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Petty cRiminality diminution through sEarch and Analysis in multi-source video Capturing and archiving plaTform



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Project

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Phase

WP2 – System Requirements

2.0	31 January 2015	Georgios Kioumourtzis (KEMEA)	Revised version based on PO review and comments
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1. Overview

The DoW describes this deliverable as:

D2.1) Petty Crimes Analysis and Initial Glossary: Petty Crime Incidents Analysis and Provisional Common Vocabulary Definition for categorisation and classification. A detailed report for petty crime incidents categorisation and classification will be developed [month 3].

The aim of this document is to conduct first, an analysis of petty crime incidents and to provide a common vocabulary for the categorisation and classification of petty crimes. To this end, the P-REACT consortium, in addition to literature review, organised different workshops in Cyprus, Greece, Ireland and Spain. In these four workshops that took place in June 2014, we invited representatives from Police, private Security companies, business associations and the public transport sector. The results of the workshops provided us the opportunity to better classify petty crimes and highlight a number of issues associated with this crime area.

This document includes the following sections:

- Section 2 attempts to provide definition and classification of petty crimes along with a common vocabulary. Statistics and trends of petty crimes in a number of European countries are also provided.
- Section 3 highlights the importance of analysts and the forensic departments in Police organisations.
- Section 4 identifies current gaps in existing CCTV systems and highlights how P-REACT solutions could enhance these systems and make the work of police analysis more efficient.
- Section 5 looks at the social and economical impact of petty crime, and finally
- Section 6 concludes this deliverable.

2. What is Petty Crime?

2.1. Petty crime definitions

Petty Crime does not have a single accepted meaning in use across the EU. There are a number of similar terms used across different EU member states and by different agencies within states. These terms include 'volume crime', 'acquisitive crime', and 'antisocial behaviour'.

The Oxford dictionary (2013) defines the term 'Petty Crime' as:

- Minor crimes such as theft, trespassing etc.
- A small crime such as minor theft, trespassing etc.

There is an indication that the word 'petty' might come from the French word 'petit' meaning small and was adopted to indicate the resulting implications of the crime action is small.

The Oxford dictionary (2013) defines the word 'petty' as:

- Of little importance; trivial.
- Law (Of a crime) of lesser importance: "petty theft".

To generalise and term a crime as 'petty' without gauging the crimes full impact, could stigmatise the victim, lead to under reporting, and irreparably damage trust and confidence between the public and police. The EU, however, uses the definition of volume crime [1],

"any non-organised crime, including frequently committed crimes, whose victims are easily identifiable (domestic burglaries, thefts from vehicles, common assault, street robberies)".

In the UK the Association of Chief of Police (ACPO) and the government prefer the term 'volume crime'. The National Police Improvement Agency (NPI) [2] defines this as:

"Volume crime is any crime which, through its sheer volume has a significant impact on the community and the ability of the local police to tackle it. Volume crime often includes priority crimes such as street robbery, burglary and vehicle- related criminality, but can also apply to criminal damage or assaults".

This term is preferred as it does not imply that such crimes have no impact; but once amalgamated their impact is significant on the community and therefore of great importance.

The Association of Chief of Police (ACPO) compiled the Investigation of Volume Crime Manual [3] and the working party identified crime types that fall into the volume crime category to include street robbery, burglary-dwelling, burglary, non-dwelling, theft (including shoplifting), vehicle crime-theft of, vehicle crime - theft from, criminal damage and drugs [4].

Another term in use is 'Acquisitive crime', crime types relating to any theft or attempt theft either in the home or in public. 'Acquisitive Crime' is defined *"as offences where the offender derives material gain from the crime"* [5]. These offences can range from burglary to theft of a bicycle, theft from a vehicle or theft from the person. Interestingly, shoplifting is often categorised as not serious, therefore the term Serious Acquisitive Crime has become notable [6].

Antisocial behaviour is another term that is commonly referred to. UK law provides this definition (Crime and Policing Act 2014, [7]):

- (a) Conduct that has caused, or is likely to cause, harassment, alarm or distress to any person,
- (b) Conduct capable of causing nuisance or annoyance to a person in relation to that person's occupation of residential premises, or
- (c) Conduct capable of causing housing-related nuisance or annoyance to any person.

Under the Greek legislation, the characterisation of a crime as 'petty' is based on its impact and, a decision is made by the court of law.

Therefore, more or less each MS follows its own rules for the definition and classification of petty crime instances.

P-REACT workshops¹ results indicated that Vandalism, Shoplifting, Robbery (from a person), Assault, Graffiti and Thefts are considered the most frequent crimes that can be fall under the category of petty crimes. With the assistance of the Hellenic Police, we will attempt to provide a common vocabulary that could be used in a standardised way by existing reporting frameworks based on Greek legislation that is in line with the EU legislation and relevant directives. In some cases we base also the given definitions on on-line resources. Our approach is at least to provide a common understanding between all entities involved in the P-REACT project including also the external experts participating in the End User Advisory Board (EUAB) and the Ethical Advisory Board (EAB). We also understand that the definitions given below may not be accepted by all MS in the EU. However, this effort can be seen as an initiative for a common definition of petty crime.

To this end, under the above terms and conditions, the following definitions and conditions could be used to describe the various types of petty crime:

Vandalism

- Problematic situations in public or private space that result in causing systemic damage, usually by young offenders, which cause discomfort or insecurity among citizens.
- Wear of foreign-owned property usually small range of damage, such as parks, statues, gardens, school property, public buildings, trash bins, etc.

Shoplifting

Although the crime of shoplifting may be prosecuted under general Larceny statutes, most jurisdictions have established a specific category for shoplifting [8]. Statutes vary widely, but generally the elements of shoplifting are:

- Wilfully taking possession of or concealing un-purchased goods that are offered for sale
- With the intention of converting the merchandise to the taker's personal use without paying the purchase price.
- Possession or concealment of goods typically encompasses actions both on and outside the premises.

Robbery

Whoever removes movable items (totally or partially) using physical violence against a person or threats combined with imminent danger of life or injure or forces him to deliver items to the illegally appropriated, is punished by imprisonment. Robberies usually take place:

¹ <http://p-react.eu/end-user-workshops/>

- Outdoors using violence or threat of violence (using weapons - mostly fake ones or knives), by removing bags, small amounts of money or small items and mobile phones with victims typically individuals. Violent removal bag - briefcase, which is very common type of robbery falls under this category.

Assault

Any intentional act by one person that creates an apprehension in another of an imminent harmful or offensive contact is considered as assault. An assault is carried out by a threat of bodily harm coupled with an apparent, present ability to cause the harm. It is both a crime and a tort and, therefore, may result in either criminal or civil liability.

Graffiti

Graffiti is writing or drawings that have been scribbled, scratched, or sprayed illicitly on a wall or other surface, often in a public place. Graffiti can be regarded a form of vandalism, which becomes costly for tax payers and business and property owners [9].

Theft

Whoever removes (totally or partially) movable things by having the purpose to unlawfully appropriate them is punished by imprisonment of at least three months. If the object of theft is particularly valuable imprisonment is increased to at least two years. Movable are also considered the energy of electricity and steam.

Thefts are commonly taking place:

- In an open area, in public transport or in crowded areas. Such thefts include removing wallets, small amounts of money and mobile phones. The most typical methods that are being used are those in which the act is not directly perceived by the victims.
- In outdoor space by removing the bag - briefcase without using force (grabbing a surprise). Perpetrators are usually powered by two-wheeled motors with victims more often being women. In many cases the perpetrator escapes on foot after or embarks on a two-wheeled motor.
- Bag or briefcase thefts from a car when the car is stopped, with the driver and/or passengers being present, from an opened window or smashing the window. Perpetrators are usually two and use two-wheeled motors.
- Thefts involving burglary from a car parked on the street or shops (food kiosks, cigarette kiosks, super markets etc.) by removing audio/video devices, mobile phones, small amounts of money, low-value items, clothing, food, etc. Over 100 million € is the loss of income in supermarkets from pilfering marked by customers. According to what is stated in Hellenic newspapers from executives of supermarket chains, most of the stolen items are intended for resale and not for consumption. These kinds of thefts have increased in the last five years and maintain their upward trend, according to the same strains.
- Home thefts when their residents are present (most of the times sleeping during midnight hours) or away (during summer vacation). Perpetrators usually “break and entry”, removing portable things like mobile phones, video and audio devices, personal computers, money, jewellery etc. Nowadays, these kinds of thefts include car thefts as well, since thieves search and (most of the times) find house owner’s car keys, and remove the car from the house’s parking garage.

Other minor offences that can be included in the list of petty crimes are i) Disturbing Public Order, ii) Violations provisions for streets, iii) Violations provisions for coasts, iv) Illegal dumping/pollution

(Environmental), v) Traffic Disruption, and vi) Risk of harm from animals, guns, stoning (glass breaking, etc).

2.2. Classification of petty crimes

As noted in section 2.1, there is not a well defined definition of 'petty crime'. Subcategories of petty crime are labelled based on the problems which a country is facing e.g. In the UK bike theft is often a separate sub category, whereas in Greece, motorcycle theft is a subcategory.

In order to come towards a common classification of petty crimes, a number of similar categories can be identified. These include:

- Vandalism.
- Shoplifting.
- Robbery (from a person).
- Assault.
- Graffiti.
- Theft.

In order to understand petty crime classifications, it is easier often to look at what is not included. Notable exceptions include crimes which are generally determined as being serious and organised crime or major incidents. These include murders, drug or human trafficking, fraud.

The key criteria that help us classify a crime as 'petty' include:

- Amount of damage or loss caused to the victims.
- Fear or insecurity caused to citizens (from actual situation or moral panic).
- Frequency or volume of offense.
- How the crime is responded to by police (allocation of resources).
- Visibility of crimes (Crimes committed in a public or private open space).

P-REACT workshops' results highlighted very interesting points regarding the classification of petty crimes, their frequency, impact and nature. During the workshops a total number of more than forty end-users from Police, security companies, railway and transportation operators and the business sector were interviewed (Table 1) via guided questionnaires (ANNEXES II, III and IV).

Date/Place	Organiser	End-Users Participants
17 June 2014/Nicosia Cyprus	ADITESS	Cyprus Ministry of Transportation <ul style="list-style-type: none"> • Department of Public Works / Architect • Department of Public Works / Safety and Health Cyprus Police <ul style="list-style-type: none"> • Criminal Investigation Division • Technical Department Municipality of Egkomi Cyprus Telecommunication Authority (CYTA) Cyprus Private Security Companies

Date/Place	Organiser	End-Users Participants
18 June 2014/Athens, Greece	KEMEA	Forensic Science Division/ Hellenic Police Hellenic Police Security Directorate Brinks Security Company G4S Security Company Alpha Hellas Security Pyrsos Security S.A. ISS S.A., Security Company ICTS S.A., Security Company Urban Rail Transport S.A. Trainose S.A., National Railway Company Athens Urban Transport Organisation Athens Trades Association
19 June 2014, San Sebastian, Spain	VICOMTECH	Prosegur (Private Security Company) Area7 (Private Security Company) EHU / UPV (Public University) PCI Security Doctors (Private Security Company) Policía Municipal de Donosti (San Sebastian's city local Law Enforcement Agency) Policía Municipal de Renteria (Renteria's city local Law Enforcement Agency) Txingudi (Commercial Center - Security Manager)
23 June 2014, Dublin, Ireland	KINESENSE	UK Home Office PSNI An Garda Síochána (Irish Police) Irish Railway Procurement Agency

Table 1 - P-REACT workshops facts

According to Police and Security experts the most frequent petty crimes currently are related to robbery (without use of violence) and assaults to individuals (Figure 1).

In terms of their gravity, based on the economical impact, shop lifting, theft and robbery appear to be of significance importance (Figure 2). According to Police officers, driving factors for such crimes are those related to drugs followed by poverty and gangs (Figure 3). The most common target of petty crime is theft of goods (in many cases shop lifting) followed by vehicle theft while almost 15% of the crimes are related to infrastructure damages including graffiti in the public transport sector (Figure 4). The Hellenic railway transport sector reports that the impact of damages in the infrastructure and graffiti reach 5 million Euros annually. As for the profile of the offenders, it seems that petty crimes are committed by both individuals and groups of people with the majority being between the ages of 18 and 39.

By summarising the above results we can see that petty crimes are mainly those committed by younger people and are related to shop lifting and vehicle thefts. Damage to public transport systems and anti-social behaviour was also noted to be carried out by young people. Therefore, petty crime involves many characteristics of antisocial behaviour and it is not only up to Police forces to try to control such behaviours. The responsibility is often left to private security operators in public transport domains.

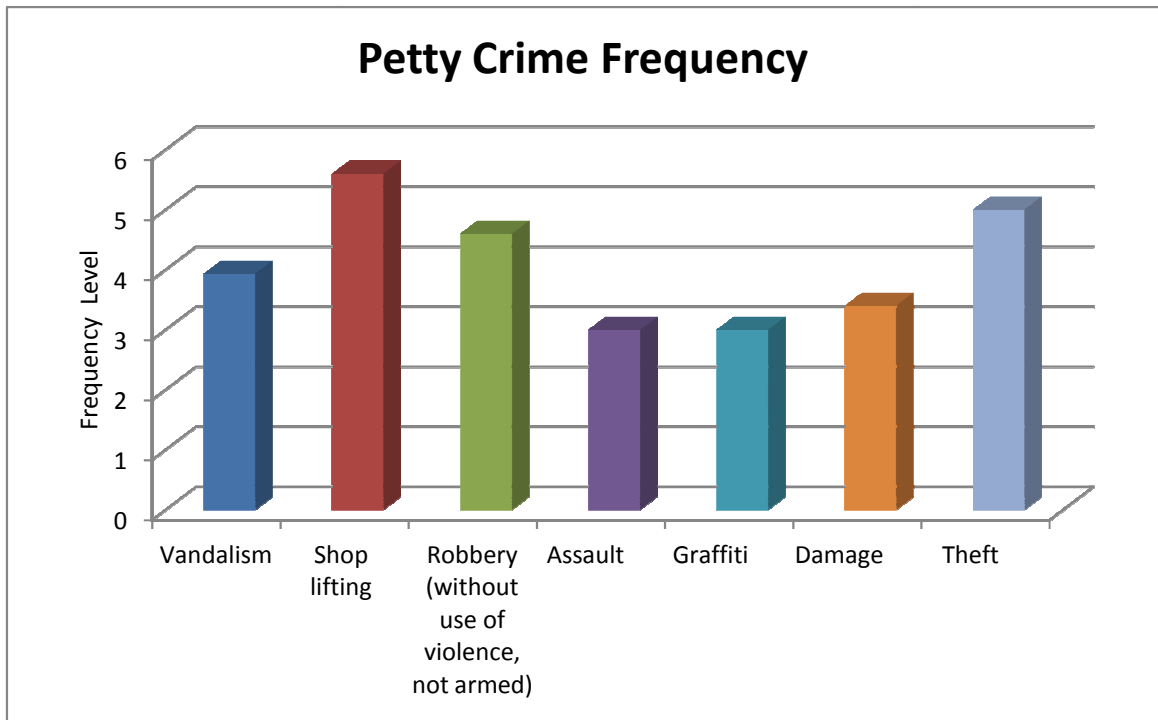


Figure 1 - Frequency of petty crime incidents (source: P-REACT end-user workshops)

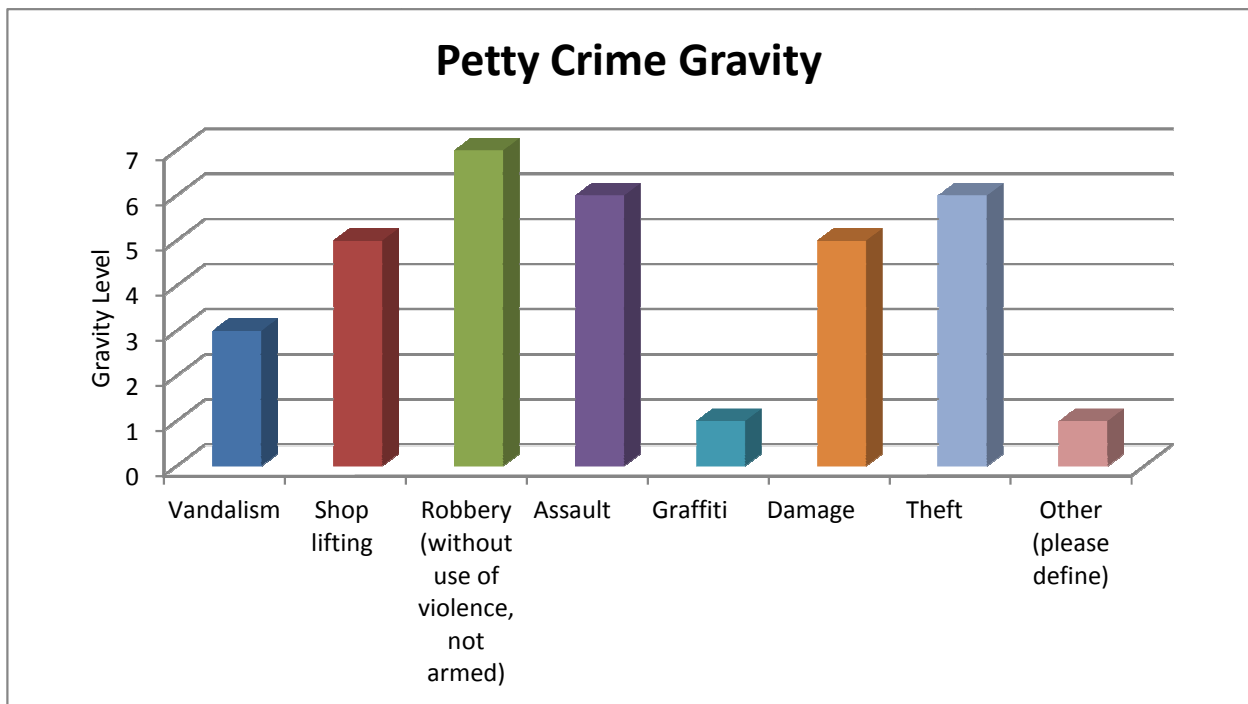


Figure 2 - Seriousness of petty crime (source: P-REACT end-user workshops)

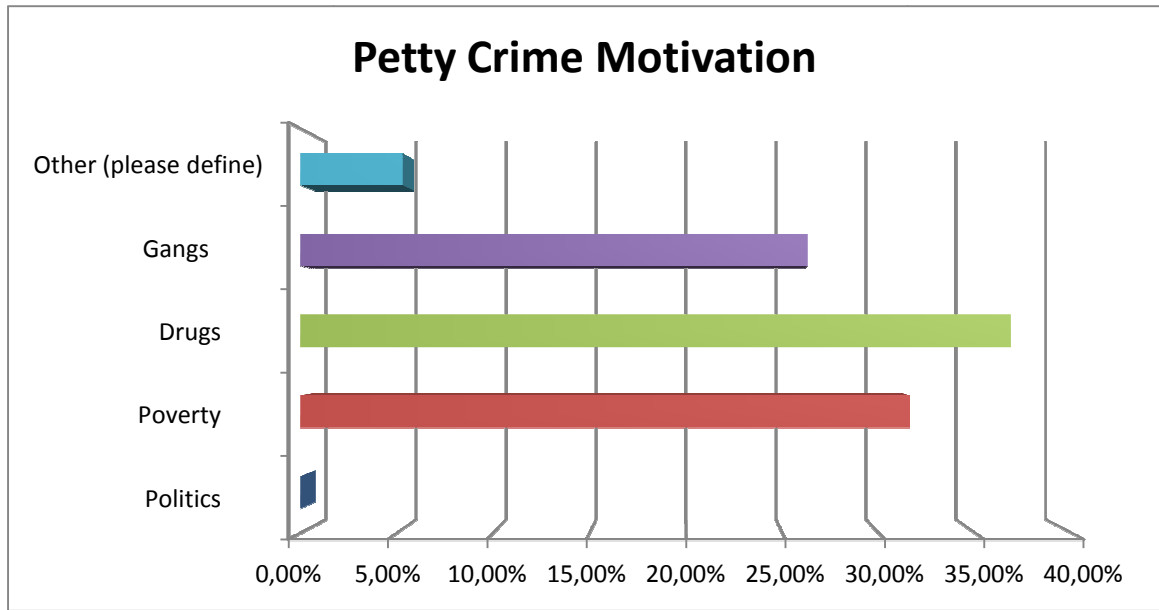


Figure 3 - Petty crime drives (source: P-REACT end-user workshops)

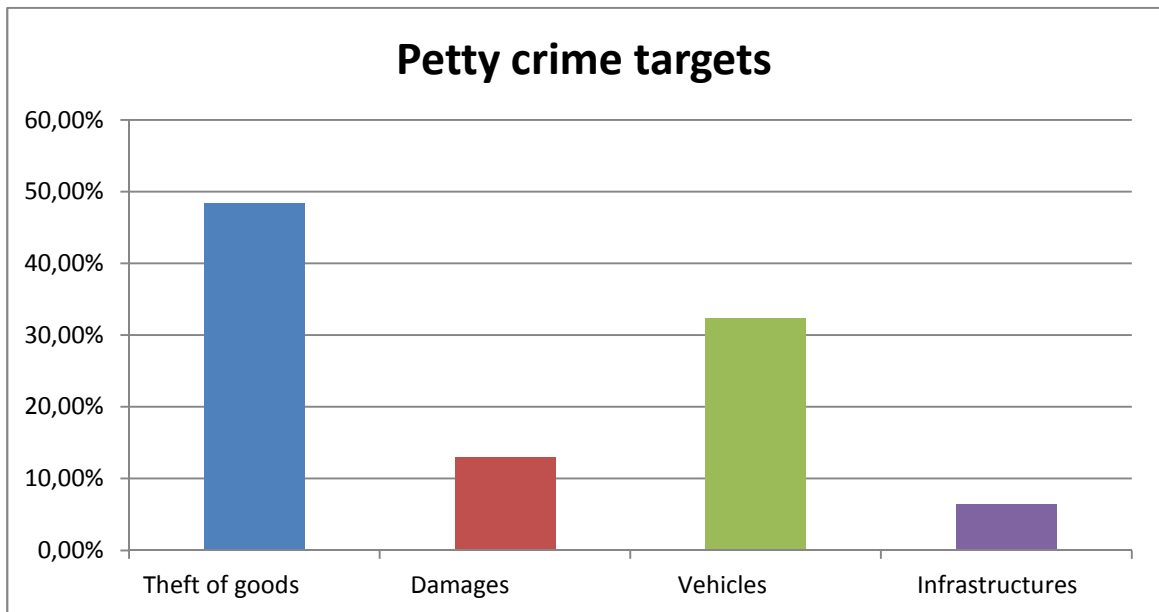


Figure 4 - Petty crime hotspots (source: P-REACT end-user workshops)

2.3. Statistics and Trends

Eurostat provides an up-to-date database with crimes reported by Police in all EU Member States (MS) [10]. These statistics however, do not provide any clear figure of crime types related to petty crime and are confined in four main categories such as homicide, violent crime, domestic burglary, and robbery. Our research in police open sources revealed that there is not explicit reporting for petty crimes. In fact we have already discussed that there has not been a unified definition for what a petty crime is up to the European level. Nevertheless, in order to obtain at least a figure of what is the trend of petty crimes in Europe we managed to gather statistics from some European countries that provide more detailed figures. A summary of crime statistics based on the sources indicated in the figures below, can be found in ANNEX VI.

Below we provide a short analysis of petty crime trends in six European countries where statistics are available. It is important to mention that in almost all countries there are not statistics for vandalism and graffiti.

In Greece we observe (Figure 5) that all types of petty crime have been decreasing over the last three years. However, still bicycle-scooter thefts, assault and thefts (pocket lifting) still present high figures.

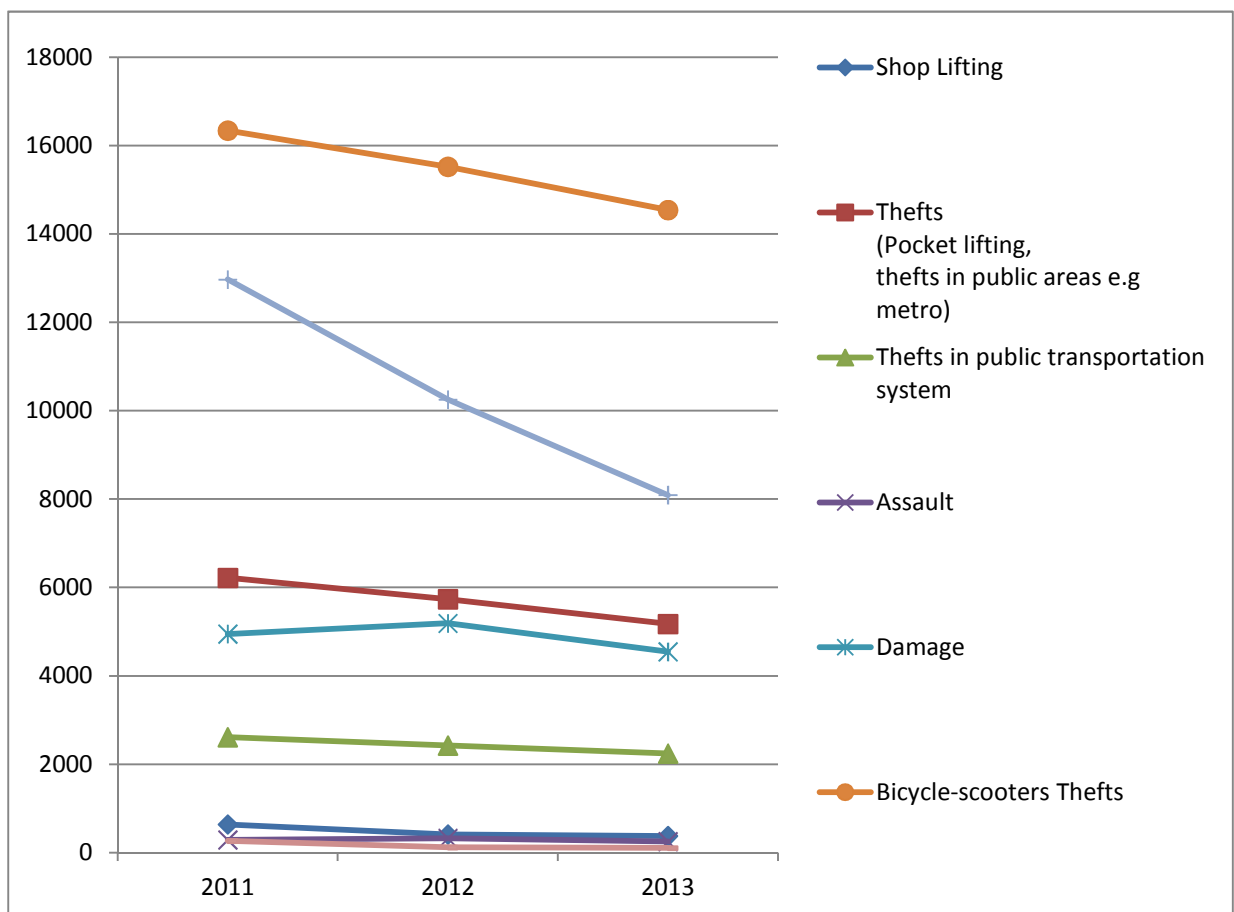


Figure 5 - Petty crime trends in Greece²

In Germany, (Figure 6) damage has been significantly decreased while thefts in public transportation

² [Greece crime statistics](#)

system have been increased. Figures of other types of petty crimes remain almost the same.

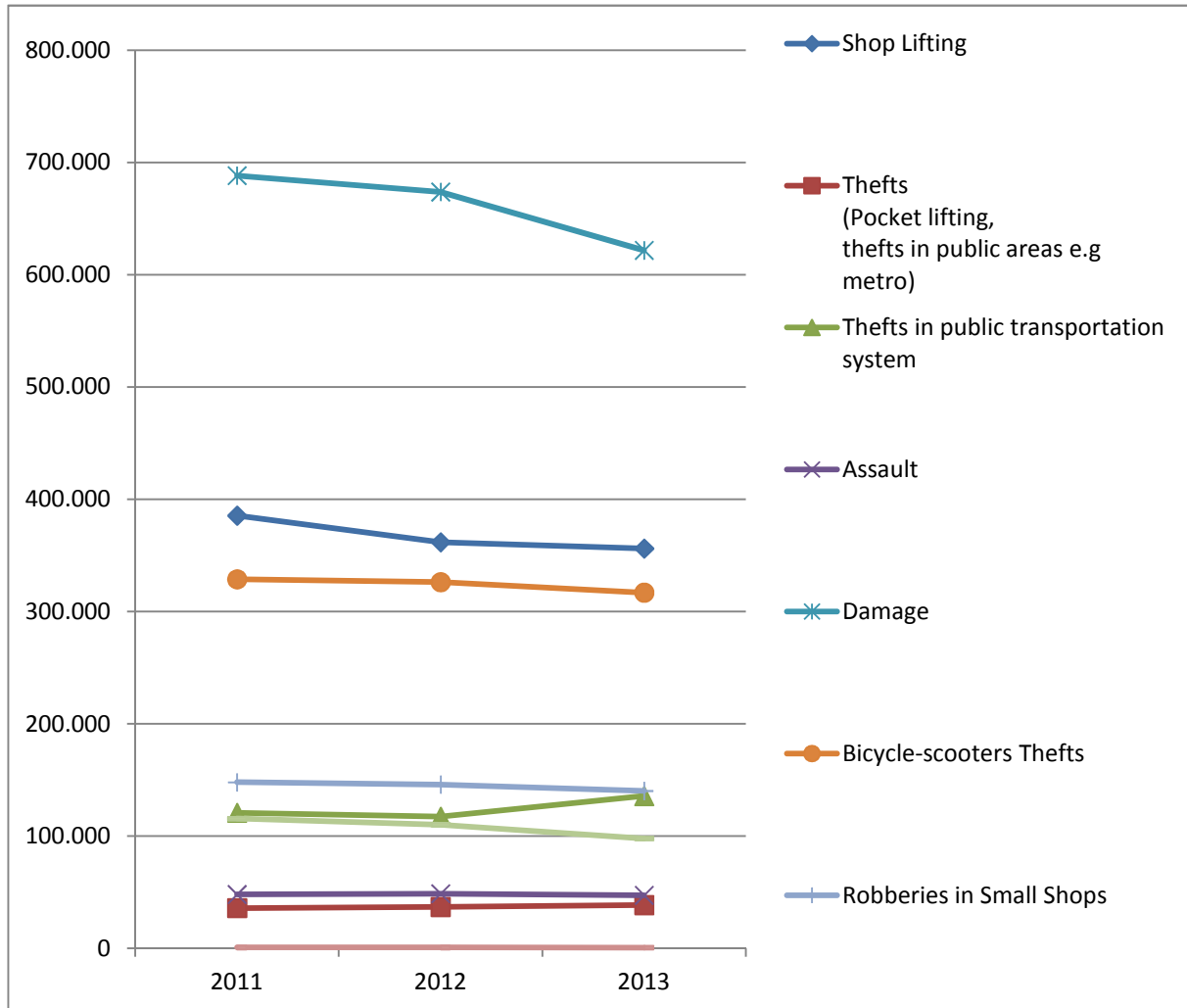


Figure 6 - Petty crime trends in Germany³

In France (Figure 7) we can see a significant increase of pocket lift and thefts in metro stations. Thefts also in public transportations were also increased in 2013.

³ [Germany crime statistics](#)

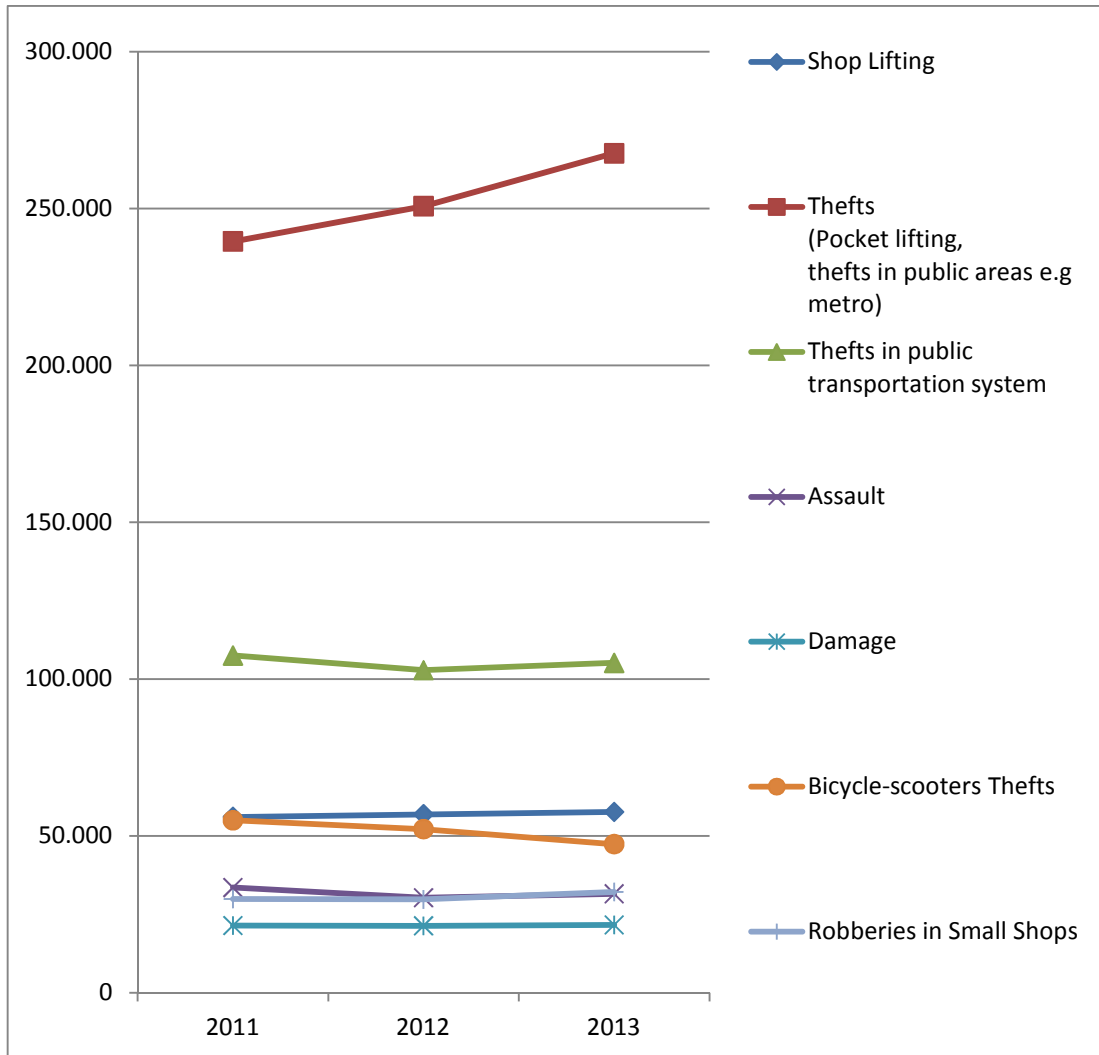


Figure 7 - Petty crime trends in France⁴

Shop lifting and assaults have been significantly increased in UK (Figure 8). However, pocket lifting and thefts in metro stations have been decreased in 2013.

⁴ [France crime statistics](#)

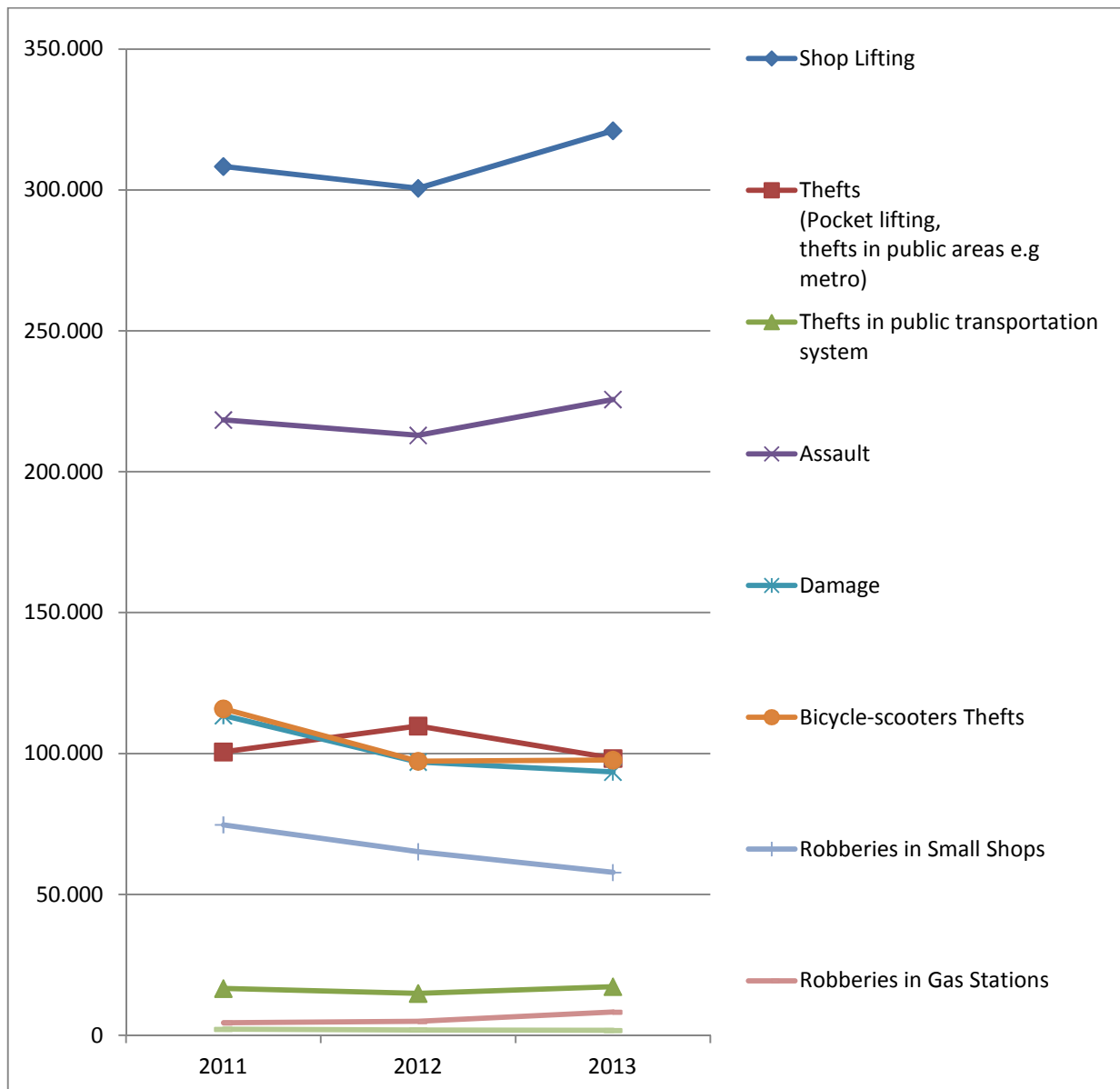


Figure 8 - Petty crime trends in UK⁵

In Cyprus (Figure 9) all petty crimes have been decreased almost in all areas while pocket lifting and thefts in transpiration areas present the same figures in 2013 compared to 2012.

⁵ [UK office of national statistics](http://www.ons.gov.uk)

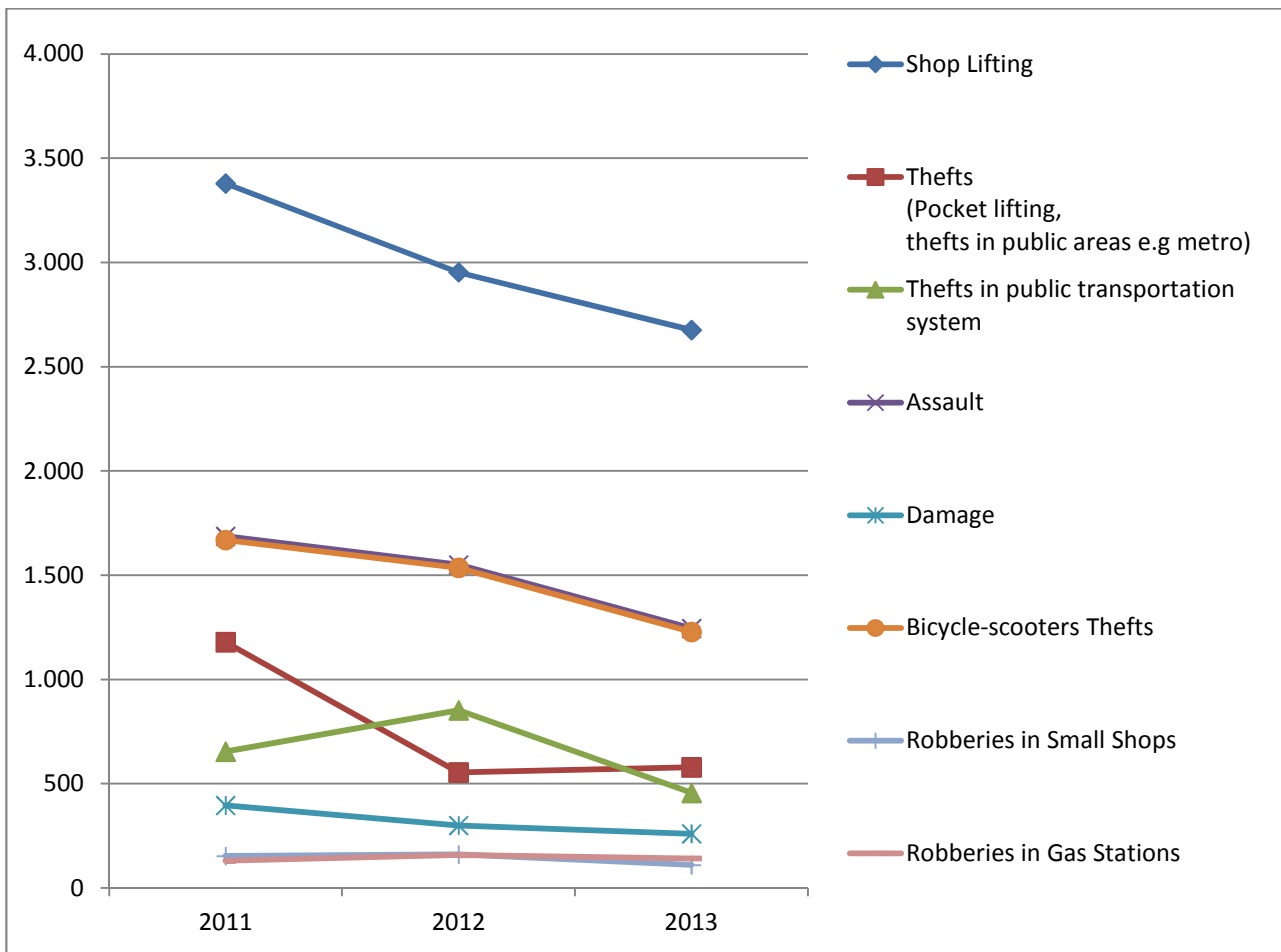


Figure 9 - Petty crime trends in Cyprus⁶

In Ireland (Figure 10) we observe an increase in shop lifting while all other petty crimes have been slightly decreased. The most significant decrease is observed in property damage. From the above analysis on the trends of petty crime we can see that P-REACT as a solution is very well suited to current trends of petty crimes at least in the above European countries.

⁶ [Cyprus crime statistics](#)

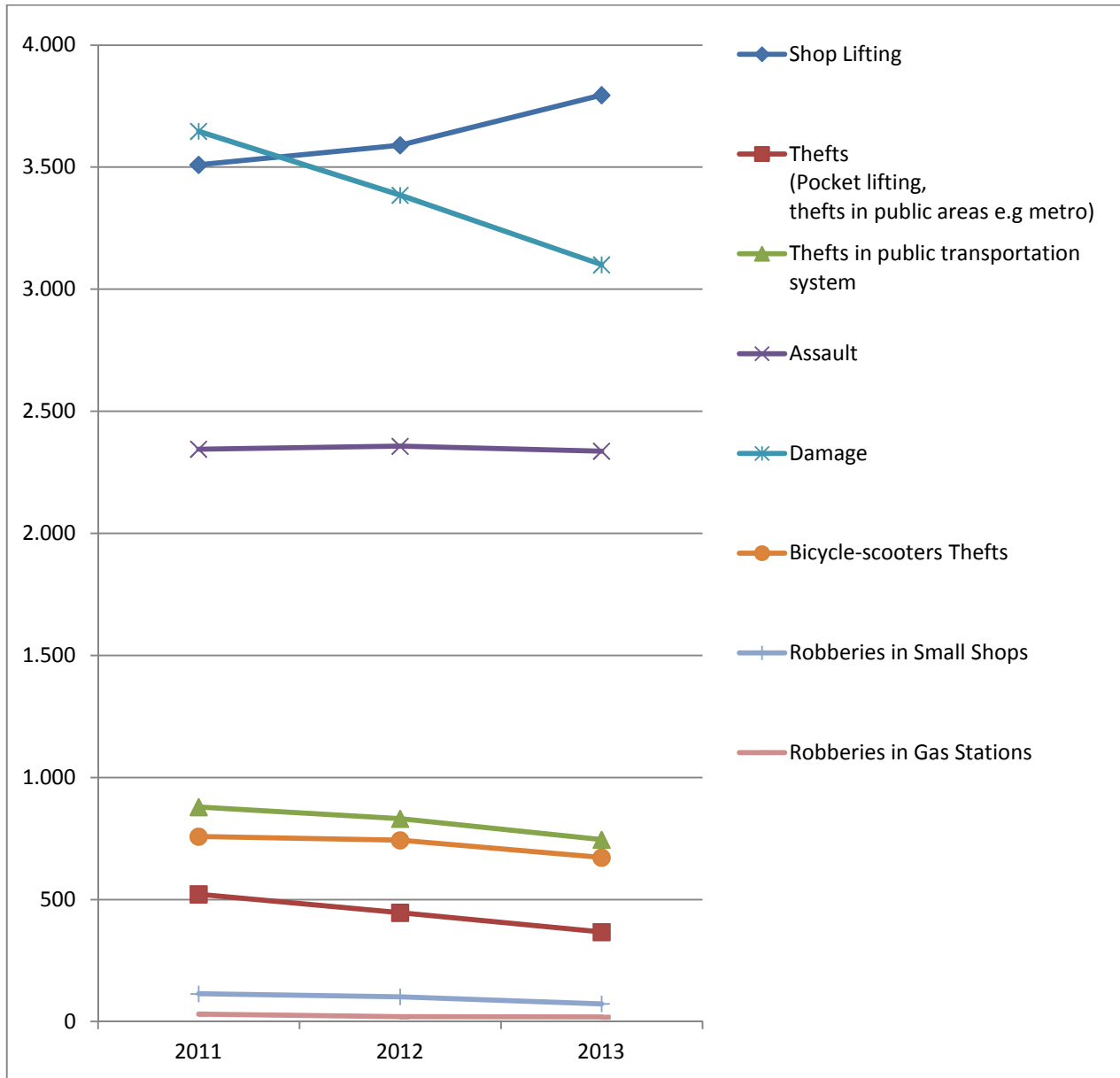


Figure 10 - Petty crime trends in Ireland⁷

⁷ [Central statistics office, Ireland](#)

3. Police Investigation Procedures

The aim of this section is to review police procedures in responding to petty crime. By looking at investigation procedures we can gain not only a greater understanding of petty crime but also the potential role of the proposed P-REACT solutions to enhance existing solutions and procedures against petty crime. We base the discussion in this section on interviews conducted within the UK and the Hellenic Police.

Generally, law enforcement agencies are considered to be very proficient and highly regarded for investigating serious crimes. However, for petty crime, solving this type of crime is often perceived as inadequate. This is due to the challenges that petty crime presents. The inadequate tackling of petty crime by police is due to excessive workload, no clear investigative direction, random response, and lack on continuity throughout the investigation.

In general, there are a number of recommended stages of petty crime investigation processes:

- Crime reporting & Call handling.
- Primary investigation and crime recording.
- Secondary Investigation.
- Suspect management.

Different police representatives are involved at different stages of the investigation. In most agencies there is a centralised Control Room or Incident Room to manage calls and some except emails also during crime reporting. This is usually the first time that a crime is recorded (and therefore the first stage that a crime is analysed). The usual process is to determine if a crime has occurred, collect as much information from the informer as possible, assign a crime report number and pass on the investigation to another person with a focus on if someone should be dispatched to the scene. What is decided depends on a number of factors, one of which is the crime type. Therefore, the analysis of the crime type during this call handling is important. Who investigates the reported crimes depend on the crime type. Depending on the nature of the crime investigation responsibility will be given to detectives or frontline police.

Two of the most important roles during petty crime investigations which revolve around the solution proposed by P-REACT include the role of the Forensic Video/Audio Analyst and Crime Analysts. We will now look at their roles in greater detail.

3.1. Crime Analysis

Analysis in Law Enforcement Agencies is conducted in the same way, even when it refers to organised or petty crime. Analysis can be defined as methods and techniques through which information is processed in a way that gives new knowledge to the prosecuting authorities to fulfil their purposes. For example, analysis may provide products (reports) to help police forces to dismantle a crime hotspot, to be known perpetrators of criminal acts and to support the leadership to take decisions on the problems of crime, etc.

Countries with developed policing have central national unit of analysis information (National Criminal Intelligence Unit) and regional analysis units that support on one hand the tactical units and the on the other hand, the decision makers and high strategic level of command. During an investigation reports, charts, assumptions and recommendations support (and direct) research will be provided. Crime analysis also focuses on predictive analysis by providing preventive, estimating future threats and risks. The central unit of analysis usually analyzes information that requires processing. This information is

derived from law enforcement authorities throughout the country, while regional units undertake information derived from local law enforcement authorities. Analysis is carried out always in cooperation with the police investigation teams, which need help to solve a crime or crimes and bring the perpetrators to justice.

3.1.1. The role of the Crime Analyst

It is the role of the crime analyst to undertake analysis of crime activity for both individual cases and at the organisational level. When a crime happens it is reported in real time and it is the role of the analyst to analyse crimes to look for patterns etc. They produce reports using techniques and specific ways of thinking grounded in inductive logic, creative and critical thinking. Software and technology is very important to an analyst. Analysts gather information, evaluate it, classify it, analyse it (using specific analysis software) and finally develop their cases and present their results with specific conclusions and recommendations to the investigation team and the organisation. Key trends which analysts will look for include crime location, crime pattern change and if predictions can be made about future potential crimes.

3.1.2. Analysis material and products

The most important and reliable information in the analysis process, usually comes from the research group and trusted analysts. Other information can be processed either from sealed sources (service records, criminal records, national computer crime bases, etc.) or open ones (newspapers, magazines, reports, scientific institutions and organizations, etc.). Each piece of information has the same weight in the analysis and findings, so they are evaluated based on a specific rating scale.

All analyses result in a written report, delivered to the investigation team. The report can be strategic (state description, risk or threat) to assist decision-making at the strategic-political level or be operational (criminal network analysis, crime analysis, criminal profiling, etc.) to help law enforcement authorities to achieve arrests and seizures. More than one report can be drawn from a survey when the research requires continued close cooperation between research team and the analysts; analysts produce short reports and drawings almost every day and bring them to the attention of the research team in order to make decisions on the investigation. An important role in the use of the findings of the analysis is the skills of analysts in written and oral communication with the research team.

The more and better information the analysts receive, the more likely they will be able to produce better analyses, which results in greater support and better results at the operational level. This can be done easier with the support of technology. The assistance offered by the analysis must be assessed in the end by the operational research team or their beneficiaries in decision-making. The views and comments are taken into account for future analyses, alongside anything noticed by the analysts themselves.

3.2. Forensic Video/Audio Analysis

3.2.1. Introduction

Video and audio evidence is unique in that it can provide a real time eyewitness account of a crime. This allows for investigators to watch or hear what transpired much quicker, helping to solve crimes quicker. For instance, a surveillance video captures a bank robbery in progress, or an assault in a shop, investigators can more readily identify the perpetrator.

Over the past decade, sources of recorded audio and video that can assist in an investigation have

increased exponentially. Closed circuit television systems (CCTV) and video and audio recorders can be found in businesses, at traffic intersections, parking lots, bank machines, on police-vehicle dashboards and of course, in cell phones. Audio and video evidence can be found at more locations and from more diverse sources than ever before. From convenience stores to fast food restaurants, malls to banks, traffic intersections to parks, CCTV systems are virtually everywhere. Cell phone Investigators should first identify all video or audio evidence that may exist. In addition to surveillance cameras at the scene, surveillance systems nearby may provide valuable footage, such as recordings of a perpetrator approaching or fleeing a scene. Even if the recording does not appear to be very clear or useful, all relevant footage should be collected. Forensic enhancement may recover details that aren't noticeable when viewing or listening to the unprocessed recording.

Although valuable, video can present law enforcement agencies with challenges. For most crimes however, high-quality audio and / or video recordings are often not available. The process of retrieving video in the first place is often difficult and laborious. Watching and sifting through video is time consuming and error prone. Without the right tools, extracting video images and video clips for reports is beyond the abilities of most investigators. This is where forensic audio and video expertise can help. Forensic experts have many techniques that can help to deal with video analysis during investigations (e.g. getting it into a viewable format, enhancing video or audio recordings etc.).

3.2.2. The role of the Forensic Audio and Video Analyst

Due to the lack of official standards on CCTV video formats, an investigator arriving at a crime scene does not know what type of surveillance system he will be faced with. It can be analogue, digital or any of over 5,000 different proprietary, closed-source, video formats.

Digital video and audio evidence from CCTV systems are generally proprietary in nature and require a special software player produced by the manufacturer to play back the collected recordings properly. When the video and audio is collected from the device it needs to be retrieved in a manner that produces the best quality possible, which is usually the proprietary recorded files. There are numerous types of digital video and audio recording devices, with a variety of methods of exporting these files. Some will have CD/DVD writing capabilities, some use USB for output, and some, although digital, may only have analogue outputs.

Feedback from Police shows that acquiring video footage is often either not possible or requires the hiring of technical experts. It is not uncommon to find that system components such as CD/DVD drive ports, USB drive ports or network ports to be damaged or broken, which prohibits the extraction of data. The extraction of footage from older CCTV systems such as VHS tape systems, data tapes systems, produces many difficulties which are generally not resolved by persons other than technical experts or specialists. In some cases, where the video footage cannot be retrieved at the location from the surveillance systems, Police are forced to remove the surveillance systems for laboratory extraction and thus are obliged to replace the surveillance system at the incident location, costing up to and over €10,000. The typical method of acquiring video from third party incident locations is by using CD media and similar technology. This has the disadvantage that video usually requires considerable media space, there are concerns about media longevity and it is less convenient to search.

To assist in an investigation, forensic experts can repair, recover, enhance and analyze audio and video recordings using an array of scientific tools and techniques. Repairing evidence is especially common for analogue and digital magnetic tape. It may need to be spliced back together or put into a new audio / video housing in order to recover the audio or video. In today's digital world sources of digital media and recording devices can be damaged by heat, misuse, the environmental conditions of a crime scene, or simply on purpose by an offender. Even in these situations, the digital files can be recovered and used for analysis.

It is the role of the video analyst to help retrieve and get video into a viewable format. Overall, it is very apparent that there is a requirement in the Police to automate practices covering the acquisition of video.

The most common function of forensic video and audio experts is to clarify a recording so that it is more apparent to the evidence demonstrates. To enhance a video recording, filters can be used to adjust the brightness and contrast, correct the colour, crop and resize an image, enhance edge detail and reduce visual distortion.

In many criminal cases, the authenticity of the recording and the content of the recording may be called in to question. Forensic audio and video experts can examine a variety of characteristics of the audio or video recording to determine whether the evidence has been altered. This includes confirming the integrity (verification) of the recording, as well as authenticating that the content of the image or audio is what it purports to be.

When video is acquired it is important to note the make and model of the recording device and important details about the recording system (e.g., how many cameras are connected and recording, whether it is recording in time-lapse mode, the current time/date, and the time/date on the recorder s display). It is also preferable to sketch the cameras positions.

The role of a video/Audio analyst is very important in addition to being challenging due to the many different formats, the generally poor image quality and the time to deal with it from capture to court.

4. Gaps in Crime Analysis Based on CCTV Systems

The aim of this section is to analyse current shortcomings related to the analysis of CCTV footage for crime investigation. CCTV footage is one of the richest of evidence sources. The gathering of evidence and intelligence information at an early stage is important not only to making resource allocation decisions; this data that will drive other functions such as the identification of offenders and hot spots. If this is inadequate, future incidents of crimes will not be so proactively handled, for example, focusing police patrols on crime hot spots etc.

The UK National Police Improvement Agency's (NPIA) practical advice on the management of priority and Volume Crime⁸ highlights the role of CCTV at a later stage during crime handling. However, as we will further elaborate in this section, current research results conducted in UK disclose a number of gaps for evidence analysis coming from CCTV systems. These gaps were also confirmed by P-REACT Workshops results conducted in June 2014 in Cyprus, Greece, Spain and Ireland.

At the end of the section we provide a list of recommendations that may increase not only the effectiveness of current CCTV systems for evidence analysis but also as means to proactively address security challenges related to crime offences.

4.1. Video/Audio Analyst Survey

Kinesense conducted a survey for CCTV evidence related to petty crime incidents involving dozens of CCTV/Imaging departments to uncover key trends in March 2014 [15]. The results are not surprising for analysts working in forensic video analysis but they disclose some interesting insights.

More specifically, on average (60% of respondents), video clips used in petty crime cases are short being between 5-30 minutes. This is not shocking as typically video clips used are taken from the scene of the crime and the time that the crime occurred is already known. Length is not the issue that is most often brought up. The biggest issues are video format and workload. There are over 3000 different video file formats being used. This is an issue because most police forces claimed to use 150 or less formats (72.5% of those surveyed). The formats that police forces have, are dictated by what DVRs are installed in their area. Converting videos in to a viewable format is found to be the most difficult task. The survey shows that on average 40% of the work day in CCTV imaging department is spent solely on getting videos into a format where they can be viewed. This task can be close to impossible if you do not already have the player for the video file. The format itself is not the only difficult part of viewing video files. Often times the quality of the files that are coming in are not great and videos needed to be enhanced. The quality of videos become a frustration for CCTV imaging departments and enhancement or clarifying video images is another large problem that respondents mention.

4.2. P-REACT Workshop Results

The P-REACT Workshops results mainly confirmed the above research findings and highlighted also the importance of P-REACT solutions along with the constraints related to data privacy issues. More specifically, Police officers who participated in the workshops confirmed that they are using a big number of video players to watch CCTV footage as each manufacture comes with its own proprietary video format. This increases the police workload as most of times they have to transcode video files to a

⁸ In UK the term Volume Crime is used instead

viewable format.

Watching video files and selection of specific video clips is the most time consuming task that it takes from 60 minutes to 1 hour for a simple case. In terms of video quality it is pointed out almost unanimously from all Police analysts that the quality in many cases is very poor enforcing analysts to apply video enhancement techniques, which additionally increases the analysis time. The lack of metadata in most of the current CCTV systems is identified as an additional gap. Moreover, cases presented to the court of law are dropped due to the fact that many existing CCTV systems do not employ Network Time Protocol (NTP) to show that the specific offence indeed happened at the specific time.

P-REACT solutions were considered by workshop participants to be very promising and attractive especially the feature of real-time reporting, which is a desired feature by Police. This will not only increase police capabilities for crime prevention, but it will also lead in a better management of police human resources in hotspots areas. P-REACT solutions to a bigger extent can also be seen as providing evidence for other serious crimes including terrorism.

However, there are concerns in terms of data privacy related to video upload and storage in cloud computing architectures. Participants from the business sector pointed out those current CCTV systems in their business area provide only a sense of security without however, significant results. These systems are isolated and there is not any connection with Police. Storing and evidence gathering is found to also be a problematic area while some of them have experienced criminal actions against the installed CCTV systems.

Participants from the transport sector unanimously see petty crime as concern to their customers. They see petty crime as having a significant economic impact. Another unanimous result of the questionnaire is that all of the participants in the transport sector have CCTV systems in place and believe that they have helped reduce petty crime incidents. Even with this being said, 50% of participants' state that they are not satisfied with their current system and 75% are looking in to replacements.

4.3. Recommendations

Based on current survey analysis and the workshop results we have come up with a set of recommendations. We believe that these recommendations will not only increase the efficiency of current CCTV systems but also the way a petty crime is handled by Police forces from the very early stage of reporting to evidence analysis. These recommendations are summarised below:

Recommendation 1: In addition to any police procedures related to handling and responding to crime, the initial investigation stage should include the notification of crime via CCTV/surveillance system (Note that this could be facilitated by citizen uploading of video via an application on mobile or via internet or by a cloud connected surveillance system which focusing on automatically detecting petty crime behaviour).

In terms of crime management, the aim is to assess the initial handling of crime reports and any investigation to date ensuring that all evidence and intelligence is exploited. Again, the focus is on what crimes should be allocated further attention or not. Essentially, it is the role of the principal screener to assess the crime as mandatory, priority or non-priority crime. If the crime is categorized as mandatory it is then assigned further investigation.

Whether a priority or non-priority is assigned resources depends on the evaluation of whether the crime can be solved. In reality the answer to this question depends on the quality and quantity of the

intelligence and evidential information alongside the analysis of the crime. Therefore, if CCTV was more readily available at this stage it would not only help in the classification of whether crimes were to be pursued but also help reduce the number of crimes that are presumed insolvable.

Recommendation 2: Intelligence and evidential video information should be accessible to the principal crime screener so as to help the screening process.

The role for CCTV analyst is clearly highlighted which denotes the importance that CCTV plays over other physical evidence or intelligence sources. The role of the CCTV analyst is currently considered a specialist one and includes maintaining a profile of CCTV in an area, liaison with CCTV operators, determining whether there might be CCTV in the vicinity of crime, collecting and reviewing video to determine any relevant intelligence or evidence, retention of video, maintaining records and statistics which measure the effectiveness of CCTV, coordinating police handling of CCTV, updating crime reports and compiling intelligence reports.

The performance of these tasks is very time consuming due to the nature of video data including its data size (big data), variety of formats and its disperse location. In the UK only, around 74% of the footage used comes from third party or privately owned cameras (not police or local authority owned systems). This means significant effort goes into retrieving video from different proprietary systems often requiring the CCTV specialists to physically go and retrieve the CCTV video files.

Recommendation 3: Police forces should map CCTV locations. The system should contain relevant information such as location, owner details, field of view, quality of video etc. The maps can be updated automatically when new video is presented and entered into crime management solution by call handlers, small business signed up to a cloud connected system or upload video via an internet crime reporting solution.

Recommendation 4: When video is obtained by Police, officers currently find that they often cannot play the video due to the file format issues. According to survey and workshop results presented in the previous section most of the police responders highlight how they had to deal with over 150 different formats in their area and how the majority of their time is spent on getting video into a viewable format. Their biggest identifiable challenge was workload; closely followed by the challenge of getting video into a viewable format. Therefore, it is essential that CCTV providers follow specific international video coding standards to allow also for standard presentation formats for use in court.

Recommendation 5: Enable small business owners, CCTV operators etc. to connect to a crime reporting solution which enables video upload either via the internet or a connected cloud solution.

Recommendation 6: Enable the implementation of metadata in all CCTV systems. In this way video analysis will concentrate only in the relevant to the crime scene video clips thus reducing processing time.

Recommendation 7: Enable the implementation of Network Time Protocol (NTP) in current CCTV systems so as to strengthen evidence brought up to the court of law.

5. Petty Crime Impact

In the section, we will mainly concentrate on the negative impact of petty crimes in our society and mainly on the economical impact in the target groups we have identified in P-REACT, namely the small business and the transport sector.

5.1. Social Impact

Petty crime undermines the social fabric of the community as it is associated with elevated rates of fear of strangers and general alienation from participation in community life. There is a direct link between the fear of crime and social outcomes, by-passing behavioural responses to fear. The idea communicated by this link is that the fear of crime, if widespread, can feed directly into attitudes that have broad social consequences, regardless of the behavioural responses that people make to fear. For example, fear might lead to a sense of distrust and alienation from social life. Once such generalized attitudinal sets become common they can lead to important social outcomes that are not specifically related to crime. An example is non-participation in the political process or a disregard for the plight of less fortunate members of society. In this sense, fear can be viewed as an impediment to attitudes and feelings which encourage a full social existence.

The erosion of the community creates fear, and thus vulnerabilities to more crime. Several studies show that social and economic damage to the community creates the conditions that fuel more crime. It has been found that fear of crime can be just as debilitating as crime itself, and is a powerful stimulus in changing people's behaviour and lifestyles. Other studies suggest strong correlations between levels of fear in the community and the amount of drug use and sale, public drinking, street gangs, loitering, and graffiti. In terms of gender issues, young males constitute the group that is victimized most often, and thus females express the highest levels of fear of crime. According to the British Broadcasting Company (BBC), surveys of older people found that almost half over the age of 75 were too afraid to leave their homes after dark believing they were subject to verbal abuse or mugging.

Considering more specifically the Transport sector, the Public Transport Authority of Bologna (SRM) conducts every year a survey after interviewing about 2,000 people living in Bologna Greater Area (users and potential users of public transport). Among several other questions, the interviewed people are asked about security perception whilst using public transport, especially with regards to pick pocketing or harassment. Results related to 2012 confirm previous findings: the need to improve security is a priority.

In particular in the 2012 survey, security factors seemed to be of high importance for the passengers as they received a ranking of 9.32/10 (it was 9.25/10 in 2011), and stated to be part of the 'expected quality'. The results of the "perceived quality" survey show that the satisfaction about current situation regarding security is evaluated by 6.90/10 (it was 6.72/10 in 2011) in services performed by bus in the urban and suburban areas of Bologna. Even if some improvement has been registered in 2012, the service should still be improved on the security aspects in order to be considered fine by the users.

Furthermore, considering the service performed by train at local level (the Metropolitan Rail Service), the factor related to perceived security is evaluated by 7/10, indicating that there is room for improvement.

5.2. Economical impact

In Italy, a study carried out in 2010 and 2011 by FORMAT Research [16] (appointed by Confcommercio, Italian association representing enterprises working for trade, tourism and services providers), in an effort to map the economical impact of crime in the above business sectors. The research results showed that in 2010 more than 15% of businesses pointed out crimes as one of the main causes limiting the competitiveness of Small and Medium Enterprises (SME). In 2011, this warning was issued by the 27% of the businesses located in the south of Italy. More than 70% of businesses were charged with additional costs to protect themselves against

crimes. In 2009, more than 22% of SME allocated to security more than 5% of their total income (in 2008 they were less than 14%). In 2010, shops and businesses spent about 5.2 billions of Euros to fight against crimes, about the 2.5 % of added value produced by this economic sector.

In UK, the Home Office did a study examining the Economic and Social Costs of crime. This study was updated in 2005 to include more accurate numbers. The basis of the survey is to examine the estimated costs of multiple types of crimes per individual occurrence. The cost estimates that the Home Office includes are costs that are not limited to the crimes reported by the police but also encompass crimes mentioned in the British Crime Survey. The total cost of crime for 2003/04 was £36.2bn. This was about a nine percent decrease from when the study was last done in 2000. The most costly crimes were crimes that consisted of large estimated physical and emotional costs such as homicide, robbery, and sexual offences [17].

Our current findings based on P-REACT workshop results confirm the high economical impact of petty crime especially in small business, commercial shops and the transport sector. Only in Greece the railway company that operates in Athens reported that the damages from individuals to railway infrastructure and those from graffiti come up to 5 million Euros per year. Small business owners reported that petty crime has economical impact of more than 10 thousand Euros per year in their business. It is also pointed out that the negative results of petty crimes are somehow hidden, in a sense that high rate of petty crimes (street crimes) in specific areas prevent customers from visiting these areas. In addition, both the small business and the transport sectors report that they are receiving complaints from their customers; a fact that further enhances the negative impact in these business areas.

6. Conclusion

In this document, we attempted to provide definitions and classification of petty crimes. We have pointed out that there are not agreed definitions and categorisation of petty crimes up to the European level. Statistics reported by several EU MSs are so different in nature that made compilation of results in a unified form almost impossible. Eurostat on the other side were kept statistics only for serious and organised crime, excluding crime types related to petty crimes. Therefore, one possible finding of this document would be the necessity for forming an agreed definition and reporting of petty crimes within EU-28.

Petty crime statistics in a sample of six EU countries, indicated that shop lifting, assaults and thefts (pocket lifting) in public transportation areas are the most frequent petty crimes.

P-REACT workshops' results confirmed the above trends indicated that vandalism, shop lifting, theft, graffiti, assault and damage of property were the most frequent crime types while thefts, shop lifting and graffiti had the highest economical impact in the transportation and small business sectors.

Police procedures for investigating crime were looked at with a focus on the key roles of Forensic video/audio analyst and Crime analyst based on personal interviews conducted with the UK and the Hellenic Police. Current gaps in existing CCTV systems that reduce the efficiency of video analysis and digital evidence gathering were identified.

The organisation of four workshops in Cyprus, Greece, Ireland and Spain with limited financial resources was of utmost importance not only for gathering feedback of an extended panel of end-users but also for the promotion of P-REACT solutions. Those workshops were attended by almost forty participants in four countries including businesses associations, transport sector operators, security companies and police experts in digital forensic divisions. Almost all the participants recognised the added value of P-REACT solutions and the fact that those solutions were missing from the market. Therefore, it was our impression that P-REACT platform would have great potential at least in the EU market.

Based on the analysis of the current status of petty crime, the end-user workshops' results and the interviews with Police experts in UK and Greece we managed to reach to a set of recommendations. The main objective of those recommendations was to indicate a number of changes in current CCTV systems and video analysis in order to increase the effectiveness and applicability of those systems and the efficiency of digital forensic departments. A striking application that would have increased the response of Police was related to real time reporting based on automatic notification via installed CCTV/surveillance systems. Accessibility of intelligence and evidential video information to the principal crime screener was also identified an important feature that has not been implemented yet. Crime mapping based on GIS information via a surveillance system would allow better response and resources allocation of police forces. Police officers pointed out that they had to deal with over 200 different video formats in their area and that the majority of their time was spent on getting video into a viewable format. Finally, connectivity of various business sectors to a crime reporting solution which would enable video upload either via the internet or a connected cloud solution was viewed as a solution that would increase security.

Petty crime social and economical impacts were reviewed in some EU countries. The results indicated that although petty crimes might be seen as small criminal actions they had apparently significant social and economical impact. Only in Greece the railway company in Athens reported that the damages from individuals to railway infrastructure and those from graffiti came up to 5 million Euros per year.



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Phase

WP2 – System Requirements

Small business owners reported that petty crime had economical impact of more than 10 thousand Euros per year. Therefore, it became obvious that P-REACT solutions may have found the ground for further commercial exploitation based on the low deployment and operational cost of P-REACT.

ANNEX II. REFERENCES

The table below shows the most significant references used and/or cited to prepare this document:

Reference
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ANNEX III. QUESTIONNAIRE FOR LEA AND SECURITY EXPERTS

Part A: General Information

Country

Years in Police or in Security Sector	Less than 5yrs	<input type="text"/>
	More than 5yrs	<input type="text"/>
	More than 10yrs	<input type="text"/>
	More than 15yrs	<input type="text"/>

Please describe briefly your professional role and experience in the security sector as well as domain of research (if applicable):

Professional role:	Experience: ___ years	Function:
How your work concerns security?	Describe briefly:	
Research domain:	Describe briefly:	

Part B: Petty Crime Incidents and Impact

1. Please rank the frequency of petty crimes types in your country (7 being the most prevalent, 1 the least)?

Vandalism	<input type="text"/>
Shop lifting	<input type="text"/>
Robbery (without use of violence, not armed)	<input type="text"/>
Assault	<input type="text"/>
Graffiti	<input type="text"/>
Damage	<input type="text"/>

Theft
Other (please define)

2. What are the most serious petty crimes? (max. three answers)?

Vandalism
Shop lifting
Robbery (without use of violence, not armed)
Assault
Graffiti
Damage
Theft
Other (please define)

3. How do you classify security incidents? What terminology do you use?

4. In the last 3 years, has the frequency of petty crime incidents changed in your country?

Increased
Decreased
No difference

5. What do you think are the motivations of petty crimes? (max. three answers)

Politics
Poverty
Drugs
Gangs
Other (please define)

6. When petty crimes do mostly happen?

Morning
Afternoon
Evening
Night

7. Are there certain hot spots for petty crime activity? If yes please outline.

8. In case the target is people, who is involved more frequently? (only one answer)

Shop Keepers/drivers	<input type="checkbox"/>
Customers/users	<input type="checkbox"/>
Other (define)	<input type="checkbox"/>

9. In case the target is objects/infrastructures, what is involved more frequently in petty crimes? (several answers are possible)

Theft of goods	<input type="checkbox"/>
Damages	<input type="checkbox"/>
Vehicles	<input type="checkbox"/>
Infrastructures	<input type="checkbox"/>
Other (please define)	<input type="checkbox"/>

10. In your experience, are petty crimes performed most frequently by individuals or groups?

Individuals	<input type="checkbox"/>
Groups of people	<input type="checkbox"/>
Both	<input type="checkbox"/>
Don't know	<input type="checkbox"/>

11. In your experience, how old are the petty crimes perpetrators typically?

12-17	<input type="checkbox"/>
18-24	<input type="checkbox"/>
25-39	<input type="checkbox"/>
40-54	<input type="checkbox"/>
Over 55	<input type="checkbox"/>

12. Do you keep records of incidents?

Yes	<input type="checkbox"/>
No	<input type="checkbox"/>
Don't know	<input type="checkbox"/>

Part C: Current Closed-Circuit Television (CCTV) Systems and P-REACT Solutions

13. Does any Law Enforcements Agency (LEA) department in your country receive

notification of a crime in real-time from any CCTV system installed in any business area?

Yes

No

Don't know

14. Do security companies in your country receive notification of a crime in real-time from any CCTV system installed in any business area?

Yes

No

Don't know

15. How frequently do suspects for a crime damage either the installed cameras and/or local storage devices in order to conceal their actions?

Almost in every case

Very frequently

Rarely

Don't know

16. LEAs can access video files in a scene of crime. How do you assess the quality of video files provided by current CCTV systems?

High

Medium

Low

17. How many petty crime cases involving video do you deal with annually (provide a number)?

18. What is the average amount of video to be dealt with in a petty crime case?

1-5 minutes

5-30 minutes

30-60 minutes

60-90 minutes

90-120 minutes

2 hours+

Don't Know

19. How many file formats/players do you have?

1-10	<input type="checkbox"/>
10-50	<input type="checkbox"/>
50-100	<input type="checkbox"/>
100-150	<input type="checkbox"/>
150-200	<input type="checkbox"/>
200+	<input type="checkbox"/>
Don't Know	<input type="checkbox"/>

20. What tasks do you spend your time on?

Making Evidence copy	<input type="checkbox"/>
Getting video into a viewable format	<input type="checkbox"/>
Watching video	<input type="checkbox"/>
Selecting clip/images for investigation	<input type="checkbox"/>
Creating evidence storyboards	<input type="checkbox"/>
Enhancing/Clarifying video/images	<input type="checkbox"/>

21. P-REACT suggests streaming video clips in case of a crime in a cloud environment. Do you think this solution increases the applicability of current CCTV systems?

Yes	<input type="checkbox"/>
No	<input type="checkbox"/>

22. P-REACT aspires to transcode any video file coming from any CCTV system into a standard file format. How important is for LEA investigation departments to deal with standard file format?

Highly important	<input type="checkbox"/>
Important	<input type="checkbox"/>
Medium	<input type="checkbox"/>
Less important	<input type="checkbox"/>
Not important	<input type="checkbox"/>

23. P-REACT suggests adding metadata in video files in a scene of crime for easier post-processing by LEAs and security operators. In your opinion how important is this solution?

Highly important	<input type="checkbox"/>
Important	<input type="checkbox"/>



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Medium
Less important
Not important

Part D: Recommendations

Please provide any recommendations related to technology exploitation that you believe they will enhance security and efficiency in existing CCTV systems.

ANNEX IV. QUESTIONNAIRE FOR BUSINESS SECTOR

Part A: General Information

Country

Years as a shop owner	Less than 5yrs	<input type="text"/>
	More than 5yrs	<input type="text"/>
	More than 10yrs	<input type="text"/>
	More than 15yrs	<input type="text"/>

Part B: Petty Crime Incidents and Impact - Current Security Systems

1. Have you experienced any of the following crimes in your shop over the last year and how many times?

Crime Type	How many times
Vandalism	<input type="text"/>
Shop lifting	<input type="text"/>
Robbery (without use of violence, not armed)	<input type="text"/>
Assault	<input type="text"/>
Graffiti	<input type="text"/>
Damage	<input type="text"/>
Theft	<input type="text"/>
Other (please define)	<input type="text"/>

2. Have petty crime incidents differed from previous years in your shop?

Increased	<input type="text"/>
Decreased	<input type="text"/>
No difference	<input type="text"/>

3. In your experience, are crimes performed most frequently by individuals or groups?

Individuals	<input type="text"/>
Groups of people	<input type="text"/>
Both	<input type="text"/>
Don't know	<input type="text"/>

4. In your experience, how old are the petty crimes perpetrators typically?

12-17	<input type="text"/>
-------	----------------------

18-24	
25-39	
40-54	
Over 55	

5. Does time of the day affect the rate or nature of the incidents? If yes please explain.

Yes	
No	
Explain	

6. What potential security incidents most concern you?

Crime Type

Vandalism	
Shop lifting	
Robbery (without use of violence, not armed)	
Assault	
Graffiti	
Damage	
Theft	
Other (please define)	

7. In your opinion, have petty crime incidents in your shop reduced your business growth?

Yes	
No	

8. How do you scale the negative impact of petty crimes in your shop?

Very high	
High	
Medium	
Low	
Minimal	

9. What was, approximately, the economical impact in your business as a result of the above crimes?

Less than 5 thousand EUROS	
Between 5 and 10 thousand EUROS	
More than 10 thousand EUROS	

10. Do you have Closed-circuit television (CCTV) systems installed in your shop?

Yes
 No

11. If not why?

Luck of knowledge
 High cost
 Not agree with the idea (please explain)

12. If yes, who manages the Closed-circuit television (CCTV) systems installed in your shop?

Myself
 An external security company
 Other (please define)

13. What is the main reason for having a Closed-circuit television (CCTV) system installed in your shop?

Prevention (before the event happens)
 Real-time measures (while the event is happening)
 Evidence for Police (after the event happened)

14. In your opinion, do Closed-circuit television (CCTV) systems have increased your business security?

Yes
 No

15. Have the Police Authorities ever used the video files from your shop to identify the suspect in a crime related to your business or other cases?

Yes
 No

16. Have you experienced any criminal action against your Closed-circuit television (CCTV) systems or the storage device in which you store the video files?

Yes
 No

17. Are you satisfied with the efficiency of the current Closed-circuit television (CCTV) systems installed in your shop?

Yes
No

18. Are you thinking of replacing the existing Closed-circuit television (CCTV) system?

Yes
No

19. Do you have an ADSL internet connection at your shop?

Yes
No

20. If not what is the reason for not installing an ADSL internet connection at your shop?

High cost
Not needed

21. Do you think that the approach of P-REACT (described above) enhances the efficiency and applicability of existing Closed-circuit television (CCTV) systems?

Yes
No

22. What would be your preferred method of redelivery of a solution as described by P-REACT ?

A system owned and controlled by your business
As external service
Not interested at all

Part C: Data Protection in Closed-circuit television (CCTV) Systems

23. Are you familiar with Data Protection Principles and obligations that CCTV operators must follow when installing a CCTV System at your shop?

Yes
No

24. Have you submitted an official notification document to the respective National Data

Protection Authority regarding the installation of Closed-circuit television (CCTV) System at your shop?

Yes

No

25. Have you justified at the respective National Data Protection Authority the necessity for installing a Closed-circuit television (CCTV) System at your shop?

Yes

No

26. Have you installed a CCTV warning notice at your shop, informing individuals on the operation of the CCTV system?

Yes

No

27. If the CCTV system was installed and is operated by a security company, have you signed a contract regarding what the security company may do with the data; what security standards should be in place and what verification procedures may apply?

Yes

No

Part D: Recommendations

Please provide any recommendations related to technology exploitation that you believe they will enhance security in your business area.

ANNEX V. QUESTIONNAIRE FOR TRANSPORT SECTOR WORKERS/OPERATORS/PROFESSIONALS

Part A: General Information

Country

Years as professional in the transport sector	Less than 5yrs	<input type="text"/>
	More than 5yrs	<input type="text"/>
	More than 10yrs	<input type="text"/>
	More than 15yrs	<input type="text"/>

Please describe briefly your professional role and experience in the transport sector:

Professional role:	Experience in the company: ___ years	Employed as a:
How your work concerns security?	Describe briefly:	

Part B: Petty Crime Incidents and Impact - Current Security Systems

1. Have you experienced any of the following crimes in your business area over the last year and how many times?

Crime Type	How many times
Vandalism	<input type="text"/>
Shop lifting	<input type="text"/>
Robbery (without use of violence, not armed)	<input type="text"/>
Assault	<input type="text"/>
Graffiti	<input type="text"/>
Damage	<input type="text"/>
Theft	<input type="text"/>
Other (please define)	<input type="text"/>

2. Have petty crime incidents differed from previous years in your business area?

Increased	<input type="checkbox"/>
Decreased	<input type="checkbox"/>
No difference	<input type="checkbox"/>

3. In your experience, are crimes performed most frequently by individuals or groups?

Individuals	<input type="checkbox"/>
Groups of people	<input type="checkbox"/>
Both	<input type="checkbox"/>
Don't know	<input type="checkbox"/>

4. In your experience, how old are the petty crimes perpetrators typically?

12-17	<input type="checkbox"/>
18-24	<input type="checkbox"/>
25-39	<input type="checkbox"/>
40-54	<input type="checkbox"/>
Over 55	<input type="checkbox"/>

5. Does time of the day affect the rate or nature of the incidents? If yes please explain.

Yes	<input type="checkbox"/>
No	<input type="checkbox"/>
Explain	<input type="checkbox"/>

6. Are there certain hot spots for petty crime activity? If yes please outline.

7. Are petty crime incidents of concern to your customers?

Yes	<input type="checkbox"/>
No	<input type="checkbox"/>
Don't know	<input type="checkbox"/>

8. Do you receive complaints from people related to petty crime in your business area?

Yes	<input type="checkbox"/>
No	<input type="checkbox"/>

9. How do you scale the negative impact of petty crimes regarding your business area?

Very high	<input type="checkbox"/>
High	<input type="checkbox"/>
Medium	<input type="checkbox"/>
Low	<input type="checkbox"/>
Minimal	<input type="checkbox"/>

10. Are petty crime incidents of concern to your organizations management?

Yes	<input type="checkbox"/>
No	<input type="checkbox"/>
Don't know	<input type="checkbox"/>

11. What was, approximately, the economical impact in your business area as a result of the above crimes?

Less than 5 thousand EUROS	<input type="checkbox"/>
Between 5 and 10 thousand EUROS	<input type="checkbox"/>
More than 10 thousand EUROS	<input type="checkbox"/>

12. In your opinion, do Closed-circuit television (CCTV) systems help reduce petty crime incidents?

Yes	<input type="checkbox"/>
No	<input type="checkbox"/>

13. Do you have Closed-circuit television (CCTV) systems installed?

Yes	<input type="checkbox"/>
No	<input type="checkbox"/>

14. If not why?

Lack of knowledge	<input type="checkbox"/>
High cost	<input type="checkbox"/>
Don't agree with the idea (please explain)	<input type="checkbox"/>

15. If yes, who manages the Closed-circuit television (CCTV) systems installed in your

business area?

Company Staff

An external security company

Other (please define)

16. What is the main reason for having a Closed-circuit television (CCTV) system installed in your business area?

Prevention (before the event happens)

Real-time measures (while the event is happening)

Evidence for Police (after the event happened)

17. Have the Police Authorities ever used the video files to identify the suspect in a crime?

Yes

No

18. Do you keep records of incidents?

Yes

No

Don't know

19. How do you liaise with local law enforcement in relation to petty crime incidents?

20. Have you experienced any criminal action against your Closed-circuit television (CCTV) systems or the storage device in which you store the video files?

Yes

No

21. Are you satisfied with the efficiency of the current Closed-circuit television (CCTV) systems installed in your business area?

Yes

No

22. Are you thinking of replacing the existing Closed-circuit television (CCTV) system?

Yes

No

23. Do you think that the approach of P-REACT (described above) enhances the efficiency and applicability of existing Closed-circuit television (CCTV) systems?

Yes

No

24. What would be your preferred method of redelivery of a solution as described by P-REACT ?

A system owned and controlled by your business

As external service

Not interested at all

Part C: Data Protection and Closed-circuit television (CCTV) Systems

25. Are you familiar with Data Protection Principles and obligations that CCTV operators must follow when installing a CCTV System at your business area?

Yes

No

26. Have you submitted an official notification document to the respective National Data Protection Authority regarding the installation of Closed-circuit television (CCTV) System at your business area?

Yes

No

27. Have you justified at the respective National Data Protection Authority the necessity for installing a Closed-circuit television (CCTV) System at your business area?

Yes

No

1. Have you installed a CCTV warning notice, informing individuals on the operation of CCTV system in your business area?

Yes
No

28. If the CCTV system was installed and is operated by a security company, have you signed a contract regarding what the security company may do with the data; what security standards should be in place and what verification procedures may apply?

Yes
No

Part D: Recommendations

Please provide any recommendations related to technology exploitation that you believe they will enhance security in your business area.

ANNEX VI. STATISTICS OF PETTY CRIMES 2011-2012-2013

Type of Crime	Greece			Germany			France		
	2011	2012	2013	2011	2012	2013	2011	2012	2013
Shop Lifting	640	414	378	385.463	361.759	356.152	56.092	56.906	57.680
Thefts (Pocket lifting, thefts in public areas e.g metro)	6.217	5.734	5.174	35.889	36.810	38.627	239.486	250.712	267.593
Thefts in public transportation system	2.613	2.427	2.245	120.790	117.277	135.617	107.512	102.860	105.168
Assault	289	324	252	48.021	48.711	47.234	33.561	30.346	31.589
Damage	4.947	5.189	4.546	688.294	673.704	621.699	21.453	21.378	21.672
Bicycle-scooters Thefts	16.337	15.519	14.540	328.748	326.159	316.857	55.012	52.197	47.418
Robberies in Small Shops	12.967	10.252	8.092	147.936	145.883	140.186	29.901	29.793	32.191
Robberies in Gas Stations	264	119	107	829	808	682	NDA	NDA	NDA
Graffiti	NDA	NDA	NDA	115.623	110.172	97.900	NDA	NDA	NDA
Vandalism	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA

Table 2 - Petty crime statistics in Greece, Germany and France ([18], [19], [20])

NDA=No official Data Available

Project

Petty criminality diminution through sEarch and Analysis in multi-source video Capturing and archiving plaTform

Phase

WP2 – System Requirements

Type of Crime	UK & Wales			Cyprus			Ireland		
	2011	2012	2013	2011	2012	2013	2011	2012	2013
Shop Lifting	308.326	300.623	321.014	3.379	2.953	2.676	3.510	3.590	3.795
Thefts (Pocket lifting, thefts in public areas e.g metro)	100.588	109.757	98.271	1.179	554	579	522	446	367
Thefts in public transportation system	16.648	14.909	17.292	654	852	456	879	831	745
Assault	218.382	212.917	225.660	1.687	1.550	1.245	2.345	2.357	2.337
Damage	113.478	97.008	93.439	396	300	260	3.647	3.385	3.100
Bicycle-scooters Thefts	115.902	97.286	97.680	1.669	1.536	1.228	758	743	672
Robberies in Small Shops	74.688	65.155	57.816	153	161	110	114	102	73
Robberies in Gas Stations	4.427	4.918	8.248	130	158	142	31	20	19
Graffiti	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
Vandalism	2.156	1.916	1.730	NDA	NDA	NDA	NDA	NDA	NDA

Table 3 - Petty crime statistics in UK, Cyprus and Ireland ([21], [22], [23])

NDA=No official Data Available