placed second in the competition Innovation Challenge: Go Green

09/06/2015

apsbank.com.mt

Finalists of Innovation Challenge: Go Green to get their work published by APS Bank

12/06/2015

tvm.com.mt

Proġetti ambjentali innovattivi proposti miz-zagħzagħ

04/06/2015

Carlos Cans Sanz (third from right) and Prof. Maria Attard (tenth from right)

http://www.gov.mt/en/Government/Press%20Releases/Pages/2015/June/04/pr151280.aspx

Times of Malta

Planning the route to collaboration: Public participation GIS can make local planning more effective Research article by Johann Attard, MSc graduate from the Institute.

http://www.timesofmalta.com/articles/view/20150719/technology/Planning-the-route-to-collaboration.577418

19/07/2015

maltatoday.com.mt

Maltese politics is stuck in traffic, too

Maltatoday editorial refers to the Institute study on the external costs of traffic and congestion.

http://www.maltatoday.com.mt/comment/editorial/55853/maltese_politics_is_stuck_in_traffic_too#.VmmLuITtKkj

06/08/2015

Times of Malta – Doing business in Malta Supplement

Finding the right location – Geographic Information can support business and investment decisions

Prof. Maria Attard talks about the importance of geographic information and how it can help businesses and attract investment.

http://www.timesofmalta.com/articles/view/20150807/business-features/finding-the-right-location.579685

07/08/2015

Times of Malta – Technology on Sunday Supplement

Give technology the green light – We need to get smart with traffic congestion

Article by Nicolette Formosa, Research Support Officer I at the Institute and Prof. Maria Attard about the use of technology to increase the capabilities of our road transport network.

http://www.timesofmalta.com/articles/view/20150823/technology/give-technology-the-green-light.581688

23/08/2015

AUGUST 23, 2015 ▪ The Sunday Times of Malta TECH SUNDAY 5

COVER STORY

Give technology the green light

We need to get smart with traffic congestion, say **Nicolette Formosa** and **Maria Attard**.

Like the proverbial weather, traffic congestion is one of our most frequent topics of conversation. Whether it's the everyday bottleneck to commute to and from work, or the never-ending delays during peak hours, traffic congestion is a nuisance to all motorists.

Locally, the demand for mobility has increased rapidly in the last decades for both personal and commercial purposes. In fact, according to statistics published by the National Statistics Office, the number of licensed motor vehicles by the end of the first quarter of 2015 stood at 337,506, a 3.7 per cent increase when compared to the same quarter last year.

Such an increase in the number and use of vehicles is causing traffic congestion in our islands, particularly in urban areas. The main reason for this is that the infrastructural capacity has been exceeded, and thus the restricted space available is continuously declining.

Projections show that the demand for mobility will continue to increase and thus timely planning is a fundamental issue to ensure a good quality of life. A temporary solution, such as increasing infrastructural capacity, is not sufficient since this leads to more people opting to use personal cars for transport. This once again leads to more congestion. So what are the possible solutions?

"Air pollution, being the leading product of gridlock, can also be quantified using simulators"

Technology can help us find solutions for traffic congestion.

creating any disruption in the real world. ... communicated via the same electronic ... spot. Studies show that in Moscow, which is

News on Campus

Launch of *Sustainable Urban Transport* edited by Prof. Maria Attard and Prof. Yoram Shiftan

Volume 7 of the Transport and Sustainability Series by Emerald

28/08/15

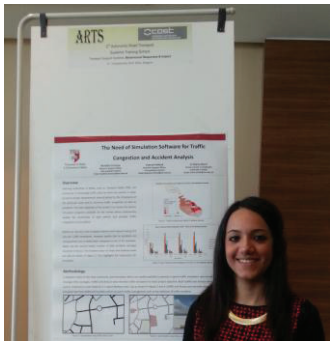
Participation in conferences and events

27th - 29th August 2014 Royal Geographical Society Annual International Conference, London, UK.

Prof. Maria Attard and Prof. Adrian Muscat deliver a presentation entitled *Modelling change and the performance of the Valletta road pricing scheme*. This work follows earlier work carried out by Prof. Attard on the performance of road pricing in reaching sustainability goals.

9th - 12th September 2014 ARTS Second Training School: Autonomic Road Transport Support Systems: Behavioural response and impact, Sofia, Bulgaria.

Ms Nicolette Formosa attended the ART Training School and presented a poster entitled "The need of simulation software for traffic. Congestion and accident analysis". This work was carried out with Prof. Adrian Muscat and Prof. Maria Attard.



14th – 17th October 2014 Third International Symposia on Integrated Coastal Zone Management, Antalya, Turkey.

Prof. A. Kideys presented a paper entitled *Not just ecology: testing a comprehensive evaluation framework for MPA's in the Maltese Islands (Central Mediterranean).* The authors of the work are Prof. Alan Deidun, Ms Alicia Said, **Prof. Maria Attard** and Prof. A. Kideys. This work was an output of the M.A. dissertation of Ms Said.

27th – 28th November 2014 IC1203 ENERGIC COST Action 4th Management Committee Meeting, Space Research and Technology Institute, Sofia.

Prof. Maria Attard delivered a presentation entitled *The potential of VGI and Citizen Science in transport planning and behaviour*.

1st - 5th December 2014 Symposium on Global Environmental Change and Small Islands, Centre for Labour Studies and Institute for Earth Systems, University of Malta, Valletta, Malta.

Prof. Maria Attard presented a position paper entitled Global Environmental Change and Small Island States and Territories: Economic and Labour Market Implications of Climate Change on the Transport Sector of the Maltese Islands. The Symposium was followed by media coverage and a post-conference journal special issue which is due at the end of 2015.

11th - 14th January 2015 Transportation Research Board 94th Annual Conference held in Washington, D.C., USA.

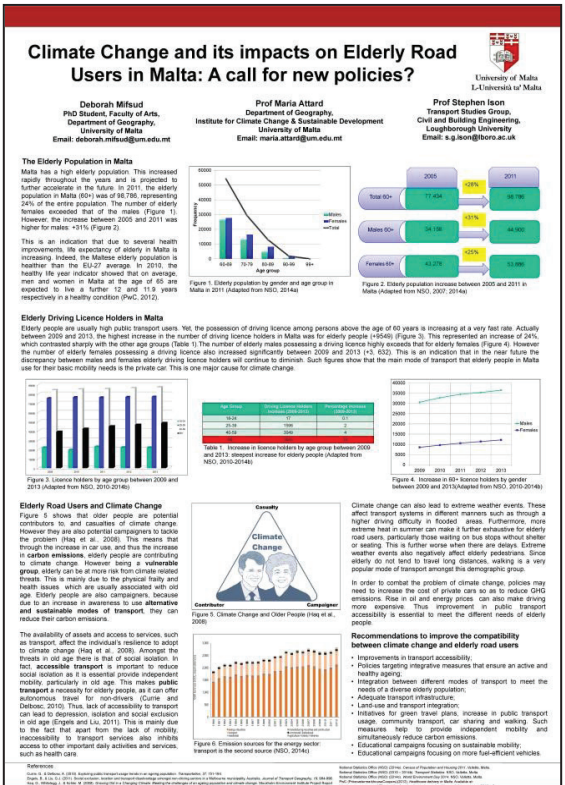
Prof. Maria Attard presented a poster entitled *City Dynamics and Road Pricing Schemes: the case of Valletta*. The work is a collaboration with Prof. Adrian Muscat from the Faculty of ICT, University of Malta.

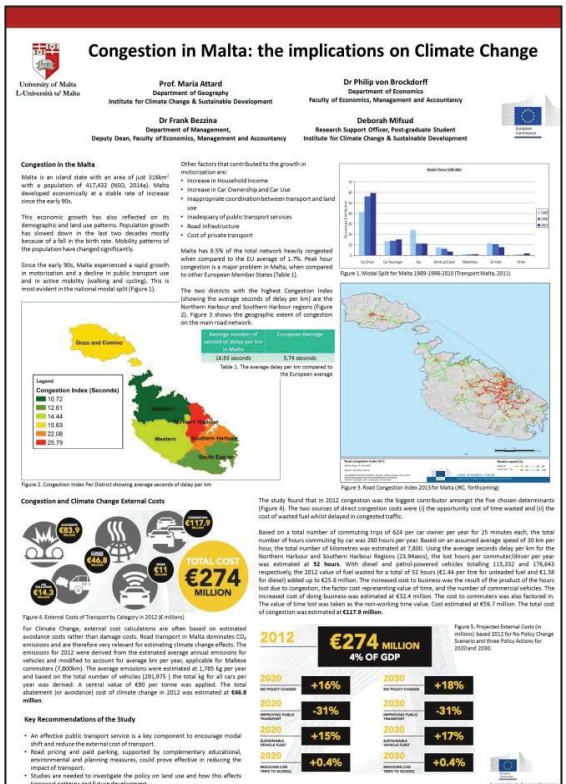
28th February 2015 Faculty of Arts The Humanities On: Migration Public Symposium, University of Malta, Msida.

Prof. John A. Schembri and **Prof. Maria Attard** contribute to a well attended public symposium with a presentation entitled *Immigration to Malta: Geo-demographic aspects*. Prof. Attard chaired the organising committee for the symposium as well as features on a number of newspapers and television features about the topic migration. The work presented follows a publication in the previous between her and Prof. Schembri.

12th - 14th April 2015 Climate Change Targets and Urban Transport Policy, International Conference, University of Malta, Valletta Campus.

Ms Deborah Mifsud presented two posters at the International Conference. The posters were entitled *Climate Change and its impacts on Elderly Road users in Malta: A call for new policies?* (with Prof Maria Attard, Prof Stephen Ison) and *Congestion in Malta: the implications on Climate Change* (with Prof Maria Attard, Dr Philip Von Brockdorff and Prof. Frank Bezzina)





At the same conference **Ms Mifsud** delivered a presentation as part of the TEA COST Action meeting entitled *Elderly and Public Transport Accessibility. The Case of Elderly Users in Malta.* The presentation was prepared together with **Ms Thérèse Bajada, Prof. Maria Attard** and Dr Floridea di Ciommo. The presentation gave an overview of a study focusing on older persons' accessibility needs in Hamrun, Malta.

Ms Thérèse Bajada delivered a presentation at the International Conference entitled *Evaluating Public Transport Policy: A Stakeholder Approach in a Maltese Context.* This research is part of her PhD studies at UCL, London, UK.

Prof. Maria Attard delivered a presentation at the International Conference entitled *Knowledge co-production, VGI and the implications on future transport systems*. This work is a collaboration with Prof. Muki Haklay (UCL) and Prof. Cristina Capineri (University of Siena). She also presented another poster with Prof. Adrian Muscat entitled *Quantification and comparison of pollution generated by a door-to-door demand responsive transport system.*

21st – 25th April 2015 Association of American Geographers (AAG) Annual Meeting, Chicago, USA.

Prof. John A. Schembri delivered a presentation entitled *Applying a GeoHumanities interpretation to Maltese place-name nomenclature.* This work is a collaboration with **Prof. Maria Attard** and Ms Ritienne Gauci from the Geography Department at the University of Malta.

15th May 2015 Cleaner Technology Centre Food and the Environment Seminar, University Residence, Lija

The Food and the Environment Seminar was organised by the Cleaner Technology Centre and looked at different aspects of production and impact on the environment. **Ms Margaret Camilleri** delivered a presentation entitled *Sustainability and the food industry* and discussed food waste and its varying impact on the environment. The presentation took a lifecycle approach at food waste during its production, consumption and disposal phase including aspects like carbon emissions, resource waste, land use and use of fertilisers and pesticides.

21st May 2015 Annual Engineering Conference on Energy and Transport: Challenges and Opportunities organised by the Chamber of Engineers, Malta, Smart City, Malta

Prof. Adrian Muscat and **Prof. Maria Attard** presented a paper on *Intelligent Transport Systems: Potential for Technological Innovation and Policy Support.*

14th - 16th June 2015 NECTAR 2015 International Conference Smart Transportation – Smart Planning, organised by NECTAR (Network on European Communications and Transport Activities Research), University of Michigan, Ann Arbor, USA.

Prof. Maria Attard delivered a presentation entitled The potential of volunteered geographic information (VGI) on future transport systems. This is work she is conducting with Prof. Muki Haklay (UCL) and Prof. Cristina Capineri (University of Siena).

20th - 21st July 2015 International Conference Georisks in the Mediterranean and their Mitigation, SIMIT Project Final Conference, Valletta, Malta.

Mr Carlos Canas Sanz and **Prof. Maria Attard** delivered a presentation entitled Framework for emergency management infrastructure using Geographic Information Systems – the case of the Maltese Islands for seismic activity.

26th - 28th August 2015 IIIEE 20 Year Anniversary Conference, University of Lund, Sweden.

Ms Margaret Camilleri attended the 20th anniversary conference of the International Institute for Industrial, Environmental Economics at the University of Lund. The conference celebrated this anniversary by discussing various topics and providing participants with the possibility of looking at different on-going projects focusing on concepts like Nudging, Carbon emissions and Extended Producer Responsibility (EPR). The conference also provided participants a chance to network amongst them. Finally, as part of the anniversary celebrations all the flags pertaining to every nationality of the students who undertook the masters' programme at the IIIEE were paraded in front of the main Lund University building (including Malta's).

1st - 4th September 2015 Royal Geographic Society Annual International Conference, University of Exeter, UK.

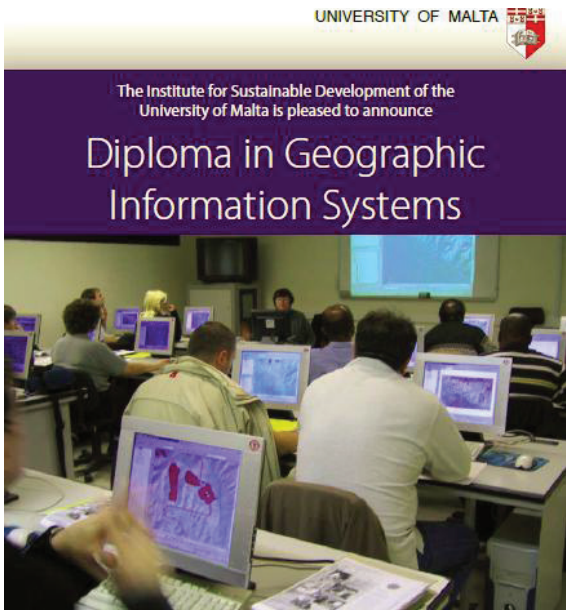
Ms Deborah Mifsud delivered a presentation at the RGS Annual Conference entitled A Holistic Overview of Transport Vulnerabilities for the Elderly: The Maltese Case Study. This is part of her PhD studies and she also participated in the post-graduate forum within the Society.

9th - 10th October 2015 First Transport Manager and Practitioner Forum, Intercontinental Hotel, Malta.

Ms Thérèse Bajada delivered a presentation entitled Infrastructure and Geographic Information Systems at the Forum.

The Institute's Study Programmes

The Diploma in Geographic Information Systems



The Diploma in Geographic Information Systems is the first opportunity for formal training for those interested in developing skills in this very specialised discipline. This is a part-time (evening) course over six semesters and falls under the Get Qualified funding scheme where students get financial support to undertake their studies.

YEAR ONE

ISD1100 Basic Skills in Geographic Information Systems (Lab Practicals) 6 ECTS
ISD1101 Basic Concepts of Geographic Information Systems 4 ECTS
ISD1102 Introduction to Geographic Information 4 ECTS
ISD1103 Introduction to Geographic Analysis 4 ECTS
ISD1104 Introduction to Database Management Systems for GIS 4 ECTS
ISD1105 Remote Sensing and Applications 4 ECTS
ISD1106 Mobile Geographic Information Systems 4 ECTS

YEAR TWO

ISD1203 Intermediate Skills in Geographic Information Systems (Lab Practicals) 6 ECTS
CRM1001 Geographic Information Systems and Crime Mapping 4 ECTS
ISD1200 Geovisualisation 4 ECTS
ISD1201 Programmable Aspects of Geographic Information Systems 4 ECTS
ISD1202 Cartography and Digital Mapping 4 ECTS
ISD1204 Geographic Information Systems and Geodemographics 4 ECTS
ISD2205 Geographic Information Systems and Databases 4 ECTS

YEAR THREE

ISD2000 Long Essay 8 ECTS
ISD2305 Advanced Skills in Geographic Information Systems (Lab Practicals) 6 ECTS
ISD2301 Web Mapping 4 ECTS
ISD2302 Geographic Information Systems in Transportation 4 ECTS
ISD2303 Managing Geographic Information Systems 4 ECTS
ISD2304 Advanced Geographic Analysis and Mapping 4 ECTS

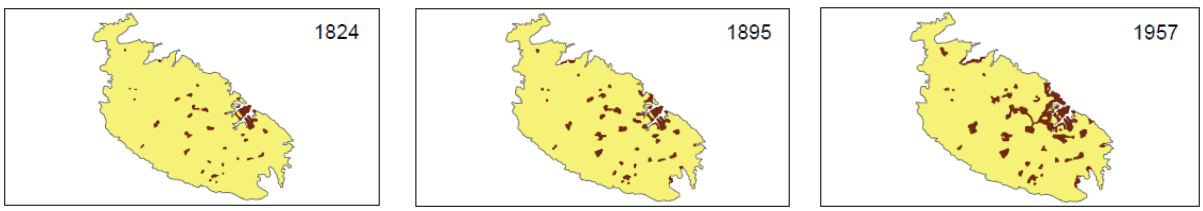
The Diploma in Sustainable Land and Real Estate Management

The Diploma in Sustainable Land and Real Estate Management is an interdisciplinary study programme bringing together the main aspects related to land and estate management. The study programme is designed in such a manner as to effectively develop skills and knowledge required by land managers to understand the complexities of rural and urban management and development. The study programme includes a number of study units aimed at the teaching of basic concepts of economics, law, geography, environment, finance, planning, management, architecture, marketing, ICT tools and statistics. This is a part-time (evening) over six semesters.

YEAR ONE
CVL110 Law of Ownership and Property Law Relating to Sustainable Estate Management 4 ECTS
MGT1013 Fundamentals of Management 4 ECTS
ISD1110 Principles of Sustainability 6 ECTS
ECN1003 Introductory Economics for Land and Real Estate Management 4 ECTS
GEO1042 Socio-geographic Aspects of Land Management 4 ECTS
ISD1108 Geographic Information Systems for Land Management 4 ECTS
ISD1109 Quantitative Techniques for Land Management 4 ECTS

YEAR TWO
CVL1109 Legal Anthropological Perspectives on Land, Property and the Environment 4 ECTS
GEO1041 Urban and Rural Geography 4 ECTS
RFS1400 Rural Policy and Land Use Management 6 ECTS
EMP1201 Impact Assessment and Monitoring 4 ECTS
LIN1063 Academic Reading and Writing in English 2 ECTS
MRK1011 Introduction to the Marketing Concepts 6 ECTS
SPI1011 Development and Spatial Planning 4 ECTS

YEAR THREE
BKF2200 Real Estate Finance 4 ECTS
CIS1043 Information Systems for Land Management 4 ECTS
CNM1041 Property Valuation 4 ECTS
ERL1000 Principles of Environmental and Development Planning Law in relation to Estate Management 4 ECTS
MGT1052 Leadership and People Management 4 ECTS
ISD1205 Project 10 ECTS



The Postgraduate Certificate in Geographic Information Systems

The Postgraduate Certificate in Geographic Information Systems covers the principles of the Geographic Information Science, such as spatial databases, programming, remote sensing and digital cartography and the technology supporting Geographic Information Systems such as principles, management and applications. It is a part-time (evening) course over two semesters.

YEAR ONE

ISD5001 Principles of Geographic Information Systems 5 ECTS
ISD5002 GIS and Databases 5 ECTS
ISD5003 Applying GIS (Lab Practicals) 5 ECTS
ISD5004 Geographic Information, Remote Sensing and Digital Cartography 5 ECTS
ISD5005 Managing Geographic Information Systems 5 ECTS
ISD5006 Programming in GIS 5 ECTS

The Master of Science by Research (Sustainable Development)

The Master of Science (Sustainable Development) is a research programme enabling researchers to focus on a variety of topics to be studied in depth through full-time or part-time study. The study programme is over three semesters or equivalent in part-time.

Research conducted by MSc students is outlined in Annex 1.

YEAR ONE
ISD5100 Dissertation 80ECTS
ISD5101 Research Methods 5ECTS
ISD5102 Principles of Sustainability 5ECTS

Student Intake 2014-2015

Student	**Dissertation Title**
Mr Christian Grima (Part-time)	Investigating the relationship between tertiary education and employment in Malta's labour market Supervisor: Prof. Maria Attard
Mr Christian Magrin (Part-time)	Analysing the usage of groundwater by the agricultural sector in Gozo, its conservation programmes and the alternative water usages in order to guarantee its long-term future Supervisor: Prof. Maria Attard Co-supervisor: Ms Sonya Sammut

New Research Activity

The Institute has continued to work on the projects awarded in the previous year. It has also succeeded to submit and participate in project proposals, both locally and abroad. Table 1 shows the projects which were developed by the Institute and its partners and the outcome of the funding applications.

Funding Programme	**Title of Project**	**Project Partners**	**Outcome and Value**
UOM R&I	Assessing the impact of transport measures on sustainable mobility	Prof. Maria Attard, Institute for Climate Change and Sustainable Development	EUR 1,000
HORIZON2020	ADAPTAGE	IFSTTAR (FR), TRL (UK), VTI (SE), IST-LU (PT), CENIT-UPC (ES), FACTUM (AT), SFI (DK), **UOM (MT)**, Technion (IS)	NOT AWARDED
HORIZON2020	DIMITRIS	PMF (IT), UNICT (IT), AMT (IT), UPM (ES), CRTM (ES), **UOM (MT),** G&E (DE), POLIS (BE), TfGM (UK)	PENDING
Malta Resources Authority (Climate Change Group)	Low Carbon Strategy – Tender for Services	E-cubed Consultants, ADI Consultants	NOT AWARDED
Malta Resources Authority (Climate Change Group)	Development of the LULUCF Map for Malta to support the reporting obligations under the UNFCCC Convention	Institute for Climate Change and Sustainable Development	PENDING
COST	Citizen Science to promote creativity, scientific literacy, and innovation throughout Europe	Coordinated by Museum für Naturkunde Berlin (DE). Partners COST Countries	PENDING
COST	ITS for preventing vulnerable road user and passenger slips, trips and falls (i-TRPS)	Coordinated by UCL (UK). Partners COST Countries	NOT AWARDED
Vodafone Malta Foundation	Developing a shared demand responsive transport system	Prof. Maria Attard, ICCSD and Prof. Adrian Muscat, Faculty of ICT	EUR27,000

On-Going Projects

STREETS (STRatEgia IntEgrata per un Trasporto Sostenibile Italia-Malta) is a 3-year project partly financed by the EU under the Operational Programme Italia-Malta 2007-2013. The project aims to contribute to the improvement of the transport and to enhance the integration of multi-modal transport between Sicily and Malta, in support of the TEN-T corridor 5. This will be developed through a joint mapping of the transport network, aiming at improved internal/external accessibility, while overcoming the current bottlenecks identified between the two islands. The project aims to develop a web-GIS platform by collecting geo-referenced data about the transport system, while making it available to the Public Administration of the involved territories. This will in turn enhance the quality and safety standards and the communication with citizens and stakeholders.

STREETS involves six partners, with the leading partner being the Dipartimento Regionale Delle Infrastrutture, della Mobilità e dei Trasporti di Sicilia, together with Collegio Universitario ARCES, Vittoria Local Council, Catania Port Authority, University of Malta (coordinated by Prof. Maria Attard) and Transport Malta.

The University of Malta represented by the Institute for Climate Change and Sustainable Development is responsible for the joint mapping of the transport system between Malta and Sicily, amongst other tasks.

The University is leading the team to draw up a detailed analysis to investigate the urban road access to the port of Malta and its traffic flows in and out of the port area of Catania and Malta. A map will be developed to provide efficient connections between the ports, land and air transport, superimposed on a topographic map of the Maltese Islands. An analysis of the road supply-demand relationship within the traffic network between the two islands will also be analysed and will serve as a unified strategy between Catania and Malta.

A detailed analysis will be carried out to determine current territorial problems, any economic and social issues, or critical infrastructures or strategies currently in action. Guidelines will be established for efficient flow of origin-destination passengers and goods within a certain time schedule.

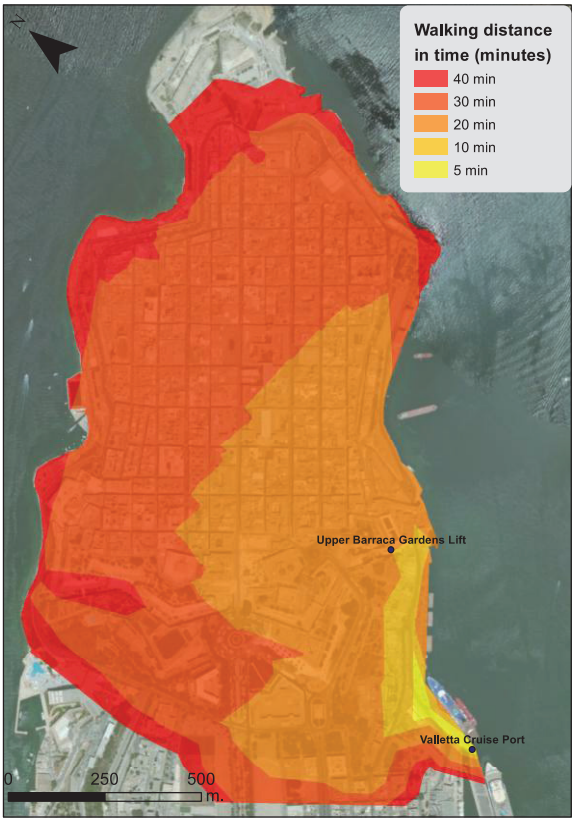
Intermodal means of transport connecting Malta and Sicily will be identified while keeping in mind the short-medium and long-term infrastructures and services currently available to provide an integrated logistics platform within the Sicilian-Maltese environment.

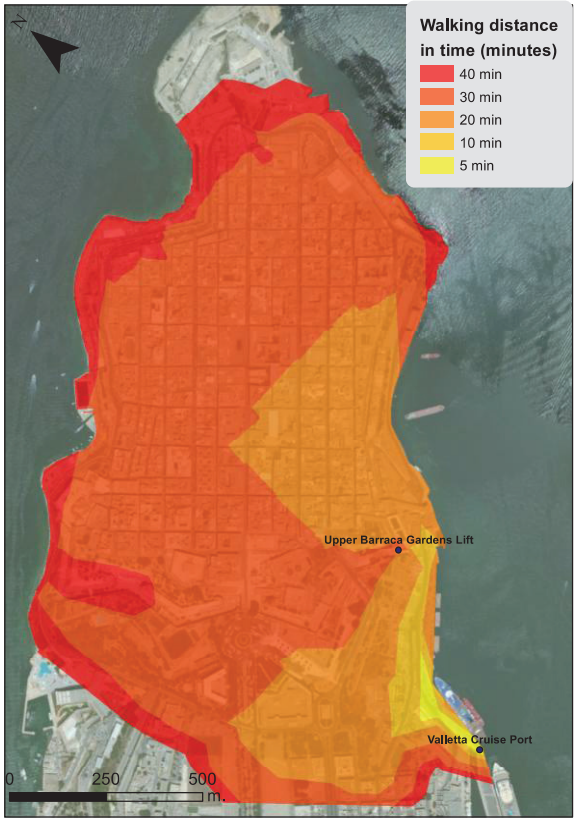
An analysis of what data is required to efficiently capture the flow of passengers and goods between Malta and Sicily will be investigated. This will also incorporate analysis of the data available from local operators or surveys to be distributed to passengers, to capture the flow of passengers and goods between the two islands.

In 2015 Carlos Canas, with the help of Iago Gomez (an Erasmus intern) carried out fieldwork to collect different attributes about the network transport of Valletta. The data was inputted into a geo-database to perform some transport modelling and transport network analysis. The data was also used to create thematic cartography to show some of the project's results.

To enhance the working progress between all project partners, several meetings are planned to take place.

Project co-financed by the European Union – European Regional Development Fund





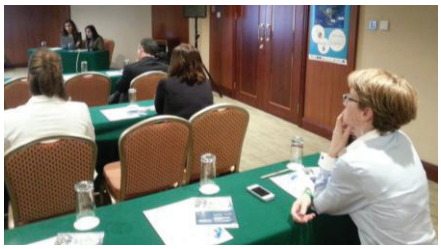
Project Events

9th – 10th October 2014 STREETS Project Intermediate Conference in Trapani, Sicily

All project partners discussed progress of works. At the conference staff of the Institute presented the work with regard to the development of a digital map of the Maltese transport network and survey results on the flow of passengers between Malta and Sicily. The group was also joined by Dr Claire Ellul, Research Fellow at the Department of Civil, Environmental and Geomatic Engineering at UCL, who delivered a keynote presentation.

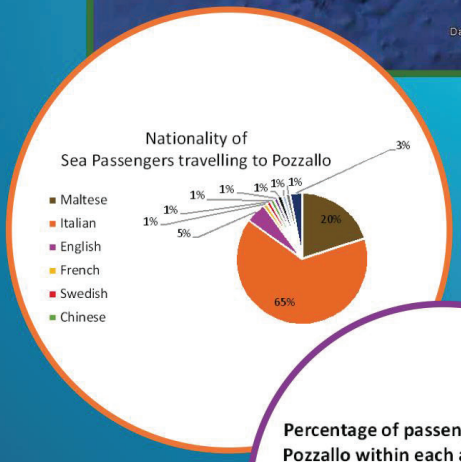
24th October 2014 STREETS Project Info Day, Hotel Excelsior, Valletta

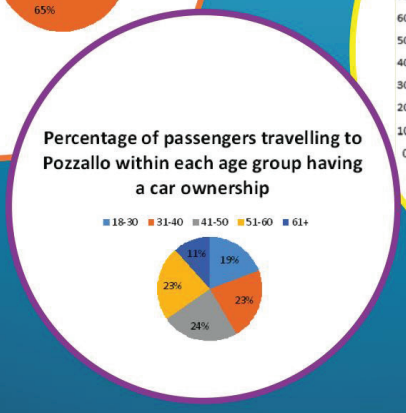
The STREETS team prepared posters, presentations and materials for an open day for the general public to visit, learn and enquire about the STREETS Project.

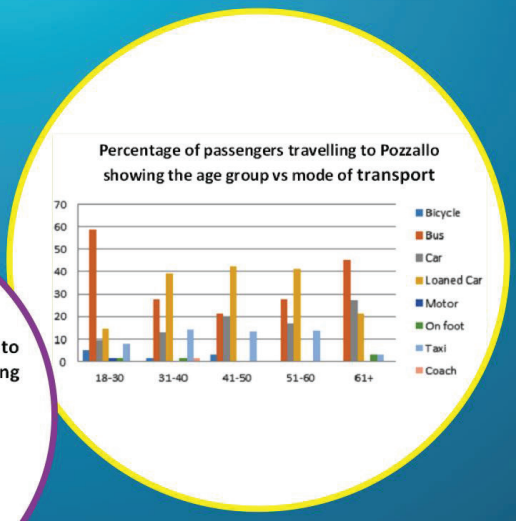



STREETS
Integrated Strategy for Sustainable Transport Italy-Malta
Italia Malta
2007 - 2013
malta
INFO DAY
University of Malta
24th October 2014
Grand Hotel Excelsior, Valletta
from 9:00hrs to 15:00hrs
Integrated Transport Malta - Sicily
THE INSTITUTE FOR CLIMATE CHANGE AND SUSTAINABLE DEVELOPMENT
is organizing an info day event for the public and all partners of the STREETS Project (B1.1-17/3) funded by the Operational Programme Italia-Malta 2007-2013.
ROYAL AIR FORCE

SEA TEANSPORT BETWEEN MALTA & SICILY



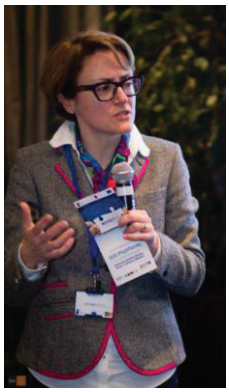




Italia-Malta Programme - Cohesion Policy 2007-2013
A sea of opportunities for the future
This project and post are part-financed by the European Union
European Regional Development Fund (ERDF)
Co-financing rate: 85% EU Funds; 15% National Funds
Investing in your future

26th - 27th February 2015 Launch of the STREETS GIS Platform, Radisson Blu Resort and Spa, Għajn Tuffiegħa, Malta

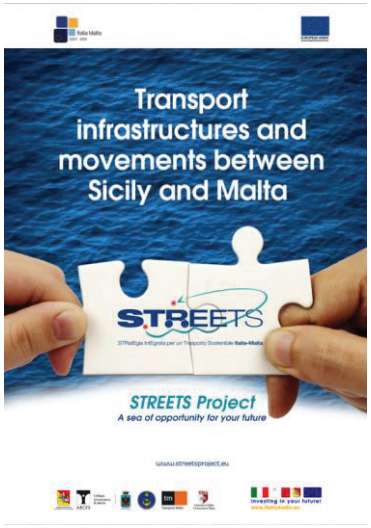
The STREETS Project envisaged the development of a GIS platform to support strategic data about the two island territories and their transport infrastructure. Transport Malta, responsible for the development of the platform organised a conference to launch the platform and its services. Prof. Maria Attard presented the Institute's contribution to the platform in the form of geographic data.

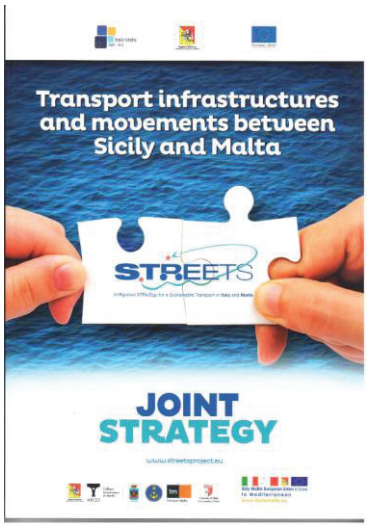


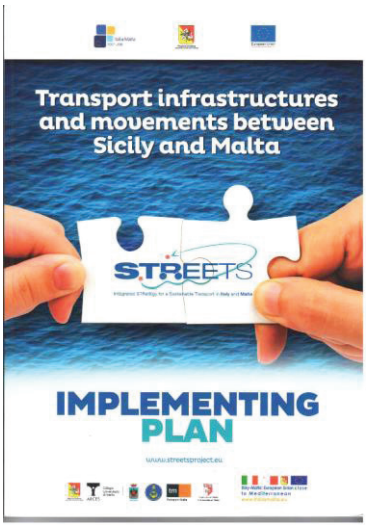
3rd - 4th March 2015 STREETS Final Conference, Palermo, Sicily

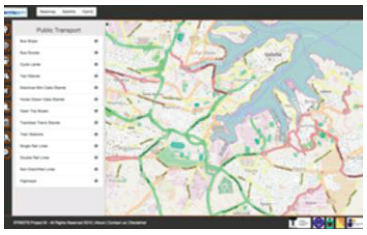
The STREETS Project came to and end in Palermo with the last two final events, a press conference at Palazzo Branciforte and a final conference at the Galleria d'Arte Moderna, both beautiful venues in the City of Palermo.

The contribution of the Institute to the STREETS Project is documented in three volumes published at the end of the project. These and other materials are available on the STREET website www.streetsproject.eu. This project was led by the Regione Sicilia.









European Mobility Week Sustainable Urban Mobility Plan (SUMP) Awards

The Valletta Local Council was awarded EUR50,00 for their proposals for a Sustainable Urban Mobility Plan which was developed by **Prof. Maria Attard**, Director of the Institute. The Institute is very proud to have supported the Valletta Local Council to place first in this national award on sustainable mobility, held as part of European Mobility Week







Malta Resources Authority, Climate Change Group – Malta's National Green House Gas Inventory Review

The Climate Change Group at the Malta Resources Authority commissioned a number of contracts to support their efforts in reviewing different sectors of the National Green House Gas Inventory. This work is required by the Convention and an independent review was provided in the fields of (i) land-use, land-use change and forestry (LULUCF) by Mr Carlos Canas Sanz, (ii) energy by Prof. Robert Ghirlando and (iii) transport by Prof. Maria Attard.

SIMIT Integrated System for Trans-boundary Italo-Maltese Civil Protection

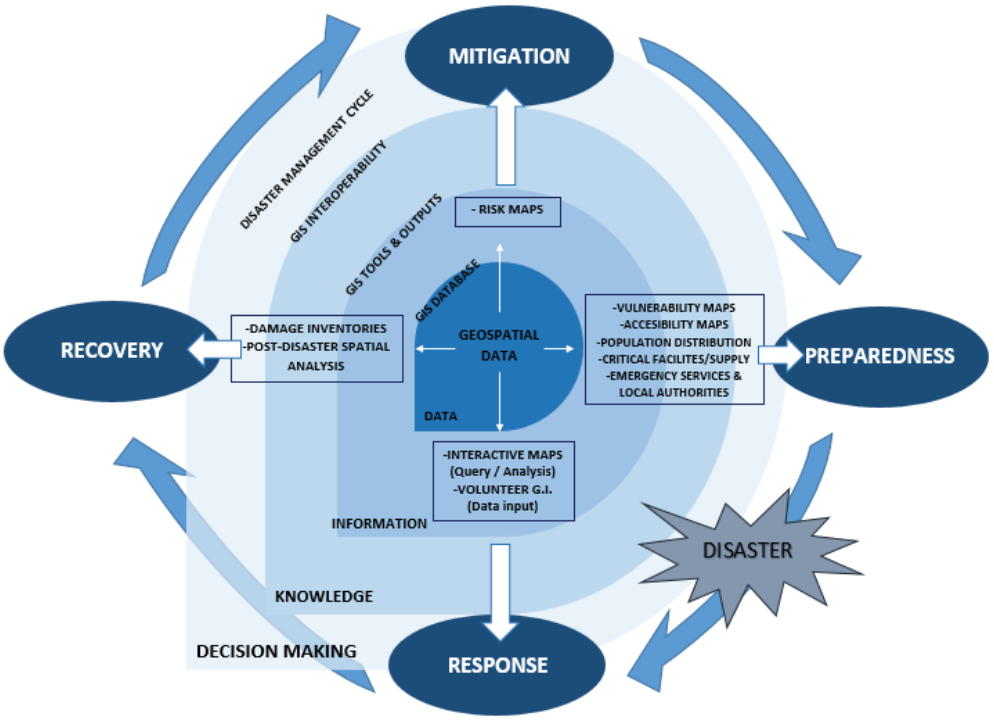
The SIMIT Project aims at developing an integrated civil protection network between the Sicilian and Maltese bodies involved in the risk forecast, prevention and mitigation processes, and moreover in the planning and management of emergencies, to be further extended to the cross border countries.

The project aims at structuring an integrated system of interventions, targeting the identification and prevention of seismic, volcanic, hydro-geological, as well as risks and issues related to the vulnerability of the cross-border territory.

These objectives are pursued with the creation of an institutional network between parties involved and consulted outside a portal that could be checked from outside, facilitating the exchange of information on its functional use.

The ICCSD has continued to work on the SIMIT project by developing a geo-database within a Geographic Information System (GIS) with all the data outputs generated by the University of Malta. The data has been geo-referenced, standardised and integrated in a GIS Infrastructure to support Emergency Management.

Based on the research and work performed, Carlos Canas Sanz and Prof. Maria Attard developed a framework for emergency management infrastructure supported by Geographic Information Systems and reported on the case of Malta. This work is part of the proceedings from the international conference "GeoRisk in the Mediterranean and their mitigation" held at the University of Malta, Valletta Campus on the 20th and 21st of July 2015. During the event, Carlos Canas gave a presentation about the work done by the ICCSD and the current situation of the GIS Infrastructure to support Emergency Management in Malta.



Cultural Mapping Project

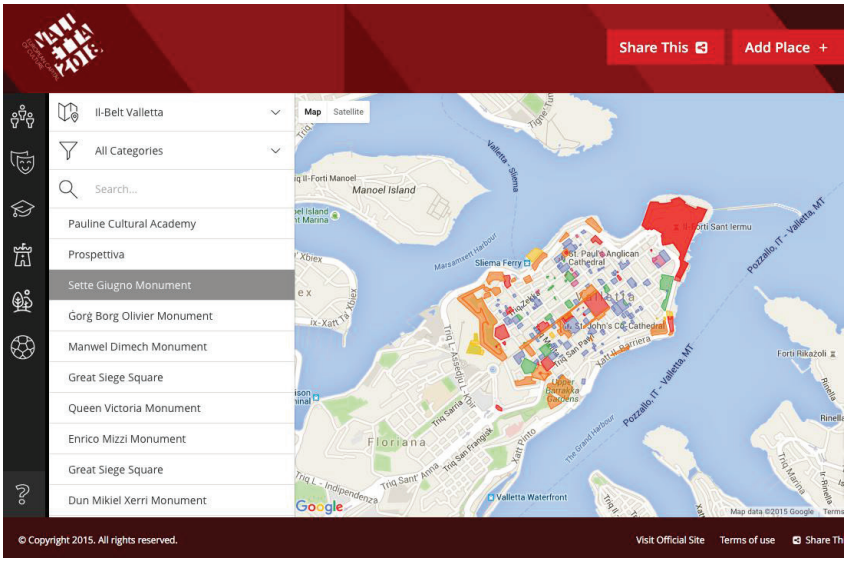
Description and Aims

Launched in October 2013, the Cultural Mapping exercise aims to gather and input data related to the islands' cultural infrastructure. This data was collected and entered into a Geographic Information System, and included spaces used for a variety of activities of different cultural events and initiatives. This exercise generated information related to cultural use of public spaces and venues in all localities of Malta. The project was concluded in December 2014.

Prior to the conclusion of the project a number of public meetings were organised with Local Councils and the general public. Presentations of the results were also made to the Valletta 2018 Foundation and its main stakeholders.

Public consultation exercise Siggiewi Local Council. Mr Jeremy Azzopardi (first from left), Mr Glen Farrugia (second from left) and Professor Maria Attard (fifth from left) represented the Institute.

Subsequently the Valletta 18 Foundation launched the cultural map, containing the data of the Cultural Mapping Project. The launch was attended by Prof. Attard who gave a description of the project and demonstrated the results which can now be found online.



www.culturemapmalta.com

Prof. Maria Attard at the launch of the Culture Map by the Valletta 2018 Foundation.

The results were also included in the V18 International Conference as a keynote address.

Title: Cultural Mapping – Tools to Engage.
By Maria Attard and Jeremy Azzopardi

In 2014 the Institute for Climate Change and Sustainable Development within the University of Malta was commissioned by the Valletta 2018 Foundation to collect and collate spatial information about Malta's cultural infrastructure and spaces. A variety of spatial features were identified in the landscape where many different (cultural) activities occurred. The objective of the project was "to generate information on the cultural use and practices in public space and cultural venues and sites, run and managed at community level and situated in localities in Malta and Gozo". This spatial database was set to be the framework upon which a cultural infrastructure map was built, with the potential of engaging the community to contribute to the map information through an online interface, making it not only a very reliable source of cultural infrastructure information but also to bring together the (cultural) community to share and upload information. This form of Citizen Science project broadens engagement and inclusion while building a collaborative space for users, planners, managers and even researchers in the field of culture, to work together. Citizen Science projects have, over the past decade, enabled large-scale data collection, increase in literacy and awareness of issues, particularly in environmental fields. The Cultural Mapping Project aims to extend the experience and success achieved so far in the field of Citizen Science and subsequently in the collection of Voluntary Geographic Information, to engage more people in culture. As Malta prepares to host the European Capital of Culture in 2018 efforts are being made to raise awareness and engage the local population in not only appreciating the cultural heritage but be part of the infrastructure and spaces that encourage cultural practices. The application of the Citizen Science approach to Cultural Mapping provides new challenges and opportunities. Issues with data quality, public participation, technological innovation are all foreseeable challenges. These however might also be the opportunities for new ventures, ones that are relate to the creative class and open science movement, and that transcend the 2018 Capital of Culture and sustain a long-term impact on both the economy and society of Valletta and beyond.

Malta Resources Authority, Climate Change Group – LULUCF (Land use, land-use change and forestry) Map Project.

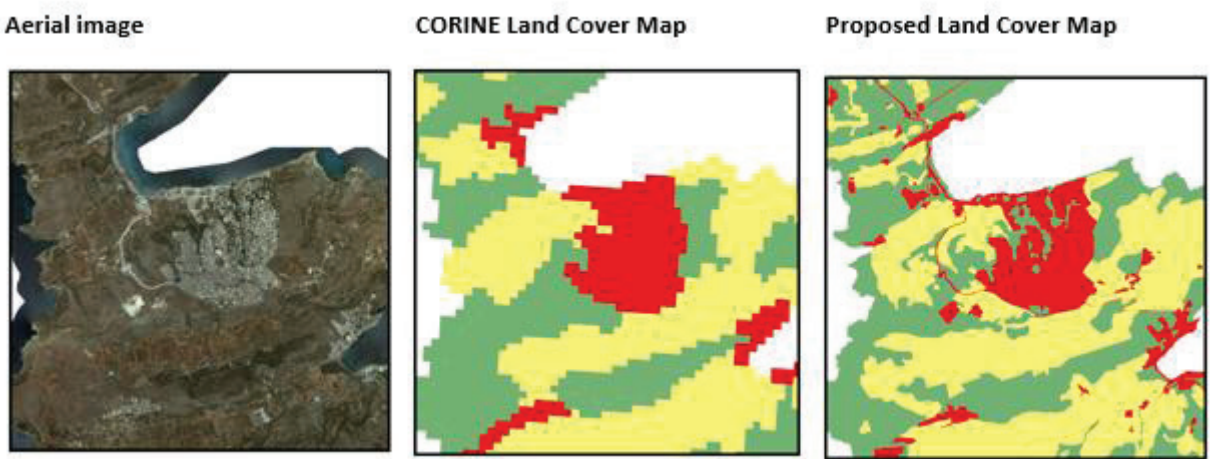
The ICCSD has advised MRA (Malta Resources Authority) to assess land use change through the use of map layering from the CORINE Land Cover data for the years 1996, 2000 and 2006. Through this project the ICCSD analysed and managed the raw data provided by the European Environmental Agency (EEA) with GIS software and created land use matrixes that show the land use evolution in Malta from 1996 to 2006.

In the conclusions of this preliminary work, the ICCSD recommended that due to the limitations of the CORINE Land Cover data (primarily because of its spatial resolution) and the requirement of the Authority to produce a detailed map of Malta's land use for the purposes of maintaining the GHG Emission Inventory and reporting obligations to the UNFCCC, the Institute would produce a national scale land use map for the Maltese Islands. This would allow the production of specific, more accurate and reliable data about land use change at national level.

The second stage of the project was to set up the need assessments of a national land use and land cover national map for Malta. The ICCSD studied the implementation of the most convenient mapping scale, the unit size area, the minimum mapping unit, the cartography parameters and the land use nomenclature. A number of meetings with different Maltese stakeholders were held to study the availability and usability of existing data that could be used as ancillary documentation for the project and to ask for advice in the creation of a detailed Maltese land use classification.

The stakeholders included the Rural Development Department (Agriculture Directorate), Rural Development Department (Parks and Initiatives), MSDEC-ARPA (Agriculture and Rural Payments Agency), Nature Trust Malta, Birdlife Malta and Malta Environment and Planning Authority (MEPA).

The ICCSD searched for the sources of existing aerial images, satellite imagery, national cartography, topographic maps, thematic land cover maps, agricultural census boundaries, transport network maps, terrain cartography and inventories with any spatial component. Once the data availability and potential was identified and discussed with the stakeholders, the ICCSD proposed a methodology to create the first National Land Use Map for Malta.



The European Commission Representation in Malta – A study on the impacts of congestion

Following the European Commission 2013 Country Specific Recommendations, Malta is required to tackle emissions from energy and transport. To this end the European Commission Representation in Malta approached Prof. Maria Attard in order to commission a study specific to the impact of congestion in Malta. The study was coordinated by Prof. Attard, with Dr Philip Von Brockdorff and Prof. Frank Bezzina from the Faculty of Economics. Ms Deborah Mifsud, Research Support Officer at the Institute is providing the necessary support.

The study was launched in January 2015 with an event organised by the European Commission Representation in Malta. The seminar was addressed by European Commissioner Karmenu Vella and the Minister for Transport and Infrastructure Hon. Joe Mizzi. Mr Guus Van De Schouw from Directorate-General Mobility and Transport outlined the transport dimension within the European Semester. Apart from presenting the key findings of the study, the event also served as an opportunity to discuss in more detail the findings and exchange views on this key policy challenge. A panel discussion composed of Commission and local experts amongst them Prof Maria Attard, Director of the Institute for Climate Change and Sustainable Development at the University of Malta, concluded the event.

Apart from the study hitting headline news of all local newspapers, the main results of the research were referenced in the European Commission Country Report for the 2015 European Semester (http://ec.europa.eu/europe2020/pdf/csr2015/cr2015_malta_en.pdf). The study has since been referenced in numerous articles, by a good number of researchers and research students at the University and has also been topic of discussion in international fora interested in the nexus of transport, economy and urban areas.

The Commission Representation in Malta publicized further the results of the study with an insert entitled **I AM TRAFFIC** which was distributed with all newspapers in the island. This insert showed graphically the impacts and costs of the use of private and commercial vehicles in Malta. The aim of this leaflet was to raise awareness of the problems associated with car dependence and the impact on both the economy and the environment. The launch of the report was followed by another report by the WHO which identified and costed the number of deaths and hence the cost of air pollution in Malta.

I AM TRAFFIC

IMPACT AND COST OF ROAD TRAFFIC IN MALTA

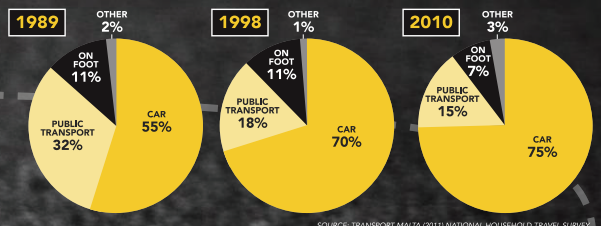
RATE OF MOTORISATION IN MALTA

(NUMBER OF PRIVATE CARS PER 1,000 POPULATION)

1985	230
1995	376
2005	508
2012	592

(SOURCE: NSO, EUROSTAT)

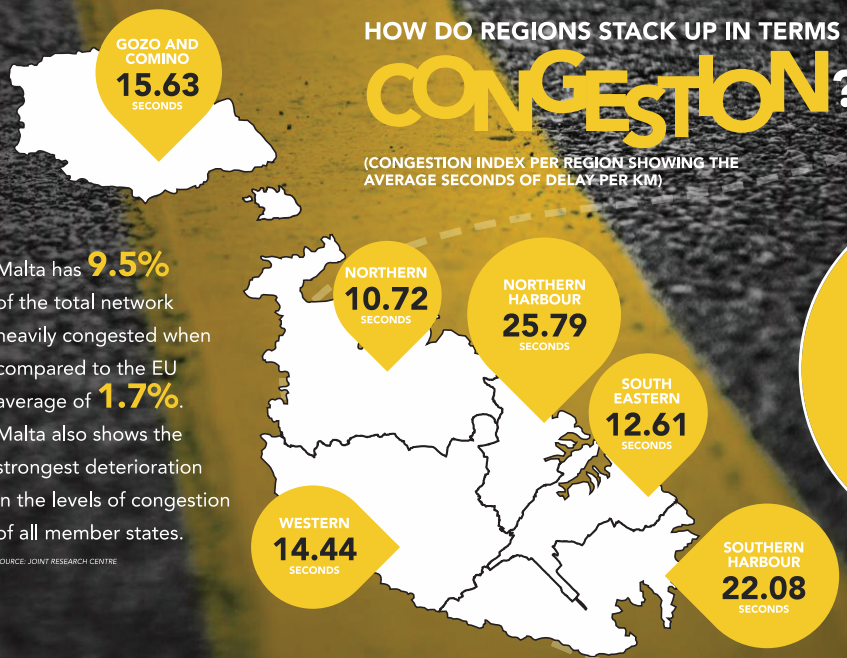
CHANGING MODAL CHOICE



SOURCE: TRANSPORT MALTA (2011) NATIONAL HOUSEHOLD TRAVEL SURVEY

HOW DO REGIONS STACK UP IN TERMS OF CONGESTION?

(CONGESTION INDEX PER REGION SHOWING THE AVERAGE SECONDS OF DELAY PER KM)



Malta has **9.5%** of the total network heavily congested when compared to the EU average of **1.7%**. Malta also shows the strongest deterioration in the levels of congestion of all member states.

SOURCE: JOINT RESEARCH CENTRE

A TOTAL OF **52** HOURS PER YEAR ARE LOST PER COMMUTER IN TRAFFIC IN MALTA

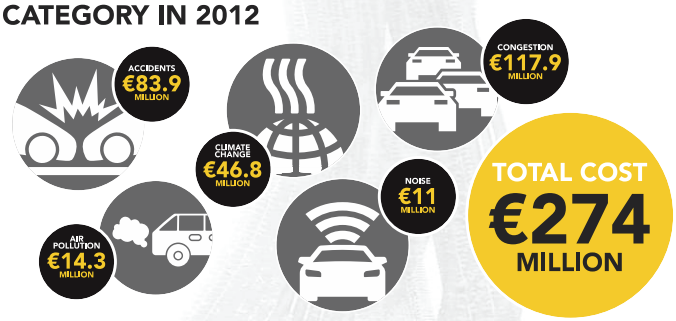
AIR POLLUTION

77% of Malta's vehicle fleet is made up of private cars. **69%** of which are petrol and **30%** are diesel... electric, hybrid and other types of vehicles make up the rest.

69% of Malta's vehicle fleet is over 10 years of age, making it a very old and polluting fleet.

Transport contributes to over **20%** of CO_2 emissions in Malta.

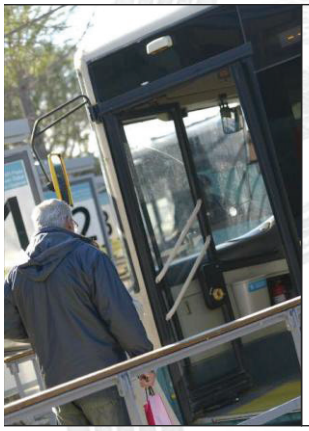
EXTERNAL COSTS OF TRANSPORT BY CATEGORY IN 2012



PROJECTED EXTERNAL COSTS OF TRANSPORT IN MALTA UNDER DIFFERENT SCENARIOS

2012 — **€274 MILLION** — 4% OF GDP

2020 NO POLICY CHANGE	+16%	2030 NO POLICY CHANGE	+18%
2020 IMPROVING PUBLIC TRANSPORT	-31%	2030 IMPROVING PUBLIC TRANSPORT	-31%
2020 SUSTAINABLE VEHICLE FLEET	+15%	2030 SUSTAINABLE VEHICLE FLEET	+17%
2020 REDUCING CAR TRIPS TO SCHOOL	+0.4%	2030 REDUCING CAR TRIPS TO SCHOOL	+0.4%



KEY RECOMMENDATIONS OF THE STUDY*

An effective public transport service is a key component to encourage modal shift and reduce the external cost of transport.

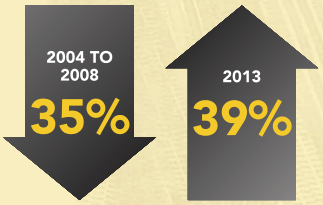
Road pricing and paid parking, supported by complementary educational, environmental and planning measures, could prove effective in reducing the impact of transport.

Studies are needed to investigate the policy on land use and how this affects transport patterns and future development.

EFFECTS OF VALLETTA ROAD PRICING SCHEME (CVA)

BETWEEN 1998 AND 2010 10% OF ALL TRIPS TO VALLETTA DONE BY CAR TRANSFERRED TO PUBLIC TRANSPORT.

MORNING PEAK TRAFFIC IN FLORIANA



UNIVERSITY OF MALTA
L-Università ta' Malta

Institute for Climate Change and Sustainable Development
www.um.edu.mt/iccsd

* All the facts and figures reproduced here are part of a study carried out by the Institute for Climate Change and Sustainable Development at the University of Malta with the support of the European Commission Representation in Malta. The study aimed at estimating the external costs of traffic in Malta and had the objectives of (i) analyse the road transport situation in Malta and its expected development, (ii) develop an analytic framework to determine the external costs of Malta's road transport system, and (iii) analyse the impact on external costs of implemented and planned policies influencing road transport, and provide policy recommendations.

Further details about the study and a full report will be published online at http://ec.europa.eu/malta/

European Commission

Supported by the European Commission Representation in Malta.

Travelling Smart – The Green Travel Plan Committee at the University of Malta

Prof. Maria Attard continues to chair the Green Travel Plan (GTP) Committee which aims to implement the University Green Travel Plan approved in 2012. Mr Raphael Mizzi, the GTP Coordinator, is currently following an MSc by research (Sustainable Development) with the Institute for Climate Change and Sustainable Development. The focus of his research is in transport area. He still administrates the GTP work as well as act as secretary to the GTP Committee.

The GTP Committee for 2014 – 2015 was made up of:

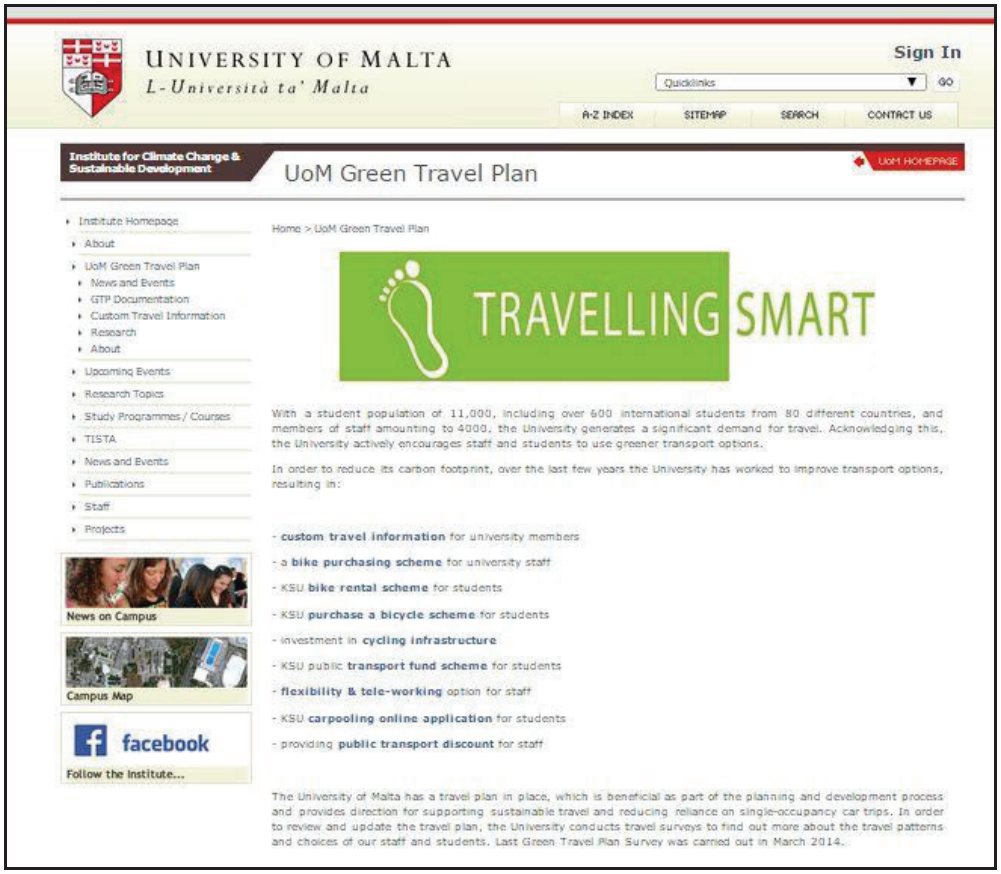
Prof. Maria Attard (Chair)
Ms Thérèse Bajada (Travel Plan Expert, ICCSD)
Mr Gayle Lynn Callus (President, KSU)
Mr Joseph Camilleri (Precincts Officer)
Ms Amanda Ciantar (Office of Human Resources)
Ms Nathalie Cauchi (UHM)
Mr Raphael Mizzi (Secretary)
Ms Maronia Schembri (Precincts Office)
Prof. Luciano Mulé Stagno (UMASA)
Perit Christopher Spiteri (Director Estate & Works)

During 2014/2015 a number of initiatives were undertaken by the GTP Committee and the GTP Coordinator in order to improve travel to the University.

The Website

In order to maintain communication lines open with the University community the GTP website is updated on a regular basis with useful information and links about green travel to and from University. Lately the GTP Coordinator performed some important updates to the home page by linking the following KSU initiatives which are related to the green travel

KSU Rent-a-bike scheme
KSU Purchase a Bike Scheme
KSU Public Transport Fund
KSU Car Pooling Application



Further useful links and information will be made available through this website and publicized from time to time internally within the University community.

The GTP website name was also changed from http://www.um.edu.mt/iccsd/greentravel to http://www.um.edu.mt/greentravel

Cycling

Results from the last Green Travel Plan (GTP) survey carried out in 2014 have shown that 45% of the UoM population would be encouraged to cycle to University if sheltered bicycle parking was made available on Campus. Through the Green Travel Plan the University of Malta is trying to reduce the number of vehicles on the roads and subsequently the individual carbon footprint. To this end, the KSU in collaboration with the Green Travel Plan and the Estate & Works Department, designed and installed two bicycle shelters which will protect the bicycles from the elements.

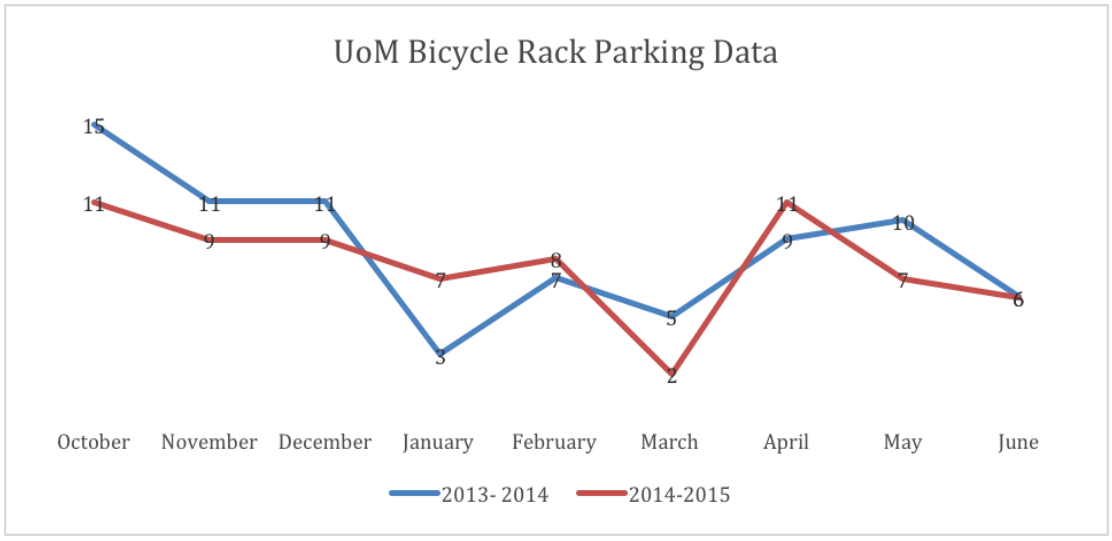
These are situated near the Gateway Building and in front of the Bank of Valletta ATM Machine.

Purchase of Adult Bicycle and Cycling Equipment from the WRF (Work Resources Fund)

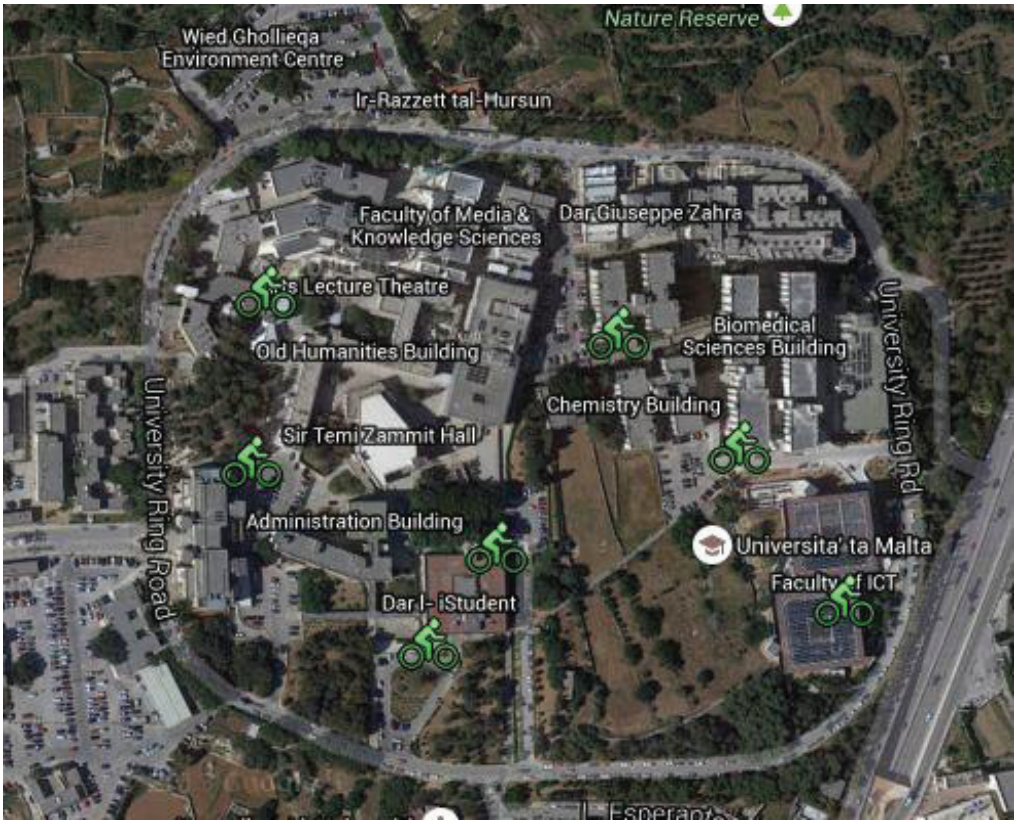
Following the implementation of the bicycle purchasing scheme incentive for support staff at UoM, the GTP Committee requested the number of staff who made use of this opportunity. From August 2014 to August 2015 the Committee approved **19 applications for the purchase of an adult bicycle and two applications for cycling equipment**.

Bicycle Parking Data

Weekly bicycle counts are collected by the GTP Coordinator during the academic year to monitor progress of GTP efforts over time. The line chart below represents the data collected from October 2013 till June 2015. The highest number of bicycles on campus (15) were recorded during October 2013, with the lowest amount (2) recorded in March 2015. The average number of bicycles on campus for 2013-2014 was nine bicycles and for 2014-2015 was eight bicycles. There are some instances where the bicycles could not be counted because they are parked in unofficial spaces, and some other bicycles which are used by UoM staff that are parked inside buildings and private offices.



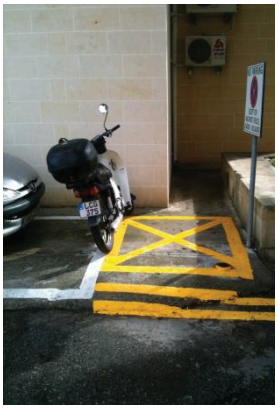
Counts were collected from seven different bicycle racks which are represented in the map below.



Pedestrian Safety

Pedestrian Obstruction

The GTP Coordinator together with Estate and Works Department ensure that pedestrian passageways within UoM are well maintained and cleared from any obstruction. Appropriate methods were applied in the designated areas.



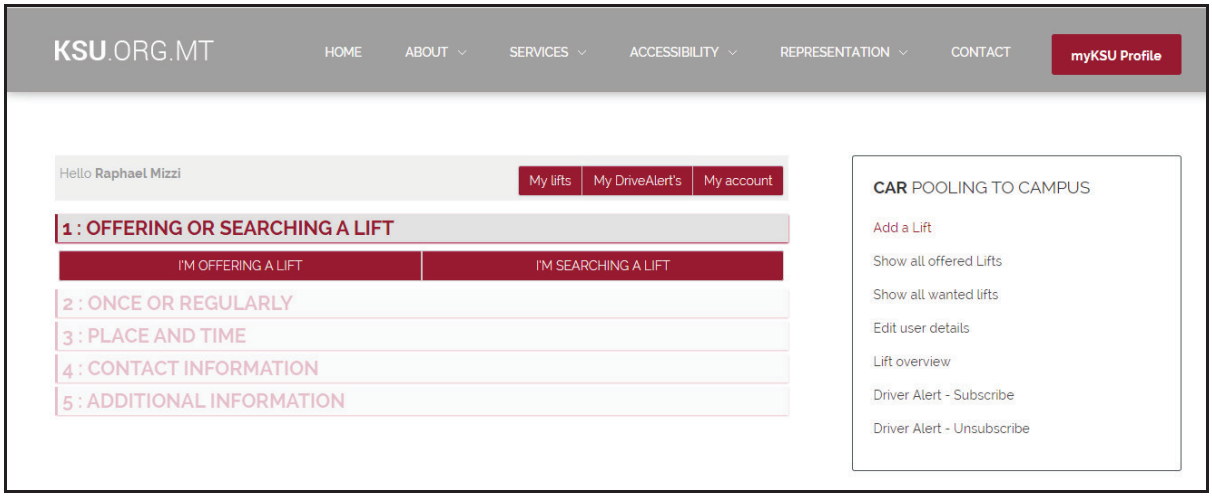
Tunnel Traffic Lights

As part of the efforts of the University to encourage walking and pedestrian safety, a set of traffic lights have been installed at the tunnel leading to and from the Sports Area/South Gate. This has made it possible for the construction of a pavement for the safe passage of pedestrians.

Information was provided in a specific notice to staff and students, available at http://www.um.edu.mt/nocentries/notices/tunneltrafficlights

Car-pooling

The initiative of a car-pooling application was taken over by KSU and in December 2014 they launched the 'KSU Car Pooling Application'. The main aim of this system is to reduce the number of vehicles travelling to and from UoM, by matching a number of drivers and riders travelling to the same destination in real time. The GTP coordinator together with IT Services Department are looking at means to extend this system to UoM staff.



Public Transport

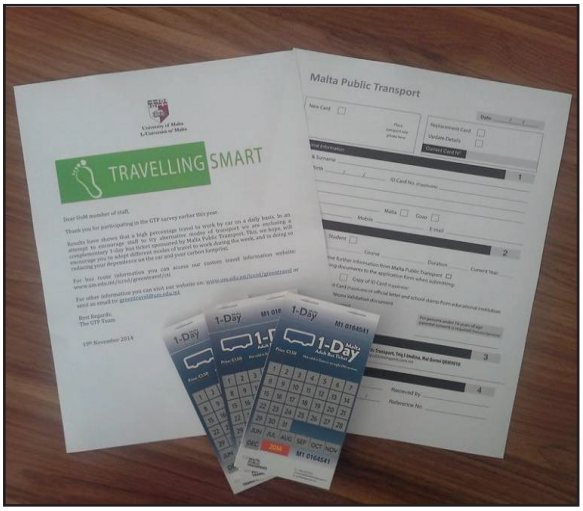
GTP collaboration with Malta Public Transport on Car Free Day 2014

The GTP Coordinator collaborated with MPT to provide free bus tickets to UoM employees on the 22nd September 2014. The aim was to encourage the use of alternative means of transport not only among students but also among University employees, thus helping to reduce the amount of pollution and traffic on roads leading to and from the University Campus.

This initiative was also reported by the media *Free Bus Tickets to UoM Staff – 19 November 2014*
http://www.maltatoday.com.mt/news/national/43977/free_park_and_ride_on_car_free_day#.VQv4-o4hi53

Results from the last GTP survey carried out in 2014 showed that over 100 UoM members of staff, who participated in the survey, travel to and from UoM every day using their vehicle as their primary mode of transport.

The UoM would like to contribute to a reduction in the number of vehicles on the roads and eventually, reduce individuals' carbon footprint. A number of staff members commuting daily using their vehicle, and who have participated in the survey were randomly selected to try out the public transport service and were provided with a complimentary 1-day bus ticket.

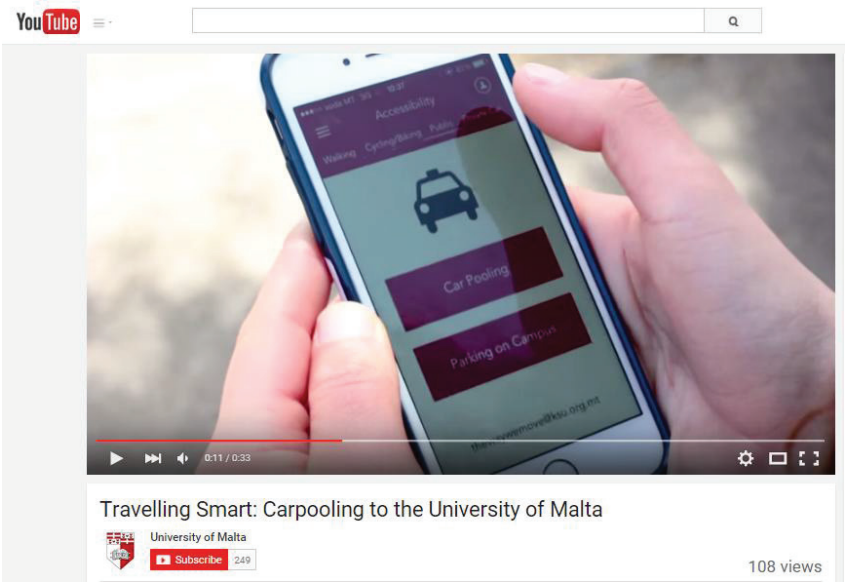


Other GTP initiatives on Campus

Travelling Smart Video Clips

During May 2015 the GTP Coordinator together with KSU and Communications Office filmed four different video clips promoting alternative transport methods to UoM. These were filmed around the UoM campus with students taking part as actors for the video clips. The video clips are shared on the GTP and KSU websites and are being used for promotional activities. The GTP would like to thank Mark Grech (KSU) and James Moffett (Communications Office) for their kind assistance and support.

Travelling Smart: Carpooling to the University of Malta



https://www.youtube.com/watch?v=WyTYySSNHmQ

Travelling Smart: Public Transport to and from the University of Malta

https://www.youtube.com/watch?v=L2clgFJMuiI

Travelling Smart: Walkway Facilities at the University of Malta

https://www.youtube.com/watch?v=xsi2y39h3iw

Travelling Smart: Bicycle Facilities at the University of Malta

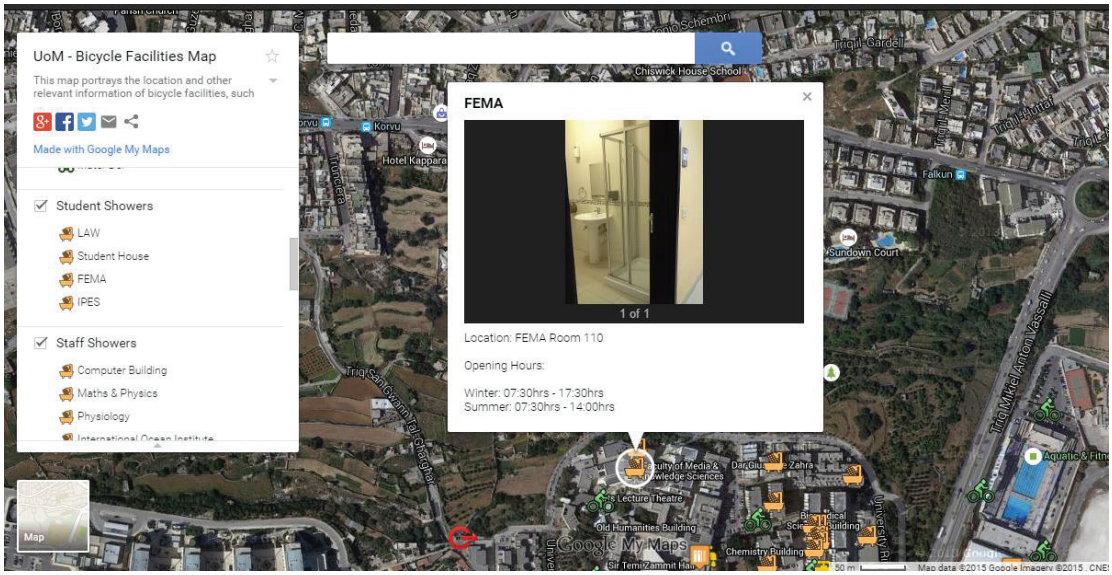
https://www.youtube.com/watch?v=7HB3fUkxI1c

Travelling Smart: Avoid Traffic and Parking Hassles

https://www.youtube.com/watch?v=oTrHpgikbQM

Installation of more showers on campus

During first months of 2015 the GTP Coordinator located more showers situated on campus which were not utilized and were in need of refurbishment. These showers were reported to Estate and Works Department and by May 2015 all the necessary work was completed. These showers were opened once again for UoM staff and students. Their location, together with other relevant data and images, were added to the Bicycle Facility Map.



Events

GTP during Freshers' Week 2014

The Green Travel Plan UoM was present at Freshers' Week 2014 with a dedicated stand about travelling to and from University by different modes. The stand had also a variety of bicycles, including an e-bike.

The GTP Coordinator delivered information to students and staff regarding green travel while the representative of Pedal Power gave custom information on which commuting bicycle is best for ones needs. Visitors had also the opportunity to book a test ride from the stand.

An A5 leaflet promoting the GTP initiatives was designed and disseminated to visitors together with other promotional material.

Malta Public Transport was also present on University Campus from day one of Freshers' week. The stand offered a "help desk" where personnel answered queries related to bus routes. Visitors had also the opportunity to produce their SaverCard on the stand.

University of Malta
L-Università ta' Malta

TRAVELLING SMART

Why don't you leave the car at home every now and then? Choosing to walk, cycle or ride the bus is not only good for your health but also good for the planet!

Bus—UoM is easily accessible by bus. A number of routes pass within easy walking distance from campus.

Using the bus instead of driving frees up time to do something that you enjoy. Use your journey to catch up on emails, text your mates, read the paper or do the latest Sudoku challenge. Or simply relax, let someone else do the driving, and plan for the day ahead.

Visit www.um.edu.mt/iccsd/greentravel/cti for bus route information.

Walk — You can practice your daily exercise by walking to/from University.

Did you know that it only takes 30 minutes to walk from Birkirkara to UoM? If you need to have a quick shower before starting your lectures you can use UoM shower facilities.

Cycle - Did you know that travelling by bicycle to UoM can be faster than bus and vehicle in peak traffic times? If you are thinking about buying a bicycle, check out the bicycle discount scheme which is supported by Pedal Power.

Ask KSU for more details about this scheme.

Car Pooling—So you really need to drive?... Why not check out car pooling options. You can set up your own, or join an existing group. A useful website is: www.facebook.com/CarpoolMalta

For more information on green travel initiatives visit: www.um.edu.mt/iccsd/greentravel

GTP during Discover University 2014 Sunday event

As part of the GTP promotion, this year's theme for Discover University Open Week was 'Walking'. Mr Mizzi the GTP Coordinator, Ms Lara Gerada from the Health Promotion Unit at the Ministry of Health, together with other representatives were present at the stand of the ICCSD delivering information to visitors about the benefits of walking.

The 'Walking' theme was sponsored by Mochika who displayed items related to walking, such as trekking shoes, socks, clothing and insoles as part of their promotion. Visitors had the opportunity to optimize their step and improve their striding comfort by listening to the Mochika representative who advised about the use of insoles according to footbed formation.

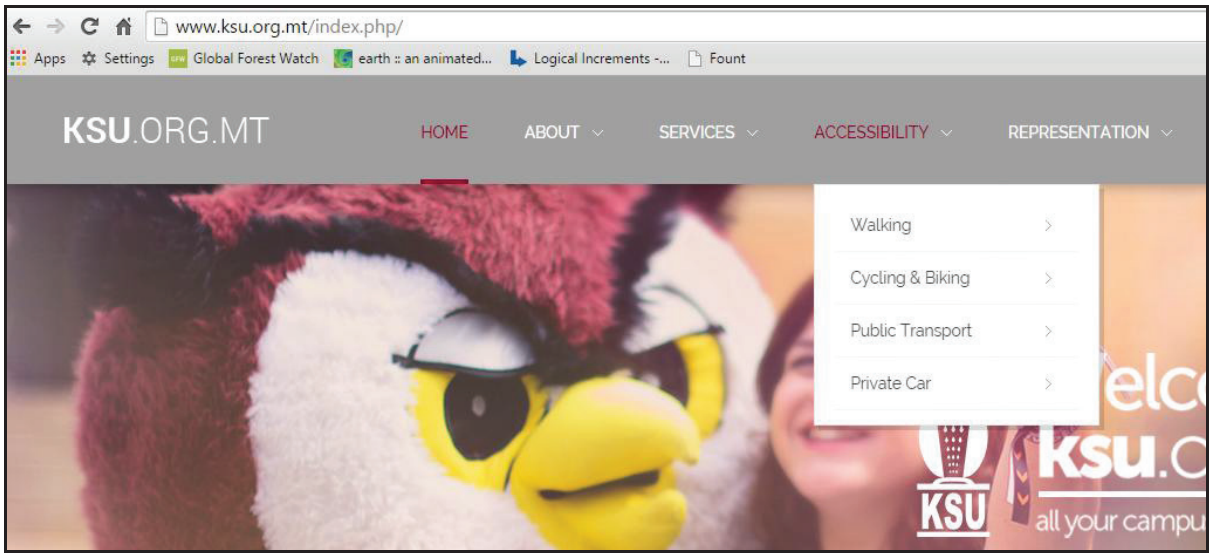
Later in the day the GTP team led a short walk around the Msida Campus. All along participants could learn about the proper use of subways and zebra crossings, and quieter and alternative walking routes to major roads.

KSU Press Conference on Accessibility

On the 10th December 2014 KSU launched a press conference entitled 'The Way We Move'. During this conference KSU launched several initiatives aimed at encouraging students to shift to alternative transport while they commute to and from UoM, in order to alleviate the problems related to parking and traffic. Mr Mizzi was present for this conference together with other members from transport related entities.

https://www.youtube.com/watch?v=detQFbBSzZI

KSU added a new tab in their website entitled 'Accessibility' where it contains information about alternative transport methods such as, walking, cycling, public transport and car pooling.



GTP during Global Campus World Café

On the 9th December 2104, the GTP Coordinator, Mr Raphael Mizzi was present at the first Global Campus World Café at UoM canteen, together with a number of students' organisations and partners, delivering information on alternative transport methods.

UoM Students

In May 2015 Masters students from the Faculty of Built Environment – Department of Spatial Planning and Infrastructure, requested GTP data for a University transport project.

Participation in International Scientific Committees

Academic members of staff of the Institute have participated and contributed to a number of scientific committees and conferences during the period under review. Below is a list of contributions.

- Prof. Maria Attard continues to co-lead the NECTAR Research Cluster 2 on Policy and Environment. NECTAR is the European Transport Research Association

- Prof. Maria Attard continues to co-lead the Special Interest Group G3 on Urban Transport Planning and Policy in World Conference on Transport Research (WCTR). This year she chaired the Scientific and Organising Committee for the SIG G3 International Conference *Urban Transport Policy and Climate Change Targets*, organised by the Institute at the Valletta Campus, 13-14 April 2015.

- Prof. Maria Attard is co-chair of the Climate Change Committee of the Association for European Transport (AET). She will be automatically designated as part of the annual conference scientific committee.

- Prof. Maria Attard is a member of the Emerald Advisory Board of the Transport Sustainability Book Series, published by Emerald. This year Prof. Attard published a co-edited volume on Sustainable Urban Transport with Prof. Yoram Shiftan (Technion).

- Prof. Maria Attard was member of the Scientific Committee for the NECTAR 2015 International Conference "Smart Transport – Smart Planning" organised by the Association of European Communications and Transport Activities Research (NECTAR), University of Michigan at Ann Arbor (USA), 14-16 June 2015.

- Ms Nicolette Formosa and Prof. Maria Attard hosted and chaired the Early Career Researchers Conference on Autonomic Road Transportation Systems (ARTS) supported by COST Action TU1102, at the Corinthia Hotel, Balzan, Malta, 27-28 May 2015.

- Prof. Maria Attard chaired the scientific committee and hosted the ENERGIC 2015 Training School as part of the COST Action IC1203, at the University of Malta, Msida.

During the period under review **Prof. Maria Attard** acted as paper reviewer to a number of academic journals including the Journal of Transport Geography (Elsevier), ICE (Institute of Civil Engineers) – Transport (ICE) and Transportation and Research Part A: Policy and Practice (Elsevier).

Other staff news

Raphael Mizzi, the Green Travel Plan Coordinator within the Institute attended a number of events over the year. These included:

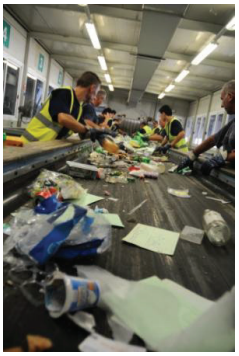
- The STREETS Project Information Day on the 24 October 2014
- Launch by the EC Representation in Malta – Study on the Impact and Cost of Road Traffic in Malta on the 30 January 2015
- The Institute for Sustainable Energy Annual Conference on the 17 March 2015.
- The WCTRS SIG G3 International Conference on Climate Change and Urban Transport Policy organised by the Institute on the 12 – 14 April 2015
- The COST ENERGIC Training School organised by the Institute in Malta between the 8 – 12 June 2015

Ms Rosalie Camilleri was accepted for a PhD within the Institute with her research on transport and climate change. This is the first PhD student for the Institute. She is going to be supervised by Prof. Maria Attard and Prof. Robin Hickman (UCL Bartlett School of Planning, UK).

Mr Carlos Canas Sanz was awarded a scholarship to attend the training school on Crowd-sourced Geographic Information and Citizen Science held by the Vespucci Initiative in Fiesole, Florence during the summer in 2014. The following summer I was also awarded with a scholarship to attend another training school on Volunteer Geographic Information and Citizen Science organised by the Institute for Climate Change and Sustainable Development at the University of Malta. Both summer schools included about 30 participants and facilitators from all over the world that ranged from master students that are about to start their PhD studies, to established professors who came to learn and share knowledge. The workshops were supported by COST Action IC1203 ENERGIC.

Mr Carlos Canas Sanz was the first runner up for a competition called "The Innovation Challenge: Go Green" held by the Edward de Bono Institute at the University of Malta. The aim was to identify an environmental problem that affects Malta, and come up with a green innovation solution to this problem. Mr Canas presented a project related to the environmental and health hazards posed by the littering of cigarette butts and suggested setting up a local network which would collect cigarette butts and recycle them into toxic-free plastic souvenirs that creates benefits to find the whole process. The project will be published in a Journal later in the year. Mr Canas has also been invited to attend an international event called "Towards collaborative practice – European conference on youth work, social innovation and enterprise" which will take place in Malmo, Sweden in November 2015.

Ms Margaret Camilleri was involved in a number of lectures with a number of students coming from different disciplines. The lectures involved also a series of fieldtrips to Sant' Antnin Waste Treatment Plant and presentations about sustainability, including a special session coordinated by Greg Nowell co-founder of Sharklab Malta.


During summer 2014 **Ms Margaret Camilleri** and **Mr Anton Pizzuto** held a series of meetings with the Ministry for the Economy, Investment and Small Businesses (MEIB) regarding the possibility of assisting MEIB to organise a Sustainable Enterprise Award to encourage local businesses to make their operations green. The proposal was accepted and subsequent meetings were held in April and May 2015 regarding the conduct and application for the award. During July Ms Camilleri and Mr Pizzuto conducted site visits related to the award and supported the organization of the event, which is set to happen later in 2015.

Ms Thérèse Bajada also participated in the following events related to her Continued Professional Development:

- 15th October 2014 *Transforming transport research into policy and practice* High Impact Conference held at the Church House Conference Centre, Westminster, London, UK. The conference involved research done by UCL and the University of Oxford on transport related issues, such as Urban Wellbeing, Improving Accessibility for Older People, and Climate Change. A Panel Discussion followed, which highlighted the importance of integrating research that provides implications for policy-making and eventual practice

- 21st October 2015 *Is Big (geo) Data the next big thing in GIScience?* A talk by Prof. Michael Goodchild, UC Santa Barbara at UCL, London, UK.

- 22nd October 2014 *Benchmarking disaggregate customer satisfaction scores of public transport operators in different cities and countries.* UCL Centre for Transport Studies Seminar Series. Talk by Mr Mark Trompet, Head of Bus Benchmarking and an Associate Director of the Railway and Transport Strategy Centre, within the Centre for Transport Studies at Imperial College London, UK.

- 23rd October 2014 *Managing stakeholders in large and complex construction projects*. Attended a USAR (Urban Sustainability and Resilience Programme) Seminar. Talk by Prof. Geoffrey Shen from the Research Institute for Sustainable Urban Development, Hong Kong Polytechnic University, at UCL, London, UK.

- 19th February 2015 Ms Bajada attended a short course on LaTeX for Bibtex at UCL, London, UK.

- 20th February and 6th March 2015 Ms Bajada attended short courses on *Creativity and Craft in Writing* at UCL, London, UK.

- 25th February 2015 *Bus Deregulation – 30 years on* TEG (Transport Economists' Group) Seminar Series. Attended a talk by Prof. John Preston, University of Southampton, in London, UK.

- 10th March 2015 *Effecting a change in individual travel behaviour: How to increase walking and cycling*. UCL Centre for Transport Studies Seminar Series. Talk by Dr Eva Heinen, University of Cambridge (UK) and researcher at Delft University of Technology (the Netherlands), at UCL, London, UK.

- 11th March 2015 *Impact and Public Engagement*. Attended a seminar organised by the Arts & Humanities Research Skills Programme for Postgraduate Students, UCL, London, UK.

- 23rd March 2015 attended a short course on *Practical SPSS*, UCL, London, UK.

Prof. Maria Attard was invited as Visiting Professor at the Department of Civil and Environmental Engineering, University of Catania, Italy. She delivered lectures to engineering students under the Progetto RESET, Azione Formazione Master Universitario di II Livello, 9th and 10th July 2015.

Prof. Maria Attard was invited as discussant at *The Future of Traffic Management – Innovative Mobility Seminar*. Organised by the Malta Chamber of Commerce, Enterprise and Industry, the German Maltese Business Council and the Embassy of the Federal Republic of Germany, Valletta, Malta. October 2014.

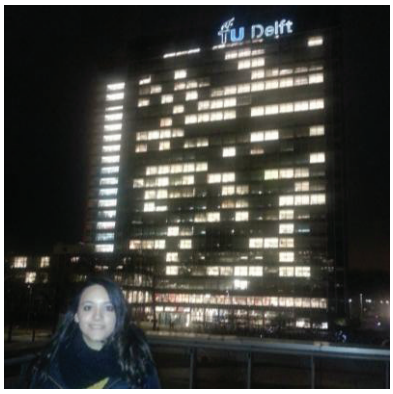
Prof. Maria Attard was the Chair of the Adjudicating Committee for the 2014 TransLog Awards organised by SSM Group and BPC (2014).

Other Initiatives

Participation in COST

Prof. Maria Attard continued to serve as member of the Transport and Urban Development Domain Committee within COST until early 2015. Other members of the Institute or affiliated academics have participated in COST Actions and events.

Prof. Maria Attard continued to act as DC Rapporteur on the COST Action TU1102 Towards Autonomic Road Transport Support Systems (ARTS) (2011-15). **Dr Kenneth Scerri** and **Ing. Luana Chetcuti Zammit** (Faculty of Engineering) are the MC members on this Action. **Ms Nicolette Formosa** attended the ARTS Training School in Sofia as well as an Early Career Researchers workshop at TU Delft, The Netherlands between the 19th and 20th November 2014.



Ms Formosa attended another workshop at the COST Office in Brussels on the 6th February 2015, representing the COST Action. Following that she was invited to the University of Newcastle on work and tasks related to the ARTS COST Action and the activities related to Early Career Researchers, including the conference organised in Malta later in the year.

Prof. Maria Attard was assigned as DC Rapporteur on the COST Action TU1209 Transport Equity Analysis: assessment and integration of equity criteria in transportation planning (TEA). **Ms Thérèse Bajada** and **Ms Deborah Mifsud** (Institute for Climate Change and Sustainable Development) are the MC members of this Action.

Ms Deborah Mifsud and **Ms Thérèse Bajada** attended the second TEA Workshop: Workshop on Equity Analysis and Assessment: Bringing together different data and evidence and 4th Working Groups Meeting of the TEA COST Action in Rotterdam, Netherlands 9-10th December 2014.

Ms Mifsud was also the rapporteur of a Panel Group that discussed the mobility needs of groups at risk of accessibility poverty.

Prof. Maria Attard and Prof. Matthew Montebello (Faculty of ICT) continued to participate in COST Action IC1203 ENERGIC (European Network Exploring Research into Geospatial Information Crowdsourcing): software and methodologies for harnessing geographic information from the crowd (2012-17). Mr Carlos Canas Sanz benefitted from two scholarships to attend the ENERGIC Training Schools in Fiesole, Italy (2014) and at the University of Malta (2015). He later joined the COST Action and is active in the research community particularly the Early Career Researchers network.

In 2015 the Institute organised two COST events in Malta.

Autonomic Road Transport Systems (ARTS) Early Career Researchers Conference Hotel Corinthia, Balzan, Malta 27th - 28th May 2015

The ARTS ECR 2015 Conference was organised as part of the COST Action ARTS. This was an opportunity for Early Career Researches with an interest in Autonomic Road Transport to produce an original piece of scientific work and present it to an audience of peers and experts in this field. The conference attracted 25 participants with 17 ECR presentations and keynotes by experts and invited guests including Mr Rasmus Lindholm, Partnership Services and Communications Director – ERTICO, the European umbrella organisation for Intelligent Transport Systems. **Ms Nicolette Formosa** and **Prof. Maria Attard** organised the conference in collaboration with Dr Fabio Galatiolo, University of Newscastle.

Further information about the conference is available at http://www.um.edu.mt/iccsd/news_and_events/isdconference/artsecr2015

IC1203 COST ENERGIC 2015 Training School on GIS, Crowd-sourced Geographical Information and Citizen Science, University of Malta, Msida Campus, Malta 8th - 12th June 2015

The Institute organised and hosted the second training school of the ENERGIC COST Action in June 2015. The support of COST enabled the training school to engage seven trainers from across Europe and provide funding for 21 participants from all over the world.

The Training School focused on various aspects of GIS, crowd-sourced Geographic Information and the role of Citizen Science. The aim of the training school was to share experiences with using GIS, collecting geographic information and exploring Citizen Science. The training school was a mix of lecture based sessions and in-the-field experiences collecting geographic data. Tutors and facilitators provided facilities for participants to try

out new ways of interacting with Geographic Information as well as support learning with lectures and tutorials. The training school was open to a wide range of participants having a basic knowledge of GI and GIS.

Prof. Maria Attard was joined by Prof. Cristina Capineri (Univ. of Siena), Prof. Muki Haklay, Dr Vyron Antoniou and Dr Claire Ellul (UCL), Dr Rob Lemmens (ITC, Netherlands) and Dr Nuno Charneca (LNEC, Portugal). Each of the trainers contributed to a series of lectures and hands one sessions with participants (primarily PhD students) from Europe, Brazil, New Zealand, Middle East and China. The training school included a citizen science project in Gozo and hands on sessions with a variety of mobile equipment to collect geographic information.

A truly international training school which succeeded not only to engage, educate and inspire participants, but which formed long lasting relationships and networks amongst early career researchers.

More information about the training school is available at http://www.um.edu.mt/iccsd/news_and_events/cost_energic_training_school_2015

The Institute 2015 International Conference

Climate Change Targets and Urban Transport Policy

in collaboration with the World Conference on Transport Research (WCTR) Special Interest Group G3 Urban Transport Planning and Policy

organised at the University of Malta, Valletta Campus 14th - 15th April 2015-12-16

Transport is responsible for more than 20% of CO2 emissions worldwide and its contribution is increasing rapidly across many countries, especially in medium to large cities. There are concerns about the importance of climate change targets in policy as climate change mitigation strategies deal less and less with transport activities. The increase in mobility of people and goods in and around cities and the importance of adopting sustainable transport practices will play an important role in achieving climate change targets. This conference aims to serve as an arena for discussing the role of policy in reducing impacts, managing demand and move people and goods effectively, and showcase urban transport policies that aim or contribute to reduce the impact of transport in climate change.

The conference attracted over 80 participants who presented their work during the two days of the conference. Conference participants arrived from Europe, Australia, North America, Indonesia and Japan. The conference was supported by Transport Malta, the European Commission Representation in Malta, Dopplemayr, Magri Cycles, Air Malta, Malta Council for Science and Technology and the Ministry for Climate Change, Environment and Sustainable Development, and Malta Public Transport.

The TEA COST Action (Transport Equity Analysis) co-located a working group meeting during the conference with a series of presentations dealing with equity in transport.

The conference was opened by the Hon. Joe Mizzi, Minister for Transport and Infrastructure. A series of keynote speakers attended the conference including Prof. Deb Niemeier, University of California Davis (US), Prof. Dominic Stead, TU Delft (The Netherlands), Prof. Yoram Shiftan, Technion (Israel). The presentations included seven Maltese researchers all working in the field of transport.

More information about the international conference is available at http://www.um.edu.mt /events/g3wctrs2015



CLIMATE CHANGE TARGETS AND
URBAN TRANSPORT POLICY


B.A.G.
Hierarchy of Controls
For safer roads for cyclists


RMIT

The Institute Visiting Lecturers

This year the Institute hosted Prof. Yoram Shiftan from the Technion, Israel's Technical University in Haifa in April 2015. Prof. Shiftan delivered presentations at the University and participated in the WCTRS SIG G3 International Conference organised by the Institute.

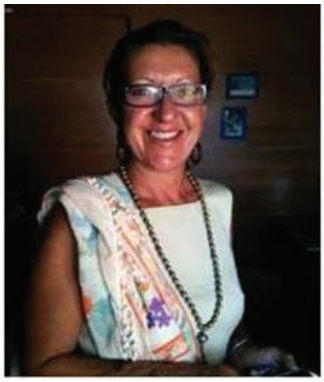
Prof. Yoram Shiftan, Technion, Israel
http://yoramshiftan.net.technion.ac.il/

Yoram Shiftan is an Associate Professor of Civil and Environmental Engineering in the Technion, and the previous Head of the Transportation and Geo-Information Department. Prof. Shiftan teaches and conducts research in travel behavior with a focus on activity-based modeling and response to policies, the complex relationships between transport, the environment and land use, transport economics and project evaluation. Prof. Shiftan is the editor of Transport Policy and the chair of the International Association of Travel Behavior Research (IATBR). He is a member of the Transportation Research Board (TRB) Committees of the Public Transportation Marketing and Fare Policy Committee (AP030), and the Committee on Metropolitan Policy, Planning, and Processes (ADA20), and a past member of the Travel Behavior and Values Committee (ADB10). He is the co-chair of the Network on European Communications and Transport Activities Research (NECTAR) cluster on Environment and Policy, member of the World Conference Transportation Research (WCTR) scientific committee, and chair of its Transport Security Special Interest Group. Prof. Shiftan received his Ph.D. from MIT and since then has published dozens of papers and co-edited the books 'Transportation Planning' in the series of Classics in Planning, and "Transition towards Sustainable Mobility, The Role of Instruments, Individuals and Institutions." In Israel, Prof. Shiftan was the president of the Israel Association of Transportation Research and chaired two of its annual conferences.

Prof. Shiftan will be delivering a public lecture entitled

Public Transport and Parking Policy as the Main Pillars of Sustainable Transport Policy

Then in June, the Institute hosted Prof. Cristina Capineri from the University of Siena who delivered a public lecture as part of her visit during the ENERGIC Training School organised by the Institute at the University of Malta.



Prof. Cristina Capineri, University of Siena, Italy
http://www.dispoc.unisi.it/it/dipartimento/persone/docenti-di-ruolo/cristina-capineri

Cristina Capineri is Associate Professor in the Department of Cognitive Sciences and Social Policies of the University of Siena, where she teaches political geography, economic geography and development. She directs the Laboratory **Ladest** at the same Department. She graduated from the University of Pisa and subsequently followed the specialization course in Tourism Economics, University of Florence. In 1990 she received his PhD in Urban and Regional Geography. From 1987 to 1991 she was a member of the Editorial Board of the Italian Geographical Magazine and since 1998 is the scientific secretary of the Society of Geographical Studies, based in Florence. Among other charges taken: Commission Transport Research Board of the National Science Foundation (USA) from 2000 to 2006; Management Committee of the Landscape Museum, Castelnuovo B.ga (Siena) (since 2001) of which she was also scientific curator; Steering Board of the NEXUS Network, Network Sustainable Siena, University of Siena; founding member of the Vespucci Initiative (www.vespucci.org) (since 2002). She is now the Chair of the COST Action ENERGIC (EUROPEAN NETWORK EXPLORING RESEARCH INTO INFORMATION GEOSPATIAL CROWDSOURCING) (2012-2016). Her areas of research concern the issues of globalization and transport, sustainable development, local development and production of environmentally friendly farming and quality, methods of evaluation and measurement of sustainability and eco-efficiency, geographical information systems, the information generated by users (Volunteer geographic information) and citizen science.

Prof. Capineri will be delivering a public lecture entitled

Supported by:

The Fortune of Volunteered Geographic Information

Wednesday 10th June 2015 at 6:00pm in Lecture Theatre 1

ENERGIC
European Network Exploring Research into Geospatial Information Crowdsourcing

cost

Staff Publications for 2014-15

1. Von Brockdorff, P., **Mifsud D.** (2014) Transport by the elderly: comparing use of private and public transport to access out-patient services at Mater Dei Hospital (Malta). *Bank of Valletta Review*, Vol. 49 pp 21-50.

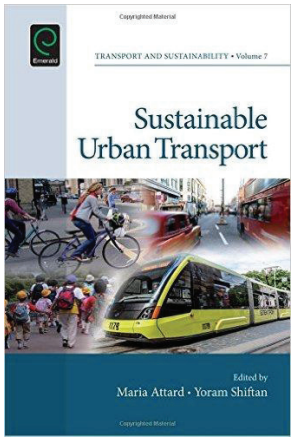
2. **Attard, M.**, Ison, S.G. (2015) The effects of road user charges in the context of weak parking policies: the case of Malta. *Case Studies in Transport Policy*. Vol. 3(1) pp 37-43.

3. **Attard, M.**, Von Brockdorff, P., Bezzina, F. (2015) The External Costs of Passenger and Commercial Vehicle Use in Malta. University of Malta – European Commission Representation in Malta.

4. **Formosa N.** and Scerri K. (2015) Modelling and Interpolations of Spatio-Temporal Datasets. *Xjenza – Journal of Malta Chamber of Scientists*. Vol. 3(1) pp 23-30.

5. **Attard, M.**, Shiftan, Y. (2015) Sustainable Urban Transport Transport and Sustainability Series. Emerald Publisher.

6. **Bajada, T.** (2015) The Malta Bus Service Reform: Implications for policy from a "natural experiment" of attitudes towards bus service quality, and modal shift. In M. Attard & Y. Shiftan, eds. *Sustainable Urban Transport*. Emerald Publishing Limited, pp. 93–119. Available at: http://dx.doi.org/10.1108/S2044-994120150000007016



Participation in Local and Community Events and Initiatives

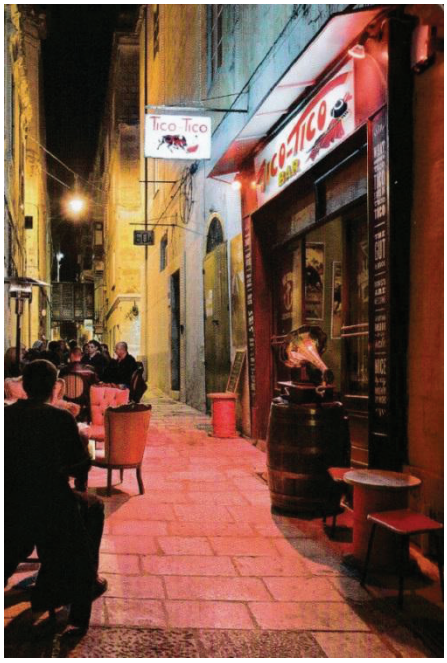
TV and Radio Contributions

During the year Prof. Maria Attard contributed to a number of television and radio programmes to raise awareness and discuss issues related to sustainable mobility. Programmes included TVAM (PBS), Newsbook (RTK Radio), Għandi X'Ngħid (Radju Malta), NET Television, Super One Television and Campus FM.

Annex 1

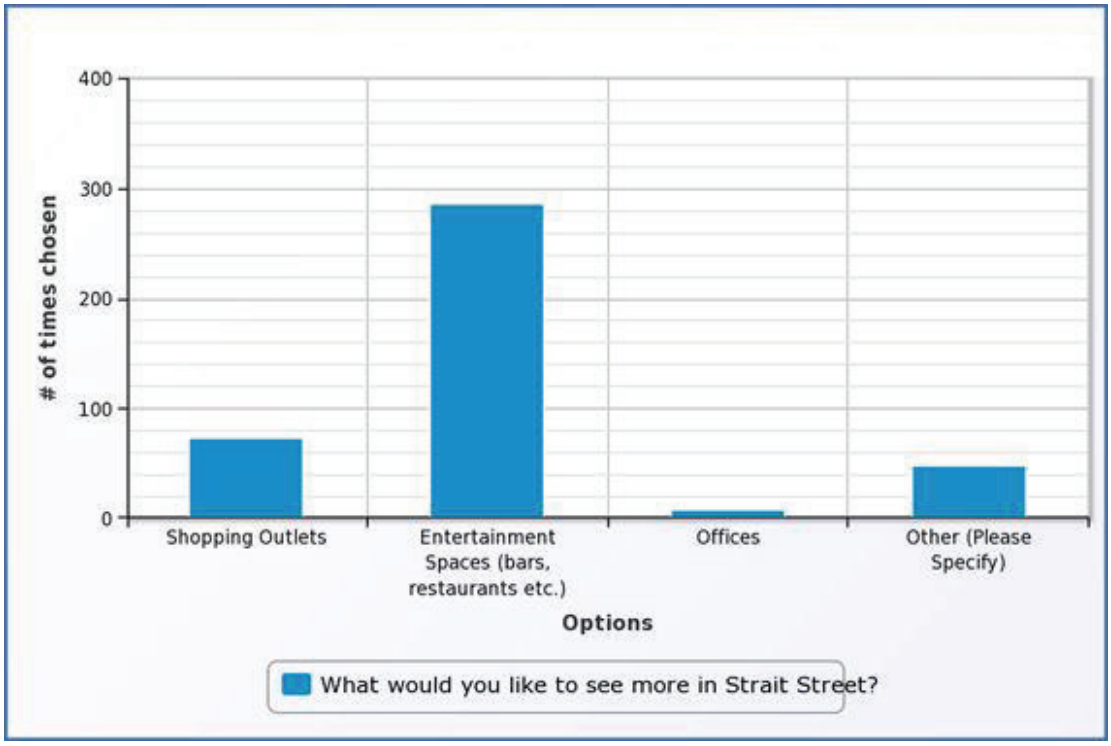
Social Sustainability, Urban Regeneration and Postmodern Development approaches for Strait Street, Valletta.

by Jonathan Caruana BSc Geography and Environment (Lond.)



Reconciling the improvement of poor neighbourhoods through the eradication of visible problems with the countervailing needs of regeneration and community may be the biggest challenge facing government approaches to neighbourhood renewal. Such consideration is one of the main themes concerning social sustainability. Close attention should be paid to the practical, operational and perhaps less economically friendly aspects of social sustainability. Cities are today embarking on policies of urban renaissance, at the heart of which is the re-establishment of neglected areas. Their conversion into thriving and attractive urban districts is often based on consumption and visual attraction, as well as a support for 'ephemeral' quick fix activities such as events and festivals, instead of long term legacies in the shape of long term sustainable housing provision. Like other European cities, Valletta seeks to attract tourists, as well as financial investments, by bolstering its image as centre for cultural innovation. Grand projects such as the City Gate development help in this purpose. Without effective measures in other areas however, such efforts could become isolated, with no effective links to the rest of the urban area.

Strait Street has in the past years regained its reputation as the capital's main spot for entertainment. Commercial activities however should form only part of any regeneration project. The importance of creating a harmonious relation between its residents and the on-going commercial revival cannot be overstated. An Online Questionnaire carried out as part of this research, showed a strong consensus that regeneration in Strait Street should emphasise on both commercial and cultural activities. A clear preference was directed towards entertainment, as opposed to a 'retail' space (see Figure 1). The potential for business opportunities makes Strait Street fundamental for any revival of the city's nightlife. The street's past is now its main attraction. A sense of nostalgia fuels the imagination of its visitors. Most of all, as one interviewee noted, there is a wish to attract the 'right' type of people, a 'niche in society' attracted by stylish decoration and appearance.



The term 'regeneration' however does not solely involve the restoration of stone fabric and creation of visually attractive spaces. It is also about giving a long term sustainable use to abandoned buildings. The amount of vacant spaces present in the street remains a major problem. This has perhaps been the main degenerative force from which Valletta has been suffering during the past decades. As was the case with other European cities, the gradual emptying of property creates excellent business opportunities for business developers with enough financial muscle to buy and redevelop them into commercial spaces or new spacious - and often luxurious - housing properties. As a result however, the few remaining residents risk being muscled out and replaced by new and wealthier occupants. For now, this process of gentrification appears to be a distant, yet still possible, scenario. One of the objectives of the European Capital of Culture event should be to attract residents back to the city but the long-term social needs of communities should not be overlooked in the quest for immediate economic returns.

Jonathan Caruana completed his MSc research in 2015 under the supervision of Prof. Maria Attard.

The research work disclosed in this publication is partially funded by the Master it! Scholarship Scheme. The scholarship is part-financed by the European Union – European Social Fund.

Kids on the Move

by Rebecca Cassar B.A. Hons (Melit.)

Private car ownership and usage have been growing with the increased desire for independent mobility. As the Integrated Transport Strategy Directorate is presently analysing all modes of transport, the current national transport government policy seeks sustainable mobility by deploying ITS to achieve modal shift from the private car to non-car modes and easing traffic congestions.

At present, Malta has one of the highest per capita car ownership levels in the EU. The private car accounts for 74.6% of modal split in the Maltese Islands (NSO, 2010). As of the end of 2014, there were 256, 950 licensed vehicles in the Maltese Islands. This equates to approximately 768 cars for every 1000 citizens and 1, 355 cars per 1000 licensed drivers (NSO, 2015). Additionally, 53% of all households own more than one car. Moreover, considering the car is present in 94% of Maltese households with children (NSO, 2007), Maltese families have become heavily dependent on the use of the private car as their mode of transport.

A recent study conducted as part of a Master of science in Sustainable Development at the Institute for Climate Change and Sustainable Development, highlighted the importance of modal shift amongst Maltese children. The research established that the determinants of the child's gender, age and the distance travelled affect modal choice in different ways. It also studied the social and educational effects of each mode of transport on Maltese children in regards to their geographical bearing and spatial cognition. Therefore, the aim of the study has been to increase awareness amongst parents and policy makers alike on the degree of car dependence experienced by Maltese children.

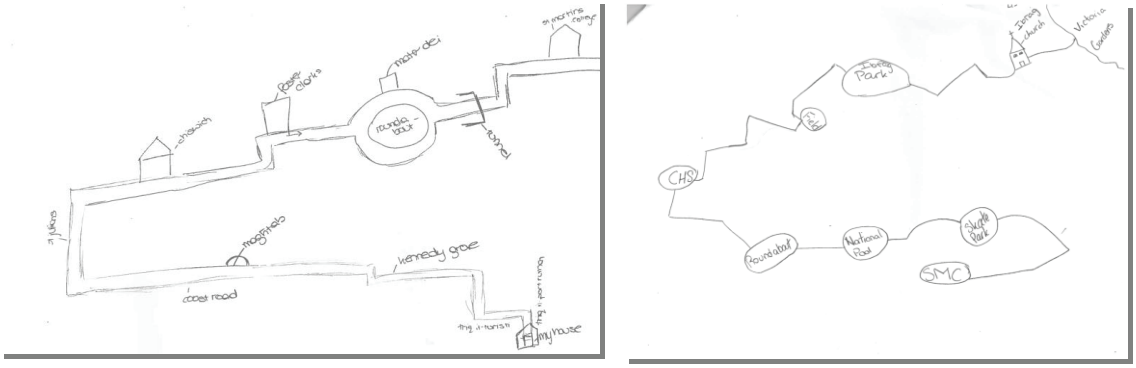
Data was obtained through the use of child-profile questionnaires and travel diaries handed out at St. Martin's College, Swatar. The participants involved were aged ten to fourteen years of age. The study on the modal split of the school children confirmed that the personal car was the most commonly used mode, regardless of their gender, age or the distance travelled. This was followed by the use of school transport which then increased in use for the journey back home. This showed how parents and children used different modes and did not depend solely on the use of the private car.

The modal shift was higher amongst boys, as 49% of boys used the car in comparison to 72% of the girls. This significant difference underlines the notion that gender influences modal choice. On the other hand, the use of the car was similar in the highest and lowest school levels of the sample, signifying that no pattern often exists between age and mode. Similarly, the use of the school transport was highest in the middle school level, but again no similar pattern was found between the school levels and the use of school transport.

The use of the car was equally high with an increase in the distance travelled. This creates an insignificant relationship between the popularity of the car and distance travelled. However, the use of school transport increased in popularity with increasing distance.

Participatory action research was employed to study how children build spatial and navigational skills through the mode of transport that they use on a daily basis. Here, the child's geographical and spatial skills were analysed by testing their knowledge of locations and the route travelled to school. As the children participated in mapping exercises, the level of spatial cognition shown was correlated to the mode used. Despite car use being perceived as having a negative effect on children, car-driven children were more spatially cognitive. In turn, the child-participants who travelled with school transport or practiced carpooling owned poor navigation skills.

The research aims to support policies working to change household and family transport behaviour. The popularity of school transport in the sample was higher amongst boys and increased with distance travelled. Therefore, strategies should be implemented to encourage families to practice modal shift even when travelling shorter distances, regardless of the child's gender.



Student sketches describing their journey to school

The car has also shown to create a greater spatial awareness during the child's journey, therefore this study concludes that the car should not be eradicated completely from the child's travel patterns, but be included in a mix of modes.

Sustainable practices in transport need to be put at the forefront of discussion on a national level. This would include alterations to the structure and nature of the journey to school. Carpooling schemes and a higher use of school transport need to be promoted.

Sustainable child mobility is also the individual responsibility of parents to practice more sustainable methods of travel. Sustainable mobility must be discussed between the family, as the home is where all fundamental decisions are primarily made.

Rebecca Pirotta completed her MSc research in 2015 under the supervision of Prof. Maria Attard.

Interrupting habit – car use habit and personal norm combined: Implications for Malta
by Sara Hazzard

The governments of European countries have committed themselves to implement sustainable urban policies addressing the impact of lost natural resources and the improvement of urban areas (the European Union's growth strategy 'Europe 2020'). Regions are therefore under pressure to strengthen the social interaction elements that bind them or risk reducing urban quality of life further. The need to be mobile and to have different forms of mobility exists everywhere to varying degrees. At the same time there is pressure to utilise land efficiently because indiscriminate development has revealed waste that regions can no longer afford, highlighting conflicting positions for major economic and environmental stakeholders. Not only is there the constant challenge to find affordable, sustainable fuel scenarios for the projected vehicle numbers around the world, numbers of which are illustrated in Figure 1 below, but there is the question of how the world's heavily urbanised regions would accommodate such volumes if that challenge was indeed met.

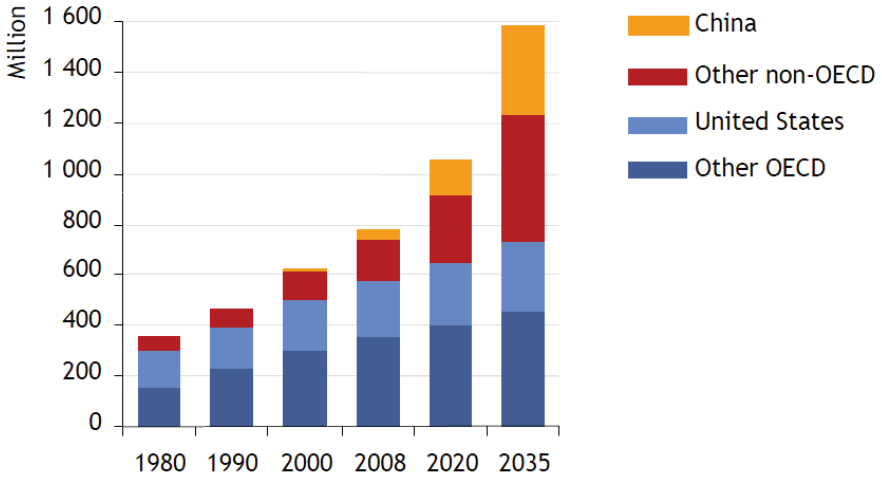
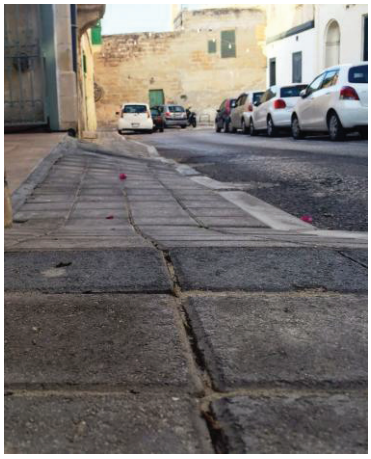
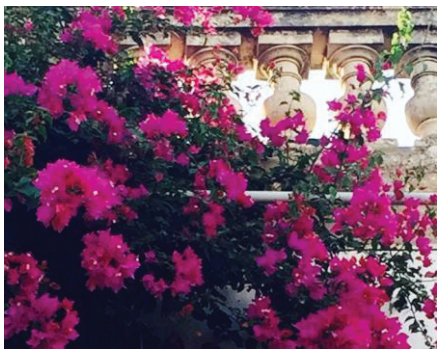


Figure 1 Passenger vehicles in the New Policies Scenario. Source: World Energy Outlook (2010).

The overall focus of this study was personal car use in an urban environment and the factors that influence individuals who use the car as their primary form of transport. The particular environment studied was Malta. Factors influencing car use were explored using a case study research method to produce data about different, interrelating aspects of an individual's life using car diaries and interviews. Articles sourced from local media, social media, government press releases and local authority media releases published before and during the time of the primary data collection, were sampled to illustrate the media house attention to the current environment, health and economic priorities and the peripheral impact this attention brings in forming the opinions of the participants.

The car has produced a high level of mobility in Malta and become a dominant mode of transport much as it has in most developed countries. Yet it has also brought higher levels of pollution, congestion and our natural spaces must compete with the infrastructure needed to meet its demand. There are differences in regions' infrastructure, regulation, income and culture that can explain why some countries have managed problematic mobility issues better than others. Malta is under pressure to address its problems compounded by an ever-increasing number of vehicles on the roads whilst car occupancy rates remain low; the last National Household Travel Survey recorded a car occupancy rate of 1.255 persons (National Household Travel Survey, 2010). The annual increase in the number of licensed vehicles in Malta indicates that road congestion will continue to increase if the car remains the preferred mode of transport.

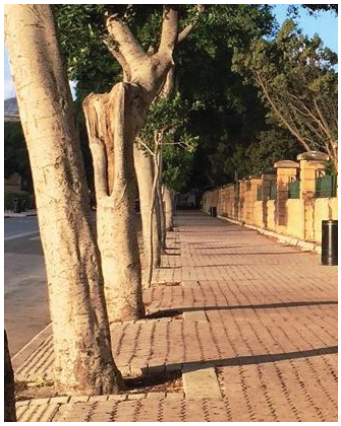




It cannot be overlooked that the natural environment could be exposed to further degradation unless measures are taken that not only change the way cars are used, but that also reduce the land resource required to support their use. An area's local population places complex demands on the available transport infrastructure and travel patterns can vary along with the many different cultural and socio-demographic factors. Looking at the circumstances and responses to questions of mobility faced by a few individuals can contribute to new hypotheses for further research that can provide solutions for better, sustainable urban communities.

What can a behavioural study conducted in Malta reveal?

While infrastructure improvements alleviate traffic flow for the short-term, a commitment to applying restrictive measures is generally accepted within the research as necessary (Attard and Bezzina, 2014). Reducing the number of cars on the roads can be achieved by limiting the number of cars people own and/or restricting when they use them, but decisions employed by authorities to restrict car use are met with resistance because they restrict personal freedoms (Bamberg et al., 2003; Tertoolen et al., 1998). Another scenario would be to capitalise on reinforcing behaviour in which people choose to not drive. Strategies that focus on reducing the demand/need to use the car at any given time/for particular purposes, have attracted researchers to try to establish what role psychological and social factors play in determining sustainable travel (Steg and Gifford, 2005; Prillwitz and Barr, 2009). This study aimed to gain valuable insight into the car-dependent culture in Malta and to build on the quantitative studies that have explored local household travel patterns in recent years. It was a small-scale study of seven participants, where each one was exposed to an implementation intention strategy to challenge them to rethink their car use and seek a viable alternative, one that they were prepared to commit to implementing because there was benefit to them personally.



A basic premise for the study was that a significant proportion of car users in Malta could be measured as being habitual in the manner in which they used their cars. The notion of habit is related to car-use behaviour by the fact that, as many researchers claim (Verplanken, Aarts and van Knippenberg, 1997; Ouellette and Wood, 1998; Aarts and Dijksterhuis, 2000; Gärling, Fujii and Boe, 2001; Bamberg, Ajzen and Schmidt, 2003), everyday travelling is by definition repeated, performed under stable circumstances, and produces reinforcing benefits valued by the car user. It is viewed to be either an automatic decision with only one choice alternative being considered or as a behavioural script stored in memory and chosen again and again in familiar situations (Verplanken and Aarts, 1999; Fujii and Gärling, 2003; Klöckner and Matthies, 2004).

A second premise was that using the car might not result in the optimal choice for performing the task concerned. The research questions asserted that habitual car use could be interrupted under particular conditions, but which had yet to be tested in Malta. One such condition, as explored by Eriksson et al. (2008), is when a person is motivated by strong personal norms; if a person, with strong moral motivation to do things in the best interests of the environment, is committed to a plan to utilise different strategies, a strong car-use habit can be interrupted. The result would be that a degree of car use could be avoided. It has been shown in previous research that a strong personal norm can augment commitment to change (Matthies et al., 2006).

Theoretical background to travel mode research

Making a commitment to reduce car use can be effective. Exhaustive research of this element is valuable for the behavioural modal-shift advocates, but there is little to explain why and this may direct future research on what can influence environmental behaviour (Lokhorst et al., 2013). Interrupting car-use habit is an essential part of a holistic approach to urban transport policy, because it represents the possibility that some of our actions are unnecessary. In recent years, habit has been researched by the behavioural sciences in relation to wide acknowledgement that habit somehow influences behavioural choices. Various theory-driven models have provided transport studies with ways to explain and predict behaviour related to car use in various contexts.

One of the main models comes from the Theory of Planned Behaviour (TPB), a rational choice model that seeks to measure how our actions are guided and formed (Ajzen, 1988; 1991). It seeks to predict behaviour based on the intention to perform that behaviour and advocates that we cannot always choose to behave in a certain way or control the behaviour because of factors such as ability, physical limitations of our environment, time constraints and habit. Essentially, it is viewed that if a person has a strong intention to behave in a certain way, as long as there is volitional control, the intended behaviour will be performed. As a result, behavioural intention can be used as a proxy for actual behaviour. As a result of various sets of studies, the TPB has been extended, incorporating moral norm and descriptive norm, environmental concern and habit, as factors all capable of determining intention.

Another model is the norm-activation model (NAM) (Schwartz, 1970; 1975; 1977; Schwartz and Howard, 1984), where pro-environmental behaviour is predominantly pro-socially motivated and determined by moral or personal norms, which are triggered by situational factors and personality trait activators, and in turn a particular behaviour follows. The model successfully describes in many contexts the way decisions are taken with respect to the environment (Hunecke et al., 2001; Bamberg and Schmidt, 2003; Klöckner and Matthies, 2004; Matthies et al., 2006; Harland et al., 2010). In the context of car use, moral norms are important to reduce car use (Nordlund and Garvill, 2003). Notably, in research from the 1980s, habit became increasingly relevant in explaining discrepancies where intention predicted future behaviour. Its continued study has sought to explain its moderating effect on intentions, in turn seeking ways to break or change habituated behaviour across many, varied contexts.

The concept of environmental concern became relevant as insights into environmental problems began to occupy researchers in the 1970s and onwards (Bamberg, 2003; Nilsson and Küller, 2000; Van Liere and Dunlap, 1980). Schultz (2000) discusses the earlier work of Stern and Dietz (1994), which looked at values that determine a person's attitude towards the environment. They devised a model, based on the NAM, called the value-belief-norm (VBN) model, in which pro-environmental behaviour is preceded by a pro-environmental norm, which in turn is directly affected by the presence of according beliefs and values. This model grouped values which could identify the particular attitudes people have towards the environment. They termed these groups egoistic, social-altruistic, and biospheric and assert that everyone has varying degrees of these value groups. Environmental

concern is a combination of the three. An individual with predominantly egoist values for the environment is more likely to have values based on self and on how he will be affected personally. Social-altruist values are based on how those around a person are affected. Biospheric values are values for the welfare of the whole of the planet and all living things on it (Schultz, 2000; de Groot and Steg, 2007). Schultz (2000) explains how behaviour can be for different motives; an individual uses the car to drive to a shop that is located five minutes' drive away. It can be considered egoistic if the motive is that it is plainly easier. Alternatively, if a person chooses not to drive to the shop to save money, it is also deemed egoistic. Choosing not to drive to reduce congestion can be considered as acting altruistically and biospherically (the awareness that congestion can raise air pollution levels and GHG emissions).

As in the study of Eriksson et al. (2008), measures of habit and personal norm were used in this study to identify participants who are both strongly habitual towards their car use and strongly motivated to preserve the environment. The strength of habit was obtained by asking each person to indicate his or her response to twelve statements from the Self-Report Habit Index (SRHI) (Verplanken and Orbell, 2003), an index shown to have high internal and test-retest reliabilities (Gardner et al., 2011) and has correlated strongly with past behavioural frequency and the response frequency measure of habit (Verplanken et al., 1994). The twelve-item scale gauges repetition and automaticity of an individual's car-use behaviour and the extent to which this behaviour corresponds with an individual's self-identity. Motivation is a factor related to a person's intention to change behaviour, in this context to change the amount of car use performed. Without any motivation to reduce car use, it is unlikely to see an actual reduction (Eriksson et al., 2008). Personal norm can be derived from a moral obligation to act to reduce the negative impact of a behaviour-type on the environment (Thøgersen, 2006). Statements were presented to each of the participants, who were asked to choose responses on a five-point Likert scale (1 = strongly disagree, 5 = strongly agree). A measure of personal norm was indexed by the summation of responses to all four of these statements. An index, in this case for a degree of personal norm, was derived from the mean scores of the participants to all four measures.

Gollwitzer, whose work in the 1990s on implementation intentions drew the attention and praise of various social psychologists, including Ajzen (2001), assumed that people can generate new intentions to perform a goal-directed behaviour when a specific context is present – the generation of what he referred to as 'if-then' plans which lead to new habits. In this study, as summarised in Table 1, new intentions were identified by the participants during individual information sessions held between the two one-week periods that participants recorded their car use. The intentions were based on personal goals to perform a pro-environmental behaviour and reduce car use. Such behaviour could be viewed as desirable in other ways, for example to improve personal fitness and well-being, but in the majority of cases participants identified obstacles preventing them from achieving their goals.

The car diaries highlighted a number of things. There was significant number of errands being performed in combination with daily commutes and in the majority of cases, drivers performed short trips of 20 minutes or less. Examining the nature of these trips and when they are being performed, could reveal why the car is the preferred choice of travel mode. While the nature of short trips cannot ignore that more trips could well be done without using the car, it was noted that planning was present to combine journeys with errands. Comparisons between the two car diaries highlighted some reduction in car use, but the subsequent interviews revealed a general sentiment that to reduce car use would mean to compromise on mobility and lifestyle. At the same time, the interviews revealed that congestion and pollution are acknowledged as strongly significant and there has been a general deterioration of the quality of life in the areas in which they live. However, there was a prevailing sentiment that they were all willing to reduce their car use. In analysing the interview responses, habitual use of the car was strongly associated by the participants with dependency on the car. Knowledge of alternatives to driving was present, such as walking for some short trips, cycling or taking the bus to work, car-pooling or internet- shopping. However, each participant spoke of them as disadvantaging them in some way. It was evident to all the participants that they used the car mostly without thought or consideration of alternatives, but at the same time they felt dependent on doing so. It was a challenge to commit to an alternative because obstacles were great. The measure of personal norm, while reinforced by what the participants said in the interviews, did not transfer to their overall behaviour; they continued to use the car while understanding that what they were doing

contributed to the levels of air pollution and poor quality urban landscape. Participants did not associate any pressure to use the car less with restrictions imposed by the authorities, but at the same time cited the lack of sustainable mobility options as relevant and important when discussing the role of disincentives.

Table 1 Summary of intentions by study participants

ALTERNATIVES	OPTIONS COMMITTED TO TRYING							
OPTIONS	**DESCRIPTION**	**ALISON**	**DORIS**	**FRANCES**	**IAN**	**ROBERT**	**JAMES**	**KAREN**
Car sharing	Formal and informal car sharing schemes are an easy way to cut commuting costs by half or more						X	X
Walking	There's no doubting the convenience of jumping in the car but walking can often be a practical substitute, especially in a town or city			X				X
Cycling	A great way to get fit and empowered – getting from A to B under your own steam - find out what's possible around you							
Public transport	Let someone else do the driving! Using public transport is getting easier; thanks to new services that help you find what's available and plan your journey. Advance planning can make a big difference to your journey, cutting fare costs as well as travel time			X			X	
Working from home	More and more companies offer this as an option so speak to your employer about making the change					X		
Online shopping	All major supermarkets - and many speciality food companies - offer delivery services, often in energy efficient vans	X						
Coordination with other tasks	Doing big weekly shops or fitting shopping trips alongside other journeys	X	X					
Shop locally	Support local shops if you're lucky enough to have them within walking distance	X	X		X			

Car users place a high value on mobility, but car use itself has social, economic and environmental impacts that do not always result in an overall advantage for the car user or those around them. Behavioural-change measures can play a part, albeit a relatively small one, but one that may ultimately change the unhealthy, unfulfilling elements of modern lifestyles for the better. The timing of implementing different soft policies within a mix of hard and soft transport policy measures is perhaps a key factor affecting a successful long-term outcome. Where the car users acknowledged the negative effects of using the car, the positive effects of using the car outweighed these negatives, because not all the negatives were taken into account; in reality, the total real costs are not borne by those who produce them.

This study confirmed that without effective measures in place to restrict the polluting effects of road transport it may well prove extremely difficult to affect any behavioural change to use alternative modes wherever such a shift is perceived as a compromise of individual mobility and flexibility. In order to witness a voluntary shift in car-use behaviour, alternatives need to be supported by the relevant infrastructure and adopted because they are considered genuinely advantageous to the user, maintaining the standard of mobility routinely expected in the present urban environment.

Table 2 Main keywords and associations emerging from the interviews

QUESTION SUBJECT	KEY WORD RESPONSES
What priorities do you have in performing your tasks?	Time. Stress. Cost. Flexibility. Comfort. Speed. Safety. Health.
Reasons for driving	Work. Errands. Convenience. Personal space.
Threat of air pollution	Infections. Definitely. Black walls. Built-up areas. Everywhere, not just Malta. Sacrifice using car. Cars. Inner harbour regions. Vicious cycle. Electric cars. Health. Health costs. Emissions. Modal shift.
Threat of noise pollution	Stress. Our culture.
Congestion	Public transport system. School transport. Car-sharing. Lack of planning. Laziness. Traffic lights and roundabouts. Road design. Bad driving. Auto-pilot. Rush-hours.
Effect of driving on the environment	Old cars. Emissions. Noise. Volume of cars. Personal footprint.
Health and the environment	Busy roads. Bus clouds. Cycling. Ability to move. Air pollution. Playgrounds and fields. Coffee shops on streets. Technology.
Public Transport	Buses. Taxis. Ferries. Changing. Not good for errands. Not effective. Well-connected. A mess. A lot of scope. Never considered it, inconvenient. Surprising as an option. Patience.
Driving and the car	Very stressful. Enjoyable. Need. Personal. Convenient. Independence. Fast and comfortable. Rarely a passenger. Easier, can achieve more. Lazy. Congestion. Parking. Maintenance and running costs. Necessary. Status symbol.
Quality of Life	Deteriorated. Open spaces. Noise. Parking. Busy roads. Congestion.
Costs	Penalise additional cars. Push not to use car. Awareness of costs and spending. Should be greater costs. Social costs.
Policy	Do more. Cyclists. Pavements. Public transport. Incentives.
Pressure to reduce car use	No. None. Internal pressure. Norm to use the car.
Willingness to reduce car use	Definitely. Willingness. Save money. Reduce stress. Environment.

Sara Hazzard completed her MSc research in 2015 under the supervision of Prof. Maria Attard.

Assessing Participatory Geographic Information Systems for the eGozo Initiative
by Johann Attard B.A. Hons (Melit.)

The emergence of web mapping services like Google Earth and Yahoo Maps has driven public interest in geospatial technologies. These services present simple and interactive applications which facilitate the uploading of maps utilising free available application programming interfaces and data interoperability that ultimately enable the visualisation of citizen-generated geographic information.

Whereas in the past, only mapping agencies were responsible to create geographic information, nowadays anyone with a bit of knowledge can easily make a map and publish it online.

The free availability of geoweb editing tools has narrowed the gap between data providers and data consumers. Moreover, the rapid development of social networking is a clear example of how people are making use of the web. Taking full advantage of the progress in technology for the interests of the public is crucial especially when dealing with local planning issues which ultimately affect peoples' lives. Moreover, public participation supports decision-making processes as it improves the effectiveness of planning.

The eco-Gozo initiative provides a unique opportunity to pursue the long-term path to sustainable development in Gozo. Such a holistic project depends on citizen participation. Geographic information technology, for instance, is one tool that could contribute directly to the vision's objective by encouraging local participation and interest.

For such a collaboration to be effective, the appropriate frequency between decision makers and civil society has to be set. Engaging in a participatory process would first include methods to create local knowledge and educate the general public to make their voice heard. Thus, utilising public participation GIS in a local context through the eco-Gozo initiative represents a vital change from current top-down methods used by governmental institutions to bottom up approaches. However, to be effective, existing top hierarchies need to accept that the general users have valuable knowledge and experiences that aid to take sound decisions.

For the purpose of my research, specific geographic issues highlighted in the eco-Gozo action plan were chosen to be mapped by local people. The online participatory process was intended to yield tangible results in the form of a public participation GIS where participants mapped a variety of land use concerns in Gozo. These concerns included the condition of major streets and secondary roads in Gozo, noise pollution, flooding hotspots, traffic, air quality and community perceptions about their localities.

This data together with multimedia of specific concerns were included in the designed GozoMap application to help visualise the severity of the perceived problems that will ultimately help to plan for the future. A number of map-based questions related to each topic were prepared, asking respondents to locate any potential local issues on the map. This was done in order to understand and visualise how participants spatially locate the well- known concerns, and to identify common themes that are essential in planning a sustainable vision for the island that depends on the locals' needs.

Results have clearly shown that public involvement through the use of a visual tool is effective as it can envisage a desired future environment. However, data must be presented in a way that all users can understand it. Moreover, there must be a mechanism to protect the voice of the minority in decision-making.

The GozoMap application was considered efficient and easy-to-use as it offered an opportunity to analyse the processes built in the system, focusing on the ability to democratise communities' decision-making. The contributions made during the participatory exercise also revealed that participants had a general grasp of the tool and were willing to explore the application. In addition, the fact that many users familiarised themselves with the tool by posting comments after locating a point and entering a rating corresponding to a particular theme shows the simplicity of the tool enables users to learn quickly and appreciate the concept of participatory mapping.

Overall, the concept of the tool was appreciated as the main themes discussed during the case study revealed a range of potential uses of the developed application, especially within the context of public consultations.

Information is priceless and invaluable and its value is characterised by timeliness, ease of access, and the ability of people to comprehend and use it. Nowadays, the Internet is an exceptional platform for the dissemination of information. Indeed, it is also affecting ways of how human activities – including public participation GIS – are performed. Just as strategies and policies are continuously changing as a result of the advances of modern technology, geoweb applications will keep evolving according to public aspirations and societal demands.

Ultimately, the future of neogeography tools in decision-making processes and collaborative projects would depend on the choices people make regarding the use of the Internet to create spatial information, the design used to develop these spatial technologies and the institutional arrangements to embed these tools in the future.

For more information visit www.gozomaptool.com.

Johann Attard completed his MSc research in 2014 under the supervision of Prof. Maria Attard

The research project was funded by the Strategic Educational Pathways Scholarship (STEPS) programme, which is part financed by the European Union – European Social Fund (ESF).

Analysis of Sustainable Development in Malta using a Multi-Criteria Analysis
by Ms Elaine Pace B.A.Hons (Melit.)

The structure of sustainable development developed between 1972 and 1992 through different international conferences and initiatives. The first meeting with a major international gathering was held in Stockholm in 1972 (UN, 2010). This meeting led to the creation of the United Nations Environment Programme (UNEP) and also the start of different environmental protection agencies at a national level. In 1987, the Bruntland Report which is also known as 'Our Common Future' was published. The report used the most common definition known about sustainability, that of "Development that meets the needs of current generation without compromising the ability of future generations to meet their own needs" (UN, 1987).

Sustainability indicators perform various functions, most of the times, sustainable indicators are used to measure progress towards sustainable development. These indicators can offer an important guide for decision making in different ways. They are capable of changing physical and social science knowledge into units of information that can help with the process of decision-making. Furthermore, they can also provide early advice in order to avoid damage to the environment, economy and society (DiSano, 2001). Indicators are important parameters which provide information about a phenomenon, environment or an area (OECD, 1993). In 1992, the United Nations Conference on Environment and Development, held in Rio de Janeiro, recognized the importance of sustainable indicators. Therefore, an action plan was adopted on Chapter 40 of Agenda 21. There was a call on countries to introduce a set of sustainability indicators.

The main idea of sustainability indicator framework is to provide a highly accessible information driven architecture, which is easily understood by members of society. The framework must cover an end-to-end process, which means it must monitor, assess and learn, decide and act. Furthermore, it must be transparent throughout (Hak, 2007).

In Malta, there have been various initiatives to introduce sustainability indicators at a national and regional level. The first attempt was made by the Planning Authority in 1997, as support to the development of land use planning policies. However, on December 1st of the year 2000, the Sustainability Indicators Malta Observatory (SI-MO) was established. The organization was represented by the Island and Small States Institute within the Foundation for International Studies at the University of Malta. The main objectives of the organization were to introduce and increase the skills for monitoring and reporting of the environmental parameters and sustainability indicators in Malta (Jari, 2011). In the new Sustainable Development Act of 2011, a number of indicators were chosen. These indicators help with decision-making processes and can be revised in accordance with on-going development. The Act came into force on the 10th July 2012 (Sustainable Development Act, 2010). Most of the data on indicators have been spread over a 10 year period. In order to complete the data the National Statistics Office (NSO) used a number of different sources both external and internal. The indicators are divided into the three pillars of sustainable development.

The evaluation of sustainability at macro level is now becoming a big problem for national governments, international organisations and the NGO's (OCED, 2002). Finally, Munda (1998) worked on the multi-criteria decision support method for measuring sustainable development performance (Shmelev et al., 2009). A multi-criteria analysis required a correlation of values of the socio-economic indexes with those of the environment. This allows us to know whether a location with a given socio-economic score is ranked in terms of environmental sustainability and vice-versa (Boggia et al., 2010). The main advantage of using a multi-criteria model is the fact that it can take into consideration a large datum, relationships and objectives which are normally visible in the real world. A multi-criteria model must offer a reliable framework which is aimed at aiding the structuring of the problem and the decision process. The decision makes in the end have to find a compromised solution, since when using a multi-criteria problem there cannot be one solution to optimize all the criteria. Therefore a multi-criteria evaluation cannot answer all the problems. They can however offer understanding about the nature of the conflicts and ways to compromise and reach a solution (Martinez-Alier, 1998).

A common problem found with multi-criteria analysis is the fact that it is challenging to develop weights without value judgment since the methods used need a stakeholder or a decision maker in order to identify the significance of each criteria. In order to ensure and develop a precise quantity of

sustainability for decision support, an objective method needs to be introduced based on the current understanding of sustainability. This is achieved by studying the interactions between different indicators and the impacts that they have on sustainability using correlations and comparisons in order to help create an integrated sustainability assessment. In order to improve a multi-criteria analysis as a decision support tool, it can be combined with GIS in order to be able to produce maps that can show ranking options (Carver, 1991; Crossland et al., 1995; Malczewski, 2006).

The aim of this study was to define an integrated approach to the assessment and monitoring of the integration of social, environmental and economic indicators. This was done to assess sustainability in different areas of Malta and Gozo and to rank them. It also helped to understand better, the specific technical and financial support that they need in order to grow sustainably. Furthermore, this study allowed spatial observations of the results as quantitative data obtained from different sources were mapped.

In all sixteen indicators were chosen in the study (Table 1). These were later divided into two groups, the socio-economic indicators and the environmental indicators. The reason behind such grouping was that the indicators sets were first tested separately and then were later correlated in order to see how sustainable each district is. Eventually, a visual representation of the results was given using the Geographic Information System.

Environmental Indicators	Socio-Economic Indicators
Pollution	Population Density
Artificial Surface Area	Unemployment Rate
Electricity consumption per household	Women's Unemployment Rate
Waste Separation	Work Related Accidents
Amount of water used	Higher Education
Bathing Water Quality	Tourist Establishments
Companies with ISO 14001 and hotels with ECO certification	Demographic Dependence
Ratio of people using public transport	Household disposable income

Table 1: Indicators used for this research

The aim of the sustainability analysis was to develop results obtained at the level of single indices which were integrated but not aggregated in order to identify homogenous districts in the Maltese Islands on the basis of the indicators used. The areas illustrated in Figure 1 show the results which were produced by correlating the environmental index class with the socio-economic index class.

The first evidence that can be seen from Figure 1 is the division of the Northern Harbour and Southern Harbour districts from the rest of the districts. The remarkable difference in sustainability levels between these districts is directly influenced by the set of indicators chosen, and from the surveys which were answered by different localities. The clear division of the districts can be seen in Figure 2, were a spatial representation of the results was given. This was further enhanced by a super-imposing the limits of development in Malta (Figure 3). From the super-imposition, it is evident that the limits of development and the districts with the highest level of sustainable development are correlated, since the areas with high development are also the areas with the best sustainability performance.

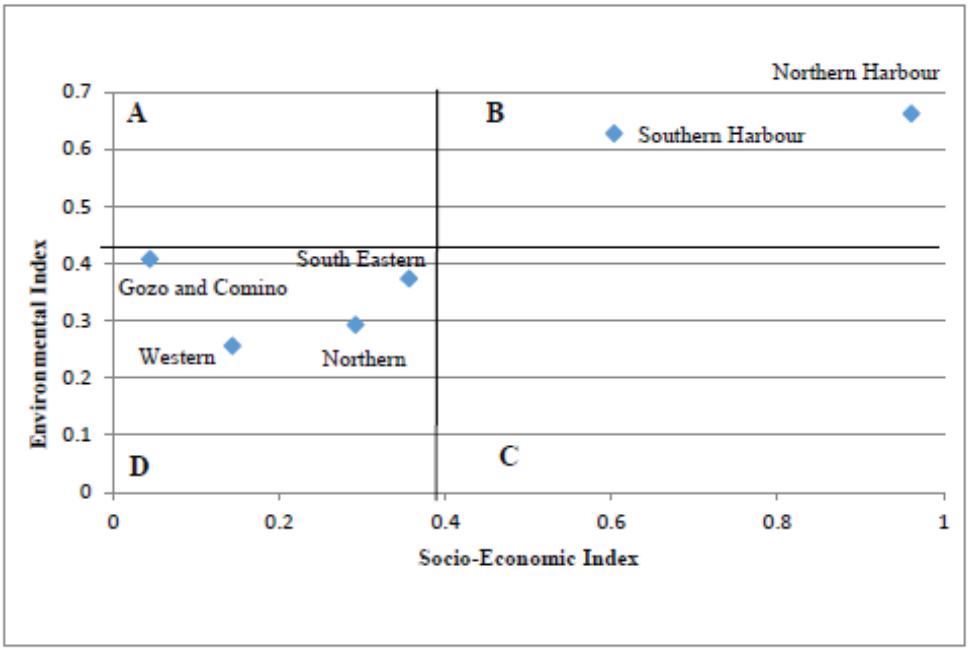


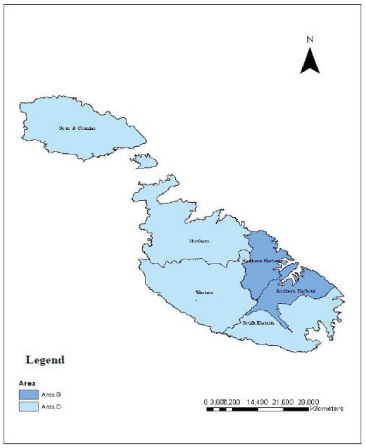
Figure 1: Crossing Environmental and Socio-Economic Indexes

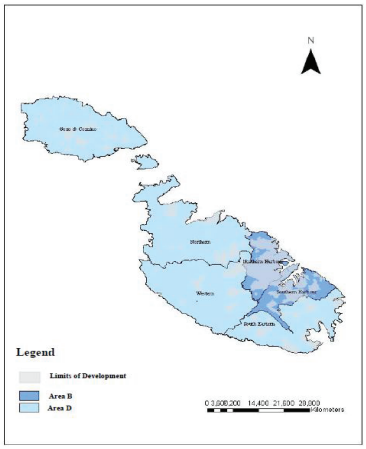
Figure 4 enable the six districts of the Maltese Islands to be situated according to a ranked distribution, were 1 represents the least sustainable area and 5 the most sustainable. This is defined by a system of different variables. Some critical aspects and different opportunities can also be identified by decision makers in different localities. The model used in this study is suitable to stimulate alternative scenarios in order to examine the effect that activities have on certain districts. It is aimed at improving environmental and socio-economic situations which are highlighted by the analysis of different indicators.

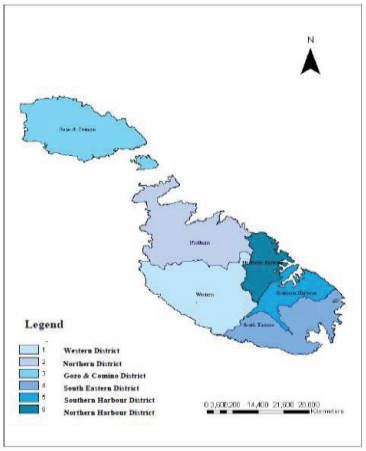
This study has shown that all three pillars of sustainability are important in planning and aspiring for sustainable development. An array of socio-economic and environmental indicators was chosen to ensure a balance. The results of this research could be the first 'warning sign' to society and stakeholders that sustainability is not just about environmental protections, it is also about finding a balance between sustainable economic and social development and the protection of the environment.

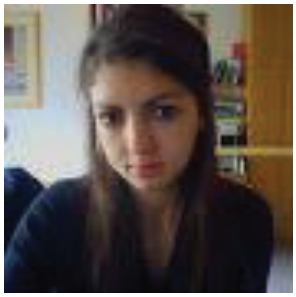
This research can be considered as the first step in understanding better how sustainable development can be implemented, and which environmental and socio-economic indicators might influence the performance of cities, regions and nations. Sustainable development is very important in today's world, and it is a multi-dimensional concept, since it integrates economy, environment and society. Policy makers must be aware of how sustainability is dependent on these three factors, before they design strategies.

This study presented a framework which can be updated with new data. Therefore, it can be more reliable and could eventually become useful in projecting future scenarios. It could also be applied to islands similar to Malta. The fact that indicators can be updated makes the model more dynamic and suitable for the use of temporal evaluation. It is still not known whether the change of indicators on the basis of one goal is preferred to a standard set of indicators which could be developed at European level (Boggia et al., 2010). A standard set would make the analysis less flexible however, it would enable the comparison of different situations in order to get a better allocation of resources in the framework of sustainable development policies. To carry this out, an effort is needed to make the assessment of sustainability more organized.









Elaine Pace completed her MSc research in 2014 under the supervision of Prof. Maria Attard

References

Boggia, A., and Cortina, C., 2010. Measuring Sustainable development using a multi-criteria model: A case study. Journal of Environmental Management. 91, pp.2301 – 2306.

Carver, S.J., 1991. Integrating Multi-criteria evaluation with geographical information systems. International Journal of Geographical Information System. 5 (3), pp. 321 -339.

Crossland, M.D., Wyne, B.E., and Perkins, W.C., 1995. Spatial decision support systems an overview of technology and a test of efficacy. Decision support System. 14, pp. 219 – 235.

DiSano, J., 2001. Indicators of sustainable development: Guidelines and Methodologies. United Nations publications.

Hak, T., 2007. Sustainability Indicators, A Scientific Assessment. Scientific Committee on Problems of the Environment. Island Press, Washington.

Jari, L., Janne, R., Petrus, K., and Timo, A., 2011. Using indicators to assess sustainable development in the European Union, Finland, Malta and Slovakia. Edita Prima Ltd, Helsinki.

Malczweski, J,, 2006. GIS-based multi-criteria Decision Analysis: a survey of the literature. International Journal on Geographical Information Science. 20, pp.703 – 726.

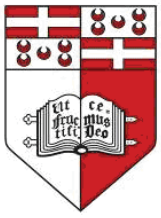
Martinez-Alier, J., Munda, G., O'Neil, J., 1998. Weak Comparability of values as a foundation for ecological economics. Ecological economics 26, pp.277 – 286.

Munda, G., 1995. Multi-Criteria Evaluation in a Fuzzy Environment, Heidelberg: Physica Verlag.

OECD, 2002. Aggregated environmental indices. Review of aggregation methodologies in use. Working Group on Environmental information and Outlooks, Environment Directorate, Environmental Policy Committee, vol. 43. OCDE.

United Nation, 1987. Our Common Future. Report of the World Commission on Environment and Development. United Nations Headquarters, New York.

United Nations, 2010. Sustainable Development: From Bruntland to Rio 2012. United Nations Headquarters, New York.



University of Malta
Institute for Climate Change and Sustainable Development
University of Malta, Msida, Malta

T: +356 2340 3403
E: iccsd@um.edu.mt
W: www.um.edu.mt/iccsd