

Document Title: The Use of Crime Mapping in Safety Efforts in Italy

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Document No.: 208042

Date Received: December 2004

This paper appears in *Policing in Central and Eastern Europe: Dilemmas of Contemporary Criminal Justice*, edited by Gorazd Mesko, Milan Pagon, and Bojan Dobovsek, and published by the Faculty of Criminal Justice, University of Maribor, Slovenia.

This report has not been published by the U.S. Department of Justice. To provide better customer service, NCJRS has made this final report available electronically in addition to NCJRS Library hard-copy format.

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LORENZO SEGATO

THE USE OF CRIME MAPPING IN SAFETY EFFORTS IN ITALY

Our insecure society faces a modern dilemma: crime control policies should increase or reduce the use of new technologies in our cities? A deeper control in everyday life can bring a reduction of citizens' freedom or an increase of their security?

This paper presents some element for the debate, by describing two experiences of use of technology in safety efforts in the Province of Padova, Italy. The first illustrates how crime mapping technologies have been used to assess the effective role of banks security measures in bank robberies; the second describes a new project of the Province of Padova, aimed at using new technologies and intelligence analysis for crime prevention. Without the pretext of giving an answer to the initial question, the paper ends with some conclusions drawn from the two experiences.

INTRODUCTION

Technology can support the fight against crime in different ways. It can harden the commission of a crime, e.g. by controlling the access to the place of crime – biometric systems, alarms – or by protecting "hot products" – with strongboxes, bullet-proof screens, or by reducing the attractiveness of target – GPS systems for trucks, smart card or pin codes for mobile phones. Finally, technology is useful in providing information on crimes in its following phase, by supporting police activity.

Mapping tools and CCTV are examples of devices aimed at this second purpose, and have been used in two experiences in the Province of Padova, which represent interesting case studies in the Italian scenario: in the first, mapping tools have been used as part of a more complex methodology for the assessment of the role that banks security measures play in criminal's choice of the target. In the second experience, still in the preliminary phase, the Service for Citizens' Safety (Servizio per la sicurezza dei cittadini) of the Province of Padova is setting up a Centre for Crime analysis, with the aim to collect, analyse and share information on crimes from and with bodies involved in the fight against crimes (Police, Local Authorities, Questura, Prefettura). The Centre will use new technologies to collect data from these subjects and from CCTV located in specific places of the territory, and will use crime mapping techniques, together with other resources information, for the analysis of criminal phenomena.

CRIME MAPPING AND BANK ROBBERY

MAPPING IN THE PROVINCE OF PADOVA

Crime mapping is a technique for the prevention and analysis of urban criminal problems widely used in America and UK, and it's becoming common in other European States in recent years. In Italy, first experiences of crime mapping have taken place recently, but the capacities of such tools are largely unexplored, as they require specific skills, powerful instruments and large datasets – from a technical point of view – but also analytical and criminological capacities to provide relevant results.

Mapping is defined as a set of resources, accessible via web, related to geographical information of the territory. Under this definition, mapping resources can be considered

specific software and databases (e.g. Mapinfo, TeleAtlas, Arcview or NavTech) as well as any other GIS resource.

Dynamic maps are made of Cartesian plans and a set of "POI" (point of interest). These points (and the lines between them) represent natural elements (e.g. rivers), administrative boundaries and, for example, streets, blocks, churches, gas stations, post offices and banks. Each point "POI" can contain information related to the coordinates of the point, but also additional information, like the name of the street or the name of the activity related to a specific POI.



Figure 1 - Example of interactive Map for crime analysis

In addition to this information, the tools of the Province of Padova also provide orthographic pictures of the area, linked to the plan in order to overlap POI information with an aerial view of the site. These aerial maps have a high definition, which allow a specific building or house to be identified precisely. The level of detail of this service can be of fundamental importance when analysing information from a criminological point of view. In fact, while a simple street map can provide information on the distribution of criminal events in specific areas of the city, a more detailed map can help in finding out the characteristics of that area (e.g. large buildings, narrow streets, proximity to abandoned areas, parking) essential in understanding why that specific crime happens in that place, or why a specific area is more victimised than another. This second kind of maps has made possible the creation of a methodology for the assessment of banks security measures.

THE USE OF CRIME MAPPING FOR THE EVALUATION OF SECURITY MEASURES EFFECTIVENESS

Crime mapping, together with advanced statistical analyses, has been used to create a methodology for evaluating security measures in banks for the prevention of robberies: banks have been geo-referenced, data have been collected on robberies and on security measures in banks in the past years, then crimes and security measures have been analysed with such methodology, developed on the basis of modern criminological theories, crime mapping and statistical analyses.

Many situational crime prevention studies start from the statement that analysing places of crimes, instead of analysing the authors, can provide better results in understanding and preventing their commission. This point of view is related to the assump-

tion that offenders act rationally, so the environment in which they move influences their behaviour (and the commission of crimes) in a foreseeable way. Some of the analyses carried out in the past on this problem have then been based on the assumption that bank robber is rational, and consequently have compared all the events of robbery one each other without any further distinction to assess the role of bank security measures.

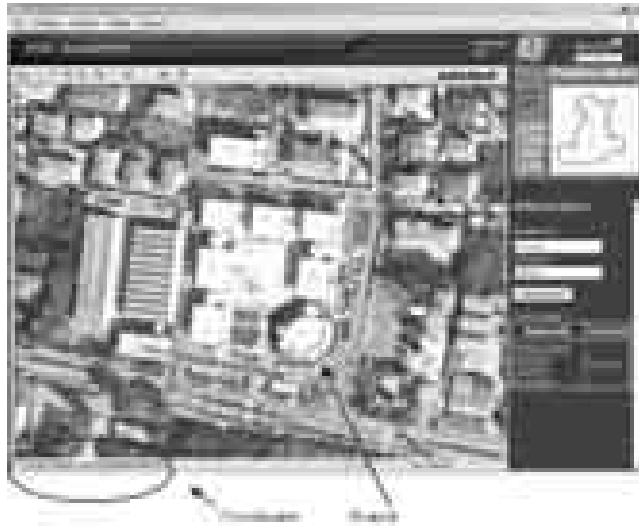


Figure 2 - Example of interactive Map of the Province of Padova

The idea of rational bank robbers must be related to each event of robbery, as every offender can evaluate security measures and environmental factors (e.g. the proximity to the highway, or the presence of a police station in the block, or the viability of the place) in a different way. Since such elements can change in banks located in different places and can affect robbers' decision making process, they have been "frozen" in the methodology.

This has been done by comparing security measures of each robbed bank with those of other banks located in a close proximity, in the day of robbery, and repeating the comparison for all events of robbery. In this methodology, crime mapping has been used for the selection of banks to compare. Bank branches have been geo-coded, relative distances have been calculated, and then security measures have been evaluated by using different radius (from 250 to 3.000 meters). Results of such comparisons have been then verified with statistical tools.



Figure 3 - Selection of banks to compare

RESULTS OF THE CRIME MAPPING

This phase has produced different results: first, a set of maps containing the distribution of banks and robberies in the Province of Padova. Reading these maps, it has come out that bank robberies are more frequent in the north-eastern part of the Province rather than in the south-west.



Figure 4 - Distribution of banks in the Province of Padova

As regards security measures of banks, the analysis has demonstrated that bank robbers, on average, do not care about security measures. There is no result that suggests that the more banks are protected, the less are robbed and vice versa.

Maps can suggest, instead, different conclusions: for example, banks on street corners, with more than one entrance, seem more subject to robberies because there is more possibility to escape; or that banks close to highway gates don't seem more subject to robberies than banks located in the city Centre, where streets are narrower and traffic heavier.

The area surrounding the train station in the centre of Padova, which is commonly considered to be unsafe, reveal one of the highest assemblies of banks, very few of which have been robbed during the past years, and one of the few is the closest to the city law courts.

Montagnana, a small town in the Province of Padova with a Middle Ages plant, has small and relatively narrow streets and four main entrances (the old city doors), and banks have never been robbed in the past six years.



Figure 5 - Map of Montagnana

An explanation for this particular situation could be the presence of the police station (the squared point) in the proximity of the banks. But while another Middle Age city had no bank robberies in the past years, even if some branches are not very close to the police station, other banks, close to the police station, have been robbed more than once.

CRIME MAPPING AND THE CENTRE FOR ANALYSIS

The second experience is about a project of the Province of Padova for the creation of a Centre for crime analysis. The centre is based on a system of data collection, including a network of CCTV located in some towns of the territory, data analysis and data sharing. This system would provide real time information for supporting police flying squad activity and is aimed also at collecting information for crime intelligence analysis. This tool can be in fact used for identifying "hot spots", adopting crime prevention strategies and supporting police intervention during the aftermath of the crime by providing real-time images of the territory.

THE PROJECT OF THE PROVINCE OF PADOVA

This pilot project of the Province of Padova is a challenging attempt to exploit new technologies for crime analysis and prevention, which has still to be implemented at the date of this paper (June 2004).

Citizens' safety is one of the tasks of the Province of Padova, which has created the *Servizio per la sicurezza dei cittadini* (Service for citizens' safety, hereinafter the Service) as a branch devoted to this specific sector with the support of the Provincial Police.

Within its activity, the Service has set up a *Centrale Operativa* (Operational Branch), aimed at collecting information from CCTV located in strategic Towns of the Province and at sharing such information with the Police.

With this pilot project the Province is setting up a *Centro di analisi* (Intelligence Branch) to collect and analyse information, with the aim of evaluating criminal phenomena in the Province of Padova and providing useful information for crime reduction and prevention policies.

THE COLLECTION OF INFORMATION

A data collection system has been set up for the system activities. Data are taken from criminal records collected by the police and, where available, from CCTV. Where these are not available, on-the-spot inspections can be carried out. This set of data is then related to geographical information for crime analysis, by using maps and software already existing in the Province of Padova.

This phase is divided in geo-coding crimes and linking criminal events to places and place information (viability, neighbourhood...) in the whole Provincial territory.

This phase is a necessary step for the intelligence activity, and requires the involvement of the Operational Branch to ensure good communications among the Intelligence Branch, Police agencies (Polizia di Stato, Carabinieri, Guardia di Finanza, Town and other local Police) and Governmental Local Office. It is essential to ensure and coordinate the stream of information among all these bodies, as well as to and from any other qualified subject that deals with crime in our cities like the Observatory for Security of the Veneto Region.

The local dimension of the territory suggests focusing efforts towards data on predatory crimes, environmental crimes, violent crimes (also domestic crimes), drug-related crimes, and also petty crimes. Information on transnational crimes, or organised crimes are not useful in this contest, as these crimes are less related to local characteristics and are more difficult to control from local police.

An important point is the detection of petty crimes (vandalism, graffiti, and bicycle thefts): these crimes have little economic consequences and produce no violence, but contribute to increase citizens' feeling of insecurity and to reduce quality life of our cities. The main problem is that these crimes are perceived by citizens but they are seldom reported to the police, which sometimes is unwilling to receive information on these crimes, as its officers consider them not important.

Knowledge on petty crimes is instead important: first, because the degeneration of an area can be accelerated if small criminal actions are not repaired; second, because petty

crimes, for an intelligence activity, can become important and can be considered, for example, early warnings for more serious crimes. Coming back to Padova, for example, a serious problem is bicycle thefts, as many University students use old bikes to move in the city. To date, few bicycle thefts are reported to the police: this has generated a solid market of stolen bicycles, and a sort of resignation by the students, but has also attracted petty criminals in specific areas of the city. Since maps show that most of the thefts are committed in front of the train station (where students leave bicycles to go home at the evening) and in the proximities of University faculties and libraries, easy controls, even for a short period, in these hot places could reduce substantially this crime.

THE INTELLIGENCE ACTIVITY

If the collection of information is important, its analysis for crime prevention is the core of the project. In this phase, crime mapping plays its key role: all available information on crime are put in maps and linked to images taken by CCTV.

These information are analysed by a team made of experts with criminological, operational, statistical skills that take information and try to read them in order to take information such as e.g. the frequency of crimes (in time and space), the characteristics of crime places, the relation among places and crimes, and the way of escape. These analyses can provide static maps or even dynamic maps, which show the trend of crimes.

The maps contain information on different POI (points of interest) of the Province of Padova. It is essential that maps contain as many points as possible, related to the position of banks, post offices (for robberies), but also shops (distinguished per activity), service stations and local police stations. Information should be collected also on pubs, clubs, cinemas and other places where young people meet.

Important information (already available) is related to the traffic of different streets, and the location of traffic lights, highway gates and galleries, which can be used for analysing aftermath possibilities. Finally, map should include any other information that can become important in crime analysis.

Each analysis can support specific crime control policy: the study of drug selling can make clear which have been the selected places for crime, so to make possible to foresee which other areas are at risk. The analysis can also find, e.g. that poor street lighting is not a problem for drug sellers (i.e. they don't choose dark streets) but, for example, that they select corners among straight streets with low traffic. Mapping analysis can follow trends of apartment thefts, giving the police information about the foresee area at risk.

The whole system is self-improving, as it learns as much as data are collected and analysed, with the insurmountable limit in crime prediction, related to criminals' decision making process, which cannot be foreseen. Any result coming out from these analyses must consider this assumption. The system can be improved also from the technological point of view: Italy has witnessed innovative pilot experience in Bologna, where Town Police has been provided with GPS pocket PC, where officers could store criminal events during their service to be transferred in a general map of the City. Technology can support intelligence activities, and the creation of a network of intelligence centres can be the future for setting up effective crime prevention policies.

THE SHARING OF INFORMATION

In the pilot project of the Province of Padova, data and analyses are shared among all subjects involved in crime prevention: law enforcement agencies, local authorities, research centres, and universities. This sharing would bring to a major coordination, in particular among different police bodies with competences on the same territory, with the idea is to create a network among institutions involved in crime prevention, with a permanent exchange of information.

CONCLUSIONS

The technological evolution in our society is bringing more resources to fight crime: GPS, crime mapping, wireless communication, biometric systems and digital CCTV with remote control are some of the instruments that can support the contrast to criminal activities in our cities.

But technology itself is not enough, as it can produce an excessive limitation of our freedom and, in the end, a worsening of our lives in the name of security. Moreover, the menace of terrorism recently extended to our countries have demonstrated two things: first, the preventive policy set up by some States is ineffective, as it has brought hundreds of people in jail on the basis of a simple suspicion, without taking out the causes and the happening of tragic events. Second, despite to all technological and protective devices, facts demonstrate that it is impossible to protect all citizens, while few people can be protected with very high costs.

Technology is a tool for crime prevention purposes, then, not a solution of crime problems, and it must be anyway accompanied by intelligence activity. In this specific contest, crime mapping can produce goods results, an intelligence centre of analysis, made of IT experts, police officers, criminologists, statisticians, can work for Local Authorities for adopting effective crime prevention policies.

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