

INTRODUCTION

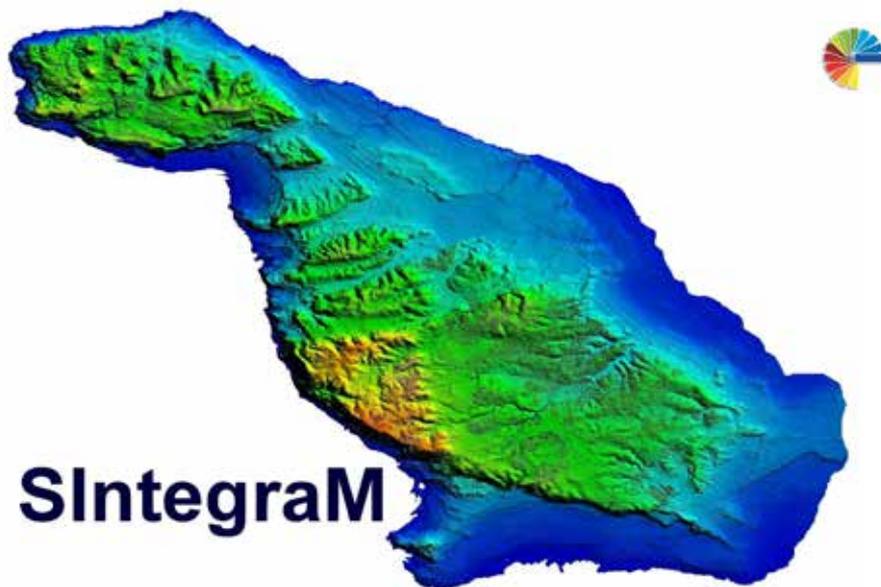
Patient Dilemmas in Fast-Tracking Technological Change

Saviour Formosa

Opening a window into the future is not an easy task. Attempting to open one in a generation after the initial launching step might seem either idealistic, naïve or with hindsight plain driven. An idea that started off in 1995 by Formosa as paralleled by a similar but unconnected effort by Perit Vincent Cassar took two decades to take a semblance of form and structure within an achievable framework. These two streams of thought came together in 2013 at the then MEPA which effort sought to push all spatial information within an integrated core that allows Malta to jump from a Data Phase to an Information Phase and over the next years to a Knowledge, Action and Wisdom phased approach. The two proponents converged and the effort took national significance through the SIntegraM concept: a concept that aimed to create a functionality targeting the Spatial Data Integration for the Maltese Islands: Developing Integrated National Spatial Information Capacity – hence the acronym SIntegraM.

Vincent Cassar in the preface depicts the difficulties in expressing such a vision into reality and with drive and a thirst for the achievement of a ‘dream’ as well as successes emanating from a previous ERDF project conceptualised and initially led by Saviour Formosa entitled “Developing National Environmental Monitoring Infrastructure and Capacity’. The lifetime experience on dealing with pitfalls and successes brought together these two persons and significant others resulting in the approval of SIntegraM through consistency and perseverance as well as the tackling of a bottom-up approach that saw all entities brought on board, whilst tackling the highest governmental echelons to ensure take-up and ensuring a cascading effect on project ownership.

However, in terms of on-the-ground acceptance, the process required a mentality shift to ensure readiness in data and information sharing, the abolition of data hoarding and the creation of collaborative protocols that ensure a gather-one/use-many scenario within a spatial construct, is coming to fruition. This process was required due to the need to ensure the elimination of barriers created through lack of access to data, the transposition of the INSPIRE Directive and a collaborative approach across all government entities.



Formosa initiated a conceptual process whereby data is built around a spatial-core and which resultant information could be used by both policy makers and academics to create knowledge and in turn action. The project will benefit Maltese Society due to its integrative process, a foresight perspective, governmental entities who can share and improve efficiency and effectivity, the industry and civic society as well as other social structure falling within the sociological foundations of society. In turn, this is an opportunity that such efforts empower the University of Malta due to its cross-thematic approach that spans all Faculties and Institutes both through access to data, access to data capture and analytical technologies as well as access to expertise.

The project will deliver a strategic approach to spatial data, integration of vital base datasets, new legislation as well as training, The main concept built around the creation of data creation protocols, information exchange, access to data, and inherently data protection and privacy, In terms of infrastructure, the project will acquire systems, equipment, data capture devices using aerial, terrestrial and marine technologies, in addition to analytical and dissemination tools that will ensure inter-governmental data dissemination, and national preparedness.

Examples of integrated research that span disciplines could include the analysis of air pollution as carried by air currents as affecting the health of children who live close to an amenity site or the investigation of potential development as it affects landscapes and skylines through a euclidean or viewshed approach, in turn resulting in the calculation of flooding that in turn alerts the Civil Protection and Transport entities to close off areas at risk. The project is set to change the way information is viewed, accessed and given academic value - added in turn enhancing the University's role in bringing about social change.

This publication seeks to help readers understand the efforts required to reach the integrative stage, mainly pushed by individual efforts that rendered the situation a lesser evil when pushing the spatial envelope. Those efforts are transmitted in the studies presented in this publication, spanning the physical, social and environmental domains.

The Technological Constructs as Foundations for Change

The first section focuses on the structural concepts and activities that impinge on the development of technological systems targeting the creation of foundation elements across the different entities..

Chapter 1 highlights another implementation project employing geographical information system (GIS) based applications. Brian Borg states that adopting this “spatial” strategy has enabled the WSC to determine how our core business can exploit location data to improve decision-making, reduce risks, and optimise operations. The WSC is as yet the first large local organisation to adopt GIS to manage, control, and plan internal projects. Over the years the corporation has built up a very comprehensive GIS capacity that includes the geo located points of all water meters, valves, taps, and pipes that exist on the Islands. Since the WSC is also responsible for Malta's wastewater, the company also has the same facilities in this sector too, complete with slope angle and elevation data. Borg describes the AquaDot AMM solution that can also provide users with information on which gateways have serviced a specific consumer meter over a period of time, rendered an enterprise-client interaction cycle closure.

Maria Gove, in Chapter 2, looks at the advances in technology that have made GIS more valuable in almost every field, not least of all transport, where Transport Malta is aiming to keep abreast with technology. As the GIS technology continues to evolve and our individual systems are becoming part of a larger interconnected platform, a platform to bring together all our data, technology, processes and people together was required. In view of this, Transport Malta implemented an EU funded project named STREETS - STRatEgia pEr un Trasporto Sostenibile to create a platform not only for the use of the public, and project partners but most imperative for the internal use across Transport Malta directorates. This project was developed in collaboration with academia and Italian

partners under the Italia – Malta 2007-2013 programme was accepted as a strategic project under the Italia-Malta Programme. Transport Malta was given the task to create this platform. The GIS Platform supports the backbone infrastructure required to facilitate and streamline processes, integrate isolated datasets used by the different target groups. By consolidating operations within the directorates and facilitate transportation planning decisions by providing one common source to integrate, visualise and manipulate land, air and sea transport, this results in strengthened harmonisation required between the directorates.

In Chapter 3 Saviour Formosa envisages the initialising of a stepped approach towards access to spatial data never purports to offer a dull moment. Stepped approaches that aim to make sense of data and harmonisation are hindered by capital and recurrent issues that pertain to the creation and maintenance of systems and protocols whilst governance across a national landscape impinges stressors on any system. The SIntegraM concept was initiated in 1995 on a two pronged process, that pertaining to a simultaneous but independent bottom-up and top-down process that had striven to achieve success but were constrained by the early concept hiccups that did not empower the project due to failed uptake by diverse entities and a defunct base mapping system. SIntegraM saw the coming together of two project champions who spent four years to morph their conceptualisation, bring together all public entities, present a spatial data integrative approach and eventually apply for basal funds to implement change.

The result was based on an integrated approach to the data cycle, innovation concepts on data capture, integration and capture, the creation of a data-sharing protocol structure within a protected and secure environment and also the newly innovative action where hardware and apparatus will be shared by all government entities, under the gather-once / use-many philosophy. The stepped approach moved away from the vicious cycle of data hoarding and towards a spiral based on the need to use such resultant information eventually growing into a complex but readily available system that is driven by the Maltese Garigor interlocking but structurally sound.

Chapter 4 posits a treasure trove of spatial informational data and access to same date. Stephen Grixti and James Foden consider the extensive investments in satellite Earth Observation (EO) there is an ever increasing running archive of open satellite imagery over the Maltese Islands. This is primarily due to the European Union's Copernicus Programme, an EO infrastructure that collects data and generates geospatial services supporting numerous sectors amongst which environment, security, transport, energy, climate change and the management of natural resources.

However, only when these new services become well known and widely used by society will expected returns on satellite investments be fully reached. On a local context the uptake of services stemming from available EO data is still at an embryonic stage and the potential in supporting the various governmental entities is somewhat under exploited. This is in part due to lack of awareness regarding the availability and potential of locally relevant EO data, thus limiting demand and willingness to invest in preprocessing services. Through its membership of Eurisy, a consortium of European Space agencies aimed at bridging the gap between space technology and society, and the subsequent understanding of the potential of such imagery over the Maltese islands, the space directorate within the Malta Council for Science and Technology (MCST) is well placed to instigate the local uptake of such data. At the core of this reasonability, the directorate is undertaking a study to create a mind map connecting the various governmental entities to their data 'needs' or interests. The work provides the space directorate with an understanding of the status quo as far as the utilization of satellite-based information is concerned. This exposes the specific challenges the various entities face in fulfilling their respective remits and sets the foundation to appropriately stimulate the local uptake of satellite data/services.

The final Chapter 5 in this section, that penned by Omar Hili, acknowledges that Spatial Data Infrastructures (SDI) are undergoing development worldwide in various Geographic Information Systems (GIS) sectors. In this respect, the study gathered data and reviewed literature on SDIs to establish the design of a conceptual model for an environmental SDI in the Maltese Islands. The environment is a highly discussed topic at all levels in Malta. As the study the environment protection was entrusted to one National Authority – the Planning Authority (PA), which was also responsible for all national matters related to planning and also included the national Mapping Agency. With the separation of the environment function of the Authority from planning and national mapping, this study was undertaken with the aim of developing a new strategy for the conceptual model in relation to how the SDI impacts on such a change.

The study analysed in depth the Authority's data cycle: how data is acquired, transferred and reported, and then devised a new strategy for the conceptual model in relation to how the SDI impacts on such a change. Understanding how it works has assisted in providing solutions, such as the need for programmers, ICT infrastructure, more GIS theme experts, change in Governmental policies and ideas to better improve the conceptual model. The results clearly defined important issues such as: policies, legislation and reporting cycles to the European Union (EU).

Chapter 6 delves into the creation of the base layers for social analysis through the Census process. Maria Refalo, Silvan Zammit, Saviour Formosa and Ashley Hili focus on the focuses on the geographical information system (GIS) approach that was incorporated into the 2011 national census of population and housing. The GIS perspective adopted a methodology where census statistical data was integrated into the spatial element, giving visual interpretation more ease to be understood by the end user. The process employed was to create a more homogeneous and seamless study with statistical data based on hypothetical approach in absence of comprehensive set of georeferenced granular data in register form.

Spatial interpretation was created through an extensive process in plotting each enumeration area with their respective routes, which also represented a number of houses, formerly delineated. These routes consisted of a number of streets or parts thereof in a particular locality, totalling 1022 across Malta and Gozo.

The GIS application was a compelling arena in this respect as it was a recent introduction and analysis of the data that can be executed efficiently; creating a niche for further studies on the data compiled through the voluminous data collection of the census. In addition, the GIS approach was also used to represent census data in a series of 1km² grid cells according to INSPIRE principles – a European-wide grid net of 1 km² containing all grid cells intersecting the landmass of the countries concerned (EU27 + EFTA countries as at end 2009), including all inland waters.

Constructs for an Environmental Understanding

The second section of the publication looks at the wide range of domains expressed within the environmental domains as the authors attempt to understand what makes terrestrial and bathymetric zones tick.

Andrew Agius, Charles Galdies, Alannah Bonnici and Joel Azzopardi argue in Chapter 7 that several aspects of modern society have come to depend on accurate and regular weather forecasts which allow them to make strategic and informed decisions, in order to preserve and maintain their assets. Due to the extent of the calculations involved in meeting the accuracy and quality requirements, NWP models are used. One of the most commonly used NWP systems is the WRF model. However, the default boundary conditions provided by the model are considered to be coarse and contain data irregularities that limit the accuracy of the weather forecast. This is because surface features such as albedo, vegetation, land-sea mask, and moisture are able to affect the overlying meteorological variables and related atmospheric dynamics at various scales.

The aim of this paper was to demonstrate how such a surface boundary condition can be improved by inclusion of high spatial resolution land cover categories of the Maltese islands and quantify the resultant improvement of the weather forecast made thereafter. The land use categories, which were based on the USGS 24-category Land Use Categories as per WRF model requirements, were significantly improved on the basis of LANDSAT data by applying the ISO cluster unsupervised classification method.

To determine the effectiveness of these improved surface boundary conditions, the precipitation and temperature forecasts of a high rainfall precipitation event over the Maltese islands were generated and compared to observations from eight local weather stations distributed using both the default and improved land use categories. Model statistical measures showed an overall improvement in forecast accuracy.

An interesting topic, more toxicological by nature is found in Chapter 8 where Chiara Scicluna and Renald Blundell stated that although some debate exists as to the subject, elements which are classified under 'heavy metals' have come to be those which pose a threat to humans in terms of toxicity. Intoxication with heavy metals is not a typical diagnosis as it is fairly uncommon. This can impose a risk on people who fail to be diagnosed and removed from the source of exposure, increasing morbidity and mortality.

For the purposes of this chapter, in order of atomic weight, the following metals will be discussed: Aluminium, Chromium, Selenium, Silver, Cadmium, Mercury and Lead. A brief introduction of each element's chemical and physical properties will be given, as well as its sources in the environment and any uses. Each metal's toxicity was illustrated using several actual cases of poisoning. In instances where human cases are not available, animal studies are discussed. Any treatments for intoxication are explained at the end of each section.

In Chapter 9, Michelle Borg states that the land use planning system introduced in 1992 placed the coast as a resource meriting environmental protection particularly from tourism. Within a policy framework to constrain urban sprawl, the strategy in the Structure Plan for the Maltese Islands called for a coastal Subject Plan and protection of public access.

As an island nation our survival depends on the coast. Ports provide an economic life link, critical infrastructure provides energy and water, engineered landfills and sewage treatment plants manage our waste, while reprieve from the hot weather and urban areas is obtained through clean seas and scenic landscapes respectively. The quality of our coast

determines the wellbeing of all those living here. Managing the coast and its users requires a comprehensive approach that recognises the dynamic nature of the land-sea interface. The challenge to implement this approach demands policy integration: the parallel processes introduced by the 1992 planning legislation that called for stakeholder consultation in decision-making proved essential. The extension of planning legislation to incorporate the sea in 1997 consolidated it further. Data collection improved the knowledge base on the coast, its resources and users.

Transforming exploitation into long-term stewardship remains a challenge, one that is further augmented by the predicted impacts of climate change. Based on coastal management principles and building on two decades of experience, the Strategic Plan for Environment and Development adopted in 2015 identifies the coast as a distinct spatial unit with an integral role to enhance climate resilience, where the ecosystems-based approach to spatial planning aims to guide socio-economic development.

Charles Galdies and Neil Mallia posit in Chapter 10 an argument that the world is experiencing a rising incidence of extreme weather events due to a number of different inter-related factors. This increase in extreme weather is affecting society directly through many fatalities and large incurred damages, as well as indirect impacts that affect industries and sectors in the long term.

The Maltese Islands are experiencing this burden imposed by extreme weather events and thus information is required to create strategies and to learn how to cope with such a situation. Three different historical extreme weather events that greatly impacted the Maltese Islands are examined by this paper. These were the supercell thunderstorm that occurred on the 29th of November 2011, the mesoscale convective system on the 2nd and 3rd of September 2012 and the hailstorm event of 15th of January 2013.

Analysis was done both from an atmospheric dynamics setting, as well as from an economic setting by assessing the monetary damages that they caused. The monetary damages on the basis of the number and amount of insurance claims presented by third parties as a result of these extreme weather events were examined and normalized in order to implement historical loss records that are more representative in today's context when one considers certain socio-economic factors. Using the data from IPCC's CIMP5 climate models, damage and loss estimations were generated. On this basis, solutions to the risks that future extreme weather events pose in Malta are reviewed.

The air monitoring networks and compliance to legislation were tackled in Chapter 11 by Francesca Tamburini and Ines Sanchez. Stating that Malta has gone through a significant economic, demographic and urban development over the last decade and though this had brought prosperity and new horizons to the island, it has also deployed the environmental conditions of the country. Due to the importance of its natural resources and its vulnerability to climatic change, Malta's governmental institutions ought to incorporate the protection of the environment to its national plans and programs. As part of this strategic line and due to the EU accession in 2002, Malta has started a long-term objective of coping with the EU requirements in terms of environmental monitoring network for air. Under this context,

MEPA had carried out a project funded by the ERDF entitled 'Developing National Environmental Monitoring Infrastructure and Capacity'. This article summarises the findings of this project that implied the analysis of the national environmental legislation and the comparison with the European Union directives, assessment of the current technical capacity and monitoring activities and the collection and evaluation of baseline data in order to determine the environmental status. Based on all these activities, the national monitoring network was evaluated and the level of compliance with the legislation requirements was determined.

Another insightful Chapter 12, was presented by Elaine Sciberras, George Buhagiar and Michael Schembri who look at the generation of and impacts of flooding through network analysis. The Maltese Islands are subject to sporadic flood events that have significant effects on the economic and social wellbeing, on transport and other infrastructure in affected areas. The derivation of hydrological networks in flood basins to establish the flow direction of runoff together with simulation of storm runoff volumes are key to identifying areas which are prone to inundation and flood risk. This paper reviews the hydrological networks derived from three separate studies to understand the generation of storm water runoff in four flood risk areas in the Maltese Islands. Hydrological networks were compared as derived from studies pertaining to the Storm Water Master Plan, the National Flood Relief Project and LiDAR topographic data.

LiDAR data were used as a high-end technology to derive Digital Surface Models, hydrological networks and to designate watersheds. A comparative qualitative assessment of the derived hydrological networks in the four catchments was carried out including the use of field data collected from the Marsascala catchment. The study identifies good similarities in the pattern of hydrological networks. Networks derived from LiDAR data demonstrate the use of such spatial technologies for hydrological studies. Shortcomings in

the LiDAR-derived dataset were identified pointing to the need for on-site verifications to refine specific areas of the hydrological network. These relate to the location of man-made drainage structures and the removal of artificial pits. The use of GIS technology together with the rectified LiDAR-derived hydrological networks for modelling of storm runoff is foreseen as the next step for more effective assessment of flood risk scenarios.

On a parallel exploratory and in-depth analysis, Daniel Sultana in Chapter 13 looks at soil change quality. Soil monitoring and the early detection of changes in soil quality are essential to conserve soil for sustainable use. This study assesses various soil chemical properties for sites corresponding to those studied in the extensive 2003 MALSIS national soil survey (MALSIS). A comparison of both data sets may serve to highlight important changes in soil quality and potential ecosystem functioning, all of which are important for national sustainable agricultural management.

Soil bulk density results suggest that 59% of the locations assessed in 2013 had a greater average bulk soil density than the same locations in 2003 i.e. soil compaction is prevalent. Electrical conductivity results suggest that 67% of the locations assessed in 2013 had a lower electrical conductivity than the same locations in 2003. Organic carbon results suggest that 59% of the locations assessed in 2013 had higher organic carbon content than the same locations in 2003. Results for pH suggest that 65% of the locations assessed in 2013 were more acidic than the same locations in 2003. Soil moisture content results suggest that 61% of the locations assessed in 2013 had higher soil moisture content than the same locations in 2003. The average national soil depth was of 47.76cm.

Various soil management measures, falling under the description of “sustainable agriculture”, have been proposed. These seek to maintain high crop yields whilst preserving soil quality in agricultural areas. Conservation tillage is considered as one of the most suitable management practices enabling sustainable agricultural production in the Maltese Islands.

Physicality and Realisms

Francesca Azzopardi tackles the functional elements of construction from an architect's viewpoint in Chapter 14, where society on a local and national level benefits from efficient time and team management in the construction industry. Collaboration, cross-functional teamwork, virtual technology and standardisation of data collation mechanisms encourage a ‘team-think’ approach, which encourages “inquiry, critical questioning, challenging behaviours (which) are all positive if they take place in a generally trusting and supporting environment” (Erdem, 2003). Adequate contractual selection, effective

change management plans and definition of roles and responsibilities at the early stages of the project lifecycle boost time efficiency and aide team efficiency. They are supplemented by virtual methodologies and tools which facilitate time monitoring and control work advances in accordance with schedules established during project planning phases. These in turn facilitate a successful project lifecycle, to the advantage of the surrounding local communities who stand to gain on an economic and social level with the least societal nuisance associated with such construction projects.

Valerian Croitorescu and Alexiei Dingli, in Chapter 15 study the challenges and approaches for smart innovative transport system replication where the mobility of the future will represent an outstanding challenge for smart transport at least until 2050. The revolution of the mobility will be assured by vehicle electrification and concurrent autonomous driving. Smart innovative transport systems will be developed on the two technologies, being able to meet all travel needs, preservation for the natural environment, long-term viability and less harmful emissions. Cities all around the world must be well-prepared for the changes that will be initiated by these two fast developing technological fields in order to gain a maximum benefit towards sustainable mobility. Starting from developing the innovative transport system and familiarising the users with the newly autonomous driving technology, the challenge consists in offering considerable reduction on emissions, costs and traffic management.

The proposed solutions consist in electric autonomous vehicles for public transport, intelligent systems for vehicle to vehicle, vehicle to grid and vehicle to infrastructure communication systems for transport planning, autonomous-charging grids for higher energy efficiency and plans of measures for travel awareness by autonomous transport systems. The electric autonomous vehicles consist of modular platforms, equipped with electric machines and high capacity batteries. The intelligent communication transport system sets the transport planning and the vehicles behaviour. The approach to implement the innovative public transport covers several points of interests inside the studied areas, the proposed routes and the possible risks. The challenge consists in improving the currently transport system and to increase the community wellbeing.

Frans Mallia investigates the benefit that spatial planners glean when faced with better familiarity with integrated information systems in Chapter 16. He states that the planning process in Malta is one of the most important public administration activities and involves many environmental and socioeconomic considerations and interactions. Some of these are highly sensitive and in some cases may even escalate into nationwide controversies. He argues in favour of a rehaul of the modern planning process that should be evidence

based; approached in a comprehensive manner; multi-disciplinary, participatory and inclusive in approach; transparent and systematic in execution; offering opportunities for public participation and redress; sustainable and making the best overall use of the available and envisaged resources; accountable; equitable; realistic and executable; taking into account socio-economic realities; and inspiring the confidence of all the involved actors and the wider society;

A good number of these requirements are addressed through legislation whilst others are addressed through administrative and operational measures. Technology pervades every sphere of society. When judiciously applied, technology leaves benefits that can be enjoyed by many spheres within society. There are many areas in Maltese planning process which have employed technology to achieve a wide range of aims. The most evident tools include the wide use of digital technology which greatly assists the near real-time dissemination of information and promotes a higher level of public participation and transparency. Moreover, the geo-referenced presentation of spatial information greatly facilitates decision taking and decision making.

Concluding this section, in Chapter 17 Adriana Zammit depicts Sustainable Underground Development as a vital element in the understanding of physical domains. She states that the current realities of shifting demographics coupled with improved liveability and environmental protection standards is creating a strong demand for new and additional infrastructure, especially at underground levels. The use of the underground to support above-ground spaces is, in fact, becoming increasingly important. However, in several countries, including Malta, the development of subterranean spaces tends to be piecemeal. Most of the underground projects in hand being implemented ad hoc with no real long-term planning. Considering that the underground is a non-renewable resource, its uncontrolled development can add more pressures to the operations of cities rather than supporting them. To achieve sustainable development, urban planning should also consider the underground as an extension to the spaces above. This study shows that planning the underground nationally entails two main constructs.

The first takes into account the dimensions for underground urbanisation that include the underground space, geo-materials and groundwater for Malta. Energy could also be considered as another dimension as is the case in certain countries. The second focuses on the collecting, organising and analysing data to create a holistic perspective of what exists below ground in terms of geology, archaeology and existing infrastructure. This should be combined with data gathering on behavioural patterns of the population to meet their demands. It is thus imperative for decision-makers to appreciate the importance

of underground as a resource that must be developed in a systematic manner. This is required to optimise resources, make cities more liveable and promote sound, sustainable development.

Social Wellbeing

Societal Wellbeing is a term seldom understood as it balanced between the concept of societal functionality and the human aspect within such a construct. Whilst studies focus on the sociological foundation of politics, religion, education, family and economy, these factors only become tangible once placed within a physical and environmental structure. These four chapters look at the preparation for disaster management, vandalism and damages, census base mapping for thematic analysis and finally a study into urban ecology and migration within a spatial construct.

John Agius, Marc Bonazountas, George Karagiannis, Elena Krikigianni and Chrysovalantis Tsiakos tackle risk assessments from a public policy perspective in Chapter 18. As the emergency management paradigm shifted from response to prevention in the 1980s, risk assessment progressively turned into a key requirement for civil protection authorities. European Union Member-States are required to draft National Risk Assessments, while State governments in the United States of America must also develop hazard mitigation plans based on disaster risk assessments. Existing methodologies fundamentally focus on analysing hazards and assessing vulnerabilities thereto. However, regulatory requirements are different in each country and the strategies for conducting disaster risk assessments depend on the type of decision-making support obligations. For example, risk assessments are hazard-based in the United States and scenario-based in the European Union. Similarly, disaster risk assessment methodologies are also diverse, with each national agency or international organization adopting its own variant.

This paper is meant as an overview of the diverse requirements for disaster risk assessments. First, we review the regulatory obligations for conducting disaster risk assessments in the European Union, the United States and elsewhere. Then, we outline the main strategies for assessing disaster risks, including the scenario-based and the hazard-based approach. Next, we present the variations in the existing methodologies and, finally, we discuss the role of critical infrastructure in disaster risk assessments.

Chapter 19 is dedicated to the study of a contextual analysis on the socio-spatial relationships of unauthorised graffiti and street art. Steve Fenech's study focuses on abandoned physical zones and how graffiti flows through the edifices, a phenomenon spreading elsewhere too, where graffiti and Street art have been under academic scrutiny

for years by many researchers stemming from different domains, each with the intent to satisfy divergent curiosities. Although they are conceptually different, these phenomena have much in common, such as their nature of being committed in an unauthorised fashion leading to property damage, a term commonly coined as vandalism.

This chapter depicts the research findings of a recent study entitled ‘Graffiti and street art: Location and dynamic aspects’ that quantitatively investigated the spatial nature of the phenomena using geographic information system (GIS) applications to visualize the data points, captured at street-level, within the study zone. The study zone’s locality context was chosen by the author and is made out of seven localities within the Northern Harbour Region, in Malta. The main aim is to investigate the incidence of the unauthorised graffiti and street art, and unravel any social, spatial and other relationships that may pertain to these forms of unauthorised art.

Through the use of GIS, the captured data points layer was visualised allowing for the creation of various hotspot representations using different proximity criteria. It was further queried by cross analysing it with other data layers obtained from Formosa (2015) to show if there is any link with the following themes: area, population, land use cover, poverty, total number offences and damage related offences. The paper will discuss the methodology applied and the research findings with the aim to provide further knowledge on the subject and shed further light on the geographical aspects of crime.

The final Chapter 20 investigates the theory of social disorganisation or urban ecology and depicts a detailed study on the ecology of migrants’ ghettoization of Marsa. Clayton Xuereb employs GIS to study movements, patters, social change and impacts on the societal fabric. Marsa is often described as a ghetto by the media. It has been depicted as a no-go area to be avoided by the local population. This was brought about by the recent phenomena of migrants who either reside at the Open Centre, or are attracted to this context for social or work possibilities. This research was conducted to investigate urban decay, areas of social disorganisation and the presence of migrant segregation in this town. A unique time geography approach was employed in this spatio-temporal research to study the dynamic activities of migrants in Marsa. Data triangulation was possible as multiple research tools were employed, including geo-spatial data collection, observation methods and elite interviews.

Thematic and spatial evaluations were implemented and the findings elicited were presented in hotspot and choropleth maps based on Burgess' (1925) concentric ring model. The results implicated that the area surrounding the Open Centre, which is also the space mainly occupied by migrants, is socially disorganised and deteriorated. The ageing local population, their lack of education, cultural conflict and racist convictions may be the reasons why this migrant related area is avoided particularly after sunset. The findings suggest that this area, according to criminological literature can be referred to as a transitional multi-ethnic slum. However, it might also be serving the purpose of the migrants' unofficial capital city in Malta, since it caters to their needs including employment, shopping and recreation. The results of this study recommend that, in order to alleviate the negative connotations with this area, an alternative solution to the Open Centre should be sought, capable guardians employed and education needs are to be addressed.

A Word in Time

Timmy Gambin posits some thoughts on the next steps envisaged in Information Collaboration post-SIntegraM.

Societies have rapidly morphed into complex entities that are both fantastic and scary, both real and virtual, yet at the same time they are reflecting the result of years of debate and action in the physical, environmental and social worlds. The transition from a limited-information society to one that has rapid access, has morphed social structures into new forms in which the development and environmental disciplines played a critical role: in turn highlighting your specific input in such a transition.

The changes in the environment, development and social fields have wrought major changes in Malta's progress and knowledge gain, however few realise the implications of such a transitional change in wellbeing: whether at entire society or individual level. The resultant knowledge gain is yet to be fully established, as access to information, social, economic, educational and technological has outshone the actual transition, with most disciplines still struggling to understand the shift. In order to help such a shift, this book strives to enable readers to understand the transition of Maltese society within a rapidly evolving physical, environmental and social domains, each highly distinct but inherently intertwined. Spatial Information Integration plays a pivot role in the preparedness of a society for functional engagement in diverse changes within each of the same domains.

