Conceptualising the CRISOLA Model

Saviour Formosa

The Conceptual Model

Why create a conceptual model? Such a question lingered through the reviews of the environmental criminology literature, the GIS literature and the 2007 Maltese scenario readings. The reviews, together with an understanding of the complex Maltese data availability situation, highlighted the need to bring together each aspect and build a mindmap that helps set out a process to depict a basic and generic model on how crime, social and landuse issues interact together.

The review process also identified techniques and datasets that can be used in the identification and understanding of crime. The use of these datasets is best explained through a conceptual model that is relevant to CRIme and to the SOcial and LAnduse aspects, herein embedded as the acronym CRISOLA.

The model took shape through a tiered 3-phase process, with each iterative phase building up from an abstract level (Phase 1) through the identification of the main datasets (Phase 2) to a final individual attribute listing (Phase 3). The model is not exhaustive as it covers potential datasets that yet need to be created/surveyed, statistical measures identified as well as inclusion of other crime relevant theories. The model can be evolved in future studies as it attempts to highlight areas of study that will not be tackled in this research and which may/may not be found to be significant, entailing further change.

The three CRISOLA radials: Crime, Social and Landuse

Initially the conceptual Model catered for the crime aspect in isolation, but crime does not stand alone: it interacts within a wider and more complex environment. The mindmap exercise soon sought the inclusion of social and landuse parameters within the model aimed at streamlining the process to facilitate the analysis. The result brings together the three CRISOLA disciplines and attempts to identify theoretical links between the different datasets.

The decision to model crime together with the sociological and landuse disciplines is based on an understanding of the interactivity between the three as identified in the

literature. The model attempts to understand criminal activity within the social and physical structures it operates in. The main area of study is the interaction between:
i.   the crime characteristics through an analysis of offender and offence composition and the interactivity between them,
ii. the social characteristics of an area through an analysis of its poverty/deprivation,
iii. the physical characteristics of an area, particularly its landuse, structural and zoning parameters.

The social characteristics of a human society are linked to the physical surroundings it operates in, which two characteristics are directly caused by or affect crime. Offender analysis requires an understanding of the social construct that the offender operates in, such as affluence and poverty. Offence analysis requires an understanding of the landuse structure crime occurs in; the opportunities offered, the mode of travel, and the activities that may lead to the occurrence of crime, amongst others.

Phase 1 – The Abstract Level

Table 3.1 outlines the Phase 1 thought process needed to reach an initial structure within which to analyse any relationships between the three disciplines. It is a high-level abstract model that attempts to look at parallel processes between the three disciplines and how an understanding of the processes can be achieved. It develops the concept through a series of five linear steps that can be tackled in order to facilitate later cross-thematic crime studies. It is aimed at an analysis of the thematic structure, focusing on the main parameter in the themes that affect change, identifying the spatial construct within the theme, highlighting the impact on capital and cohesion and finally leading to a change phase.

The latter phase can only be tackled through longitudinal studies that would draw a better long-term picture of what constitutes change. Although the current study looks at crime over a period of time, this model needs to be revisited with longer-term data if one needs to analyse sturdier change processes. This is needed particularly in the final phase that covers change for each of the CRISOLA themes.

Table 2.1: Phase 1 - Conceptual Model Logical Matrix

Social	Crime	Urban
Analysis of the Social structure of the area under study	Analysis of crime in the area under study through offences and the behaviour of offenders	Analysis of spatial constructs through a study of landuse zoning, spatial aggregates and physical structures
↓	↓	↓
Focuses on socio-economic and socio-cultural parameters towards an understanding of poverty and deprivation as a surrogate for social and community health	Focuses on offences as a measure of attractiveness of an area and focuses on offender data as a measure of social disorganization	Focuses on landuse zoning as a measure of affluence, leading to an understanding of opportunity structures
↓	↓	↓
Identifies the social-spatial constitution of the areas, leading to a social-zoning structure	Identifies the criminal-spatial constitution of the areas leading to a crime-zoning structure	Identifies the physical constitution of the areas leading to a landuse-zoning structure
↓	↓	↓
Impact on social capital – social cohesion	Impact on security and safety	Impact on spatial capital
↓	↓	↓
Social change	Crime change	Landuse change

Phase 2 – Identifying the linkages

Whilst, the high-level Phase 1 Model enables a generic focus on the study in question, a more detailed second level model was required which helped point at and identify the interactivity between the three parameters. This is accomplished preferably through the identification of datasets that may be used for analysis. Being a mindmap model, Phase 2 (Figure 2.1) sought to identify those literature related issues and integrate them within the model. It also sought to bring together the different Theories, Datasets, Spatio-Temporal Aspects, predictors and the main tenets that can be used in such a study on crime. These

include such parameters as are age and density, which have been described in the literature review chapter.

The deeper one moves into the model (towards the bottom part of each section and where the predictors are highlighted) the more research is needed to identify the real relationships and how each parameter can be predicted. The model does not attempt to solve these issues in this study but depicts the potential future studies that can be attempted.

The following walkthrough of the Model in Figure 2.1 shows the three distinct social, crime and landuse sections. Each section has a series of data boxes each depicting a specific theme, index or concept. The following section describes one such databox.

A Social section walkthrough: Taking the proximity databox as an example
Refer to the Phase 2 data model and identify the proximity index databox within the Social section.

The proximity index attempts to elicit an understanding of each area in Malta through its location in relation to proximity to a number of factors. These are split in two:
i.   *the proximity to the community centre (identified by the number 3, which number also refers to the relative Phase 3 data-box) and*
ii. *structures identifiers split into four themes,*
     a.   *two related to building state such as vacancy (4) and dilapidation (5) (indicates broken windows tipping) and*
     b.   *the other two related to densities – population (6) and dwelling (7).*

The latter four would together be developed into a structural poverty index (8) that would be integrated with the proximity to the community centre theme. These two constructs would enable the creation of a spatial poverty index (9) that introduces a concept which identifies that poverty is not essentially an economic construct but is also related to access to the community construct. Taking the model further, integrating the socio-economic poverty index (10) created through a separate integration process, with the spatial poverty index (9) would result in a deprivation index (11). This process is followed by a statistical measure that would eventually result in the identification of a categorisation of different social zones (12).

It is at this stage that the first cross-discipline links are highlighted: those of the identification of a possible link between social zones (12) as identified through the process described above and the potential relationship (brown link) to the offender location (37) that looks at the social zoning pertaining to convicted offenders. This link can be further analysed through statistical measures. Other potential cross-discipline relations are identified through the link between the social (poverty) zones (12) and the landuse social and community-related zones (15). This link could better describe the relationship

between the 'poor' areas and their location in the landuse designated for social use as against industrial and recreational use. It may identify 'poor' areas that are situated outside of the social zones as well as concentrations within specific areas of the social zones. Other lower-level links between the different themes would relate to the linkages between the final level of each theme and the potential impact on each resulting in a change in the other. The social zoning (12) to landuse (27) link is such a potential link (red line) where one could predict changes in deprivation through changes in the landuse construct and vice versa.

The other sections follow the same logical process and each successive branch highlights its particular theme, theory base and dataset pertaining to it. The best way to follow this is within the model is to once again look at the proximity index example in Figure 2.1. The level 2 model in Figure 2.1 is accompanied by a description and spatial levels key (Figure 2.2). The key describes the different spatial data aggregates available from national to regional to enumeration areas, which data layers can be employed for most datasets listed. The description section, however lists the different datasets available (D), the theories (T), the main data tenets (M) as well as other relevant information.

Once again, taking the proximity index as an example, the proximity-to-centre data-box (3) is tagged with 3 codes, amongst them D2A. The D2A refers to the key: Data (D) is available at (2A) Address-point spatial detail. Similarly the vacancy (4) data-box is tagged with T3A and D2I, where as an example T3A refers to social disorganisation theory and potential to analyse the data based on concentric rings and broken windows concepts.

Other model issues include the identification of a potential to integrate a dark figure of crime, once this is carried out. To date this has not been covered in Maltese crime studies, except for a study carried out by the author where the sample return was too small to prove reliable.

The coloured data-boxes indicate some kind of major studies that were not found in the literature review but are deemed essential to understanding crime, such as the analysis of spatial-temporal-prediction-fragmentation (31) which attempts to understand the spatial aggregate (ex: council, enumeration area, street) at which predictability starts to deteriorate over time and which would allow researchers to know how far to predict at each level in order to remain statistically significant. Such a model would help crime understanding for operational and tactical levels.

Phase 3 – Identifying the datasets and attributes

Taking the model one step further to Level 3, a series of statistical measures are listed for the variables within each dataset identified for model integration. This level is theoretical

as each link needs to have a theoretical construct attached to it with the relevant research studies carried out which would validate that such a model can work.

The Phase 3 is highly detailed where it looks at each data-box, identifies the relative dataset as indicated in Phase 2, lists the attributes within that dataset and then attempts to identify statistical measures for each level within the process. In most cases, the statistical measures call for further research into the potential measures to be employed. Also, at this stage new indexes were inputted such as insurance, sentencing practice and recidivism, each of which was identified as vital to a particular complex index.

As in the Phase 2 case, the best way to understand Phase 3 would be through an example, that pertaining to the proximity-to-community-centre data-box (3). In Phase 3, a statistical measure is listed as distance-to-centre which is further explained through the use of a distance ranking index based on GI buffering techniques employing 100m intervals.

New indexes are also identified in Phase 3, which indexes help to clarify how a more complex index is created. The following example is based on the welfare index (2) that is split into two component indexes (persons-at-risk and structural-dependency). Each of these is composed of three data complexes (ex: pensions, social assistance, widows' survivors), where each complex is composed of the sum (Σ) of a number of welfare benefits pertaining to that category (attributes within the welfare index dataset). For example, widows' survivors is composed of Widows pensions (NM and NMWP), Survivors pension (SRP and ESRP). The results are then integrated with other categories as in the Phase 2 process described earlier.

Conceptual Model Summary

In summary, the main aim of producing these three Phases was primarily targeted at understanding the potential relationships between the CRISOLA constructs. These relationships operate within a human environment that is intrinsically dynamic, where any change in one sector would affect the other two, positively or negatively. The model will be used post-research to further refine the theories and carry out in-depth studies in each of the sectors and linkages.

The conceptual model was drafted to enable the author to focus the direction this study would take though the identification of some of these areas that can be analysed, whether data exist to support such studies and also to identify further areas of research. It also helped to list the relevant theories, the data availability, the spatial and temporal aspects and the potential relations between the different CRISOLA constructs.

Once the conceptual model was drafted, the next stage of the study concentrated on the drafting of the research questions.

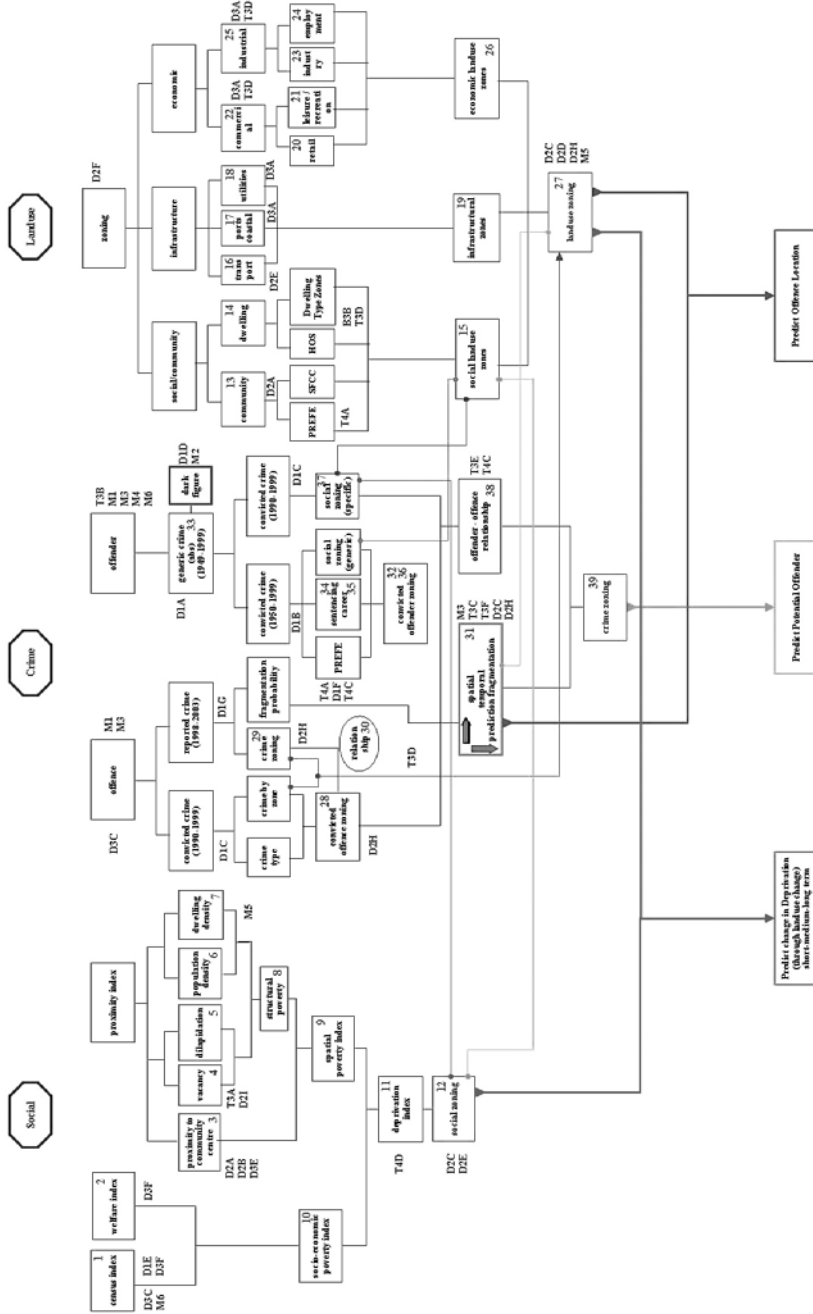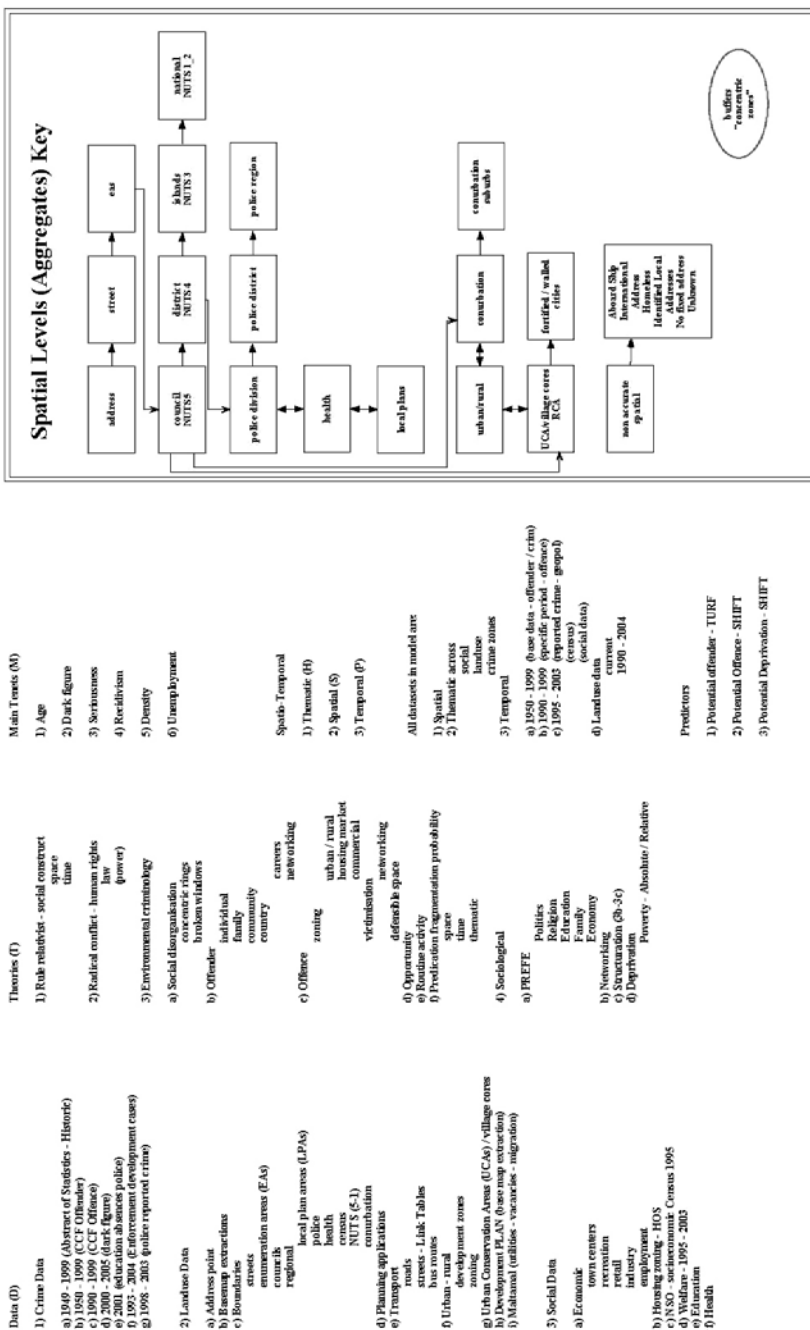*Figure 2.1: Conceptual Model Phase 2 – Linkages – Themes – Key*

Figura 2.2: Conceptual Model Phase 2 – Linkages – Themes - Key

Spatial Levels (Aggregates) Key

address — street — eas

council NUTS5 — district NUTS4 — islands NUTS3 — national NUTS1, 2

police division — police district — police region

health

local plan

urban/rural — conurbation — conurbation suburbs

UCAs/village cores RCA — fortified / walled cities

non accurate spatial

Aboard Ship
International Address
Homeless
Identified Local Addresses
No fixed address
Unknown

buffers "concentric zones"

Data (D)

1) Crime Data

a) 1949 - 1999 (Abstract of Statistics - Historic)
b) 1950 - 1999 (CCF Offender)
c) 1990 - 1999 (CCF Offence)
d) 2000 - 2005 (dark figure)
f) 2001 (education absences police)
f) 1993 - 2004 (Enforcement development cases)
g) 1998 - 2003 (police reported crime)

2) Landuse Data

a) Address point
b) Basemap extractions
c) Boundaries
  streets
  enumeration areas (EAs)
  local plan areas (LPAs)
  councils
  regional
    police
    health
    census
    NUTS (5-1)
    conurbation
d) Planning applications
e) Transport
  roads
  streets - Link Tables
  bus routes
f) Urban - rural
  development zones
  zoning
g) Urban Conservation Areas (UCAs) / village cores
h) Development PLAN (base map extraction)
i) Madrasial (utilities - vacancies - migration)

3) Social Data

a) Economic
  town centers
  recreation
  retail
  industry
  employment
b) Housing zoning - HOS
c) NSO - socioeconomic Census 1995
d) Welfare - 1995 - 2003
e) Education
f) Health

Theories (T)

1) Rule relativist - social construct
  space
  time
2) Radical conflict - human rights
  law
  (power)
3) Environmental criminology
a) Social disorganisation
  concentric rings
  broken windows
b) Offender
  individual
  family
  community
  country
  careers
  networking
c) Offence
  zoning
  urban / rural
  housing market
  commercial
  victimisation
  networking
  defensible space
d) Opportunity
e) Routine activity
f) Predication fragmentation probability
  space
  time
  thematic
4) Sociological
a) PREFE
  Politics
  Religion
  Education
  Family
  Economy
b) Networking
c) Structuration (3b-3c)
d) Deprivation
  Poverty - Absolute / Relative

Main Tenets (M)

1) Age
2) Dark figure
3) Seriousness
4) Recidivism
5) Density
6) Unemployment

Spatio-Temporal

1) Thematic (H)
2) Spatial (S)
3) Temporal (P)

All datasets in model are

1) Spatial
2) Thematic across
  social
  landuse
  crime zones
3) Temporal

a) 1950 - 1999 (base data - offender / crim)
b) 1990 - 1999 (specific period - offence)
c) 1995 - 2003 (reported crime - geopol)
  (census)
  (social data)
d) Landuse data
  current
  1990 - 2004

Predictors

1) Potential offender - TURF
2) Potential Offence - SHIFT
3) Potential Deprivation - SHIFT

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