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The Investigative Factors in Whodunit Homicides: Italian Case

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You look at that body.

You look at that body as if it were some abstract work of art, stare at it from every conceivable point of view in search of deeper meanings and textures. Why, you ask yourself, is this body here? What did the artist leave out? What did he put in? What was the artist thinking of? What the hell is wrong with this picture?

You look for reasons. Overdose? Heart attack? Gunshot wounds? Cutting? Are those defense wounds on the left hand? Jewelry? Wallet? Pockets turned inside out? Rigor mortis? Lividity? Why is there a blood trail, with droplets spattering in a direction away from the body?

You walk around the edges of the scene looking for spent bullets, casings, blood droplets. You get a uniform to canvass the houses or businesses nearby, or if you want it done right, you go door-to-door yourself, asking questions that the uniforms might never think to ask.

Then you use everything in the arsenal in the hope that something—anything—will work. The crime lab technicians recover weapons, bullets and casings for ballistic comparisons. If you're indoors, you have the techs take prints from doors and door handles, furniture and utensils. You examine the body and its immediate surroundings for loose hairs or fibers on the off chance that the trace evidence lab might actually put down a case now and then. You look for any other signs of disturbance, anything that doesn't appear to conform to its surroundings. If something strikes you—a loose pillowcase, a discarded beer can—you have a technician take it down to evidence control as well. Then you have the techs measure key distances and photograph the entire scene from every conceivable angle. You sketch the death scene in your own notebook, using a crude stickman for the victim and marking the original location of every piece of furniture and every piece of evidence recovered.

Assuming that the uniforms, upon arriving at the scene, were sharp enough to grab anyone within sight and send them downtown, you then go back to your office and throw as much street-corner psychology as you can at the people who found the body. You do the same thing with a few others who knew the victim, who rented a room to the victim, who employed the victim, who fucked, fought or fired drugs with the victim. Are they lying? Of course they're lying. Everyone lies. Are they lying more than they ordinarily would? Probably. Why are they lying? Do their halftruths conform to what you know from the crime scene or is it complete and unequivocal bullshit? Who should you yell at first? Who should you scream at loudest? Who gets threatened with an accessory to murder charge? Who gets the speech about leaving the interrogation room as either a witness or a suspect? Who gets offered the excuse—The Out—the suggestion that this poor bastard needed to be murdered, that anyone in their circumstance would have murdered him, that they only killed the bastard because he provoked them, that they didn't mean it and the gun went off accidentally, that they only fired in self-defense?

If all goes well, you lock someone up that night. If all goes not so well, you take what you know and run with it in the most promising direction, kicking a few more facts loose in the hope that something will give. When nothing gives, you wait a few weeks for the lab work to come back with a positive on the ballistics or the fibers or the semen. When the lab reports come back negative, you wait for the phone to ring. And when the phone doesn't ring, you let a little piece of you die.

(David Simon, "Homicide: a year on the killing streets")

Acknowledgments

As a criminal investigator I embarked the PhD journey three years ago as a new challenge. At that time, I did not know exactly what to expect, as the opportunities of interaction between practitioners and academics are unfortunately rare in this field, at least in Italy.

During this time, I had the opportunity to fully appreciate the rigor of the scientific method and to meet inspiring people, excellent professionals and devoted researchers, and above all, I have learned that an effective integration between practitioners and scholars should be not only possible but also extremely useful for both.

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Abstract

Research on homicide clearance has traditionally focussed on examining factors pertaining to the characteristics of the victims or perpetrators or the circumstances surrounding the murder. There has been a relative dearth of research addressing the potential influence of investigative factors on the positive outcomes of murder investigations. This was primarily due to the difficulties involved in obtaining the requisite data, which cannot be found in the police databases that such studies routinely rely on, but rather can only be obtained via the cooperation of detectives themselves.

Through administering a survey to almost one-hundred Italian Carabinieri homicide detectives, this research identified a number of investigative factors that have been observed in previous studies, of which some were found to be positively correlated with clearance. More specifically, the findings emerging out of the descriptive and inferential statistical analysis conducted for the purposes of this research corroborated the study's hypotheses, which posited that the implementation of certain best practices associated with human resource management, crime scene activities, investigative strategies and techniques can positively impact upon homicide clearance.

The present study contributes to academic debates on homicide clearance, firstly, by introducing a holistic approach through which to evaluate the effect of investigative factors on solving those murder cases which require a certain level of investigative effort on the behalf of the police, and secondly, by presenting avenues through which to overcome the limitations in extant literature.

1. Introduction

Without question, homicide is the criminal act that garners the most amount of attention, both among civil society generally, and, as a consequence of this, among the media. Academic studies exploring the factors that impact upon solving murder investigations, namely the clearance rate, largely emerged in the aftermath of the release of the annual edition of Crime in the United States in 1996,¹ which reported a decrease in homicide clearance from approximately 92% in the 1960's to 66% in 1996.²

While Italy has not witnessed a similar decline, it is commonly held that the resolution of murder investigations operates as a barometer of the overall effectiveness of the police force. This assumption is exemplified by the typical reasoning of the man in the street, who exclaims “if the police cannot solve the most serious of crimes like murders, then how can we expect them to solve those that are less severe?”

Most notably in the last decade, a series of homicides generated considerable media attention in Italy, which resulted in sloppy investigations that were characterized by a lack of professionalism on the behalf of the police, and, at times, major mistakes. Yara Gambirasio,³ Chiara Poggi,⁴ Meredith Kercher⁵ and Serena Mollicone's⁶ cases represent only the most infamous murders for which either no perpetrator has hitherto been found, or the considerable

¹ Annual report issued in the context of the Uniform Crime Reporting (UCR), a FBI's program with statistical purposes which includes the following database: the National Incident-Based Reporting System, the Law Enforcement Officers Killed and Assaulted, and the Hate Crime Statistics.

² The last available data reports an overall homicide clearance rate of 62.5% in 2013.

³ A young 13-years old girl found dead in a field outside Bergamo on February 26th, 2011, three months after her missing. Massimo Bossetti, 49, charged with voluntary murder, has been detained in pre-trial imprisonment since 2014.

⁴ A 26-years old girl wound stabbed to death in her house in Pavia in 2007. Her boyfriend, Alberto Stasi has been sentenced to 16 years.

⁵ A 21-years old British student on exchange from the University of Leeds murdered in 2007 inside an apartment in Perugia. For her death, a 20-years old Ivorian has been sentenced to 30 years. Two other individuals present on the scene, Raffaele Sollecito and Amanda Knox, have been found innocent after multiple trials during which they have been found guilty both in first and second degree and later acquitted in the re-trial of the second degree case.

⁶ A 18-years old girl found choked to death in 2001 in the countryside near Frosinone. The case is still unsolved.

doubt over the culpability of those who were arrested have not yet fully played out in the respective trials.

While these murders received considerable media attention for a number of reasons, several other unsolved cases, which only aroused local interest, nevertheless pose important questions about the capacity of the Italian police forces to effectively respond to such criminal events.

Although the high degree of professionalism displayed by the Italian police forces, especially in the fight against criminal organizations, is commonly recognised, even at the international level, murder investigations constitute a specific kind of inquiry which requires a diverse set of skills, namely: an uncommon degree of zeal and a keen sense of precision, allied with a penchant for creativity; respect for standard procedures, alongside a spirit of initiative; a sound knowledge of the fundamentals in forensic medicine, and familiarity with basic insights from psychology, and so forth (Geberth, 2006; Innes, 2003; Simon, 1991; M. D. Smith & Zahn, 1999). This is why it is not uncommon to hear investigators say that it can take up to ten years to train a good homicide detective.

Given these aforesaid points, two things are evident: firstly, investigative work plays a crucial role in securing good results in investigations; and secondly, the professionalism required to effectively perform such uncommon kinds of investigations simply cannot be improvised.

Unfortunately, research on investigative work has been hampered by the scarce availability of information on these wide range of skills, attitudes, customs, techniques and practices. This is due, in part, to the fact that these types of data can typically only be generated through directly asking those who conduct such investigations, namely detectives themselves.

For this reason, the majority of studies on homicide clearance have been forced to solely rely on data which is available to the public, specifically data from police databases; such data comprises no investigative features, but rather only a few other characteristics, such as the

circumstances of the event or specific properties about the subjects involved (Addington, 2006; Decker, 1993; Jarvis & Regoeczi, 2009; Litwin, 2004; Regoeczi, Kennedy & Silverman, 2000; Roberts, 2007).

In light of such difficulties in acquiring first-hand data, there is a relative dearth of studies focussing specifically on investigative work, while those few scholars who have examined the issue have been forced to limit their studies to either a single or, at most, a few police departments with whom they succeeded in establishing personal relations (Braga & Dusseault, 2016; Carter & Carter, 2016; Keel, Jarvis & Muirhead, 2009; Pizarro, Terrill & LoFaso, 2018; Schroeder & White, 2009; Wellford & Cronin, 1999a).

By taking advantage of the idiosyncrasies of the Italian policing system, which comprises a single military police force with a national-level of competence characterized by homogenous investigative procedures and practices across the entire country, the present study has been able to go beyond the above mentioned limitations of both the single and multi-site approaches.

In fact, an extensive analysis of a police database was then combined with a survey administered to a select number of detectives spread across the entire country, as opposed to merely either a single or few police departments. In so doing, the research was able to conduct a multi-site study that adopted tools typically used in single-site studies.

Such a methodology produced remarkable insights from an environment which is typically difficult to access, and thus isolated a wide range of investigative factors, which partially stemmed from prior studies and partially stemmed from my own experience as a homicide investigator.

The aim of the present research is to corroborate extent literature on homicide clearance, as well as identifying potential novel investigative factors which culminate in positive outcomes in investigations. The objective of this study is to both enrichen current academic debates on

homicide clearance and potentially inspire and aid police executives and decision-makers to design initiatives that are able to increase the effectiveness of the police personnel who are operating in the field of homicide investigations.

2. Review of the literature

2.1 What is clearance?

Research conducted on homicide clearance largely emerged in light of the aforementioned dramatic drop in the clearance rating of homicide investigations registered in the United States in the mid-1990's. The publicity around this decline and the attendant increase in awareness led to a gradual, and still ongoing, increase in the number of studies which sought to provide explanations for this decline and identify the factors which impact upon the clearance rate.

The unit of analysis within these studies is homicide clearance, that is, whether a case has been solved or not. Although such a dichotomous definition might seem obvious, there are, in fact, a range of different interpretations in the literature. One example of such definitional heterogeneity is the classification adopted by scholars in the United States. Traditionally, researchers who used one of the two available police databases, either the Uniform Crime Reporting (UCR) Program's Supplementary Homicide Report (SHR) or the National Incident-Based Reporting System (NIBRS),⁷ adopted the same classification used in those datasets, which distinguished between murders that were not solved and murders that were solved either with an arrest, or via 'exceptional circumstances' (Riedel, 2008; Smith & Zahn, 1999).

The latter category comprises several occurrences according to which a murder can be considered to be cleared, even in the absence of arrested persons, such as: death of the perpetrator; the culprit's flight to a country in which there is no extradition treaty; and finally, the identification of a 'suspect' that resulted in the Prosecutor's Office rejecting an indictment. Clearly, the latter criterion poses several problems with respect to the appropriateness of such

⁷ The main difference between the two databases is that the latter also includes several incident-level clearance information, which, in turn, enabled scholars to perform more in-depth analyses.

a classification for statistical purposes, in that it relies solely on the conviction of the police, rather than being endorsed and corroborated by a proper Judicial Authority.

Alternatively, in the present research, the distinction between solved and not solved cases refers to cases in which at least one person has been effectively arrested by the police, and the arrest was subsequently validated by the Public Prosecutor's Office. Utilising such a double-check process – i.e., based on the police arrest and the Prosecutor's subsequent validation - differentiates the present study from previous research, and results, on the one hand, in an overall reduction of the clearance rate and, on the other hand, in greater data reliability. Such a process was enabled by the specificity of the Italian Criminal Procedure Code, which states that, with the exception of those few cases in which a perpetrator is caught in the act of committing a crime, the arrest warrant is issued by the Prosecutor's Office after having evaluated the evidence provided by the police.

Multi-site and single-site studies

Current doxa on homicide clearance, namely that produced in the United States, is based on two different empirical approaches: the so-called multi-site and single-site research (Hawk & Dabney, 2018).

Multi-site research is based on the quantitative analysis of police data at a national level (e.g., Braga & Dusseault, 2017; Hough et al., 2019; Wellford & Cronin, 1999a; McEwen, 2009). Due to the strong heterogeneity deriving from adopting such an aggregate approach, both in terms of the practices and habits used by each single police department and in terms of the socio-demographic discrepancies between the areas considered, researchers have tended to make assumptions about the uniformity of the aforesaid factors to obtain generalizable results.

Such assumptions are likely to cause measurement errors in the models and subsequently produce a distorted understanding of the phenomena itself (Hawk & Dabney, 2018). Moreover, none of these datasets provide details about the investigative techniques and strategies deployed by the police.

On the contrary, single-site studies focus on murders that occurred within a single police department's jurisdiction, and, moreover, are frequently facilitated by personal relations between the researcher and the given police department. Such a direct contact enables the researcher to gather information which is simply not available in common police datasets, including, *inter alia*, more precise circumstances about the incident and specific details of the investigative tactics and procedures employed by the detectives (Litwin, 2004; Puckett & Lundman, 2003; Regoeczi & Jarvis, 2013).

Clearly, on the one hand, such an approach places the researcher in the best possible position to gain a broader comprehension of the dynamics at play in the heart of the investigative process and, consequently, allows them to identify the factors that are, theoretically speaking, predictive of case clearance; on the other hand however, these results cannot be easily generalized.

'Self-solved' and 'Whodunit' murders

Another aspect frequently addressed in the literature is the nature of the murders themselves. Indeed, homicide differs from all other types of crimes in two main respects: firstly, it is the only offence in which the police cannot rely on the potential cooperation of the victim; secondly, the surrounding circumstances of the crime, such as motive and modus operandi, change every time. This latter consideration suggests that every murder is characterized by specific features, which serve to make it different from any other murder (Smith & Zahn, 1999).

To cite an example, there are those homicides which present a range of factors that make them more favorable to solve, such as the presence of physical or oral evidence, which can ease the

detective's work considerably. At the same time, the absence of factors that are favourable to solving can make some cases extremely hard to solve. The present study is focussed on the analysis of these latter types of cases, as it is only in reference to these kinds of murders that the role played by investigative work can be properly evaluated and appreciated.

The distinction between those cases which require a high degree of investigative effort and those which instead require poor or zero investigative work has been described, in part, by Eck (1983), who conceived of three circumstances that detectives have to deal with: cases that cannot be solved with a reasonable investigative effort; cases solved by circumstance, which only require proper follow-up activities by police; cases that may be solved with a reasonable degree of investigative effort, but would not be solved otherwise.

A dichotomous and more simple definition utilized in extant literature makes reference to the terms 'whodunit' and 'self-solved', to characterize cases which require a significant degree of investigative work and cases which involve primarily bureaucratic activity, respectively. These two categories were originally codified by Simon (1991, pp. 41–42) and have subsequently achieved a strong degree of consensus among a number of scholars (Brookman, Maguire & Maguire, 2018; Hawk & Dabney, 2018; Innes & Brookman, 2013; Korosec, 2012; McEwen, 2009; Puckett & Lundman, 2003; Regoeczi, Jarvis & Riedel, 2008; Riedel, 2008; Schroeder & White, 2009; Wright, 2013; Feist & Newiss, 2001).

Despite this, there is still no uniformity among authors regarding the criteria used to determine whether a case is a whodunit or self-solved. In fact, some scholars (Puckett & Lundman, 2003; Schroeder & White, 2009; Alderden & Lavery, 2007) have attempted to provide criteria which are essentially related to the length of the investigations, with the quickest of these being considered self-solved cases. Other scholars have proposed a 24-hour time span (Puckett & Lundman, 2003), while others have put forward a 48-hour time span (Schroeder & White, 2009), or even a one week period (Alderden & Lavery, 2007).

However, one should hold some reservations over such time-based criteria . In fact, even hard-to-solve cases can be cleared in a matter of hours for several different reasons, including, *inter alia*, extremely effective investigative work, the presence of concomitant investigations conducted by external agencies on either the victim or the perpetrator, a stroke of luck, and so forth.

Moreover, the distinction between the two categories is further complicated by the fact that in the United States the homicide investigative units tend to manage both types of murders. Taking advantage of the fact that Italian investigative units are not involved with so-called ‘self-solved’ murders (which are instead handled by non-specialized units, like station commands and patrol units), the distinction used in the present study relies on the classification that was originally used by the local police authorities themselves.

Although there are not strict requirements which define why a case deserves the intervention of an investigative unit that specializes in homicides, a good rule of thumb is that such a decision is generally made in the field by the local police commander and the Prosecutor’s Office. In so doing, whether the intervention of specialized investigative units is required derives from an evaluation of concomitant factors, namely: the circumstances of the incident (*modus operandi* and scarcity of physical and oral evidence); the absence of apparent motive; possible links with criminal activities or mafia-type organizations; the exclusion of specific circumstances, such as homicide-suicide, femicide and domestic incidents.

2.2 The homicide investigation process

Before one can assess whether or not certain investigative factors might impact upon the positive outcome of an investigation, it is first necessary to shed some light on the criminal investigative process through recourse to previous studies carried out on this topic.

The ultimate goal of any criminal investigative process is to reconstruct the events of the crime, with the dual-aim of identifying the suspect of a crime and gathering as much evidence as possible to put the Prosecutor's Office in the best position to prosecute the case. The homicide investigative process follows the same essential rules (Feist & Newiss, 2001; Geberth, 2006; Hawk, 2015; Hawk & Dabney, 2014; Pizarro et al., 2018; Smith & Zahn, 1999).

Regarding the process itself, investigative work is commonly divided into two distinct phases: preliminary and supplementary (Geberth, 2006; Hough et al., 2019; Miletich, 2003; Pizarro et al., 2018).

In the preliminary phase, the responding officers secure the scene and adopt all the proper measures for avoiding any possible contamination of the scene, along with seeking out potential witnesses, and, if possible, arresting the perpetrator. Such an activity is complemented by a wide array of forensic duties performed by specialized technical units, who photograph the scene, lift fingerprints, and execute a series of operations whose aim is to establish an objective (i.e. scientific) basis from which to subsequently produce an incident reconstruction by means of a 'backward' reasoning scheme (Cronin, Murphy, Spahr, Toliver & Weger, 2007; Geberth, 2006).

In this respect, it is customary to distinguish between two types of crime scene: the primary and the secondary. The primary scene designates the location in which the corpse has been found, while the second encompasses all those places where evidence pertaining to the incident have been collected (Miletich, 2003). However, such a definition should be interpreted rather loosely in practice, because in the case of a dumped body, for example, the place in which the body is found does not correspond to the primary scene, which would instead refer to the place where the victim had been killed.

In light of the notable developments across a wide spectrum of medical fields, such as genetics, biology, chemistry, and so on, the laboratory tests which can now be performed are incomparable to those that existed only a few decades ago. For this reason, it is crucial that the activities of collection and preservation of the specimen must be performed by well-trained technicians to avoid the risk of undermining the subsequent laboratory examinations (Cronin et al., 2007; Miletich, 2003). As extant literature has correctly noted, “while the sequence and type of initial actions may not vary greatly from offence to offence, the quality, effectiveness and speed of the initial response may differ” (Feist & Newiss, 2001, p. 4).

The so-called ‘supplementary’ phase is the most ‘investigative’ in the strictest sense of the term, in that it comprises several different activities conducted by the investigators assigned to the case (Hough et al., 2019; Pizarro et al., 2018). The common denominator in these investigative actions is the gathering, evaluation and interpretation of as much information as possible in order to identify one or more reasonable leads, which subsequently will be examined until, via a process of elimination, only one remains (Conan Doyle, 2014).

The wide array of duties range from activities performed on the scene (‘fast track actions’) to so called ‘office activities’ (Simon, 1991; Smith et al., 2000). The first of these tasks which must be performed in the shortest possible time, namely in the first two or three weeks from the discovery of the corpse, involve: follow-up interviews; neighbourhood canvassing; searching the victim’s residence and, when possible, the perpetrator’s residence; and locating CCTV camera footage.

The reason for such urgency is due to the harmful effects that the passing of time has upon several facets integral to criminal investigation: on the human memory; on the preservation of evidence; on the time needed by the perpetrator to get rid of any incriminating evidence; and on the CCTV recording system, which overrides footage after a timespan that, on average, ranges from 24 hours up to a few weeks in some fortunate cases. To illustrate the importance of time for such activities, it has been reported that 27% of all actions conducted during entire investigations in the United Kingdom are performed in the first 20 days (Feist & Newiss, 2001).

Conversely, with respect to office-based activities, these encompass a wide selection of tasks, including: interviews with witnesses and the interrogation of persons of interest; technical operations (such as telephone interceptions and eavesdropping); phone records analysis; autopsy attendance; criminal database checks; corroborations of findings derived from witnesses’ statements and the forensic laboratory.

The process of “trace and interview” (TI) and “trace, interview and eliminate (TIE)” individuals is of particular importance, in that it accounts for approximately two-thirds of all actions performed in the first 20 days (Feist & Newiss, 2001). This datum suggests that, despite all of the recent technical developments, oral evidence continues to play a crucial role in homicide clearance. Or, to put it more bluntly yet still, investigative success “would still rely, in large part, on Getting Off Your Ass and Knocking On Doors (GOYAKOD)” (Hough, 2019, p. 89).

Furthermore, it has been reported that video recording of interviews (of witnesses) and interrogations (of suspects) has increased significantly in recent years (Cronin et al., 2007; Zulawski & Wicklander, 2001). This is due to several reasons. Firstly, it has emerged as part of a shift towards greater levels of transparency, whereby it acts as a form of guarantee for citizens. Secondly, these practices allow detectives to focus more on the content of the information itself, which, in turn, reduces the risk of being distracted while taking notes on the statement. Lastly, video recording benefits the court, in that the authenticity of the statements are preserved.

The very first stage of the supplementary phase is the crucial moment whereby the lead investigators bear the burden of responsibility to select, among the vast amount of available information (deriving from witnesses' statements, informants' tip-offs, criminal database checks, interception activities, laboratory exam results, etc.), the most promising leads, which are referred to as lines of inquiry. This is a complex process which has been defined as a 'process structure' that is characterized by an actual 'information burst' (Innes, 2002b, 2003). This definition entails that "the development and introduction of specific lines of inquiry is not random, but deliberative and purposive" (2003, p. 238), as well as being performed in an extremely short time frame (Feist & Newiss, 2001).

The ability of the lead detective, at this stage, stems from his/her capability to correctly interpret the information provided by the outside enquiry team especially, in order to isolate the most promising leads and, as far as possible, reduce the amount of false trails.

This is often a fundamental aspect of whodunit cases, as the necessity to 'close all possible doors', that is, all possible leads, requires extensive corroboration and validation of suspects' statements, of possible alibis, and of a wide range of circumstances which warrant further investigation.

It is not unusual, in fact, that weeks or months are spent following false trails deriving from mendacious behaviour by individuals, which have nothing to do with the incident per se, but rather are motivated by frivolous attempts to hide minor crimes or even cover up marital infidelities (Geberth, 2006; Simon, 1991).

In cases in which there is an absence of enough physical or oral evidence to identify a suspect, detectives tend to focus on victim profiling, which involves a wide array of actions aimed towards reconstructing a detailed biography of a victim's personal, business or criminal relationship network, as well as his/her moral identity, habits, and whereabouts in the final moments of their life (Feist & Newiss, 2001; Geberth, 2006; Hawk & Dabney, 2014; Simon, 1991; Stelfox, 2015). The aim of such actions is to identify potential leads or motives which might ease the identification of possible suspects.

Other typical investigative actions are geared towards finding a possible match with known offenders (according to the descriptions provided by witnesses, CCTV footage, or inferred from the modus operandi behind the murder itself) by means of a process of elimination. This can involve scanning criminal databases, or, alternatively, through directly interrogating persons of interest who were present in the vicinity of the incident, which, for example, can be established from finding a positive match via tower cell records analysis (Geberth, 2006; Innes, 2003).

At the same time, other possible clues or even actual breakthroughs might come from the information provided by external agencies, informants, public citizens and from laboratory exam results (Geberth, 2006; Innes, 2003; Simon, 1991).

Once the sufficient criteria needed to consider a person of interest as a potential suspect have been met, then comes the time to build a ‘case construction’, which is a series of actions aimed towards gathering as much information and data as possible in order to corroborate the working hypotheses and construct ‘an evidenced case narrative’ (Innes, 2003, p. 236). In detective jargon, this is the moment when a murder is considered to be ‘revealed’ but not yet ‘resolved’.

This is a crucial step, as all these actions are not only aimed towards gathering enough evidence to arrest the perpetrator, but also to enable his/her subsequent conviction at trial. This is the reason why, particularly in this stage, the relationship between the investigators and the Public Prosecutor becomes even closer.

In this regard, it is not uncommon to witness investigators ‘playing devil’s advocate’, in an effort to deeply scrutinize the overall robustness of the case and subsequently establish countermeasures to address the potential weak points. Such a fruitful exchange of ideas is the ultimate aim of the so-called debriefs, which should be held by the lead detective to strengthen the case, facilitate the flow of information, generate potential new lines of inquiry, and to motivate other officers in the investigation (Brookman & Lloyd-Evans, 2015; Feist & Newiss, 2001; Innes & Brookman, 2013).

The chapter now moves from examining the investigative process in the strict sense to considering the various actors involved in this process. Although often romanticized in crime fiction and crime-based TV series as a “one-man-show”, in fact, detective work is a complex and multifaceted process comprised several different procedures, activities, tasks and duties, all of which are performed by a wide array of actors who operate, ideally in an orchestrated fashion, under the supervision of a lead detective and Public Prosecutor.

In precisely the same way that the instruments played by members of a symphony orchestra are wholly different one from another, both the activities performed and the skills required to carry out an effective investigation also vary greatly (Smith et al., 2000). In fact, as per any other type of criminal investigator, the homicide detective tends to have basic qualities, such as intuition, power of observation, empathy, an aptitude to positively interact with people, knowledge of investigative and legal procedures, ability to communicate (both orally and in writing), spirit of initiative and tenacity (Cronin et al., 2007; Geberth, 2006; Innes & Brookman, 2013; Miletich, 2003; Smith et al., 2000; Stelfox, 2015).

However, what distinguishes homicide investigators from other investigators is the peculiarity of the kind of crime they investigate, both in terms of its specificity and the tasks that are performed, and as a consequence of the huge amount of data and information that must be collected, evaluated and interpreted (Cronin et al., 2007; Geberth, 2006; Hough et al., 2019; Simon, 1991; Smith et al., 2000; Stelfox, 2015). As noted in previous studies, the number of actions to be performed can reach extremely high levels (Feist & Newiss, 2001). As ascertained by Feist (2001) through observing case files related to six ‘hard to solve’ murder cases that occurred in the United Kingdom, the number of actions taken by detectives ranged from 545 to over 4000.

As Carter correctly noted, this is precisely the reason why the homicide investigator “is increasingly becoming an information manager” (2013, p. 26).

From the above perspective, further capabilities are thus required to efficiently conduct a murder investigation. Scholars have classified these into three main categories: i) management skills; ii) investigative abilities; iii) knowledge levels (Smith et al., 2000).

- i) The *management skills* category is the broadest of these and pertains to three management sub-skills: people, general and investigative. The first concerns the abilities that are needed to effectively manage a team or unit, such as a team-building approach, supporting staff and interpersonal skills. The second refers more broadly to typical managerial qualities like leadership, communication ability and resource management skills. The latter pertains to managerial qualities that are specifically applied to the investigative process, such as effective decision-making effective, ability to choose among priorities, planning skills, advisory attitude and capability to assign tasks (Smith et al., 2000; Stelfox, 2015).
- ii) *Investigative abilities* designate a broad attitude which enables the proper evaluation of information in order to perform reasonable inferences to be corroborated by subsequent investigative activities. This implies the ability to engage in what is known as ‘abductive reasoning’, which differs from both inductive and deductive in the sense that the hypothesis comprises the ‘most likely’ explanation for an observed phenomenon, with the judgement being based only on factual elements (Aliseda, 2006).

iii) The knowledge levels amount to an investigator's overall wealth of knowledge, primarily derived from their experience, which range from investigative procedures to legal and court processes, administrative and bureaucratic issues, consolidation of good network relationships, and so on and so forth. Such a cross-sectoral knowledge places a detective in the best possible position to be able to cope with the wide array of stakeholders in an investigation, such as: Public Prosecutor's Office; Coroner's Office; forensic technicians; external agencies (other specialized investigative units such as fugitives, narcotics, organized crime units); public and private entities (government agencies, local authorities as well as telephone carriers, banks and technical providers). In this respect, the detective, particularly the lead investigator, must perform a complex role which entails not only displaying 'common' investigative attitudes and skills, but rather also the ability to be "a counsellor, accountant, scientist and an administrator amongst others" (Smith et al., 2000, p. 27).

Moreover, due to the rapid development of innovative technologies and the proliferation of social media tools, additional skills are required to efficiently cope with such advancements, such as the ability to perform phone records analysis with specific software, the ability to operate both on the surface web and in the deep/dark web, as well as being competent in scanning social media profiles, and so on and so forth (Pizarro et al., 2018).

Such a variety of tasks and activities requires adequate structures. According to Cronin (2007), centralized organizations are the most appropriate to manage such a large amount of data and operations. In this regard, smaller agencies are forced to outsource the execution of technical services, such as traditional IT and IT forensics, as well as laboratory examinations, while often not having investigative units exclusively devoted to homicides.

Although a certain level of organizational structure is needed to efficiently perform homicide investigations, scholars have observed that that expenditures⁸ are not necessarily correlated with clearance (Cloninger & Sartorius, 1979). This seems to corroborate other studies which have stated that better internal organization, development of best practices, and more efficient allocation of tasks can have a greater impact on the rate of homicide clearance (Carter, 2013; Carter & Carter, 2016; Hawk & Dabney, 2018; Keel et al., 2009; Pizarro et al., 2018; Wellford & Cronin, 1999a).

Before bringing this particular discussion to a close, it is important to mention the called ‘Cold Case’ units, who investigate cases which have been unsolved for a significant length of time. According to the literature, these types of units are present only in large investigative departments (Hough et al., 2019). An interesting experiment was conducted by the Las Vegas Police Department, who utilized retired detectives to investigate in such units and implemented specific procedures to prioritize cases according to factors such as the presence of physical or oral evidence, the proof of life of the original suspects, the opportunity for multiple clearances (serial killers), and so forth (Cronin et al., 2007).

As is clear from the literature cited above, both the variety and complexity of the numerous actions that must be performed in homicide investigations should be analysed not only from a quantitative perspective, but also from a qualitative perspective. Without question, homicide detectives must take crucial decisions in a very short time frame which can change the course of the investigation in an irremediable way, relying only on partial information, and under extremely stressful circumstances due to the pressure exerted from various types of sources: top executives, victims’ relatives, media, and so forth (Hawk & Dabney, 2014; Sewell, 1994).

⁸ This is specifically measured by means of the following six variables: number of law officers per 100,000 members of the population; police expenditure on enforcement per capita; number of officers per square mile; real expenditure per square mile; number of officers per capita-mile; real per capita expenditure per square mile.

As will be described below, the majority of extant literature attempts to explain homicide clearance either as a consequence of supposed police prejudice depending on victims' socio-economic status, as a result of the intrinsic difficulties of the cases, and, albeit to a lesser extent, based on the higher probability of risk exposure due to victims' lifestyle.

Indeed, from this perspective, what ultimately makes the difference between a successful or a failed investigation is not only the number of actions taken, but rather the way they are executed. The intrinsic complexity of the aforementioned murder investigative process leads one to conclude that, in order to better understand why a case is solved or not, one cannot ignore how the investigations are conducted and why certain types of methods, strategies or tactics are more effective than others, which, in turn, affect homicide clearance.

Hence, to achieve a better and more comprehensive understanding of homicide clearance, the factors pertaining to the investigative world and the way in which they are executed cannot be disentangled from the whole set of variables that potentially affect the solvability of this type of crime, as they are so often done in extant research on this issue.

2.3 Investigations and Clearance

Extant studies on homicide clearance suggest that the variables that affect the solvability of a case can be found in one or more of the following substantive domains: i) individual; ii) situational; iii) spatial/neighbourhood; and iv) investigative (Hawk & Dabney, 2018).

- i) The individual domain refers to the demographic and criminal characteristics of the subjects involved, namely the victim and the perpetrator, as potential factors which might affect the outcome of investigations (Alderden & Lavery, 2007; Jiao, 2007; Lee, 2005; Litwin & Xu, 2007; Mouzos & Muller, 2001; Rydberg & Pizarro, 2014; Schroeder & White, 2009).

- ii) The situational domain pertains to the factual specificities of the case and the circumstances of an incident, such as the presence/lack of both physical and oral evidence, as potential factors associated with clearance (Braga, Flynn, Kelling & Cole, 2011; Carter & Carter, 2016; Cronin et al., 2007; Greenwood, 1979; Litwin, 2004; Litwin & Xu, 2007; McEwen, 2009; Regoeczi & Jarvis, 2013; Riedel, 2002; Riedel & Boulahanis, 2007; Rydberg & Pizarro, 2014; Schroeder & White, 2009; Simon, 1991; Wellford & Cronin, 1999a; Wolfgang, 1958; Xu, 2008).
- iii) The spatial/neighbourhood domain foregrounds the disadvantaged socio-economic settings in which murders occur as one of the main factors which hinder investigations, as a result of the unwillingness of the community to assist the police and provide useful information (Puckett & Lundman, 2003; Regoeczi & Jarvis, 2013).
- iv) Lastly, and most recently, the investigative domain pertains to how the specific combination of investigative strategies and tactics employed by the police can impact upon homicide clearance (Braga & Dusseault, 2016; Braga, Turchan & Barao, 2018; Brookman et al., 2018; Carter & Carter, 2016; Cawley et al., 1977; Cronin et al., 2007; Geberth, 2006; Hawk & Dabney, 2018; Keel et al., 2009; Pizarro et al., 2018; Puckett & Lundman, 2003; Schroeder & White, 2009; Wellford & Cronin, 1999a).

The following section provides a summary of the results from extant literature with respect to each of these aforementioned dimensions.

2.3.1 Factors that affect clearance

Individual

Almost all the studies on homicide clearance have focussed their analytical gaze on the characteristics of victims. Indeed, out of all the types of crime, homicide is the one in which the

relationship between the victim and the perpetrator often plays a crucial role in determining the possibility for a case to be solved or not (Cardarelli & Cavanagh, 1992; Lee, 2005; Litwin, 2004; Regoeczi et al., 2000; Roberts, 2007; Wolfgang, 1958). One of the very first steps taken in any murder investigation is to reconstruct the victim's profile in order to gather as much information as possible about their habits, whereabouts, personal networks, and so on. Based on this, it is somewhat understandable, then, that academic studies of homicide clearance have adopted an approach that focuses primarily on the demographic characteristics of the involved subjects, albeit such work has produced often conflicting findings.

Concerning *victims' gender*, most studies have found this factor to not be significant in terms of clearance (Addington, 2006; Puckett & Lundman, 2003; Riedel & Rinehart, 1996; Wellford & Cronin, 1999; Wolfgang, 1958), while other scholars have reported a higher likelihood of cases being cleared if they involved either white female victims (Lee, 2005; Roberts, 2007) or male victims (Jiao, 2007).

Studies that focus on *victims' age* have demonstrated that there is a higher clearance rate for younger victims compared to elder victims (Alderden & Lavery, 2007; Lee, 2005; Litwin, 2004; Litwin & Xu, 2007; Puckett & Lundman, 2003; Regoeczi & Jarvis, 2013; Riedel & Rinehart, 1996; Wolfgang, 1958), with the exception of Wellford & Cronin's study (1999a). As correctly pointed out by Hawk (2015), the main issue with this aforesaid research is that they did not use a common or standardized method to codify the range of ages, and thus "it is difficult to understand where the tipping point for age making a case more or less likely to be solved lies" (2015, p. 29).

With respect to *race*, the findings are equally controversial. Some studies have found that homicides involving racial or ethnic minorities tend to have a lower likelihood of being cleared (Alderden & Lavery, 2007; Jiao, 2007; Lee, 2005; Litwin & Xu, 2007; McEwen, 2009; Regoeczi et al., 2000; Xu, 2008), while other scholars have found the exact opposite to be the

case (Litwin, 2004; Wolfgang, 1958); others yet still reported non-significant effects (Addington, 2006; Puckett & Lundman, 2003; Riedel & Rinehart, 1996; Roberts, 2007; Wellford & Cronin, 1999).

Finally, the results from studies focused on *victims' prior criminal records* produced similarly conflicting findings. While some authors reported a lower clearance rate for cases involving victims who had a criminal history (Schroeder & White, 2009), other studies found either null (Litwin, 2004) or only partial effects (Regoezi & Jarvis, 2013). With respect to the latter case, there has been an observable increase in the likelihood of clearance in cases involving victims with criminal records specifically related to violent offences.

Rydberg and Pizarro (2014) created a scale of values through which to measure the progressive enmeshing of the victim in a deviant lifestyle, which was based on four different and stackable proxies, including: whether the victim was a gang member; whether the victim was a drug dealer; whether the victim was involved in illegal activities apart from gang involvement or drugs; whether the victim had a prior criminal record.

The results of their study, which was based on the analysis of a police database provided by the Homicide Unit of the Newark Police Department that referred to 814 murders occurring between 1997 and 2007, appear to corroborate the hypothesis that victims' lifestyles can affect the clearance in homicide investigations. More specifically, they demonstrated that the more a victim appeared to be involved in criminal activities, the longer the time it took to clear murders which displayed similar demographic characteristics or case circumstances between them. Although in a subsequent study the same authors found controversial results (Pizarro et al.,

2018),⁹ the impact that a deviant lifestyle has on the clearance resulted a factor worthy of further study.

Situational

This sub-section delineates research from a wholly different perspective, which tests the influence of the objective circumstances surrounding the murder (such as the presence/absence of evidence or witnesses, the modus operandi, the weapon used, the location of the crime scene, and so forth) on the positive or negative solution of a homicide investigation (Wolfgang, 1958; Riedel & Rinehart, 1996; Puckett & Lundman, 2003; Litwin, 2004; Lee, 2005; Alderden & Lavery, 2007; Litwin & Xu, 2007; Riedel & Boulahanis, 2007; Xu, 2008; Schroeder & White, 2009; Lundman & Myers, 2012; McEwen, 2009; Regoeczi & Jarvis, 2013; Rydberg & Pizarro, 2014).

One of the factors which had a specific influence on clearance was the *time* at which a murder occurred. This makes sense given that the night is the most favourable moment to commit a homicide that goes unpunished (Alderden & Lavery, 2007; Mouzos & Muller, 2001; Wolfgang, 1958). The reason for this is that there are few chances to find cooperative witnesses. Moreover, homicides committed at night, especially in outdoor locations, are typically related to other types of crimes, primarily robbery and drug *in primis*, which entail either a scarce or complete lack of relationship between the victim and the perpetrator and, consequently, lowers the probability of closing the case.

The *weather* is another variable which has been considered in previous studies, with the results indicating that bad conditions (rain, extreme heat, wind, snow, etc.) have a negative impact on

⁹ Interpreted as the result of a possible concurrency of other factors such as the presence of non-involved witnesses, or the availability of technical related evidence.

clearance, due to the harmful consequences that it has on evidence preservation and the overall integrity of the crime scene (Wellford & Cronin, 1999a).

Regarding the *type of weapon* used in the murder, there is a broad consensus over the fact that firearms dramatically hinder the odds of clearance, inasmuch as other methods of murder, such as stabbing or beating, necessitate closer contact between the victim and the offender, in turn, increasing the chances of obtaining physical evidence, either at the scene or on the corpse itself (Alderden & Lavery, 2007; Baskin & Sommers, 2010; Geberth, 2006; Litwin, 2004; Litwin & Xu, 2007; Puckett & Lundman, 2003; Roberts, 2007; Rydberg & Pizarro, 2014; Schroeder & White, 2009; Wolfgang, 1958; Xu, 2008). Despite this, there has certainly not been a dearth of opposing viewpoints on this issue. For example, while Jiao (2007) found that firearms had a lower clearance rate than others forms of murder, others scholars reported no significant variations between methods in terms of clearance rate (Xu, 2008; Riedel & Rinehart, 1996; Regoeczi & Jarvis, 2013).

The *availability of physical evidence*, as common sense would suggest, has always been deemed to be crucial for the positive outcome of investigations (Carter & Carter, 2016; Decker, 1993; Geberth, 2006; Greenwood, Chaiken & Petersilia, 1977; Keel et al., 2009; Riedel & Rinehart, 1996; Wolfgang, 1958). Specifically, Wellford & Cronin (1999) indicated that the absence of physical evidence was the primary reason for unsolved cases in approximately 17% of the homicide cases they considered in their study.

With specific reference to DNA, some authors have also found contradictory results. To cite an example, Schroeder & White (2009) found that DNA, ballistics experiments and fingerprints have no significance. An extensive study by Baskin & Sommers (2010) on forensic evidence, which took into account not only the investigative process but all the judiciary paths up until the final criminal dispositions, did not find any significance between physical evidence and the outcome, positing that “forensic evidence is auxiliary and non-determinative for homicide

cases” (2010, p. 1141). Conversely, McEwen (2009) reported that biological evidence increased the odds of clearance in whodunit cases, while Briody (2004) claimed that DNA evidence had significant results, both in terms of bolstering the resilience of a case’s probative structure, and upon juries’ decisions to convict.

To summarize, the aforementioned results appear to indicate that, rather than merely establishing whether physical evidence is present or not on the scene, what really matters in investigations is the effectiveness, celerity and quality of output of laboratory examinations.

Continuing the discussion of crime scenes, a further key factor, among others, that has been identified in research is the *presence/absence of witnesses* (Baskin & Sommers, 2010; Peterson & Baskin, 2010; Pizarro et al., 2018; Riedel & Rinehart, 1996; Wellford & Cronin, 1999a). These authors all found evidence to corroborate the commonly held belief that homicides are often cleared by means of human factors.

While Braga & Dusseault (2016) highlighted the relevance of formalized witness identification and management techniques, some authors went even further, observing that the presence of ‘eyeball’ witnesses resulted in a higher clearance rate (Regoeczi & Jarvis, 2013), while hearing witnesses did not (McEwen & Regoeczi, 2015).

With regard to this last issue, some studies have addressed the concept of *Police-frequented areas* to identify a potential relation between the clearance rate and the police’s degree of confidence about what area the murder occurred in (Jiao, 2007). The assumption here is that the more police frequent a specific area and develops its intelligence network in the environment, then the greater the possibility of knowing who to talk to when a crime occurs, in order to gather useful information.

Another important factor typically considered in research is the *crime scene location* (Alderden & Lavery, 2007; Jiao, 2007; Litwin, 2004; Litwin & Xu, 2007; Lundman & Myers, 2012;

McEwen, 2009; Regoeczi & Jarvis, 2013; Riedel & Boulahanis, 2007; Riedel & Rinehart, 1996; Rydberg & Pizarro, 2014; Wellford & Cronin, 1999a; Wolfgang, 1958; Xu, 2008). Despite these contradictory results, the bottom line here is that homicides that are committed indoors, especially in residences, are likely to be easier to solve than those that occur on the streets, for the simple reason that it is easier to collect evidence from residences because there are fewer elements that can compromise specimens (Litwin, 2004; Regoeczi et al., 2000; Wellford & Cronin, 1999). Moreover, indoor scenarios may also be suggestive of certain types of motives or relationships between the victim and the perpetrator, which serve to facilitate their solvability, such as domestic violence cases (Hawk, 2015, p. 52).

The *relationship between the victim and the perpetrator* is a factor which has been proven to be strongly correlated to solving homicides, with there being a higher clearance rate for cases characterized by strong connections between the subject involved (Addington, 2006; Alderden & Lavery, 2007; Litwin, 2004; Litwin & Xu, 2007; Puckett & Lundman, 2003; Roberts, 2007). Given that all murder investigations begin by profiling the victim and his/her personal and family networks, it is reasonable to infer from this that the stronger the ties between the players, the higher the chances that the perpetrator will be detected, at the very least as a person of interest.

Finally, and as a logical consequence of this last consideration, several studies have found a significant correlation between clearance and whether the *murder occurred concurrently with other crimes*, such as robbery, rape or drug-related crimes (Addington, 2006; Litwin, 2004; Wellford & Cronin, 1999a). This is because these types of crimes invariably involve strangers, which, in turn, greatly reduces the relevance of the victim profiling phase. Interestingly, Roberts (2007) found exactly the opposite to be the case regarding drug-related murders, interpreting such a result as deriving from drug abusers' increased proneness to commit mistakes and leave traces behind them (Riedel, 2008).

In summary, the research conducted in relation to the situational dimension appears to have produced less conflicting findings compared to studies focussed on the individual dimension. The chapter now turns to consider the spatial/neighbourhood dimension.

Spatial/neighbourhood

The present sub-section addresses relevant research which sought to establish a correlation between clearance and extra-legal factors, such as the socio-economic characteristics of settings, either with reference to the victim or the area in which the crime occurred. Those scholars, through recourse to social disorganization theory (Shaw & McKay, 1942), explored a wide spectrum of extra-legal factors in order to explain the reasons for the drop in the clearance rate in the United States, namely: i) the victim's socio economic status; ii) the decrease in both formal and informal social control mechanisms; iii) a reduction in cooperation between citizens and police; iv) the population density.

A number of studies (Riedel & Jarvis J., 1999; Litwin & Xu, 2007; Litwin, 2004; Kubrin, 2003; Keel et al., 2009; Sampson & Groves, 1989; Puckett & Lundman, 2003; Regoeczi & Jarvis, 2013; Petersen, 2017) grounded in a structural perspective have targeted public *mechanisms of social control* and the *level of cooperation between citizens and the police*. Such a perspective, which derives from social disorganization theory, argues that socio-economic changes cause a reduction in informal social control mechanisms (which, in turn, leads to the committing of more crime), along with a lowering of witness cooperation. Since the positive outcomes of murder investigations are primarily dependent on the information provided by witnesses and willing citizens, such changes in the social environment can negatively impact upon the clearance rate (Greenwood et al., 1977; Litwin, 2004; Riedel & Rinehart, 1996).

Simply put, the connective tissue between these studies is the belief that the uncooperative attitudes towards law enforcement agencies that have been observed in degraded areas is

motivated by the deep socio-economic disadvantaged conditions of its inhabitants. As a result, such conditions produce two consequences: either an overall lack of trust in institutions (Puckett & Lundman, 2003; Regoeczi & Jarvis, 2013; Keel et al., 2009; Petersen, 2017), or fear on behalf of potential witnesses over retaliation from other members of the same community (Riedel & Jarvis, 1999).

Such an approach enabled a shift in perspective from the individual sphere to the macrosocial sphere, which, in turn, enabled the development of studies based on the effect that these macrosocial factors (like socio-economic status and the population density) can have on the outcomes of homicide investigations.

Specifically, if we take socio-economic factors as an example, various authors have employed specific proxies (such as average income, unemployment levels, percentage of college graduates, percentage of the population living in poverty, etc.) to assess the potential effects of such extra-legal variables upon solving homicides (Puckett & Lundman, 2003; Litwin, 2004; Litwin & Xu, 2007; Xu, 2008; Regoeczi & Jarvis, 2013).

Unfortunately, the findings of these studies have also been deeply contradictory. For example, Puckett & Lundman (2003) did not find any correlation between *household income*¹⁰ or a *census-tract measure of victims' social class* and the clearance level. Moreover, even when some of these extra-legal factors resulted in significant findings, scholars opted to provide multiple explanations.

To cite an example, Litwin (2004), whose study showed that cases involving Latino victims were 2.5 times less likely to be cleared than cases involving white victims, interpreted this “as a consequence of language barriers between detectives and potential witnesses (...) also be concern among Latinos that speaking with police may put themselves, or someone they know

¹⁰ Referred to the census tract where the homicide took place.

and care about, in jeopardy of having an illegal residency status revealed” (2004, p. 339). Again, the same author, having found that there was a higher clearance rate in cases involving victims from *communities with higher homeowner rates* did not interpret this as stemming from a predisposition of the police to favour such leisure districts, but rather as deriving from the broader willingness of its inhabitants to cooperate with law enforcement agencies due to having a vested interest in the resolution of the case.

Continuing with this discussion, other authors have taken recourse to the social disorganization perspective to investigate the influence of factors related to area residency measures, such as *concentrated disadvantage*¹¹ and *residential instability* (Regoeczi & Jarvis, 2013). Although they did not find that they had a direct impact on the likelihood of clearance, they nevertheless interpreted these results as supporting their hypothesis: “our results indicate that neighbourhood context does impact homicide investigations by conditioning the influence of the presence of third parties” (2013, p. 1006). In other words, although such predictors did not affect directly the outcome, they still had an indirect effect in the sense that they discouraged the willingness of citizens to cooperate with police.

Conversely, Borg & Parker (2001) found interesting evidence that variables like *greater racial disparities in education, income, employment, and residence, greater residential stability, higher levels of educational attainment, and higher expenditures for educational programs* all had positive effects on the clearance rate.

In a similar vein, Corsianos (2003), through conducting qualitative research that comprised several in-depth interviews with detectives responsible for different “high profile” cases in a large Canadian police department, found evidence to suggest that more manpower and resources were allocated to investigations involving high-profile victims to the detriment of

¹¹ Operationalized by the following measures: *percentage of female-headed households, percentage of owner-occupied housing, percentage of vacant housing.*

cases involving more common citizens. On the contrary, Brandl (1993), subsequent to a six-month observation and quantitative analysis of data related to robbery and burglary, reported that “offense characteristics are by far more powerful predictors of time spent [by each detective on a case] than victim characteristics” (1993, p. 395).

In this regard, another relevant contribution to this approach is Hawk & Dabney’s (2014) study, which involved interviews with several detectives from a police department located in the southern part of the United States. Although they did not aim to provide objective measurements, their findings demonstrated the existence of mechanisms of evaluation about the assigned investigations on the behalf of the detectives, which were suggestive of a certain degree of either over-evaluation or devaluation of cases, based on factors such as: victims’ socio-economic status; level of media attention; victims’ criminal background, and so forth.

Litwin & Xu’s (2007) study provides partial confirmation of the importance of extra-legal factors. In fact, both their economic disadvantage index (comprised factors like *income, unemployment, poverty, female-headed households, vacancy, and owner-occupied units*), and their consideration of race (Black and Latinos) were shown to have a significant effect on the clearance rate, albeit with respect to only one of the three separate time frames considered by the authors.¹² This result also highlights the importance of time when considering these aforesaid factors, particularly with respect to socio-economic or race variables. In light of this point, Xu (2008) implemented the consideration of time as a key element, assessing that some extra-legal factors that produced effects in specific periods of time turned out to be irrelevant during other periods. Indeed, predictors like *vacant housing* and *Black population*, which were shown to be significant in other research, did not remain meaningful over time.

¹² Only in the time frame 1986-1995, but not in the other two: 1966-1975 and 1976-1985.

Investigative

The first studies that aimed to evaluate the impact of investigative work on crime clearance began to emerge from around the mid-1970s. In fact, until that juncture, scholars had invariably focused their attention on patrol working than on investigative procedures. Nevertheless, the studies conducted over the course of the 1970s, 1980s and 1990s were not specifically focused on homicide clearance, but rather on every type of offence.

Moreover, the majority of this research was either descriptive or exploratory in nature, based on qualitative interviews and surveys submitted to detectives in order to observe and evaluate their day-to-day work. Hence, the lack of quantitative measurement hindered the possibility of developing precise predictors capable of explaining the correlation between investigative factors and clearance.

Despite these aforesaid limitations, these studies were nevertheless expedient insofar as they shed light on a field which had always been relatively overlooked in academic debate. Moreover, they promoted the use of the survey tool as a formidable sociological instrument that was capable of observing and describing such a complex reality. Up until that point, United States-based researchers who wanted to explore the investigative world had faced a number of difficulties deriving from the limitations of their primary resource: Supplemental Homicide Reports (SHR). In fact, such a database, while providing important data like details on the victim, the weapon used and several other circumstances around the murder, do not provide information on the nature of the investigation, or on the detectives' work. For this reason, some scholars began to conduct time-consuming surveys and interviews with detectives in order to gain a more detailed picture of the kinds of activities they engaged in to solve cases.

As a matter of fact, research that addressed the role that detective work plays in the solvability of cases did not begin under the most favourable of circumstances. In fact, seminal studies

(Greenwood et al., 1977; Willman & Snortum, 1984) in this area reported that only a small element of the cases observed were solved thanks to investigative efforts, concluding that detectives' contribution was far from relevant in clearing a case. By means of a survey administered to more than 156 United States police departments, the so-called Rand Corporation Study (Greenwood et al., 1977) concluded that the majority of the murders were solved as either a result of information gathered by patrol units on the scene, or due to their timely action in catching a perpetrator "red-handed".

However, there are some scholars who explicitly traced the results of this study back to a deliberate attempt, motivated by political reasons, to discredit investigative departments to the benefit of patrol units (Geberth, 2006, p. 906), and, indeed, the role of investigators was downsized as a consequence of this study. In fact, as Goldstein (1977) stated, "much of what detectives do consists of very routine and rather elementary chores, including much paper processing; that a good deal of their work is not only not exciting, it is downright boring; that the situations they confront are often less challenging and less demanding than those handled by patrolling police officers (...) and that the capacity of detectives to solve crimes is greatly exaggerated" (1977, pp. 55–56). Such an approach basically framed clearance as something that was beyond the control of the police, that is, as something that was solely dependent on exogenous circumstances, such as the random presence of either physical or oral evidence.

A less drastic and altogether more reasonable approach was put forward by Eck (1983), which foreshadows the aforementioned distinction between self-solved and whodunit murders; specifically, Eck (1983) purported that there are three circumstances which detectives may have to deal with: cases that cannot be solved with reasonable investigative effort; cases solved by circumstances which only require proper follow-up activities by police; cases that may be solved with reasonable investigative effort, but that would not be solved otherwise.

In contradistinction to earlier approaches, some studies, both qualitative and survey-based, began to investigate whether or not various investigative practices, such as *victims' interviews*, *informant management and criminal database checking*, increased the likelihood of a crime being solved (Block & Bell, 1976; Block & Weidman, 1975).

As reported by Braga & Dusseault (2016), Bloch & Weidman's (1975) study represented a clear turning point for research assessing how specific factors associated with investigative practices impacted on the clearance rate. The specific factors they assessed were: *budgeting and allocation of resources; improving relationships with the Prosecutor; interacting with the public, especially victims and witnesses; improving relationships between investigators and patrol officers; decentralizing detective assignments, particularly in neighbourhood team policing approaches; using civilian employees for investigative tasks; assigning personnel; supervising and training of investigative personnel; improving investigative procedures; and conducting investigative activities that were not related to specific cases*. Most of these factors identified by Bloch & Weidman (1975) have informed subsequent research, including the present study.

From the late-1990s onwards, a series of research studies have been conducted that seek to address the issue in a more rigorous manner, by focussing specifically on homicide clearance, rather than on crime in general. Among these studies, Wellford & Cronin's (1999a) work can be considered as the cornerstone of this new approach that seeks to highlight the importance of detectives' work, in that they categorized for the first time the vast amount of procedures and tactical factors associated with investigative work. Consequently, their research represents the benchmark for all subsequent studies.

In their study, the authors interviewed, via surveys, several detectives from four police departments in the United States, which displayed remarkable differences in their clearance rates between the time span 1994-1995.

The composite results of the study showed that certain factors, some of which are especially designed for homicide investigations, such as having *more than one detective assigned to each case, the actions of the patrol units on the scene, the time required to reach the crime scene, proper documentation, witness follow-ups, computer criminal database checks both on suspects and on the guns seized at the scene, interaction with medical examiners, the role of Prosecutors in the investigation, and autopsy detectives' attendance* were all statistically significantly correlated with solving cases.

From the early 2000s onwards, several studies have been developed along the same lines, that is, focussing on a wide range of factors that are assumed to be correlated with homicide clearance. The findings arising out of these types of studies highlighted the relevance of specific investigative procedures and tactics which, in turn, became baseline factors for subsequent research in this field, including the present study.

Among those factors pertaining to human resource management, some authors considered *personnel training* to be of especial importance (Keel et al., 2009; Pizarro et al., 2018). With regards to this point, Keel, Jarvis & Muirhead (2009) showed its crucial importance, not only in terms of what concerns investigators, but rather for all the other key players involved, such as first responders, supporting detectives, and so forth.

One of the most interesting studies which addressed managerial and investigative practices as a whole is Carter & Carter's (2016) research. Their qualitative analysis addressed several procedures and best practices that were implemented in seven geographically-representative law enforcement agencies, which had experienced at least 24 homicides in 2011 and had a clearance rate of 80% or higher. Their express aim was to understand if their working methods were sufficiently different to other agencies to justify such positive results.

Although their qualitative analyses found that high homicide clearance rates within these agencies were facilitated by a *strong community policing presence, collaboration with external agencies*, and a *culture dedicated to innovation*, they also described several factors associated with ‘successful’ agencies which served as inspiration for subsequent studies, including the present one. Among the numerous factors considered, the issue of training issue was also addressed. Specifically, their findings demonstrated that the most successful agencies required specific background experience in order to be entitled to apply to homicide units, and held frequent specialized training courses not only for detectives, but also for patrol unit members, whose role extended beyond the typical vision of “place holders” to instead become proactive support players, who finalized the identification of witnesses and secured physical evidence (Braga & Dusseault, 2016; Carter & Carter, 2016; Keel et al., 2009; Wright, 2013).

In conjunction with Carter and Carter (2016), two other impressive studies on the influence of detectives’ work on clearance homicide are undoubtedly Braga & Dusseault (2016) and Braga et al.’s (2018) work. The authors, taking advantage of a profound renovation of problem-oriented policing that was implemented from 2012 onwards within the Boston Police Department (BPD) Homicide Unit, as a result of a decade-long period of having a clearance rating well above the national average, succeeded in performing quasi-experimental research based on a comparison between these two periods. In so doing, the authors organized factors referring to three key aspects of the investigation: the investigative resources applied to clear a case; the results from the investigation of the initial crime scene; the subsequent investigative actions and forensic testing of the acquired evidence. Their study definitively deserves credit for having assessed the significance of a series of procedures and practices related to investigative work.

Nevertheless, in the author’s opinion, what distinguished this study from others, more than the tactics implemented by the BPD as such, is the fact that the authors correctly highlighted the

method which underpinned it. Indeed, since every jurisdiction has its own peculiarities, there is no guarantee that the aforesaid procedures would result in positive effects everywhere.

Yet, the authors effectively emphasised the proactive method adopted by the BPD to tackle this question, which is highly acceptable and applicable on a large-scale basis. In fact, as the authors noted:

“with the aid of academic research partners, the BPD analysed¹³ homicide case characteristics that influenced clearances, identified gaps in their investigative and forensic practices and processes, and implemented a set of reforms that were tailored to the nature of their homicide clearance problem. Other jurisdictions interested in improving clearance rates for homicides or other crime types should replicate this process rather than simply adopt specific tactics from the BPD approach” (2016, p. 25).

Hence, their research serves as an instructive example of how to bridge the gap between academics and police executives and analysts, by establishing a durable and effective solution to the issue of homicide clearance rate that begins from mutual cooperation without prejudice.

Since all the innovations introduced within the BPD pertained to managerial and investigative procedures and practices, this study represents a particularly useful means through which to observe whether such measures are effective in improving the homicide clearance rate. In this specific case, the findings of the post-intervention period (2012-2014) confirmed an increase of 9.8% in the homicide clearance rate, which, moreover, was in stark contrast to the overall

¹³ Through case reviews and interviews with homicide detectives and the subsequent establishing of a Homicide Advisory Committee staffed by homicide detectives, district detectives, Crime Scene Response Unit (CSRU) officers, Forensic Group analysts, intelligence analysts, homicide prosecutors, and others to identify best practices and gaps in their investigative processes.

Massachusetts clearance rate, which during the same period decreased from 60% to 45.1%, thus consisting of a +24.7% difference-in-difference comparison.

The initiatives adopted comprised a series of recommendations which also addressed training, especially regarding the homicide unit, CSRU, and Forensic Group staff, all of whom received extensive additional training in cutting-edge investigative techniques.

Continuing the discussion on training, other authors have considered specific possible tools that improve detectives' ability to come up with a working hypothesis in the first phase of investigations (Pinizzotto, Davis & Miller III, 2004; Wright, 2013). Despite the controversial nature of the findings, the results from Wright's study (2013) especially warrant mention here. Based on pictures of crime scenes of solved murders, detectives were asked to come up with several potential hypotheses through which to produce a likely reconstruction. The findings showed that experience played the main role in this process, which lends credence to what has always been vaguely defined as detectives relying on their "gut" or "sixth sense".

With respect to this last point, *detectives' experience* has been taken into account in studies, albeit it produced a null effect vis-à-vis solving, likely as a result of the bizarre method used to codify it (Puckett & Lundman, 2003). Indeed, the authors assumed that experienced investigators preferred to work in the daytime, and distinguished between the experiences of investigators who worked day and night shifts.

Another study found a counterintuitive relationship which produced a higher clearance rate among detectives with less experience (Pizarro et al., 2018). Given that this research compared, among other things, 'old school' investigative methods with the introduction of innovative new technologies (such as social media management and IT forensic techniques), this result has been classified as providing a better description of how 'new' investigators, with respect to the most 'senior', exploit such innovative tools.

Some researchers, relying on the so called *Production-Function Perspective*, have investigated the potential influence of a heavy *workload* on solving homicides, with rough estimations that ultimately resulted in non-significant effects (Liska, Chamlin & Reed, 1985; Puckett & Lundman, 2003; Rydberg & Pizarro, 2014). Others have instead directly interviewed homicide detectives, concluding that, compared to those who manage non-fatal shootings, they generally have a lighter workload, which, in turn, enables them to have more time to interview witnesses, follow new leads, and so forth (Cook, Ho & Shilling, 2017).

With respect to additional factors related to the resource management field, Carter and Carter (2016) reported that successful departments employed two different *staffing management methods*, both of which proved to be effective: the first, involved having one coordinator and four investigators rotating as the team leader, while the other adopted a team approach, in which each detective was always in charge of the same types of tasks.

Concerning staff scheduling, the study demonstrated that the model that schedules detectives permanently on either day or night shifts was more effective and economic. The latter approach was also shown to be effective in another study conducted by Pizarro & al. (2018), which reported “adequate staffing with competent, well-trained investigators, proper oversight by management and the immediacy in which tasks are distributed” as having a positive effect on clearance.

Specifically, the authors observed the difference in the clearance rate both before and after an intervention which occurred in 2012 at the Rochester Police Department. Some of the innovations proposed resulted in an enhancement of the clearance rate, including the effective *reallocation of human resources and task assignment*, increase in *supervisory oversight*, and the possibility of lead detectives being *helped by other colleagues in the execution of more time consuming activities*.

Another crucial factor considered in several studies is the role played by the forensic laboratory, particularly the *speed of lab results*. In contrast to what common-sense would suggest, the research demonstrated that this had either a limited effect or none whatsoever on solving (Baskin & Sommers, 2010; McEwen, 2009; McEwen & Regoeczi, 2015; Peterson & Baskin, 2010; Schroeder & White, 2009). Possible justifications for this is that the chronic delays which seems to affect all forensic labs across the globe do not have a significant effect on this process, because detectives often close the case before receiving the results.

Finally, Braga & Dusseault (2016) reported that several factors increased the clearance, namely: *the formal designation of a crime scene entry log scribe; the canvas supervisor role; the formal assignment of responding district detectives to homicide unit detectives for on-scene and post-scene briefings; the increasing deployment of Forensic Group technicians to homicide scenes.*

From a more strategic perspective, Carter and Carter (2016) highlighted the importance of developing *good relations* between detectives and forensic members, as well as with other crucial stakeholders, such as the Prosecutor's Office, external agencies (ATAF,¹⁴ DEA,¹⁵ fugitive squads), and so forth. The authors, through recourse to the social disorganization perspective, accord a similar degree of importance to the *relationship with citizens*, as a prerequisite to gathering useful information from potential witnesses, as well as the importance of providing the department with adequate *equipment and resources*, like take-home vehicles, laptop computers, and interview rooms with audio-video recording.

Some authors also pointed towards investigative techniques, which are traditionally performed after the conclusion of crime scene operations. The *running of computer checks* on suspects was shown to be positively correlated with solving, while, curiously enough, the same activity

¹⁴ Bureau of Alcohol, Tobacco and Firearms.

¹⁵ Drug Enforcement Agency.

conducted on victims and witnesses did not produce the same results (Schroeder & White, 2009; Wellford & Cronin, 1999a).

The *autopsy attendance* affected clearance in two respects: from a detective's perspective, it allowed them to gather in a relatively short time a wide range of information and possible clues useful for corroborating their hypothesis or developing new leads; from the Coroner's perspective, detectives' active contribution via asking specific questions can give the examiner a broader view of the event (Carter & Carter, 2016; Innes, 2002b; Keel et al., 2009; Wellford & Cronin, 1999a).

The importance of holding *brainstorming meetings*, or peer-review sessions, were shown to be important in terms of updating each member about recent developments in the case, as well as providing useful hints from supervisors or other detectives not directly involved in the case (Braga et al., 2018).

Lastly, the *implementation and fast access to technological tools* (such as digital forensics, phone records analysis software, case management systems, and so forth) emerged as being a crucial means through which to increase the clearance rate (Braga & Dusseault, 2016; Braga et al., 2018; Richardson & Kosa, 2001).

2.4 Theoretical framework

In light of the above, one can conclude that the majority of studies on homicide clearance have examined the topic from several different perspectives, which can be classified into four theories: victim devaluation, event characteristics, police devaluation and victim lifestyle (Pizarro et al., 2018).

The 'victim devaluation' perspective, which is also known as 'discretionary' or 'extra-legal', stemmed from Black's theory of law (1976), according to which non-legal factors, such as the

social position or demographic characteristics of the victim, are expected to affect the ‘level of law’ received by citizens, and, in turn, impact upon the likelihood of a homicide case being cleared. Specifically, the governmental social control systems vary in response to five aspects of social life: stratification, morphology, culture, organization, and alternative social control (Riedel, 2008). According to this approach, these extra-legal characteristics are likely to influence priorities and level of resources, namely the level of police commitment that a given homicide case receives (Klinger, 1997; Roberts, 2007; Xu, 2008).

In contrast to the aforesaid thesis, the event characteristics, or ‘nondiscretionary’ theory, suggests that while social characteristics may affect the policing of minor criminal offenses, homicide investigations are taken very seriously by the police compared to other types of crimes. From this perspective, explanations for an investigation’s failure should be sought exclusively in so-called ‘legal factors’, i.e. specific characteristics of each homicide, such as the presence/absence of witnesses, the modus operandi, the weapon used, the location of the corpse, the organizational level of the perpetrator and of the law enforcement agency (LEA.) engaged.

The police devaluation perspective has its roots in the negative perception of the police held by those individuals who live in socio-economically disadvantaged backgrounds (Riedel & Jarvis, 1999; Litwin & Xu, 2007; Litwin, 2004; Kubrin, 2003; Keel et al., 2009; Sampson & Groves, 1989; Puckett & Lundman, 2003; Regoeczi & Jarvis, 2013). This perspective purports that this feeling of distrust serves to hinder the development of a fruitful relationship among such citizens and the police, in turn, reducing the potential witnesses who will come forward and thus the subsequent exchange of useful information. Such an attitude makes the investigative work harder and, hence, negatively affects clearance in these areas.

Finally, a novel theory has recently been introduced by Rydberg & Pizarro (2014), which is known as the so-called ‘victim lifestyle’ perspective. According to this approach, victims’

behaviour, particularly their involvement in criminal activities, can hamper clearance. This is due to several reasons that pertain to the engagement of the victim in criminal environments, namely: less opportunities to pinpoint cooperative witnesses (either because of fear of retaliation or so as not to be labelled as a snitch); less cooperation by victims' relatives (because they are committed to preserving their own criminal activities, even those not related to the murder itself); the overall negative attitude of inner-cities citizens to actively collaborate with the authorities due to deep-seated suspicion, if not outright cynicism, towards police work.

The following section provides a summary of studies which have addressed homicide clearance through recourse to the aforementioned theories, irrespective of their respective contradictory findings.

2.4.1 Victim devaluation

From the perspective of the results described in reference to 'individual' factors, as noted by Riedel (2008), there is a strong enough degree of corroboration in the literature to revisit the discretionary perspective. In fact, several studies have demonstrated that demographic factors such as gender, age and race of the victim can affect clearance.

Specifically, there is a broad consensus in extant literature that female victims tend to lead to a higher likelihood of solving a homicide (Addington, 2006; Puckett & Lundman, 2003; Riedel & Rinehart, 1996; Wellford & Cronin, 1999; Wolfgang, 1958).

Moreover, young victims also have a higher clearance rate (Alderden & Lavery, 2007; Lee, 2005; Litwin, 2004; Litwin & Xu, 2007; Puckett & Lundman, 2003; Regoeczi & Jarvis, 2013; Riedel & Rinehart, 1996; Wolfgang, 1958).

Finally, although to a lesser extent, the race of the victim has also been proven to have a significant effect on clearance rates, in that cases with minority (Black and Latino) victims tend to have lower clearance rates than those involving white victims (Alderden & Lavery, 2007; Jiao, 2007; Lee, 2005; Litwin & Xu, 2007; McEwen, 2009; Regoeczi et al., 2000; Xu, 2008).

2.4.2 Event characteristics

Regarding the non-discretionary perspective, the summary of findings from extant literature is more complicated than those related to discretionary, primarily because of the wide range of factors considered and also because of a lack of uniformity, among scholars, in operationalizing such variables (Riedel, 2008). Despite this limitation, the results corroborated the present theory by confirming that there are other additional factors to those that pertain to the demographic characteristics of the victim, which affect the positive outcome of an investigation.

The time and location of the murder (Alderden & Lavery, 2007; Mouzos & Muller, 2001; Wolfgang, 1958), the type of weapon used (Alderden & Lavery, 2007; Baskin & Sommers, 2010; Geberth, 2006; Litwin, 2004; Litwin & Xu, 2007; Puckett & Lundman, 2003; Roberts, 2007; Rydberg & Pizarro, 2014; Schroeder & White, 2009; Wolfgang, 1958; Xu, 2008), the presence/absence of witnesses and evidence (Carter & Carter, 2016; Decker, 1993; Geberth, 2006; Greenwood et al., 1977; Keel et al., 2009; Riedel & Rinehart, 1996; Wolfgang, 1958), the victim/perpetrator relationship (Addington, 2006; Alderden & Lavery, 2007; Litwin, 2004; Litwin & Xu, 2007; Puckett & Lundman, 2003; Roberts, 2007) and other associated crimes (Addington, 2006; Litwin, 2004; Wellford & Cronin, 1999a) are all factors which strongly correlated with solving, irrespective of the demographic characteristics of the victim.

2.4.3 Police devaluation

This theory has been operationalized in literature through the use of several types of proxies (such as average income, unemployment levels, percentage of the population living in poverty, racial composition, etc.) to measure the socio-economic characteristics of disadvantaged areas. The findings showed only partial correlations (Greenwood et al., 1977; Litwin, 2004; Riedel & Rinehart, 1996; Keel et al., 2009; Petersen, 2017), and, moreover, there was no lack of alternative explanations even among those authors who statistically corroborated this theory. To cite an example here, Litwin (2004) hypothesized that the supposed interruption of the private-public mechanism of social control might be more to do with problems deriving from language barriers between detectives and potential witnesses, rather than an essential mistrust in the police.

Several studies did not find any correlation with clearance rates (Puckett & Lundman, 2003; Regoeczi & Jarvis, 2013; Xu, 2008), while conflicting results have also been found with respect to the racial composition of a neighbourhood as a proxy (Pizarro et al., 2018).

2.4.4 Victim's lifestyle

Regarding the more recent theoretical approach, the relative dearth of studies on the issue hinders the possibility of formulating a more precise evaluation. Although this is not the first time that victims' lifestyle has been taken into consideration (Alderden & Lavery, 2007; Jiao, 2007; Lee, 2005; Litwin, 2004; Litwin & Xu, 2007; Roberts & Lyons, 2011; Wellford & Cronin, 1999a; Xu, 2008), the innovative aspect introduced by the authors stems from the proxies that they used to measure deviant lifestyles, which enabled them to formulate a theory which overlaps with both the individual and situational perspectives. This is important, because previous studies solely focussed on the presence of victims' criminal records in general, as well as on victims' involvement in gang activities or their reported consumption of alcohol or drugs.

2.5 Knowledge gaps in the literature

Having now described extant literature on homicide clearance, the innovative aspect of the present research can now be fully comprehended in relation to the following gaps identified in empirical and theoretical doxa.

Most of the research on homicide clearance evaluates the possible effect of demographic or incident related factors and, to a lesser extent, the victim's lifestyle on clearance (Addington, 2006; Alderden & Lavery, 2007; Baskin & Sommers, 2010; Litwin, 2004; Litwin & Xu, 2007; Puckett & Lundman, 2003, 2003; Riedel, 2008; Roberts, 2007; Rydberg & Pizarro, 2014; Schroeder & White, 2009; Wellford & Cronin, 1999a; Xu, 2008). Only a few studies, mainly from the United States, have partially explored the influence of investigative work on positive outcomes in murder investigations (Braga & Dusseault, 2016; Brookman & Innes, 2013; Carter & Carter, 2016; Hawk & Dabney, 2018; Hough et al., 2019; Keel et al., 2009; Pizarro et al., 2018; Wellford & Cronin, 1999a).

The lack of such research is likely a consequence of the inherent difficulties involved in acquiring detailed information about the vast and heterogeneous array of strategic and tactical actions, procedures and best practices employed in murder investigations. In fact, such data can only be gathered by directly asking detectives via the use of interviews or surveys.

There are several obstacles in this regard which one must overcome. Firstly, researchers must create a personal relationship with a police department, display an ability to handle potentially confidential information, while both parties must work through and overcome the scepticism and distrust which can sometimes characterize these types of relations. Secondly, large countries comprise hundreds of police departments, each of which has their own procedures and customs. For this reason, it is not a straightforward task for the researcher to forge fruitful

relationships with several different entities so as to perform country-based multisite studies (Carter & Carter, 2016; Hough et al., 2019; Keel et al., 2009).

Thanks to the specificity of the Italian military police force organizational system, which operates and employs similar procedures, protocols and practices across the whole country that acts as one big police department, it is thus possible to perform a country-based multisite study. This is one of the very few examples of multisite research on a national basis, together with Hough's study, published in 2019, which addressed approximately 80 police departments in Florida.

Moreover, due to the peculiarity of the Carabinieri structure, which is composed of both big and very small investigative units, the present study focussed on both types of L.E.A.; while previous research mainly addressed big metropolitan investigative units which had managed 25 murder cases per year (Carter & Carter, 2016; 2019; Keel et al., 2009; Wellford & Cronin, 1999a).

Furthermore, given that investigative factors play a crucial role in the context of cases which involve a certain level of investigative effort (and to a much lesser extent in 'easy' cases), scholars have always had to cope with the problem of finding effective ways to distinguish between 'self-solved' and 'whodunit' murders, which has led to inconclusive results.

The approach adopted in the present study follows the criteria used by the Italian police itself. In fact, the standard procedures employed by Carabinieri Corp establish that the investigative units are asked to step in only in the case of murders which deserve a certain level of investigative action, as a result of a joint decision taken by the local police commander and the respective Public Prosecutor assigned to the case. The cases that are dropped by means of such an exclusionary process are subsequently assigned to non-investigative units, such as station commands and patrol units. Taking advantage of such a custom, the selection of whodunit cases

has been made by complying with the decision made by the police command which handled each case.

In view of the above, the innovative aspects of the present study can be summarized as follows:

i) it has enabled the researcher to conduct a country-based multisite study on homicide clearance; ii) it has contributed to compensating for the relative dearth of these type of studies outside of the United States; iii) it has provided insights on the working method of both big metropolitan and small provincial investigative units; iv) it has afforded objective criteria through which to distinguish between self-solved and whodunit cases.

3. Methodology

This study adopted a mixed-methods research design, which utilized both quantitative and qualitative methods, to explore homicide case clearance. Data was collected from two resources: firstly, from an official police dataset of all the murders that occurred in Italy in 2014; secondly, from surveys administered to ninety-eight police detectives, who participated in the investigations documented in the aforementioned police dataset.

The police dataset was supplemented by conducting a scanning analysis of national and local media websites in order to gather more information about each case, which was subsequently compared to the original database. The police detectives who responded to the survey were based in the Carabinieri Corp, a military police force that operates as a large unique police department across the entire country.

The present chapter is organized into four descriptive sections: research questions and hypotheses; description of the site; data collection processes; and the analytic strategy.

This study aims to both contribute to extant knowledge about the potential impact of police investigative efforts and resources upon homicide clearance, and develop standards and procedures through which to enhance case clearance in Italy and other Western countries.

3.1 Research Questions and Hypotheses

The present study aims to contribute to academic debates on homicide clearance by, firstly, introducing a holistic approach through which to evaluate the effect of investigative factors on solving murder cases which required a certain degree of investigative effort, and secondly, by providing avenues through which to overcome the identified limitations in extant literature.

The study is underpinned by the following research question: “What are the investigative factors that affect homicide clearance?” In light of this research question, the overall objective of the study is to investigate which of those investigative factors identified in previous studies and from my own personal experience contribute to positive outcomes in murder investigations.

In so doing, in contradistinction to most previous studies, only investigative predictors will be considered for statistical analysis, while other commonly used variables, such as those referred to as ‘*subjects involved*’ or ‘*surrounding circumstances*’, will be treated only for control purposes.

To answer the research question analytically, investigative factors were conceptually organized and classified into four methodological areas (named ‘dimensions’), which comprised: personnel, equipment and resource management within the police organization; the range of activities performed at the crime scene; the strategic policies and decisions adopted by police executives to ease detectives’ work; and the specific techniques employed by detectives when investigating a case.

Most prior studies have focused their analyses on the effect of such factors, irrespective of the typology of homicides (‘self-solved’ or ‘whodunit’). In fact, due to the fact that police databases do not contain any details about the level of difficulty of cases, murder has invariably been considered as an overall category, with no distinction between self-solved and whodunit cases. Moreover, even when researchers have applied criteria to discern between the two categories, they have often utilized ineffective proxies based on only partially relevant measures, such as investigation length (Alderden & Lavery, 2007; Puckett & Lundman, 2003; Schroeder & White, 2009).

Hence, it has hitherto not been possible to effectively estimate the potential correlation between investigative factors and homicide clearance, as previous analyses have been skewed by the

presence of a large number of observations referred to as ‘self-solved’ cases upon which investigative variables often have either little or no effect.

Given such limitations, it is important to develop an effective way through which to distinguish between these two types of murders, as doing so would potentially help to reduce the impact of inherited case characteristics. This is due to the fact that, should there be a high clearance rate among even whodunit cases, then this would mean that there are other factors that account for clearance rates than the intrinsic difficulty of cases themselves.

To implement this effectively, some scholars have argued that the most reliable way to establish whether a murder is either ‘self-solved’ or a ‘whodunit’ is to ask police personnel themselves (Schroeder & White, 2009). The methodology adopted in the present study follows this very approach, in that those cases considered by the police as being worthy of investigative work were isolated from the overall number of murders. Such an approach was only made possible by virtue of the Italian policing system, which assigns cases they deem to require investigative effort to investigative units, whereas those cases that only require paperwork and bureaucratic engagement are assigned to non-investigative offices, such as Station Command or Patrol Units.

To summarize, taking advantage of the data acquired from a national survey, the present study aims to both corroborate previous findings in homicide clearance research and test new hypotheses. More specifically, the present study is driven by the following research hypotheses and objectives.

Research hypothesis (1)

Previous studies have demonstrated that specific investigative factors pertaining to the dimension of resource management, such as *speed of the lab results*, *detectives’ experience*, *available manpower*, *investigators’ training* and *their workload*, are likely to have an affect on the positive outcome of investigations, albeit there these results are often conflicting (Baskin &

Sommers, 2010; Block & Weidman, 1975; Braga & Dusseault, 2016; Braga et al., 2018; Carter & Carter, 2016; Cook et al., 2017; Innes & Brookman, 2013; Keel et al., 2009; Liska et al., 1985; McEwen, 2009; McEwen & Regoeczi, 2015; Peterson & Baskin, 2010; Pizarro et al., 2018; Puckett & Lundman, 2003; Rydberg & Pizarro, 2014; Schroeder & White, 2009; Wellford & Cronin, 1999a; Wright, 2013).

Specifically, the rapidity of results, not only in terms of execution but also in terms of their transmission, has been shown to be crucial for providing detectives with solid evidence through which to either corroborate their initial hypotheses or explore new leads (Wellford & Cronin, 1999a). Furthermore, due to the inherent complexity of murder investigations, detectives' experience and professional training have often been considered to be a crucial factor that can positively affect outcomes (Braga & Dusseault, 2016; Carter & Carter, 2016; Cook et al., 2017; Keel et al., 2009; Pinizzotto et al., 2004; Pizarro et al., 2018; Wright, 2013). Moreover, manpower management, both in terms of the available manpower and the individual case workloads of detectives, have been found to have a significant impact on outcomes (Cook et al., 2017; Wellford & Cronin, 1999a).

Objective (1)

To further investigate the effect on homicide clearance of specific investigative factors pertaining to the resource management dimension, such as the *speed of lab results, detectives' experience, available manpower, investigators' training and their workload*.

Research hypothesis (2)

As has been partially demonstrated in previous studies, *the assignment of specific tasks to the same detectives on an ongoing basis* can help to foster professionalism in the execution of such duties and, in turn, is likely to produce better results in terms of homicide clearance (Braga & Dusseault, 2016; Carter & Carter, 2016). Although these authors were primarily referring to the

presence of a supervisor to monitor the proper execution of neighbourhood canvassing, I would contend that this approach could be extended to encompass several other crucial activities, namely: *witness management; proper evidential chain of custody; locating and analysing the footage from CCTV cameras on the scene; paperwork duties needed to proceed with phone interception activities; phone records analysis.*

The rationale behind selecting these specific tasks over others is grounded in the nature of murder investigations themselves. Regarding *canvassing and witness management*, it is likely, especially in the early stages of investigations, that the frenzy around a case can cause an overlapping in activities (especially with respect to witnesses' interviews) and, hence, either the duplication and loss of important information, or their improper communication. Consequently, to randomly assign the canvassing of a neighbourhood to more detectives, or even to patrol units, may only result in more fragmented information about the case. Moreover, frequently, especially in socio-economically disadvantaged areas, people do not want to talk to the police, or, alternatively, they may only be willing to talk with a specific police officer who they already know and trust. This is the reason why canvassing can be considered as a form of 'art'. Not all detectives are skilled in eliciting information from reluctant witnesses, who hold back what they know for several different reasons, which are often unrelated to the event under investigation. This is why it is so important to proceed systematically when taking notes in interviews, as well as why investigators must subsequently contact individuals opportunistically.

For the purposes of obtaining a *proper evidential chain of custody*, assigning cases to the same detectives can help to prevent the aforesaid risk of information fragmentation. This is because a specialized detective may acquire a rigorous and proven methodology to master a critical task, which can make all the difference between a precise and sloppy chain of custody.

The specialization of the assignee is also critical with respect to the *locating and footage analysis of CCTV cameras on the scene*. Indeed, the gathering of CCTV footage is extremely complicated. To cite an example of this complexity, after having located the cameras, the manager responsible for each camera circuit must then be contacted, often during the night and in a short period of time (in order to avoid the overwriting of data). During this, detectives must: download the data; verify any discrepancies between the real time and display one; watch the video in order to perform a sort of ‘virtual’ surveillance of the person of interest; and, at the same time, try to locate the person of interest on the basis of the information provided by witnesses, interception activities or criminal database checks, and so forth.

Moreover, such information might come with a strong delay and, consequently, locating further cameras becomes a race against time. As so often happens to detectives during trials, defence lawyers often object to the presence of alleged cameras which, in their opinion, would have exculpated their client in the event they had been located in time. In order to properly respond to such objections, a systematic process of collection is required, such as creating a surveillance map which contains the location of every camera in the vicinity of the body, a description of those which were functioning, those that were either broken or fake, those whose data were overwritten due to the passing of time, and so forth. Such a duty also implies a high-level of dedication in the analysis phase of footage, in that hours spent watching CCTV footage can undermine both the attention and power of observation of detectives.

Regarding the *specific paperwork duties needed to proceed with phone interception activities*, as redundant as it may seem at first, such activities comprise a wide amount of tasks, chief among which is cultivating good relationships with telephone carrier operators, who have the power to speed up the process if they see fit. Resultantly, having specific staff devoted to these types of operations can relieve detectives from such bureaucratic duties, while, simultaneously, accelerating a process whose effectiveness is based solely on speed.

Finally, assigning the same detectives to *phone records analysis* performed on specific software represents the best solution for increasing professionalism in a multifaceted activity, one which necessitates several skills and attitudes and would benefit immensely from being performed by specialized operators. Indeed, notwithstanding the necessary software capabilities, such an activity also entails a pronounced deductive disposition so as to be able to discern, among a massive amount of data, what is useful for the investigation. In fact, phone records provide a vast amount of information, such as the location of individuals, their acquaintances, their whereabouts, habits, and so forth. Hence, the analyst must have an overall knowledge of the investigative process and persons of interest in order to select and organize the data which, at first glance, may seem useless, such as a sudden change of habits, an incomprehensible phone switch-off, and so on and so forth.

Objective (2)

To investigate the effect on homicide clearance of permanently assigning the following tasks to the same detectives: *canvassing and witness management; proper evidential chain of custody; location and analysis of footage from CCTV cameras on the scene; specific paperwork duties needed to proceed with phone interception activities; and phone records analysis.*

Research hypothesis (3)

A further aspect routinely addressed in the literature concerns the performance of specific activities at the crime scene which are likely to affect the positive outcomes of murder investigations, namely: *access monitoring; the use of proper equipment by forensic teams and detectives; time needed to reach the scene; neighbourhood canvassing; and the use of checklists or standard operating procedures (SOP)* (Block & Bell, 1976; Braga & Dusseault, 2016; Braga et al., 2018; McEwen & Regoeczi, 2015; Regoeczi & Jarvis, 2013; Schroeder & White, 2009; Wellford & Cronin, 1999a).

Objective (3)

To investigate the effect on homicide clearance of specific activities performed at the crime scene, such as *access monitoring, the use of proper equipment by forensic teams and detectives, the time needed to reach the scene, neighbourhood canvassing and the use of checklists or standard operating procedures.*

Research hypothesis (4)

Along the same lines as above, other investigative factors related to the crime scene dimension have also been partially shown in extant literature, as well as from my own personal experience, to have a crucial effect on solving homicides. Specifically, both the implementation of a *secure corridor* so as to better protect the scene against contamination and a *systematic process to locate and collect CCTV camera footage* are likely to impact upon the positive resolution of an investigation. These aforesaid factors can be understood as an evolution of the importance of crime scene integrity noted by some scholars (Braga & Dusseault, 2016; Carter & Carter, 2016; Wellford & Cronin, 1999a), as well as of the attention devoted in earlier research to the implementation of standardized procedures through which to systematically execute specific duties (Block & Weidman, 1975; Braga & Dusseault, 2016).

With respect to the *secure corridor*, even when a crime scene is properly signalled, notwithstanding potentially negligent attitudes, it is common to see unauthorized or ‘semi-authorized’ people wandering around the scene (Geberth, 2006). While it is not always straightforward to impose one’s authority and prevent access to such individuals, the establishment of a safe corridor in the crime scene is critical for reducing damage to the site. An expedient strategy to preserve a crime scene is to create two concentric limited access areas: the wider area hosts such ‘VIPs’ and enables them to feel the thrill of ducking under the crime

scene tape, while a smaller area should be preserved solely for assigned detectives, forensic teams, Public Prosecutors and coroner.

Regarding the *systematic process to locate and collect CCTV camera footage*, the importance of this task is analogous to what was discussed in hypothesis (2), with the main difference being that, in this case, it is not possible to assign such a task to the same individuals, rather it must be managed by means of a systematic and tested methodology.

Objective (4)

To investigate the effect on homicide clearance of both the implementation of a *secure corridor*, which prevents the scene from being contaminated, and a *systematic process of locating and collecting CCTV camera footage*.

Research hypothesis (5)

Previous research hypothesised that specific investigative strategies, such as *the type of decision-making process, presence of cold case units, and establishment of good relationships with the various stakeholders involved in the investigation* are likely to lead to positive outcomes in murder investigations (Addington, 2007; Allsop, 2013; Block & Bell, 1976; Block & Weidman, 1975; Braga & Dusseault, 2016; Carter & Carter, 2016).

Objective (5)

To investigate the effect on homicide clearance of implementing specific investigative strategies, such as *the type of decision-making process employed, the presence of cold case units, and the establishment of good relationships with various stakeholders involved in the investigation*.

Research hypothesis (6)

In a similar vein to that described above, other investigative factors that have hitherto only partially been acknowledged but never explicitly analysed in previous studies will be considered in the present study. Specifically, *effective coordination with media and the use of specific rooms (equipped with audio/video recording systems) designed for conducting interviews and interrogations* are both likely to have a positive impact on the outcome of murder investigations.

The first factor has already been addressed in extant literature from different perspectives. On the one hand, research has evaluated the extent to which extensive media coverage impacts upon the police's efforts (Lee, 2005), while, on the other hand, from a *do ut des* perspective, it is assumed that the police exploit the media to promote their activities and successful operations, and that news personnel take this opportunity to gather as much information as possible to produce crime stories (Chermak & Weiss, 2005). Conversely, for the purposes of this research, this factor is examined in terms of the impact that cooperation with the media has on reducing the likelihood of information leaks.

The second factor partially stemmed from the consideration paid by some scholars to the ready availability of adequate resources and equipment for the police (Carter & Carter, 2016). In this respect, attention is paid to the importance of having silent and discreet environments specifically intended for performing one of the most crucial and sensitive activities in murder investigations: interviewing witnesses and interrogating persons of interest. While these specific aspects have not been considered in previous research on homicide clearance as predictors in the strict sense of the term, various studies have highlighted the importance of the environment in which such a crucial investigative tool takes place (Kassin et al., 2007; Reid, 2008).

Objective (6)

To investigate the effect on homicide clearance of implementing *effective coordination with the media and the use of specific rooms (equipped with audio/video recording systems) designed for performing interviews and interrogations.*

Research hypothesis (7)

Several studies have assumed that the implementation of specific investigative techniques, such as the use of *case analysis software, the habit of holding briefings among investigators and autopsy attendance* positively impact upon the outcomes of murder investigations (Braga & Dusseault, 2016; Carter & Carter, 2016; Innes, 2002a; Keel et al., 2009; Wellford & Cronin, 1999a).

Objective (7)

To investigate the effect on homicide clearance of implementing specific investigative techniques, such as *the use of case analysis software, the habit of holding briefings among investigators and autopsy attendance.*

Research hypothesis (8)

With respect to those factors that pertain to the investigative techniques dimension, in consideration of the attention paid by previous studies to the effects of the pervasive use of social media and novel technologies on criminal investigations, other specific predictors associated with such a line of inquiry have also been taken into consideration (Frank, 2011; Iqbal & Ekstedt, 2017; Kumar, Hanumanthappa & Kumar, 2017; Lillis, Becker, O’Sullivan & Scanlon, 2016; Mason, 2018; McMillan, Glisson & Bromby, 2013; Murphy & Fontecilla, 2013; Police Executive Research Forum, 2018; Reith & Carr, 2002; United States, Department of Justice & Office of Community Oriented Policing Services, 2006).

The aim of the present study is to examine whether *the monitoring of social media, use of a timeline, and the practice of acquiring a forensic copy of electronic devices belonging to persons of interest* are likely to affect the positive outcomes of murder investigations.

Regarding the first of these above factors, it has become common for police to take advantage of social media to identify potential suspects and reconstruct a relationship network.

In a similar vein, due to the wide range of information stored in everyone's mobile devices, the need to rely on professionals who know how to properly handle such instruments, gather valuable information from them, and to prevent their operations from being subjected to objections raised by the defence during trial, has become essential for every police force.

Finally, the use of a timeline as "*a visual tool to identify the relationships between people, places, dates, time and evidence*" (Mason, 2018), should be considered as a key resource in the investigative toolkit, particularly in complex and multifaceted investigations such as murders.

Objective (8)

To investigate the effect on homicide clearance of *the monitoring of social media, the use of timelines and the practice of acquiring a forensic copy of electronic devices belonging to persons of interest*.

3.2 Site description

The aim of the present study is to explore further whether, and, if so, in what ways specific investigative strategies and tactics influence the positive outcomes of murder investigations in Italy. The data used in this research derives from both official police data and information collected through surveys. All the analysed data pertain to Italy at the national level, in that the police database comprises all the murders that occurred in Italy in 2014, while the survey was administered to almost one hundred Italian police detectives who had actively participated in these cases in the aforesaid police dataset, with a uniformed distribution of respondents along the entire peninsula.

Italy's murder rate per capita in 2014 was 0.78 per 100,000 residents, with a population of 60,780,000 and an overall homicide clearance rate of 76.8%. The highest murder rates were reported in the provinces of Nuoro (Sardinia), Crotone (Calabria) and Sassari (Sardinia), with 6.3, 3.5 and 2.1 per 100,000 residents, respectively. The cities which had the highest amount of homicides were, as one would expect, the large metropolitan centres, with Rome, Naples and Milan reporting 41, 38 and 25 murder cases, and a murder rate of 1.5, 3.9 and 1.9, respectively. The percentage of foreigners in 2014 was 8.1%, with the most represented nationalities being Romanian (22,0%), Albanian (10,1%), Moroccan (9,2%), Chinese (5,2%) and Ukrainian (4,5%).

The qualitative data gathered via surveys were similarly nationally-based, in that they were administered to detectives who belonged to one of the two national police forces operating in the entire country, the Carabinieri Corp. While due to the lack of cooperation with the police authorities it was not possible to administer the survey to the other national police force, the State Police, the organizational structure and standardized procedures employed by the two

police forces to manage murder investigations are basically the same. Despite such homogeneity between the two police forces, this still represents a limitation of the study.

The Carabinieri Corp (“Arma dei Carabinieri”) is a national police force with general competence in all types of crimes. In contradistinction to the State Police, which is a civilian organization, the Carabinieri Corp is an armed force which also has law enforcement capabilities. This means that, in addition to providing all the typical duties associated with law enforcement, such as preventing and prosecuting crimes, it also operates overseas as a Military Police force in the context of international missions conducted by organizations like NATO, UN, and so forth. Moreover, in contrast with the State Police organization, which is primarily established in metropolitan areas, the Carabinieri Corp, although also present in major urban centres, is more pervasive in the provinces.

The Corp is an armed force comprising almost 105,000 police officers, and is divided into two different primary structures: the so-called “territorial” and “specialized” structures, both of which are hierarchical and ran by the General Command in Rome. The first comprises 103 provincial commands (which correspond to the number of provinces within Italy), which are headed by a Colonel and oversee more than 500 company commands headed by a Major or Captain, and are based in large provincial municipalities and metropolitan areas.

The community policing system is provided by the presence of more than 4,500 station commands. These are headed by senior warrant officers (Sergeants), spread across the municipality level, are hierarchically subordinate to the respective company commands, and are composed of either a limited number of officers in a small or rural context (ranging from 10 to 15) and up to 30 police officers in larger centres.

The first response function of the Carabinieri Corp is provided by patrol units, the “Nuclei Radiomobili”, which belong either to the provincial commands, when operating in large

metropolitan centres, or to the company command, when operating in the provinces. In large metropolitan areas, such competence is shared with the State Police patrol units. The metropolitan areas are generally divided into two or three sectors, whereby each of the two police force operates in an exclusive manner over the course of one of the four shifts which make up the working day. At the end of every shift, that is, every six hours, the sectors' responsibilities are mutually rotated between the two police forces. Conversely, in the provinces and rural context, where the presence of the State Police is marginal, control over the territory is the purview of the Carabinieri patrol units and, in a residual manner, of the station commands. Along with the common duties associated with control over territory and preventative policing, these units are also in charge of conducting, together with the station commands, the preliminary activities at the crime scene, namely scene preservation and locating potential witnesses.

The second organizational structure of the Carabinieri police force, called “specialized”, comprises several different functions pertaining to investigative,¹⁶ technical support,¹⁷ SWAT, anti-riot and international operations. That said, none of these departments constitute the foci of the present study, with the only exception to this being the technical department, namely the “RIS”, which provides support for specialized forensic activities, such as DNA, ballistics, electron microscopy exams, CCTV footage manipulation, sound expertise and so on.

Within the “territorial” structure, the investigative function for every type of crime, except for terrorism, is performed by two different types of agencies: the “investigative” and “operative” units. These units operate within the provincial commands and company commands,

¹⁶ As the R.O.S. – Raggruppamento Operativo Speciale (Special Operations Group), which is the investigative structure in charge of counter terrorism and anti-mafia activities; T.P.C. – Tutela Patrimonio Culturale (Cultural Heritage Protection), which investigate on art thefts; N.A.S. – Nucleo Anti Sofisticazioni (Anti-Adulteration Unit), in charge of food and pharmaceutical frauds.

¹⁷ R.I.S (Scientific Investigation Group), which comprise several different capabilities, such as technical labs for dactyloscopic, biology, ballistic, ecc.

respectively. Consequently, the first are composed of 103 offices belonging directly to their respective provincial commands, while the latter comprise 500 units in the service of their respective company commands.

The “investigative units” are headed by a Lieutenant Colonel and are in charge of investigating major crimes such as homicides, kidnappings and extortion, sexual assaults, drug trafficking, bank robberies, and white-collar crimes. The units generally comprise several detectives ranging from 15-20 warrant officers in small provinces, up to 120-150 in large metropolitan centres like Milan, Rome, Naples, and so on. Within each investigative unit is a technical unit, called the Scientific Investigation Section, who are in charge of performing preliminary forensic activities at the scene (photographic documentation, fingerprint detection, etc.) and limited laboratory examinations, such as fingerprint matches and drug tests.

The investigative units are divided into “sections”, which are headed by a Captain and based upon a type-of-crime criterion. In large metropolitan areas there could be, at most, seven sections: homicides, crimes against persons and white-collar crime; robbery and organized crime; narcotics; fugitives; financial investigations; IT-computer forensics; forensic. In smaller provincial commands, the investigative units are led by a Major and can compose of only two main sections: crimes against persons and crimes against property.

There are more than 500 company commands that are subordinate to the provincial commands, and which depend upon an equal number of “operative units”, headed by a senior warrant officer (Sergeant), which are investigative units that, although generally in charge of less complex crimes, such as burglaries, small robberies, drug trafficking and attempted homicides, often also conduct murder investigations. The operative units often comprise only 5 detectives in small centres and up to 20-30 in densely populated criminal areas, especially in the southern part of Italy.

For the purposes of the present research, I refer to investigative and operative units as ‘primary’ and ‘auxiliary’, respectively. I use the term auxiliary not to downplay the capabilities of these offices, but rather only so as to provide a quick definition to distinguish between provincial investigative units to the local. In fact, despite their chronic shortage of technical equipment, funds and manpower, the results of the auxiliary units are absolutely outstanding.¹⁸

With regards to the professional background of the detectives, in order to work in an investigative department, Carabinieri personnel must generally gain at least four years of experience in station commands or in patrol units. Generally speaking, before being employed in a primary unit, it is customary to spend some time in an auxiliary unit. Since these latter commands deal with a wide range of crimes, they are extremely useful for newcomers to gain hands-on experience, as they are provided with the opportunity to deal with different kinds of strategic and tactical investigative approaches and allowed to develop their fundamental basic skills, such as organisation, capacity to prioritize, writing and narrative ability, intuition, interview techniques, use of surveillance methodologies, and so on and so forth.

In light of the fact that they deal with a huge amount of cases, while, simultaneously, being constrained by a chronic lack of human and technical resources, these units are invariably extremely flexible in their approach to the investigative process. They are capable of managing up to 15 cases (from murders to attempted murders, extortion, robberies, burglaries, drug trafficking), despite the fact that they comprise only five members. The age of the personnel ranges from 25 to 45, due, in part, to the fact that this kind of work approach is extremely stressful, both in terms of one’s physical and psychological energy.

¹⁸ As an example, the clearance rate for ‘hard to solve’ murders in the primary and auxiliary units is 55.9% and 54.3%, respectively.

After spending a certain period in auxiliary units, a detective can then apply to primary units, which, conversely, are characterized by a more specialized approach to the type-of-crime investigated. These units generally comprise personnel with good experience in their own sector, such as homicides, robberies, drugs, etc., to the extent that it is extremely rare for a detective to decide to change his/her specialism over the course of their career. The age of the personnel varies from 35 to 55, while, generally speaking, once a detective is in an investigative unit, they tend to spend their entire career in it.

The investigative process is addressed in a similar way by the State Police. The State Police's equivalent of the investigative unit is called "Squadra Mobile", while the equivalent of the Operative unit is known as "Commissariato". Both offices are based in large metropolitan areas and in the provinces, and operate with the same characteristics and constraints outlined above. The chief difference pertains to the fact that the distribution of the State Police across the territory only goes so far as the level of the Commissariati, who are equal to the Company Carabinieri level. Conversely, the Carabinieri Corp can rely on the further dissemination of more than 4,500 station commands, which ensures that the community policing system is extremely widespread even in small villages and rural locations.

Regarding the homicide investigation process, although from a legal perspective every police agency is authorized to perform any kind of inquiry, in practice, within the Carabinieri Corp only the primary and auxiliary units manage these type of investigations. The same goes for the State Police; indeed, it is only the Squadre Mobili who investigate these types of crimes and, only occasionally, the Commissariati.

The Carabinieri's 'rules of engagement', in contradistinction to what happens in other countries, prescribe that the first units to be called-in when either a corpse is found or a suspicious death occurs are not specialized homicide units, but rather station commands and the patrol units. This is a crucial step, as the information provided by these two agencies enables

the auxiliary and primary commanding officers to decide whether or not further investigative support is required.

Subsequent to a corpse being found, the Station and patrol units must converge on the scene to implement all the primary investigative activities, such as ensuring the preservation of the scene, identifying potential witnesses and, when possible, apprehending the perpetrator(s). At the same time, they must also effectively communicate all the information gathered on the scene to their respective company commanding officer, who then activates the hierarchical line of communication so as to ensure that other stakeholders (investigative unit and provincial commanding officers) are continually informed.

Generally speaking, auxiliary units and forensic units would always be expected to support first responders in the preliminary investigative activities that need to be performed on the scene, such as conducting dynamic reconstruction of events, neighbourhood canvassing, photographs, technical measurements, collection of latent fingerprints, and so on. The auxiliary unit detectives are also in charge of regularly communicating with their respective commanding officers in order to implement the information and observations provided by the first responders, which aid their superiors to obtain a ‘bigger picture’ of the scene and events.

Following such a procedure, the station commands and, to a lesser extent, the patrol units are then officially appointed to manage those cases that are classified as ‘self-solved’, as opposed to the “whodunit” cases which necessitate a certain degree of investigative effort (Simon, 1991). Self-solved cases can be defined as follows:

- cases consisting of either a committed or attempted homicide/suicide, in respect of which the surviving perpetrator has either been found at/nearby the scene or has provided a full confession;

- cases in which the author surrendered, by voluntarily handing himself into the police and providing a full confession;
- cases in which the author has been found at the scene or close to it, which in police jargon is referred to as ‘red-handed’ circumstances;
- domestic murders, when the author is known from the very beginning to be an intimate partner, and thus the investigation is a mere ‘manhunt’ rather than an investigation which sets out to identify an unknown individual;
- cases with an overwhelming quantity of physical or oral evidence that makes it possible to immediately identify the perpetrator with little effort;
- cases with enough preliminary evidence that are corroborated by the fleeing of a suspect and his/her subsequent fugitive-status which, once again, results in a generic effort to locate him/her as opposed to an investigation that sets out to identify an unknown individual.

Vice versa, should the circumstances of the incident induce consideration about the necessity for more specialized investigative support, then the auxiliary units would become officially involved in the case. If the circumstances of a murder case warrant an even greater level of investigative effort, such as in the event of a potential relation between the victim and criminal or mafia activities, or if there are multiple victims involved, extremely puzzling circumstances or such like, then the primary units would be called-in. The only exception to this rule is in areas where the mafia are prevalent, in which case the auxiliary units frequently also manage complex murder cases. This is due to their recognized extensive knowledge of the criminal groups and families who operate within their territory. This expertise can, at the very least, aid the identification of the criminal environment in which the homicide occurred, along with providing insight into the potential motives for the murder. In such cases, it is customary for the investigation to be managed by both units together.

The decision over which office a case should be assigned to is generally taken by the commanding officer of the primary investigative unit, in accordance with the Prosecutor's Office in charge of the investigation, and is based on the information provided by first responders and the Company's commanding officer. When the circumstances are unclear, the commanding officer of the primary unit may attend the scene to gain a more detailed direct impression of the situation. In this regard, it is customary that some primary unit commanders make a sort of 'selection' of the cases that are to be managed by their own unit, which is generally based on the current workload. While protocol dictates that all cases that are dropped by the primary units should be assigned to the dependent auxiliary unit, murders which require investigative effort are always managed by an investigative office, either primary or auxiliary.

Regarding human resource management, the most common shift for detectives (whether primary or auxiliary) is 08:00 a.m. to 03:00 p.m. from Monday to Saturday; however, it is customary to extend each shift up to at least 05:00 p.m. every day. The maximum amount of overtime is 55 hours per month, which is regularly exceeded during homicide investigations, especially in the initial weeks of activity. The exceeding part of the weekly work (or festive days) is compensated by 1 day off for every 6 hours of overtime.

Due to the overall low frequency of homicides in Italy¹⁹ compared to other countries like the US, neither the homicide sections of the primary investigative units nor the auxiliary have night shifts specifically intended for homicides. That said, both units do have a pair of detectives working each of the two night shifts, which last from 06:00 p.m. to 00:00 a.m. and from 00:00 a.m. to 08:00 a.m., who are at the disposal of the operations room in the event of any kind of intervention which might require the presence of detectives. Such requests are generally related to paper work that is required to execute an arrest warrant for fugitives caught by other

¹⁹ To cite an example, even among the largest metropolitan centres, like Milan and Rome, or in high density criminal areas, like Naples and Catania, in 2014 there were 25, 38, 41 and 20 murder cases reported, respectively.

commands, as all fugitives' records belong to the homonymous section of the investigative unit. In the event that the dispatch room does not require their presence, then detectives on the night shift work on their cases as normal. In the event of a homicide however, they are the first detectives to arrive on the scene, generally right after the patrol units or the station command militaries. In these instances, their duty is to cooperate with the first responders in performing preliminary activities and update the first homicide detectives on the scene, who generally arrive one to three hours later.

3.2.1 Comparison between Italian and Anglo-Saxon investigative process

Although there are interesting exceptions in extant literature, the main difference in the investigative process between the Italian investigative units (both primary and auxiliary) and those employed in Anglo-Saxon countries pertain to the organizational management of cases. For example, as reflected in my own personal experience over the course of several visits to the Bronx Homicide Squad of the NYPD, the US approach tends to assign a pair of detectives to a given case. After the first few hours of an investigation, in which other detectives help with the initial activities that need to be performed at the scene, the entire investigation is subsequently conducted by a couple of investigators, often under the guidance of a team leader.

The situation in Italy is completely the opposite, in that every member of the unit participates in each case. There are several reasons for this. Firstly, neither primary nor auxiliary units have sections specifically dedicated to homicides. In the case of large primary investigative units, there may well be a Homicide Squad, within the first Section, which is generally composed of five to eight detectives and headed by the senior detective, who is often a sergeant. Secondly, depending on local habits, the organizational model of both primary and auxiliary units can be either 'vertical' or 'horizontal', which is to say that they are more prone to adapt to the directives

of the most senior (or charismatic) detective or office commander, or, conversely, more inclined to give detectives a high degree of discretionary freedom in choosing strategies and tactics.

Moreover, due to the extreme heterogeneity of duties and functions that must be performed in homicide investigations, the presence of more detectives operating on the same inquiry, in turn, enables the development of individual capabilities and specializations on specific tasks in ways that would not be possible in the aforesaid US investigative approach. In fact, it is customary in a Squad that some detectives specialize on specific tasks, such as analyzing phone records, systematically collecting CCTV footage, neighbourhood canvassing, interrogation of persons of interest, etc., which all require time to be learned and cannot be mastered by a single person.

Theoretically speaking, such a ‘team’ attitude appears to be ideally suited to easing the exchange of information between the various members of an investigative unit. In fact, in order to overcome possible information short-circuits stemming from the aforesaid ‘segregation of duties’, it is customary to arrange several briefings, particularly at the beginning and end of the working day. As reported by various respondents in this study, it is common practice to regroup for a progress report during coffee breaks. The expedience of informational flow has been considered in previous studies, which emphasised the role of specific figures, such as Senior Investigative Officers, in conducting periodical briefings with detectives to ensure that everyone is updated about developments in the case, along with monthly peer-review meetings to discuss open cases (Brookman & Lloyd-Evans, 2015; Feist & Newiss, 2001; Innes & Brookman, 2013). According to the survey respondents, the ‘staff’ approach occurs almost automatically, especially in the first 2-3 weeks after a murder, before gradually decreasing over time to one or two briefings each week.

Such an approach also enables the extensive use of large interceptions that are conducted in Italy. In fact, with especial regard to eavesdropping activities executed within vehicles, it can often happen that up to three or four cars are tapped during a single murder investigation, with

an average of fifteen-twenty telephone interception targets²⁰ being hit in the very first hours after a murder. This means that it is necessary to organize a team of detectives to listen to these intercepted conversations on both day and night shifts. In fact, more often than not, the persons of interest are also involved in other types of crime, which means that the ‘live’ listening becomes essential for preventing other possible crimes, regardless of the homicide investigated.

On the other hand, such an approach leads to the potential workload not being equally split between several pairs of detectives, but rather by the entire unit, who, especially in the southern part of Italy, are often forced to work simultaneously on more than two murder cases, which are all added to other pending cases like attempted murders, robberies, drug trafficking, etc. In this regard, it is likely that the use of the ‘team’ approach in Italy is facilitated by the limited number of murder cases managed compared to several counterpart US Police Departments.

The specificity of the Italian investigative process for homicides described above, particularly with respect to the ‘rules of engagement’, helped to facilitate one of the key aims of the present study, which is to select those murders which require investigative effort, namely whodunit cases. In fact, given that the investigative units, both primary and auxiliary, only work on these types of crimes and not on so-called ‘self-solved’ cases, the detection and selection of whodunit cases resulted facilitated.

The survey administered to ninety-eight detectives of the Carabinieri who had actively participated in an equal number of investigations included in the original database, was expedient for providing the qualitative information necessary to supplement police data and in terms of gaining insight into an environment that is traditionally difficult to understand. The respondents belonged to both types of investigative units, specifically 74.5% from primary units

²⁰ As a rule of thumb, the telephones of victim’s relatives, closer friends and of his/her very last people in contact are often tapped, at least for the first weeks after the murder.

and 24.5% from auxiliary units, with an acceptable representation of both large metropolitan areas and small provincial municipalities. This also faithfully represented the existing balance of whodunit cases managed between these two types of agencies in Italy, which is 69.9% and 30.1%, respectively.²¹

3.2.1 Defining Investigative Factors

Factors, predictors, regressors, independent variables are all terms that can be used to define elements that potentially have the power to influence another element, the dependent variable, and thus cause variation in a given outcome.

In homicide clearance research, the dependent variable considered is the solving of a case, namely whether an investigation has been cleared or not. Consequently, in these types of studies, the factors that are considered are all those elements that are capable of influencing whether or not a homicide is solved.

The majority of extant studies hypothesize that the outcome of murder investigations may have been influenced either by the demographic factors of victims (such as their gender, age and race) or by objective circumstances related to the type of murder investigated (like the motive, the weapon used, the location of the corpse, and so forth). Only a few studies have considered that the odds of solving a case can also be affected by the capacity of the individuals assigned to solve murder cases: the investigators. In consideration of this new approach, the whole array of activities performed by police during homicide investigations began to be examined in literature as potential ‘factors’ capable of influencing the outcome of investigations.

²¹ Although the geographic distribution between primary (N = 103) and auxiliary units (N = 500) is totally reversed (approximately 20.0% against 80.0%, respectively), the percentage considered in the present study refers instead to the number of ‘whodunit’ cases handled by the two types of office, which is approximately 70.0% against 30.0%. Generally speaking, this is due to the fact that the most challenging murder cases tend to be investigated by primary units.

The term ‘investigative factors’ is a holistic definition which encompasses the total amount of procedures, practices, strategic and tactical tasks deployed by police investigative units to gather evidence that aids them in reconstructing the facts and identifying and charging the perpetrator of a crime.

The present study operationalizes investigative factors in a more substantial way, in that they refer to a complex range of procedural and operational activities which are executed daily by every police investigative department worldwide in the process of solving a crime.

For organizational purposes, such activities have been classified according to the following macro areas, which are referred to as ‘dimensions’:

- *Resource Management*, which is considered as the whole complex of activities and procedures - established at the executive level – that are intended to enable the effective use of both human and technical resources, namely: human resource management; training and deployment; laboratory examinations organization; permanent assignment to the same detectives of specific and crucial tasks (canvassing and witness management, location and analysis of CCTV footage at the scene, specific paperwork activities).
- *Crime Scene* activities are those wide array of duties performed at the crime scene, not only by forensic technicians but also by detectives, such as: access management; use of proper equipment to preserve the integrity of the scene; time taken to reach the scene; and so forth.
- *Investigative Strategies*, which pertain to long-term applications of policy and help to put detectives in the best possible condition to perform their tasks, such as: decision-making process; the establishment of good relationships with media, the Prosecutor’s Office, and the Coroner’s Office; the presence of a Cold Case unit; the opportunity to monitor and record the office waiting room and the interrogation room; and so forth.

- *Investigative Techniques*, which encompass as the whole complex of specific investigative tools performed at the detective level, such as: autopsy attendance; periodical briefings; the use of software for specific tasks such as phone records analysis and case management; the practice of arranging IT forensic copies of the mobile phones of persons of interest; and so forth.

The present categorization is used to ensure a rational classification of such elements, as well as to provide an overall and fluid description of the investigative activities, ranging from the most strategic to the more practical activities performed at crime scenes and in police offices.

3.3 Data collection

Data was collected and electronically recorded from two sources in a three-stage process. The first stage of the data collection involved reviewing a police dataset of the murders that occurred in Italy in 2014, which included details about victims' demographics, as well as the date and place of the incident. The second stage involved supplementing the aforesaid dataset with more detailed information about the stakeholders and the circumstances surrounding the event, by means of open source scanning of national and local media websites. In the third stage of data collection, this data was enriched further with details about the investigative factors involved in the cases, which were gathered through administering a survey to ninety-eight police detectives who had participated in part of the cases observed in the original police dataset.

The following sections discuss the data collection efforts and information sources in detail.

3.3.1 Methods for data collection

Police data was acquired from the Italian Institute of Statistics (ISTAT). Subsequently, I performed open source scanning to compare the information reported in the dataset with data gathered from national and local media websites which had covered the respective murders.

The survey phase was executed thanks to my personal relationship with several police offices belonging to the Carabinieri Corp across the entire country, as well as the subsequent utilization of a ‘snowball’ sampling technique to increase the sample size

What follows is a detailed description of the methods utilized to collect and analyse the three types of sources.

Official Records

Data was collected from the dataset provided by ISTAT that documents all murders that occurred in Italy in 2014. This data is based on information published²² every year by The Ministry of Interior pertaining to crimes that are either reported to the police or autonomously investigated by such authorities.

Such data represents only a limited portion of the overall information inputted by each police office into the online Investigation System (SDI),²³ which basically contains the total amount of data referring to a given crime, such as the type of offence, victim demographics, the crime location, possible perpetrators’ ID, other physical or legal persons involved, and a brief description of the facts from the preliminary report sent by the police to the Prosecutor’s Office.

Due to privacy issues, the information transmitted to ISTAT is partial and essentially refers to the type of offence, the demographic characteristics of the victims, and the location in which the crime occurred up to the provincial level or, at the very most, to the metropolitan level if the incident took place in one of the twelve major metropolitan areas in Italy.²⁴

²² The validation process is carried out directly by the Ministry of Interior, by means of the periodical transfer of data which will be used for statistics purposes to a separate database (STATDEL) and by the subsequent analysis of the related frequency tables, also comparing results with data provided by each Prosecutor Office.

²³ Acronym of the Italian translation ‘Sistema di Indagine’.

²⁴ Bologna, Bari, Catania, Florence, Genoa, Milan, Naples, Palermo, Rome, Turin, Venice and Verona.

The data used in the present study was an excel file comprising demographic information (individuals' gender, age and nationality) on 468 victims of homicide that occurred in Italy in 2014, along with data on the location (at the municipality level) of the event.

Open source

In order to address the scope of the analysis and enrich the information contained in the original victim-based ISTAT dataset, the dataset was converted from a victim-based dataset into an incident-based one, by means of a manual open source scanning performed on the websites of both national and local newspapers.

In fact, each observation ($N = 468$) contained in the victim dataset corresponded to a murder victim, while the observations ($N = 419$) considered in this study refer to single murder cases, ranging from one to three victims each.

The rationale behind performing such a conversion stemmed from the need to create the 'unit of analysis' in this study, which corresponds to a single homicide investigation. Indeed, the aim of the present research is to assess how specific factors affect the outcomes of murder investigations. Resultantly, the dependent variable considered is single investigations rather than single victims, as, in the case of the latter, there may have occurred, in the case of double or triple murders, an over representation of outcomes (i.e. victims) referred to the same investigation. Such occurrences would have also led to an overvaluation of the factors pertaining to murders involving multiple victims.

In order to perform such a conversion, relying on the information present in the victim-based dataset, each victim's ID (i.e., name, age, gender and other demographic characteristics) was associated with a specific murder case by means of the manual online scanning of national and local newspapers. This was only possible because of the extreme geographic granularity of the dataset, which enabled the perfect matching between each victim and the respective

investigation. Basically, once the name of a victim had been identified, the total number of victims related to such an event could then be verified. In the case of multiple victims, the research was replicated, relying on information provided by the media to identify all other victims, and subsequently group them together into the same murder case.

The scanning conducted on news websites was conducted not only to match up victims with the respective murder case, but also to collect as much possible additional information pertaining to each case.

The procedure employed here comprised the first step of typing (in Italian) into Google the following key words: “2014 + HOMICIDE + [MUNICIPALITY] + [VICTIM SEX] + [VICTIM NATIONALITY] + [VICTIM AGE]”, which represents the data provided in the ISTAT database. After having identified the corresponding event and correctly matching victims in the case of multiple murders, a series of snowball queries were subsequently performed in order to identify as many details as possible pertaining to the occurrence. Generally, once the victim’s ID had been identified, it was sufficient to type in “2014 + HOMICIDE + [VICTIM’S ID]” to find all the required data.

A content analysis of the description provided by the media outlet who reported on the event (who often described the events with a keen investigative approach, which is typical of crime reporters) provided further information. To cite an example, if a specific media outlet only mentioned the identity of the victim, another outlet would invariably provide the author’s name as well, or several novel circumstances related to the event.

With respect to each original observation, a minimum of three to ten websites were analysed in order to procure all the variables needed for the analysis. No significant discrepancies were recorded in the reporting of different media outlets about the same case. This is perhaps because of the fact that, traditionally speaking, journalists rely on information provided during the same

press conferences held either by local police forces or by the Prosecutor's Office. For example, there were no differences recorded in media reporting about perpetrator's ID, neither in terms of motives, the weapon used or other significant circumstances of cases.

The main issue encountered during the course of data collection concerned large metropolitan areas where several murders occurred. In these cases, I took advantage of the details included in the original data, especially those pertaining to the gender and nationality of the victim. As a result, despite not being able to detect a small sample size ($N = 11$, i.e. 2.35% of $N = 468$), 97.65% ($N = 457$) of the observations (i.e. victims) were narrowed down by establishing a proper match between the original incident data and the results garnered from the online research. This produced an incident-based dataset comprised $N = 419$ cases, with an overall clearance of 76.8%.

Finally, one of the most challenging aspects of this stage of the research concerned the identification of those cases which 'deserved' to be analysed. Indeed, given that the aim of the present study was to assess the effect of investigative work on clearance, the analytical focus was clearly only fixed upon those murders which required a certain level of investigative effort, namely 'whodunit' cases.

Taking advantage of the abovementioned specificities of the Italian police system, I opted to implement the aforesaid distinction via observing what police unit managed the case. According to the definition provided above, self-solved cases in the Italian policing system can be identified as those cases that are exclusively managed by non-investigative units, such as patrol units or Station Command personnel; or, phrased otherwise, those cases in which neither primary nor auxiliary investigative units directly handled the investigations.

Based on this criteria, it was possible to distinguish, across the whole incident dataset ($N = 419$), between those cases that were either self-solved ($N = 213$, i.e. 50.8%), or whodunit cases

($N = 198$, i.e. 47.3%).²⁵ Such a percentage is consistent with previous literature, where self-solved cases commonly range between half and two-thirds of the overall murders (Alderden & Lavery, 2007; Chaiken, Greenwood & Petersilia, 1976; Puckett & Lundman, 2003).

From the perspective of the process described above, whodunit cases are conceived as a new dataset ($N = 198$), which can be considered as a sub-assembly database of the incident-based dataset ($N = 419$). The whodunit cases comprised $N = 186$ single homicides (93.9%), $N = 7$ double homicides (3.5%), $N = 5$ triple homicides (2.5%). Here, the clearance rate dropped from 76.8% of the overall incident-based dataset to 55.1%²⁶ of the whodunit sub-assembly dataset, specifically, $N = 109$ ‘solved’ (55.1%) and $N = 89$ ‘not solved’ (44.9%).

In summary, the whodunit sub-assembly incident-based dataset comprised 198 whodunit murders (i.e. cases) that occurred in Italy in 2014. Such a dataset was obtained by dropping all the self-solved cases ($N = 213$) from the incident-based dataset, which originally consisted of 419 observations.

Survey

In order to gather information on the investigative process used in the whodunit cases ($N = 198$) included in the incident-based dataset, a survey was designed and administered to a sample of detectives who actively participated in the investigations cited in the whodunit sub-assembly incident-based database.

Such a tool was considered to be the most efficient method through which to gain a deeper understanding of the overall investigative process conducted in the observed cases, which cannot be gained by means of a police dataset or open source scanning alone (Braga &

²⁵ $N = 8$ (1.9%) observations were classified as “unknown”, due to the fact that it was not possible, by means of scanning media reporting, to properly identify the cases.

²⁶ The clearance rate corresponds to the period of December 2018.

Dusseault, 2016; Carter & Carter, 2016; Hawk & Dabney, 2014; Keel et al., 2009; Wellford & Cronin, 1999a).

The survey was modelled into general and more specific sections, intended to assess, on the one hand, the general procedures and practices implied at a resource management level and the techniques and strategies commonly used during the investigative activities and, on the other hand, to analyse the specificities and critical issues that emerged during the investigations of the considered cases.

What follows is a recap of the sections and sub-sections of the survey, which were modelled on those found in previous studies (Keel et al., 2009; Wellford & Cronin, 1999a), as well as being informed by my own personal experience and suggestions made by a panel of experts to whom I submitted a draft version of the survey.

With respect to this final point, I was able to rely on the crucial cooperation of the following professionals: i) the former Commander of the homicide unit of Carabinieri in Milan from 2008 to 2012; ii) the former Commander of the homicide unit of Carabinieri in Milan from 2012 to 2015; iii) the former Commander of the homicide unit of Carabinieri in Milan from 2012 to 2015; iv) the former Deputy Commander of the homicide unit of Carabinieri in Milan from 2012 to 2015; v) four detectives currently working for the homicide unit of Carabinieri in Milan; vi) five detectives who previously worked for the homicide unit of Carabinieri in Milan; vii) three detectives currently working for the homicide unit of State Police in Milan; viii) four detectives currently working for investigative units of Carabinieri who are operating in the southern part of Italy.

The general section of the survey comprised six parts that referred to the following topics:

- *Recruitment and training*: type of unit (primary or auxiliary); respondents' gender, age and rank; experience (both in terms of years and of number of homicide investigations conducted); specific training on murder investigations attended.
- *Human resources*: workload; existence of a cold case unit; presence of forms of psychological support; training to manage relationships with victims' families.
- *Crime scene activities*: time to reach the scene; use of checklists or standard procedures; direction of the operations; access logs; use of a safe corridor to reach the scene; criteria used to assign specific critical tasks (such as the evidential chain of custody, locating CCTV cameras, phone records analysis, and so forth).
- *Interview and interrogation*: whether the office's waiting room and interrogation room were provided with audio/video equipment; neighbourhood canvassing methodology.
- *Internal office organization*: decision-making approach; social media monitoring; use of periodic briefings; use of software for phone records and case analysis; media coordination; cooperation with the Prosecutor's Office during the trial.
- *Forensics, IT forensics, Coroner*: fingerprints and IT forensics lab availability; speed of lab results; autopsy attendance; procedures used to properly manipulate IT devices and mobile phones; use of crime scene reconstruction software.

The purpose of the special section (G) was to analyse in detail the activities performed as part of the cases observed, providing multiple choice questions to assess the relevance of several well-known factors identified in previous literature and known by practitioners that may have positively or negatively impacted on cases. This section was divided as follows:

- *Homicide characteristics*: single, double or triple murder; victims' gender and nationality; victims' criminal records and socio-economic status; civil society cooperation; motive; perpetrators' nationality.
- *Evaluation of specific factors which might have a positive effect on solving the homicide*: witnesses, physical evidence, useful footage from CCTV, tower data dumps, telephone interceptions, eavesdropping, computer forensics, effective cooperation with other law enforcement agencies, confidential snitch, statements by repentant criminals, correct crime scene preservation, effective use of criminal database, surveillance activities, speed of lab tests, speed of computer forensic analysis, relationship with Coroner's office, pre-existing knowledge of the criminal environment, cooperation of specific geographical and criminal environment experts, assistance of police officers specialized in hi-tech activities, clearly defined modus operandi, experience of the detectives, investigative acumen, commitment, creativity, team-building, perseverance, fascination with the challenge, possibility of using personnel as support, constructive dialogue among investigators, relationship with forensics, relationship with the Prosecutor's Office, ability of the executives to solve problems and ease investigators' jobs, relationship with media, translator's acumen, use of specific software to manage the investigation, fortuity.
- *Evaluation of specific factors which might have a strong impact on the failure of the investigations*: lack of witnesses, lack of physical evidence, lack of useful CCTV, lack of useful tower data dumps, uncooperative environment, possible witness intimidation, poor coordination with other police forces, irreparable contamination of the crime scene, excessive length of time between the murder and the discovery of the body, indeterminate cause of death, indeterminate victim ID, slow lab results, slow computer forensic results, poor communication with Coroner's office, poor pre-existing knowledge of the criminal environment, lack of specific geographical and criminal environment experts, lack of

experience of the detectives, poor team building, poor dialogue among investigators, poor communication with forensics, poor communication with the Prosecutor's Office, failure of the executives to solve problems and ease investigators' jobs, rejected interception request, difficulty/impossibility of intercepting voice over ip communication, individual mistakes, scarcity of resources, scarcity of manpower, excessive number of investigations simultaneously being managed, personnel assigned to different duties during the investigation, excessive media pressure, leaks to the media, lack of ability on the behalf of translators, lack of specific software to manage the investigation.

- *Witness management*: methods used to locate relevant witnesses; witness follow-up; utility of the information provided; classification of the witness according to their utility.
- *Relationship with other stakeholders*: Prosecutor's Office, Coroner's Office, Forensics.
- *Detectives' self-evaluation of the following aspects of the Unit*: team building; experience; perseverance; creativity; empathy.

At the end of these two sections, an open-ended question was also included in an attempt to stimulate suggestions and proposals from the respondents.

The survey content was then uploaded into a free web-based platform that specializes in surveys (www.surveymonkey.com) in order to ensure a smooth and quick response, a process which was also enhanced by the possibility of respondents being able to complete it on their mobile phone.

The sample

The database used to select the respondents derived from the whodunit incident-based dataset ($N = 198$). Hence, theoretically speaking, the sample comprised 198 detectives who belonged to either the State Police ($N = 63$) or the Carabinieri Corp ($N = 133$).²⁷

The fact that I once worked for the Carabinieri Corp meant that I was confident that my formal request for cooperation would be accepted. An official request was submitted to the Carabinieri General Command on July 5th, 2018, but resulted in a rejection, which was communicated on July 18th, 2018.

I encountered similar bureaucratic difficulties with the Public Security Department,²⁸ and, as such, opted to focus on the Carabinieri Corp which, theoretically at least, increased the odds of a high response rate. In so doing, I relied on my personal network established over almost twenty years of duty in the Corp to contact the detectives who had managed the observed cases, convincing them to participate, on a voluntary and informal basis, in the research by completing the survey.

The first step involved assessing whether a Carabinieri survey sub-sample ($N = 133$) was consistent with the overall whodunit sub-assembly incident-based panel ($N = 198$). In order to establish this, I opted to select the following proxies: clearance rate; differences in motive; the macro area (North/Centre/South) in which the murders occurred.

Such criteria were chosen to assess the presence/lack of balance between the two datasets. The clearance rate was chosen in order to avoid the risk of considering a sample comprising either too many unsolved or too many solved cases. The motive was taken into consideration so as to

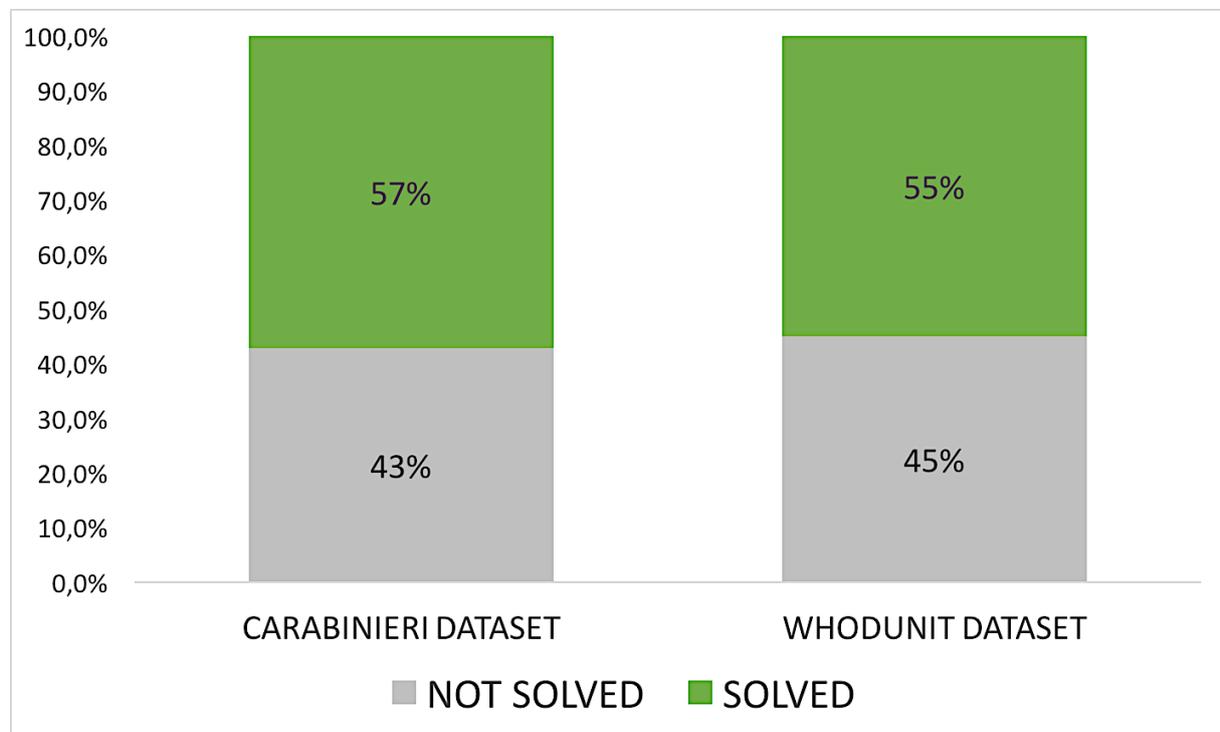
²⁷ Two observations are classified as ‘unknown’ as it was not possible to assess which law enforcement agency (L.E.A.) performed the investigations.

²⁸ Which the State Police belongs to.

rule out the possibility of analysing a panel of observations composed of a disproportionate number of specific types of murder over others. The geographical proxy was treated to prevent the overrepresentation of cases from one macro area or another.

Regarding the clearance rate, the survey sample resulted in 57.1% out of 55.1% of the total whodunit cases.

Figure 1. Difference in clearance rate between the Carabinieri sub sample deriving from the same dataset (N = 133) and the whodunit sub-assembly incident-based dataset (N = 198).



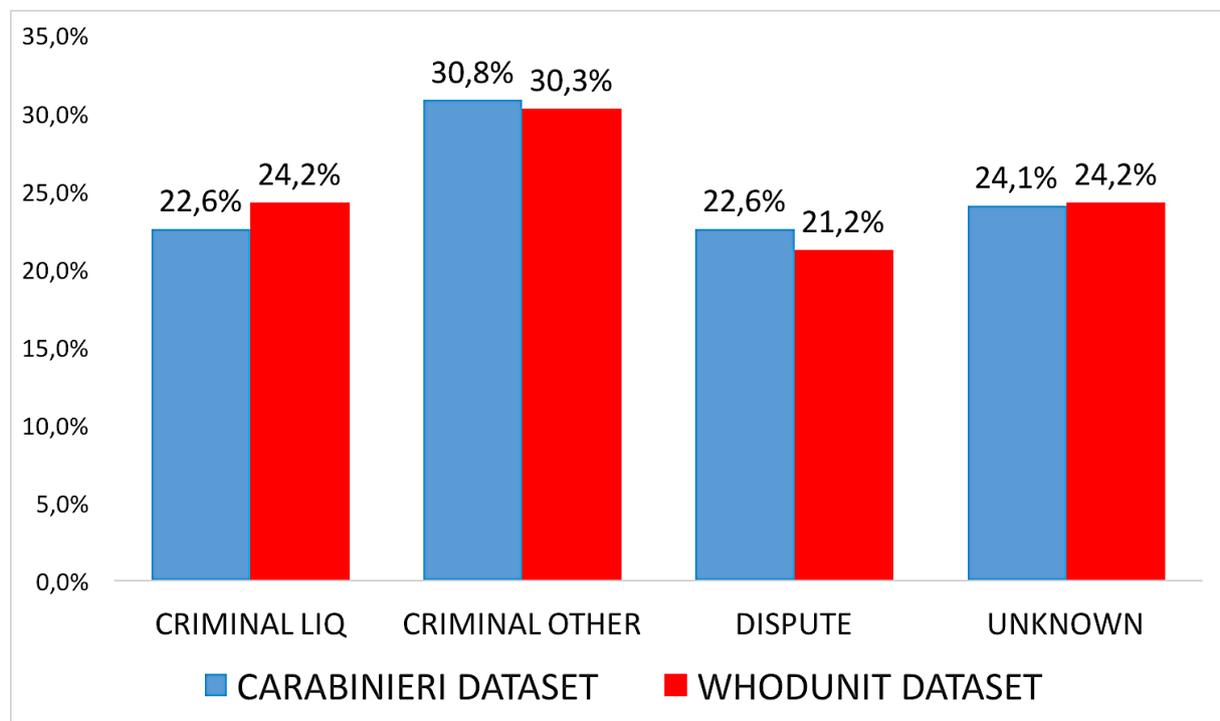
With reference to the motive, through recourse to previous literature (Alderden & Lavery, 2007),²⁹ the panel was classified into three broad categories: *criminal* (comprising criminal motivations, such as drugs or sex-related murders and more trivial reasons); *intimate* (comprising both domestic and acquaintance disputes); and *unknown* motive. In order to also

²⁹ Those authors use the broad distinction between ‘instrumental’ and ‘expressive’ motives, to distinguish between murders committed for economic and criminal purposes and those that are driven by instincts, which is referred to as the affective/emotional sphere.

account for the specificity of murders related to organized crime, which is a frequent type of homicide in Italy, the criminal category was further split into *criminal other* and *criminal liquidation*, with the latter pertaining to mafia-related homicides.

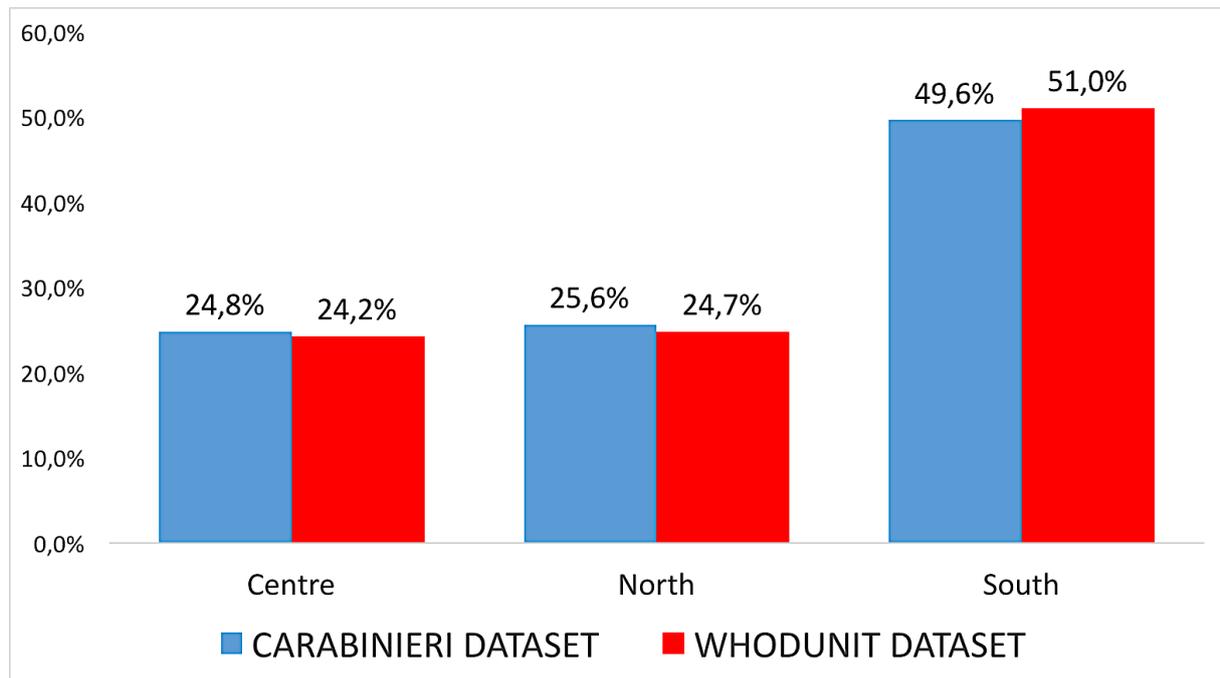
This classification produced a well-balanced result from the Carabinieri survey sub-sample panel ($N = 133$) and the overall whodunit incident-based dataset ($N = 198$), as demonstrated in the table below.

Figure 2. Difference in motives between the Carabinieri sub-sample deriving from the same dataset ($N = 133$) and the whodunit incident-based sub-assembly dataset ($N = 198$).



Finally, with respect to the difference in the macro area in which each murder occurred, it resulted in an overall equivalence between the Carabinieri survey sub-sample and the whodunit incident-based dataset. Indeed, the murders that occurred in the North turned out to be 25.6% of the Carabinieri survey sub-sample compared to 24.7% of the whodunit dataset, while the Centre was 24.8% compared to 24.2%, and the South was 49.6% compared to 51.0%.

Figure 3. Difference in murder distribution across three macro areas between the Carabinieri sub-sample deriving from the same dataset ($N = 133$) and the whodunit sub-assembly incident-based dataset ($N = 198$).



The output of this assessment enabled consideration of the Carabinieri survey sub-sample ($N = 133$), which was consistent with the whodunit incident-based dataset ($N = 198$).

Once the representativeness of the survey sample was assessed, each of the commanding officers of the 133 Carabinieri investigative units were contacted by phone to explain the nature of the study and the fact that participation was wholly voluntary, before entrusting them to assign the survey exclusively to detectives who had participated in the considered cases.

Despite the possibility of administering the survey to more than one detective who participated actively in the same case, I opted to administer the survey in such a way that there was only one respondent for each case, in order to maintain a balance between the responses.

Subsequently, a request for cooperation to each of the 133 Carabinieri offices using my official academic e-mail address (christianfabio.persurich@unicatt.it) was sent to their institutional e-mail addresses (“name.surname”@carabinieri.it). Information about the nature of the study and

instructions for completing the survey (along with the dedicated link (www.surveymonkey.com) were included in the request, along with a statement ensuring confidentiality over the information provided and personal data of the respondents.

Moreover, in order to help the respondents immediately recall which homicide the survey was referring to, further information pertaining to the specific case, such as date/time of the murder, the name of the victim and the municipality where the body was found in 2014 were also included. In the event that I had personal knowledge of the respondent, such a request was sent directly to the detective's personal e-mail address who I knew had managed the case.

Although every respondent was provided with the aforesaid details as an aid to memory recall, the first part of the survey referred, on purpose, to the investigative practices that were 'usually' employed in 2014. Such a specification was made in order to ensure responses which represented the 'general attitude' of each respective investigative unit towards homicide investigations overall. More specifically, this approach was utilized in order to avoid potential bias deriving from variations in their routine behaviour as a result of exceptional circumstances related to the case, such as if the case received extraordinary media attention, or involved particularly vulnerable victims, such as children.

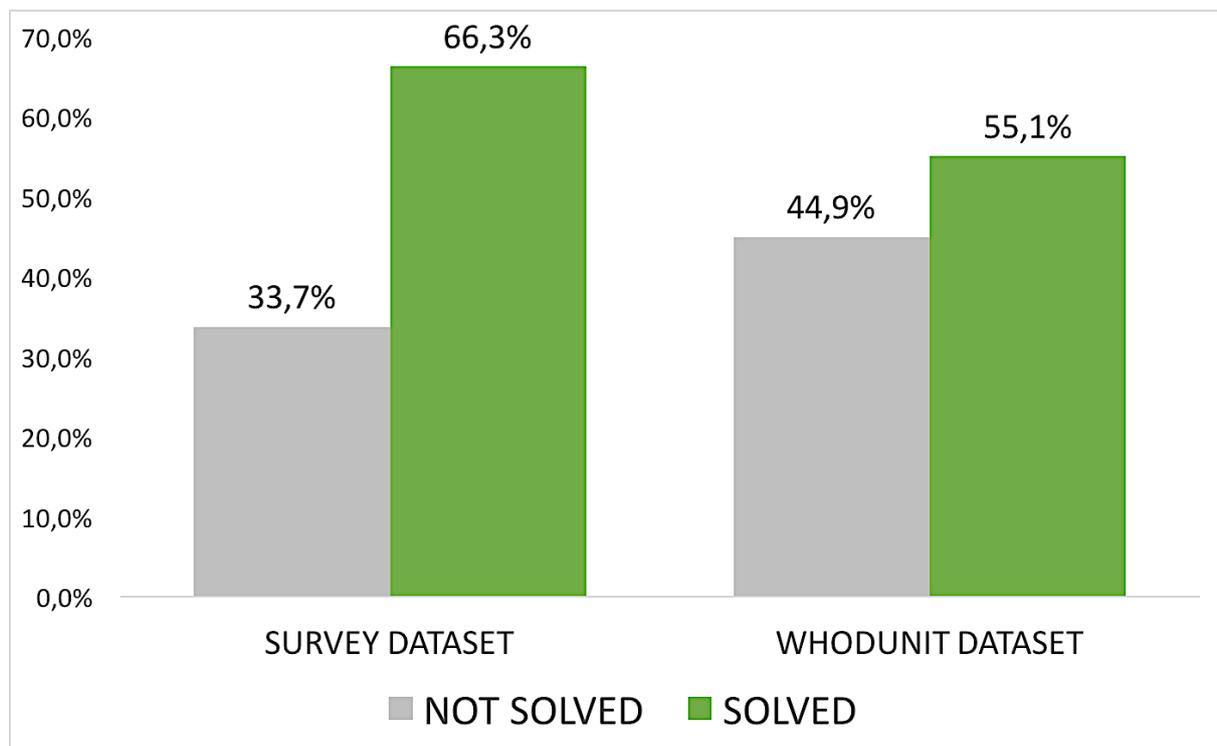
For this reason, despite a reasonable degree of confidence that the contents of the 'specific' part of the survey correspond exactly to how that specific investigation played out in practice, such an assumption cannot be wholly guaranteed.

After having sent the request, in the event that I had not heard anything in one week, a second phone call was made to check on the progress of the request. The mailing list phase and the survey replies covered the time span of July to December 2018, with the first survey being completed on July 26th, 2018 and the final one on January 9th, 2019, with a total of 98 replies, which is a response rate of 73.7%.

After having successfully concluded the survey phase, in order to verify the same level of equivalence between the surveys that were effectively administered ($N = 98$) and the whodunit incident dataset ($N = 198$), a similar assessment was performed in relation to the clearance rate, motive and the macro area in which the homicides occurred.

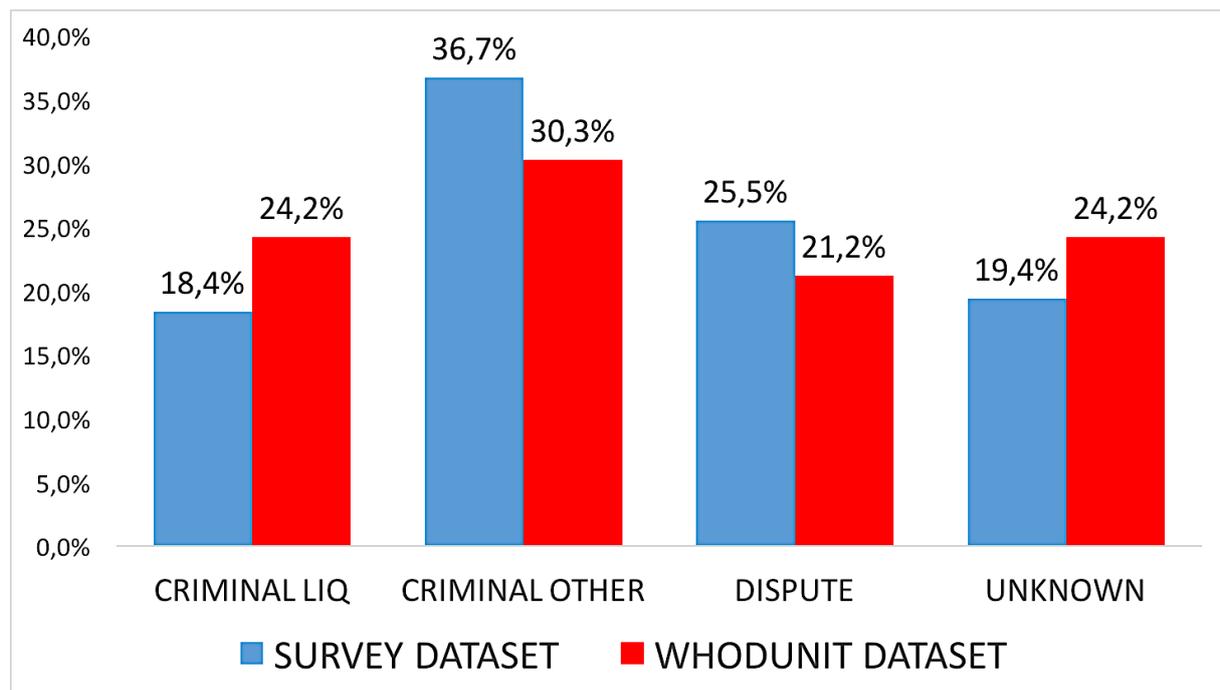
Regarding the clearance rate, the completed survey panel resulted in 66.3% against 55.1% of the whodunit incident-based dataset. This may have been due to the greater likelihood of respondents replying to solved murder cases than unsolved cases.

Figure 4. Difference in clearance rate between the “Survey” dataset ($N = 98$) and the whodunit sub-assembly incident-based dataset ($N = 198$).



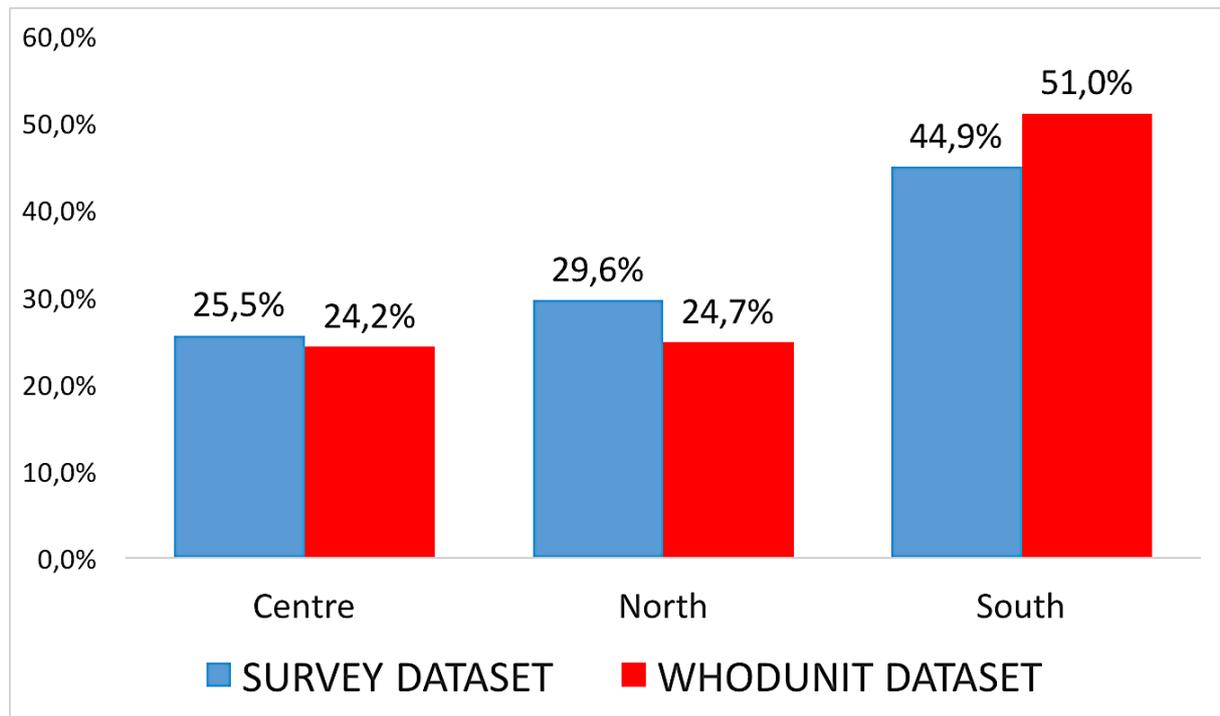
With respect to motives, an acceptable balance was achieved between the survey panel and the whodunit incident-based dataset, with a maximum range of discrepancy of almost seven percentage points in the *criminal liquidation* category.

Figure 5. Difference in motives between the “Survey” dataset (N = 98) and the whodunit sub-assembly incident-based dataset (N = 198).



Regarding the macro area in which the murders occurred, it resulted in the following relationship between the survey panel and the whodunit dataset: North, 29.6% against 24.7%; Centre, 25.5% against 24.2%; South, 44.9% against 51.0%, respectively.

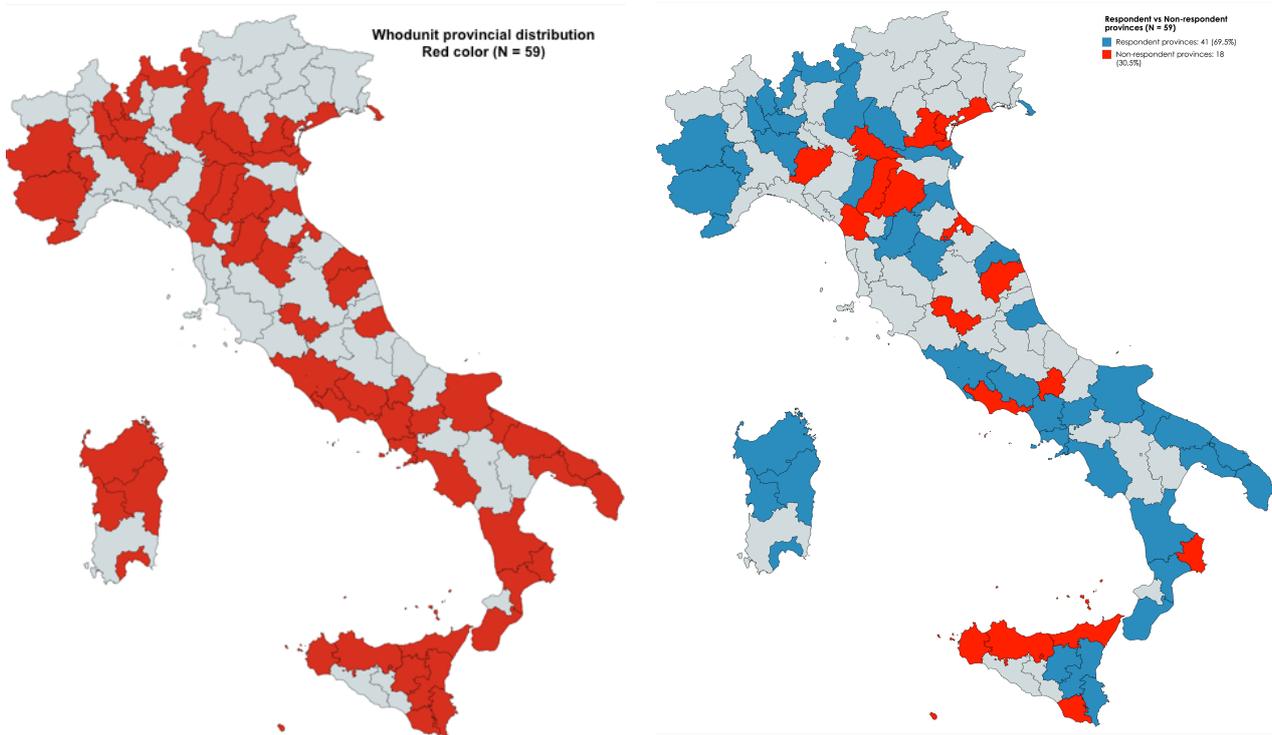
Figure 6. Difference in murder distribution among three macro areas between the “Survey” dataset (N = 98) and the whodunit sub-assembly incident-based dataset (N = 198).



To summarize, even considering the slight prevalence of solved cases in the survey dataset ($N = 98$), the database nevertheless provided a good representation of the original whodunit sub-assembly incident-based dataset ($N = 198$).

Finally, for descriptive purposes, the map in Figure 7 depicts the geographical distribution of whodunit cases, at both the provincial level and with respect to the respondents’ survey response rate. Of the fifty-nine provinces in which at least one whodunit murder was committed, forty-one provinces provided at least one survey each (69.5%), in comparison to 18 (30.5%) which did not provide any response. This result demonstrates a satisfactory degree of geographical distribution in the responses.

Figure 7. Whodunit provincial distribution and response rate.



Whodunit provincial distribution (N = 59)

*Respondent (blue N = 41)
Vs
non-respondent (red N = 18) provinces*

3.3.2 Datasets

The analysis of the aforesaid sources provided three respective datasets which have been utilized for the descriptive and inferential statistical measurements. While the victim-based dataset remained relatively unchanged, the incident-based dataset comprised several factors pertaining to the demographic characteristics of the stakeholders, as well as numerous factors related to the circumstances surrounding the incident. In order to follow as closely as possible previous studies, the majority of the factors that were chosen were already highlighted in extant literature. Furthermore, the survey dataset provided a wide array of investigative factors, some of which were already considered in literature, while others derived from my own field experience.

What follows is a description of the contents of each of the datasets.

Victim dataset

The victim dataset comprised all the victims of murders that were registered in Italy in 2014. The dataset from ISTAT included demographic characteristics of 468 victims (gender, age and race), plus the date and location of the incidents.

Table 1 Factors deriving from the victim dataset.

VICTIM DATASET (<i>N</i> = 468)
Date and location of the incident
Victims' gender
Victims' age
Victims' citizenship status

Incident dataset

After the conversion phase from a victim-based to an incident-based database, a new incident dataset composed of 419 murder investigation cases was created, comprising 389 single murders, 22 double murders and 8 triple murder cases. As aforementioned, this incident

database ($N = 419$) has been used as the basis to create a sub-assembly incident-based dataset comprised only of whodunit cases ($N = 198$), which was used to select the survey sample.

By means of the aforesaid open source scanning activity, it was also possible to gather a broad range of additional information, which, in turn, increased the number of variables pertaining to both demographic and case-related characteristics. Such a procedure of information integration was executed with reference to both datasets, namely the incident-based dataset ($N = 419$) and the whodunit sub-assembly incident-based dataset ($N = 198$).

Regarding demographic variables, victims' age, gender and race were already present in the data provided by ISTAT. What open source scanning enabled was the acquisition of further information related to victims' socio-economic status, which was roughly inferred via the description of the victims provided by media outlets and subsequently classified according to four categories: "wealthy", "middle-class", "working-class" and "indigent". An additional variable that has already been considered in previous work, that is, victims' prior criminal records, was measured in accordance with the information provided by media outlets, before being generically classified on a dichotomous basis (YES/NO).

The variables related to perpetrators, both demographic and SES based, were gathered merely for descriptive purposes, as these types of data clearly concern solved cases only. As such, for the purposes of the present study, such variables represent little value, in that they imply null variance in the model. Indeed, in an attempt to overcome this issue, previous research reversed the problem by directly asking detectives to indicate, among unsolved cases, identified suspects that did not result in any arrests (Hawk & Dabney, 2018). Such an approach, although intriguing from a utilitarian perspective, undoubtedly presents problems in terms of bias, as it is predicated solely on subjective opinions, the foundations of which, if made available to researchers, would warrant an additional separate in-depth analysis.

Regarding those variables related to the characteristics of the murder, there have been several factors commonly considered in homicide studies.

Firstly, the so-called ‘incident circumstances’ dimension has been taken into consideration in extant research, which refers to the circumstances surrounding the event, such as motive, the murder weapon, and the time at which the murder occurred (Hawk, 2015).

Regarding the *motive*, in accordance with extant literature, the panel was classified into three broad categories: *criminal* (comprising of criminal liquidation³⁰, other criminal motivations, drugs or sex-related murders, or more trivial reasons), *intimate* (comprising of both domestic and acquaintance disputes) and *unknown* motive (Alderden & Lavery, 2007)³¹.

The first challenge concerned whether the case was solved or not. In fact, in some cases the odds of the police establishing the effective motive increased, due to the evidence that was gathered and, at times, as a result of a confession from a perpetrator. Nevertheless, there have been some recorded cases in which, despite the murder being solved, the motive was officially reported by the police as unknown.

In the case of unsolved murders, the motive has instead been inferred on the basis of the overall features of the murder observed, as well as on the basis of considerations expressed by media outlets, which, in turn, represented the opinions of the investigators.

In this respect, for example, unsolved murders that occurred in a high-density-organized-crime-area, whose victims had mafia-related prior records and were killed via a typical mafia-style method left little doubt about the motive and its link to organized crime. In other cases, the

³⁰ Namely, organized crime-related murders.

³¹ Those authors use the broad distinction between ‘instrumental’ and ‘expressive’ motive, to distinguish between murders committed for economic and criminal purposes and those that are perpetrated on instinct, which is referred to as the affective/emotional sphere.

motive has been inferred on the basis of the hypothesis formulated by investigators that was reported by the media.

Continuing with our discussion of the circumstances around the incident, with respect to the weapon used in murder, extant literature has distinguished between ‘firearms’ and ‘others’. Such a distinction derives from the findings of earlier research, which identified the increased volume of unsolved murders that were committed by firearms compared to other weapons, due to the fact that this kind of weapon involved less contact (and hence less evidence) between the players compared to other methods, such as knives, blunt objects, and so forth (Baskin & Sommers, 2010; Litwin, 2004; Regoeczi et al., 2000; Wellford & Cronin, 1999a).

The *time* at which the murder occurred was classified as either day or night, along with the day of the week. This classification was made as a result of previous studies having identified that homicides were more prevalent during the night and at the weekend (Alderden & Lavery, 2007).

Regarding the so called ‘case dynamic’ (Hawk, 2015), the crime scene *location* was classified through several factors. Firstly, according to the difference between murders that occurred indoors or outdoors, as previous research had found that indoor settings were more likely to result in solved cases, due to both the possibility of better preserving evidence and the likelihood that an indoor location entailed a personal relationship between victim and author (Litwin, 2004; Regoeczi et al., 2000; Wellford & Cronin, 1999a).

The murder location was also implemented via creating two novel variables. The first refers to the distinction between murders committed in *cities* and those that occurred in a *province*. Such a distinction is based on the assumption that specialized homicide units operate in cities, while province-based murders are often managed by non-specialized agencies. The second type of variable was created with the express aim of assessing whether possible discrepancies in

clearance rates were due to the geographical area in which the murders occurred. In this respect, the peninsula was divided according to the three main areas established by ISTAT: North³², Centre³³ and South³⁴. In fact, a preliminary descriptive analysis showed an imbalance in the motives among the various homicides. To cite an example, of the overall murders, 98.0% of organized crime-related homicides occurred in the South. This negatively impacted on the overall murder clearance rate in that area (61.9%), in comparison with the North (94.4%) and Centre (80.5%). When considering only whodunit cases, such a discrepancy increases further, up to 38.6%, 87.8% and 56.3%, respectively.

Finally, the *number of victims* was also considered, as previous studies have reported that cases that involve more than one victim are more likely to be solved than those involving one victim (Mouzos & Muller, 2001). In the case of the present research, the spectrum ranged from one to three victims, at the most.

With the express aim of gaining as much information as possible from the scanning activity, several novel variables were created. The first one referred to the correct *classification of the law enforcement agency* which conducted the investigations, whether State Police or Carabinieri Corp. Such a distinction has been drawn in order to assess potential discrepancies between the clearance rate and the methods employed by the two police forces. Nevertheless, for reasons already explained, such a classification turned out to be extremely useful for the survey phase, as the respondents were selected exclusively from detectives who worked for the Carabinieri Corp.

The confidence in whether I correctly identified which agency investigated a given homicide stemmed from the following indicators. Generally, media outlets themselves clarified which

³² Piedmont, Aosta Valley, Ligure, Lombardy, Trentino-Alto Adige, Venetian, Friuli - Venezia Giulia, Emilia – Romagna.

³³ Tuscany, Umbria, Marche, Latium, Sardinia.

³⁴ Abruzzi, Molise, Campania, Puglia, Basilicata, Calabria, Sicily.

force managed the cases. For example, in solved cases, representatives of the police force which led the investigations attended the press conference with the Public Prosecutor. In very few instances, I relied on crime scene pictures published by the media in order to discern which agency conducted the investigations. Nevertheless, as emerged in the survey phase, there remained a degree of vagueness around a few cases (all of which were unsolved), characterized by a ‘blame game’ being played by representatives from both parties, who both stated that they did not participate in the investigations.

The time in which the media announced either an arrest or a positive conclusion to an investigation provided an opportunity to create a timespan for the *length of the investigation* for the considered case. Such a variable has already been utilized in other studies (Lee, 2005; Regoeczi, Jarvis & Riedel, 2008; Roberts, 2007). Nevertheless, for the purposes of the present research, such a variable has a merely descriptive value, as the investigation length should be considered more as a consequence as opposed to a factor affecting clearance.

I also created a variable related to whether the investigations were managed by units that *specialized* in homicides. In this instance, the information provided by media outlets were highly specific about precisely which type of agency conducted the investigations, namely whether they were ‘primary’ or ‘auxiliary’ units.

Table 2 below presents the data deriving from the victim dataset and the data that was acquired by means of open source scanning, which subsequently led to the development of the incident-based whodunit dataset.

Table 2 Factors originating from the victim database and incident database.

VICTIM DATASET (<i>N</i> = 468)	INCIDENT DATASET (<i>N</i> = 419)
Date and location of the incident	Victim's ID
Victims' gender	"Self-solved" / "Whodunit"
Victims' age	Murder location (outdoor/indoor)
Victims' citizenship status	Murder location (city/province)
	Murder macro area (North/Centre/South)
	Time of the murder (night/day)
	Date of the murder
	Victims' criminal record
	Victims' occupation
	Number of victims
	Motive
	Confession (Yes/No)
	Number of arrested people
	Date of arrest
	Authors' ID
	Authors' gender
	Authors' age
	Authors' criminal record
	Author type of crime
	Authors' citizenship status
	Victim/Offender relationship
	Type of weapon
	Law enforcement agency
	Length of the investigation

Survey dataset

The survey dataset was the source from which various investigative predictors were drawn from. Such a database comprised information provided directly by those detectives who had managed the ninety-eight whodunit cases cited in the incident dataset (*N* = 419), and particularly in its sub-assembly that comprised whodunit cases only (*N* = 198).

The total amount of survey responses received (*N* = 98) composed the survey dataset, which subsequently served as the basis for creating the variables that were used to perform the statistical analysis in-line with the aims of the present research.

Specifically, all the variables pertaining to investigative factors that stemmed from the results of the survey returned a wide array of data and information that had to be selected for practical purposes in order to provide a number of variables that were suitable for statistical analysis.

The selection process principally relied on a comparison with predictors that had been

considered in previous studies that had analyzed investigative practices (Wellford & Cronin, 1999a; Keel et al., 2009; Carter & Carter, 2016; Braga & Dusseault, 2016; Schroeder & White, 2009; Baskin & Sommers, 2010; Hawk & Dabney, 2018; Hough et al., 2019).

Having said this, based on personal and motivated considerations about the practical impact that other factors (hitherto not considered in research) can have on homicide clearance, several other independent variables were also conceived and tested.

The four “dimensions”

In total, this process produced a selection of forty-six variables which, according to the research question that underpins this study, affect homicide clearance. From a quantitative perspective, variables, or *factors*, *predictors*, *regressors*, are identical terms that are used to define the elements that potentially have the power to influence other elements, i.e., the dependent variable (in the present case, the outcome of the investigation), and cause the variation in a given result.

These variables have been listed according to the aforementioned classification, or what I am referring to in this research as “dimensions”, which is based on labour and the division of tasks, criteria that is commonly employed in every law enforcement agency. Such a categorization is used in order to ensure the rational classification of the aforesaid variables, as well as to provide a holistic and fluid description of the investigative activities, ranging from the most strategic to the more practical activities that are performed at the crime scene and in police offices.

The following sub-sections present a detailed list of all the investigative factors considered in this research, which are distinguished by those that have already been considered in earlier studies and those that are unique to this research, having emerged from the qualitative information collected in the survey, as well as from my experience.

Resource Management

The *availability of specialized labs* and the *speed of lab results* speed are two factors that have already been identified in previous research, albeit with conflicting results. Some authors observed that they had null significance on solving (Baskin & Sommers, 2010; McEwen, 2009; McEwen & Regoeczi, 2015; Peterson & Baskin, 2010; Schroeder & White, 2009), while others measured that they had a significant effect (Carter & Carter, 2016). The speed in processing the results has been classified according to the following area of expertise: fingerprints; IT forensics (computer forensics and analysis of mobile phones and computers); DNA samples; ‘other’, which comprises all other technical exams such as ballistics, biology, electron microscopy, product market analysis, and so forth. These predictors were selected in order to assess whether the speed of lab results impacted upon the solving of homicides.

Detectives’ experience has been applied in only one study and was shown to have no effect on solving (Puckett & Lundman, 2003). However, the authors used *shift assignment* as a proxy (supporting the hypothesis that experienced investigators prefer to work in the day time). In my estimation, such a criterion scarcely represents the complexity of the matter. For this reason, I have opted to evaluate two different types of *experience*: *years of duty* and *number of murder investigations directly managed*, hypothesizing that experience can positively affect clearance.

Manpower is a factor that has also been observed in previous research (Wellford & Cronin, 1999a). In this case, respondents were asked to indicate how many detectives worked in their unit on a value scale ranging from five up to more than fifteen detectives. The objective was to determine whether or not adequate human resource management influenced positive outcomes of investigations.

Previous research has also shown the factor of *training* (Block & Weidman, 1975; Keel et al., 2009; Pizarro et al., 2018; Wright, 2013) to have significant positive effects. Respondents were

asked to reply whether or not, in the last five years, they had attended official courses on murder investigations in order to assess if specialized training had an impact upon solving.

Workload has routinely been considered as a factor which can have a negative effect on clearance. As discussed in the literature review chapter, some authors have sought to use a variety of proxies for such a slippery concept (Puckett & Lundman, 2003; Rydberg & Pizarro, 2014; Wellford & Cronin, 1999a). The first approach measured homicide occurrences at the time of each new homicide, whilst the second approach employed a more structured proxy based on the time that had elapsed since their last case, the total number of open cases, and recently opened cases. In the present research, respondents were asked to indicate how many murder investigations they usually simultaneously managed in an attempt to corroborate the negative correlation that had been identified in previous studies.

Homicide investigations (together with other crimes typically managed by homicide units, such as kidnapping, suspicious deaths, and attempted murder investigations) is an extremely specific activity, one which requires a high degree of *specialization* and experience and a huge investment of time, as well as of physical and mental resources. Moreover, over the course of an investigation other collateral crimes are often reported and compulsorily investigated, hence causing a doubling or tripling of investigative efforts. In other words, it is not something that can be done as a side job, as strain and fatigue inevitably impacts upon positive outcomes, and detectives should not be distracted by other investigations. For this reason, the specialization factor has been included in the present research.

The following section discusses a set of factors hitherto not examined in homicide research, all of which are based on the hypothesis that *the assignment of specific duties (tasks), on a permanent basis, to the same detectives* increases detectives' professionalism in performing such duties and, as a result, enhances the overall level of efficiency and positively impacts upon investigations. These tasks derive specifically from a multi-site study on clearance (Carter &

Carter, 2016) as well as from previous studies not specifically related to homicide clearance (Frank, 2011; Iqbal & Ekstedt, 2017; Kumar et al., 2017; Lillis et al., 2016; Mason, 2018; McMillan et al., 2013; Murphy & Fontecilla, 2013; Police Executive Research Forum, 2018; Reith & Carr, 2002; Scott et al., 2006). All these factors are well-known practices that are commonly employed, albeit with different levels of professionalism, in every law enforcement agency, both in Italy and abroad.

The first task to be considered pertains to the proper management of the *evidential chain of custody*, which, if underestimated, can either lead to the loss of critical pieces of evidence or cause them to be damaged. Exercising caution in this area has become even more crucial in light of the extensive use of DNA examinations. This has led to the police having to take all possible precautions to prevent possible objections in court, as well as having to ensure that they can provide evidence samples for further confirmatory exams.

Another fundamental task is *CCTV camera locating* (or gathering), which, although it may seem elementary, in fact involves several critical steps and processes that must be performed with zeal and rigour.

The same goes for *CCTV footage analysis*, which also requires the same level of diligence and even more patience. The difficulties associated with this task pertains to the ability required to be able to spot a specific detail after having watched hours of tapes of a single frame, or, alternatively, to successfully perform “electronic tailing”, which is when the person of interest is followed for miles and their movements are reconstructed minute-by-minute by ‘editing’ dozens of different CCTV camera footage.

Another important task, which some may view as merely paperwork, is the organization of all of the various papers and documents that are needed to let the *interception activities start*. This involves a wide range of legal papers, court orders, and communications with telephone carriers

and private companies who are authorized to technically perform such activities, which can often take hours to be executed. In Italy, a typical murder investigation assumes at least a dozen telephone interceptions from the first day alone: victim's family, friends, acquaintances, as well as possible persons of interest. To dedicate a single person to such a task means that other detectives' time can be dedicated to focusing on other duties, while the fruitful personal relationships that this dedicated person would likely cultivate with such a wide range of interlocutors can help to dramatically accelerate the process.

Phone records analysis provides a wide range of useful information, including the mapping of a person's legal or criminal network, their habits, their whereabouts, corroboration of an alibi, and so on. However, all this data requires an expert who is able to analyse and interpret it through the use of specific software. That is to say, it is not a 'one-shot' capability, but rather a skill which requires years to be mastered. Indeed, phone record analysis can be considered as a multifaceted activity, which implies several skills and attitudes on the behalf of specialized operators in order to get the most benefit from it. In fact, notwithstanding the necessary software capabilities, it also entails a pronounced deductive disposition so as to be able to discern, among massive volumes of data, what is useful for the investigation. Hence, the analyst must have a sound overall knowledge of the investigation and of the persons of interest in order to select and organize the right data which, at first glance, may seem useless, such as a sudden change of habits, incomprehensible mobile phone switch-offs, and so forth.

Finally, *witness management* represents the "summa" of detectives' craftsmanship. The ability to read people is a combination of a natural aptitude and specific competences, such as body language interpretation, psychology and an extensive knowledge of human weakness. Not all detectives are skilled in eliciting information from reluctant witnesses, who invariably hold back what they know for a variety of motivations, which are often not linked to the investigated event. This is why it is mandatory to assign this crucial task to individuals who have really

honed this skillset and, at the very least, to have them mentor personnel with less experience and skill in this area.

Crime Scene activities

The following factors have been chosen with the aim of assessing whether placing a professional and implementing specific precautions and procedures at the crime scene affect the positive outcome of investigations.

The expedience of assigning an *officer to authorize crime scene access* and *registration of ID* for personnel who enter a ‘crime scene entry log’ is something that has been considered in previous studies (Braga & Dusseault, 2016), and produced good results in terms of clearance within the Boston Police Department. From my own experience, I have witnessed several episodes in which an alleged VIP forced themselves into the crime scene area and even touched pieces of evidence for no apparent reason other than simply curiosity. The hypothesis to be tested in this research is whether the presence of an officer and, further yet still, a registration log might prevent such access and enable a more secure management of the crime scene.

A new factor introduced in the present study concerns implementing a *safe corridor* to reach the crime scene in order to preserve it (Geberth, 2006). This method obliges all authorized personnel to walk through a unique path, in turn, facilitating not only the preservation of the scene but also a more effective supervision of the tasks performed by the forensic units.

The use of the *correct equipment* (such as latex gloves, single-use masks, plastic boots and so forth) to properly handle the crime scene environment is a predictor which, somewhat surprisingly, has received scant attention in the literature (Carter & Carter, 2016). This is problematic, because adopting a scientific and professional approach represents a crucial step in the early stages of investigations, as mistakes stemming from malpractice in these early moments can cause irreparable damage to an investigation.

Regarding the importance of the *process of collecting CCTV cameras*, the main difference with respect to the task of *collecting CCTV cameras* is that it is not simply a question of whether ‘specialization’ impacts upon clearance, but rather also about the impact of using standardized practices in the process of CCTV camera collection.

A proxy that previous research has used to measure police effort is the *time taken to reach the scene* (Braga et al., 2018; Wellford & Cronin, 1999a). Despite receiving scholarly attention, I would contend that timing is largely irrelevant. Indeed, investigative units can arrive on the scene hours after a body has been found. Rather, what is of paramount importance, is that first respondent officers, who belong to the station or patrol units, arrive on the scene as soon as possible and properly preserve the scene. Despite my above point, in order to compare the effect of this variable with findings from previous studies, this factor was taken into consideration.

The final two factors concern providing *first responders* and *investigative units* with a *checklist* comprising all the standard procedures to be followed both at the scene and during the early stages of investigations. Every investigation involves several different tasks that must be accomplished at the scene. Crime scenes are often characterized by a general degree of confusion and an atmosphere of collective fibrillation, which tends to permeate those on the scene, who, more often than not, are not directly involved in the investigation. Detectives must deal with voluminous pieces of information from a variety of sources: first respondent officers, witnesses, victim’s relatives, Coroner. Crime scene supervision, seeking CCTV cameras in the area, neighbourhood canvassing, first report drafting, classification and preservation of evidence, witness interviews, car and house searches and seizures constitute only a few of the tasks that must be completed in a matter of hours, often outdoors and occasionally in bad weather conditions. In a similar vein, patrol units have the crucial task of preserving the crime scene, which involves several tasks that need to be done and other things that must not be done.

This is the reason why, in my estimation, the dissemination of such a crucial tool for both detectives and patrol units might be of great help in terms of limiting mistakes, and combating forgetfulness and duplication.

The same dedicated methodology might also be used for another critical task, which has only recently begun to be examined in literature (Braga & Dusseault, 2016), namely the *canvassing* of neighbours and bystanders. As per the forensic and investigative activities performed on the scene, a common occurrence due to the chaos that often ‘rules’ the crime scene, is that not all of the potential witnesses are located or adequately interviewed, while, conversely, others might be mistakenly interrogated twice, resulting in a loss of information or useless duplication. Moreover, especially in socio-economically disadvantage areas, neighbours are not willing to talk to uniformed officers, and thus it becomes important to locate individuals for follow-up interviews. These constitute only a few of the reasons why such a crucial activity needs to be performed with zeal, perhaps through creating a map or a log containing all the details about interviewees, those who have been interrogated, the reasons for their absence, and so forth.

Investigative Strategies

The choice of the following variables was driven by the aim of verifying whether the adoption of specific strategies affects clearance. In this specific context, the term ‘strategy’ designates the long-term application of policies and policing practices that puts detectives in the best possible condition to perform those tasks which, in turn, enable them to solve investigations.

The *approach used in managing the case* is something that has been investigated in previous research (Block & Bell, 1976; Carter & Carter, 2016), which distinguished between horizontal and vertical (hierarchical) approaches: the former is an approach in which “*good ideas have no rank*”, while the second approach addresses the decision-making process on the basis of rank

or seniority. The rationale for including this variable is to assess whether the decision-making process adopted by units positively impacts upon investigations.

The presence/absence of a *cold case unit* was included in the present study, because it has been addressed in earlier studies (Addington, 2007; Allsop, 2013; Cronin, Murphy, Spahr, Toliver & Weger, 2007; Hough et al., 2019).

Despite the importance of effective *communication with media representatives* for murder investigations (both in terms of reducing the possibility of information leaks and in terms of utilizing the news as a tool for investigative strategies), this factor has hitherto not been addressed in previous studies.

The establishment of *good relationships with other stakeholders*, such as the Prosecutor's Office, the Coroner's Office and Forensics, is a variable that has been considered as being important in extant literature (Block & Weidman, 1975; Braga & Dusseault, 2016; Carter & Carter, 2016; Wellford & Cronin, 1999a). Hence, the survey respondents were asked to evaluate the quality of their relationships with other stakeholders on a scale ranging from "excellent" to "poor".

The last three factors pertain to measures that have hitherto not been considered in homicide literature: the possibility of *wire-tapping the office waiting room*; the presence/absence of an *interrogation room*; in the event of positive responses to the previous one, the opportunity *to have it monitored* by means of an audio/video recording system. Monitoring the police waiting room could be extremely helpful in terms of intercepting potential comments made by people waiting to be interviewed or interrogated. The presence of an interrogation room serves to protect against the risk of distraction, as well as creating the best possible environment in which to conduct such a challenging and delicate activity. The opportunity to monitor and record the

conversations which occurred in the room would strengthen the evidence that was gathered, as well as providing a guarantee against potential police misconduct.

Investigative Techniques

The selection of the following variables was made with the aim of assessing whether the use of specific operational techniques on a permanent basis positively influences the outcomes of investigations.

The opportunity to scan the web to monitor a person of interest's *social media account* is a variable that has only recently been explored in literature (Pizarro et al., 2018). The choice to include it in the present research stems from the consideration that social media usage is widespread across different age groups, while, from an investigative perspective, these technologies provide a crucial auxiliary tool through which to anonymously identify persons of interest and to effectively reconstruct their relationships and contact networks.

The implementation of a *timeline* is another novel factor which refers to the habit to write down, often on a big whiteboard, all the major points of the investigation in chronological order. This is a highly useful practice, in that it provides investigators with a clear daily picture of a wide range of key events, such as the victim's final hours, the suspect's alibi, and so forth.

The use of *case analysis software* to manage the complexity of data involved in every murder investigation is considered to be an important variable to be taken into account. The huge amount of data deriving from various sources, including witnesses, database checks, phone records, interceptions, surveillance activities, and so forth, must be analysed and organized by the detectives through the use of specific data mining software.

With respect to the *phone records analysis*, the difference from *phone records analysis task* variable is the fact that in this case it is not questioned the level of 'specialization' in performing

this duty, rather whether or not a given unit use dedicated software, or still relies on ‘old fashioned’ methods like pen and paper.

Given the increased number of seizures that now require detectives to *handle technical devices* (such as smartphones, computers, and so forth), the present research includes the implementation of *specific standard practices* to properly manipulate such equipment as a variable to be examined.

Similarly, police today might often end up having access to a mobile phone belonging to a person of interest, which might contain data that would otherwise not be available, not even through traditional intercept activities (e.g. Whatsapp content and other messages). In such instances, the possibility of acquiring this kind of data by means of *IT forensic copying the mobile device* can secure vital information capable of changing the course of an investigation.

Autopsy attendance is yet another variable that has been routinely analysed in extant literature (Carter & Carter, 2016; Innes, 2002b; Keel et al., 2009; Wellford & Cronin, 1999a). During the post-mortem examination, a wide range of useful information can be obtained. Clearly, most, if not all, of this information will be conveyed in the Coroner’s report; however, the Coroner does not have complete knowledge over all of the elements that have arisen during the course of the investigation, which, in turn, would guide them in focusing on specific aspects more than others. Hence, if detectives do not attend the post-mortem, they may miss out on the opportunity to ask proper questions to the Coroner, which, in turn, means that they are forced to rely, for the remainder of the investigation, on results provided by a ‘standard’ autopsy or on considerations that were solely based on the Coroner’s investigative intuition.

Finally, the opportunity to conduct frequent *briefings* to brainstorm about the current status of investigations often results in a fundamental process of exchanging of information which, due to the wide range of activities performed by several different detectives, is in danger of

becoming fragmented, or, worse yet still, lost (Brookman & Lloyd-Evans, 2015; Feist & Newiss, 2001; Innes & Brookman, 2013).

Having outlined all the variables considered in this research and highlighted the main differences between those related to demographic features and murder characteristics and those that refer specifically to the investigative setting, what follows is a recap of the variables examined in the present study, as distinguished by the phase in which they were obtained (i.e., the open source scanning and survey phase).

Table 3. Summary of the sources from which the factors originated: i) the victim database; ii) the incident database; iii) the survey dataset (purely for descriptive purposes, the factors hitherto not considered in previous studies are marked with an asterisk).

VICTIM DATASET (N = 468)	INCIDENT DATASET ³⁵ (N = 419)	SURVEY DATASET (N = 98)
INVOLVED SUBJECTS		
Date and location of the incident	Date and location of the incident	Date and location of the incident
Victim's gender	Victim's gender	Victim's gender
Victim's age	Victim's age	Victim's age
Victim's nationality	Victim's nationality	Victim's nationality
	Victim's ID	Victim's ID
	Victim's criminal background	Victim's criminal background
	Victim's job	
	Number of victims	Number of victims
	Author's ID	
	Author's gender	Author's gender
	Author's age	
	Author's nationality	Author's nationality
	Author's criminal record	
	Victim/Offender relationship	
ECOLOGICAL CHARACTERISTICS		
	Residency	Residency
	Crime scene location	Crime scene location
		Victim's SES
INCIDENT-LEVEL CIRCUMSTANCES		
Murder municipality	Murder municipality	Murder municipality
	"Self-solved" / "Whodunit"	"Self-solved" / "Whodunit"
	Murder location (outdoors/indoors)	
	Murder location (city/province)	
	*Murder macro area (N/C/S)	
	Time of the murder (night/day)	
	Date of the murder	Date of the murder
	Motive	Motive
	Confession (Yes/No)	Confession (Yes/No)
	Number of arrested people	Number of arrested people
	Date of arrest	
	Type of weapon	

³⁵ Which contains a sub-assembly incident-based dataset comprising only of whodunit cases (N = 198).

<p>Law enforcement agency Length of the investigation</p>	<p>* Law enforcement agency</p>
<hr/> <p>INVESTIGATIVE FACTORS</p> <hr/>	
	<p><i>Resources Management</i> * 24/7 availability of lab specializing in IT forensic activities * Presence of an IT forensics unit * Speed of IT forensics 24/7 availability of fingerprints lab Speed of fingerprint testing Speed of DNA testing Speed of other labs * Exclusivity Experience (years) Experience (investigations) Manpower Training Workload * Task evidential chain of custody * Task CCTV camera location * Task CCTV footage analysis * Task wire-tapping paperwork * Task phone records analysis * Task witness management</p>
	<p><i>Crime Scene</i> Access officer Access log * Safe corridor Correct equipment * CCTV camera collecting process Canvassing Time taken to reach the scene First responders' checklist Detectives' checklist</p>
	<p><i>Investigative Strategies</i> Decision-making approach Cold case unit * Media coordination Good relationships Public Prosecutor Good relationships Coroner Office Good relationships Forensics * Waiting room wiretapped * Interrogation room * Interrogation room monitored</p>
	<p><i>Investigative Techniques</i> * Social media monitoring * Timeline Case analysis software * Phone Records Analysis software * IT Forensics checklist usage * Forensics copying of mobile phones of interest Autopsy attendance Briefing</p> <hr/>

3.3.3 Variables and operationalization

The dependent variable

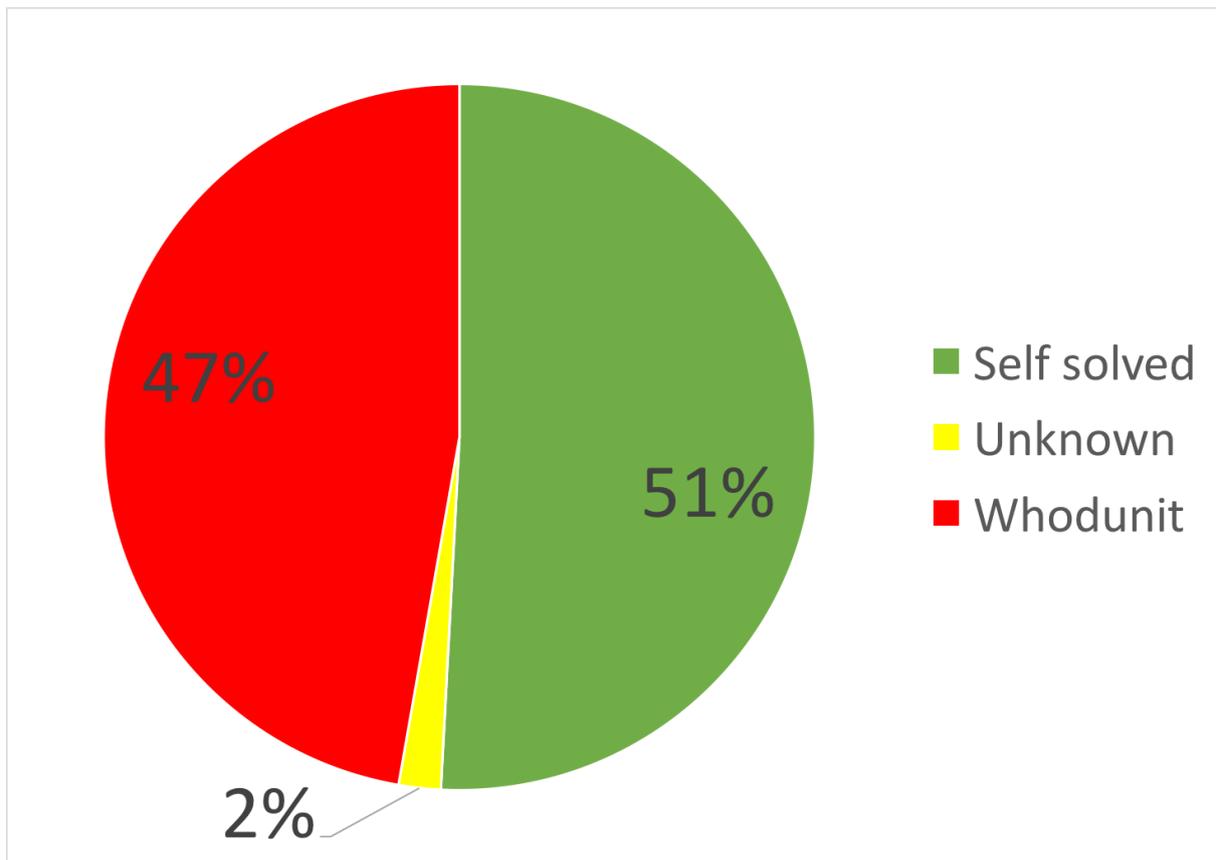
The dependent variable is whether the case considered, namely each observation, was solved or not. The size of the sample is $N = 98$, which corresponds to the total amount of observations, namely the amount of surveys administered to an equal number of detectives who actively participated in one investigation from the final whodunit case-based dataset ($N = 198$). All the survey observations ($N = 98$) refer to the whodunit incident sub-assembly dataset only and comprise $N = 65$ solved murders (66.3%) and $N = 33$ (33.7%) murders that were not solved. In contradistinction to the predominant trend in extant literature to distinguish between homicides ‘cleared by arrest’ and ‘exceptionally cleared’,³⁶ which is imposed by the UCR system, in the present research the term ‘solved’ refers only to cases in which one or more authors have been effectively arrested and, at the very least, indicted (Riedel & Boulahanis, 2007).

Relying on the incident-based dataset, which comprises all the murder cases that occurred in Italy in 2014 ($N = 419$), an interesting observation about the dependent variable can be drawn. Firstly, the proportion of self-solved ($N = 213$) and whodunit cases ($N = 198$)³⁷ demonstrates that the amount of cases were almost divided fifty-fifty between the two categories.

³⁶ The latter of which assumes that even in the absence of arrested persons a case can be considered to be cleared if the following requirements are met: identification of the offender; having gathered enough evidence to support an arrest, make a charge, and turn over the offender to the court for prosecution; having identified the offender’s exact location, so that the suspect could be taken into custody immediately; having encountered circumstances outside the control of law enforcement, which prohibits the agency from arresting, charging, and prosecuting the offender.

³⁷ Eight cases were not identified by means of the open source scanning of media websites.

Figure 8. Proportion of the overall murder cases (N = 419) in Italy in 2014 that were self-solved (N = 213), whodunit cases (N = 198) or unknown (N = 8)



The clearance rate for the overall cases (N = 419) was 71.7%,³⁸ which differed from the clearance rate indicated by ISTAT, which was 62.1%. Such a discrepancy stems from the fact that the ISTAT clearance rate is determined on a victim-based classification rather than a case-based one. Consequently, this means that ISTAT calculate the clearance rate according to the number of victims (as opposed to the number of cases) for which at least one perpetrator has been identified and prosecuted.

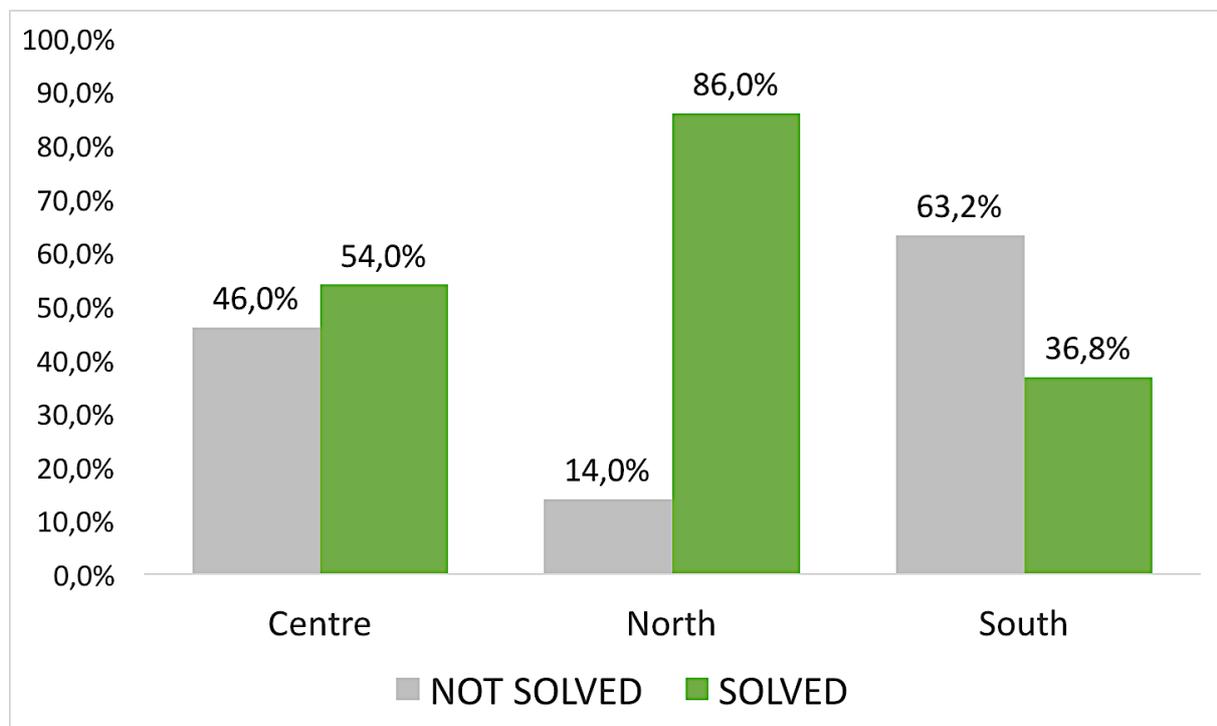
Since the present incident-based dataset was finalized in June 2018 and continually updated up until December 2018, it comprises all of the 2014 cases that were solved as per December 2018. Specifically, it is composed of 287 cases that were solved in 2014, 16 that were solved in 2015,

³⁸ The clearance rate was counted, as per ISTAT, up to the date of 31st December 2014, namely by calculating only those murders that were cleared within the same year as the one observed. Such a calculation was possible thanks to the implementation in the original database of the ‘investigation length’ variable.

6 that were solved in 2016, 5 that were solved in 2017 and 3 that were solved in 2018. According to such a continuous calculation, the current³⁹ clearance rate for the cases considered in the final case-based dataset is 76.8%.

Given that all the self-solved cases were obviously cleared, if we consider only the whodunit cases, the percentage changes dramatically. In fact, the clearance rate drops to 55.1%, with there being marked discrepancies between the three macro areas in which Italy is divided: 86.0% in the North, 54.0% in the Centre and 36.8% in the South.

Figure 9. Clearance rate for whodunit cases across the macro areas (N = 198).



Such differences are perhaps surprising, in that they mirror the intrinsic difficulties of the murders that occurred in the South. Indeed, firstly, among all of the whodunit cases that occurred in Italy in 2014 (N = 198), the South ranks first (N = 101). Secondly, southern detectives deal with 97.9% of the “criminal liquidation” murders that occur in Italy, namely

³⁹ To the date of December 31st, 2018.

those related to organized crime. Moreover, almost half of the whodunit cases in the South are “criminal liquidation” cases (46.5%).

Figure 10. Motives for whodunit cases across the macro areas (N = 198).

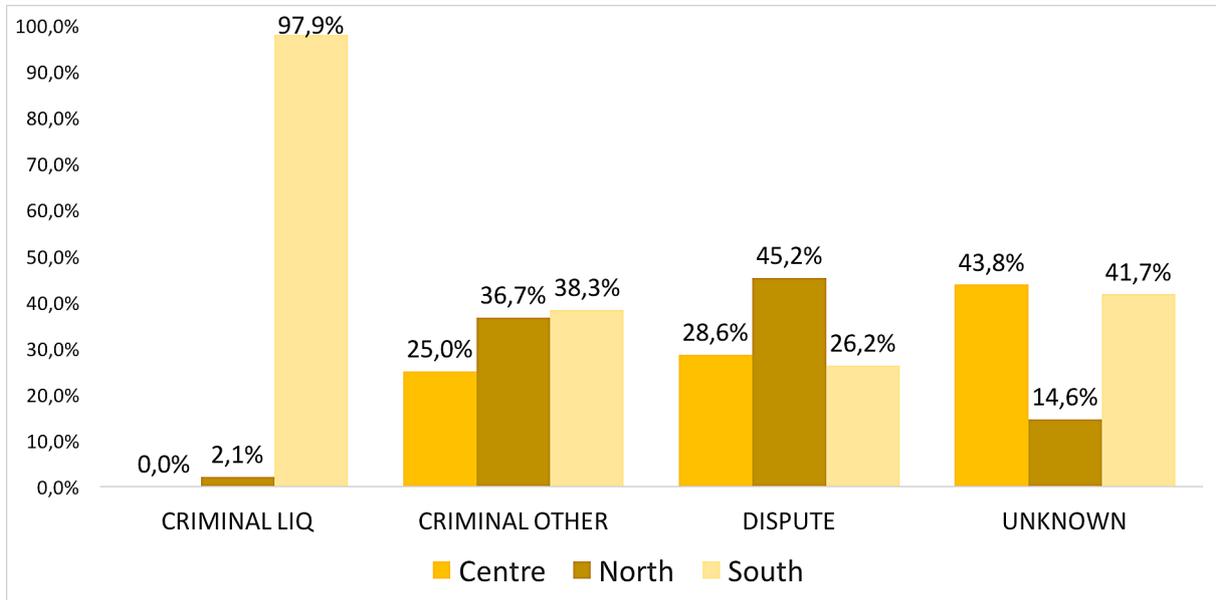
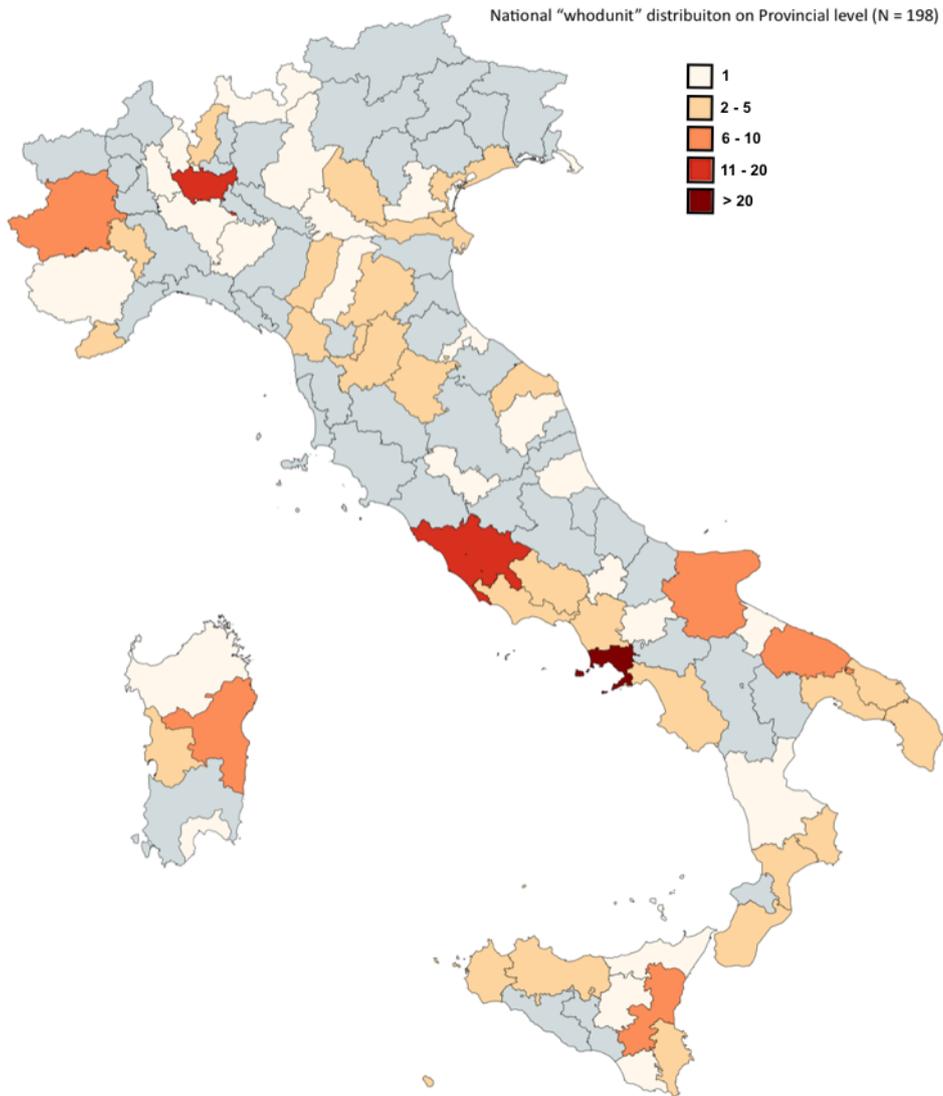


Figure 11. National “whodunit” distribution at the provincial level (N = 198).



The independent variables

The independent variables are categorical; most of them are dichotomous (both nominal and dummies), one is nominal (“*managerial decision-making process*”), while all the rest are ordinal, with a possible range from one to three. The control variables are all dichotomous.

Given that the data is either dichotomous or ordinal, traditional analysis based on mean and mode parameters would return poor explanatory value. For this reason, the data was analysed for descriptive purposes by means of a proportion estimation. The following tables describe the proportion of each investigative factor distinguishing between the four dimensions.

Table 4. Descriptive analysis of the investigative variables pertaining to the *Resource Management* dimension, considered by means of proportion estimation (variables marked with an asterisk were included in the correspondent logistics model).

<i>Resources Management dimension</i>	Proportion	Std.Err.	[95%_Conf	Interval]
IT forensics lab 24/7 availability				
“Often”, “Rarely”, “Never”	0.490	0.051	0.391	0.590
“Always”	0.510	0.051	0.410	0.609
IT forensics unit				
“Often”, “Rarely”, “Never”	0.663	0.048	0.563	0.751
“Always”	0.337	0.048	0.249	0.437
Speed of the IT lab				
Within 24 hours	0.143	0.036	0.086	0.229
Within 48 hours	0.571	0.050	0.470	0.667
More than 48 hours	0.286	0.046	0.204	0.385
Fingerprint lab availability				
“Often”, “Rarely”, “Never”	0.439	0.050	0.342	0.540
“Always”	0.561	0.050	0.460	0.658
Speed of fingerprint lab				
Within 24 hours	0.622	0.049	0.521	0.714
Within 48 hours	0.276	0.045	0.195	0.374
More than 48 hours	0.102	0.031	0.055	0.181
Speed of DNA lab				
Within 48 hours	0.122	0.033	0.070	0.205
Within 72 hours	0.694	0.047	0.594	0.778
More than 72 hours	0.184	0.039	0.118	0.275
Speed of other exams labs				
Within 1 month	0.112	0.032	0.063	0.193
Within 2 months	0.316	0.047	0.231	0.416
More than 2 months	0.571	0.050	0.470	0.667
Detectives’ experience (years)				
From 10 to 20 years	0.255	0.044	0.177	0.352
From 21 to 30 years	0.633	0.049	0.531	0.723
More than 30 years	0.112	0.032	0.063	0.193
* Exclusivity				
Yes	0.837	0.038	0.748	0.898
No	0.163	0.038	0.102	0.252

Detectives' experience (amount of cases managed in career)				
From 1 to 10 cases	0.337	0.048	0.249	0.437
From 11 to 20 cases	0.214	0.042	0.143	0.308
More than 20 cases	0.449	0.051	0.352	0.550
Unit manpower				
Less than 5 detectives	0.153	0.037	0.094	0.240
From 6 to 10 detectives	0.663	0.048	0.563	0.751
More than 10 detectives	0.184	0.039	0.118	0.275
Detectives' training				
Yes	0.245	0.044	0.169	0.341
No	0.755	0.044	0.659	0.831
* Detectives' workload (amount of cases handled)				
One at a time	0.306	0.047	0.222	0.406
From 1 to 3	0.367	0.049	0.277	0.469
More than 3	0.327	0.048	0.240	0.427
* Task evidence custody				
Assigned always to the same detective	0.663	0.048	0.563	0.751
Randomly assigned	0.337	0.048	0.249	0.437
* Task CCTV camera collection				
Assigned always to the same detective	0.296	0.046	0.213	0.395
Randomly assigned	0.704	0.046	0.605	0.787
Task CCTV footage analysis				
Assigned always to the same detective	0.347	0.048	0.258	0.448
Randomly assigned	0.653	0.048	0.552	0.742
Task witness interview				
Assigned always to the same detective	0.327	0.048	0.240	0.427
Randomly assigned	0.673	0.048	0.573	0.760
Task paperwork needed for interception				
Assigned always to the same detective	0.469	0.051	0.371	0.570
Randomly assigned	0.531	0.051	0.430	0.629
*Task phone records analysis				
Assigned always to the same detective	0.153	0.037	0.094	0.240
Randomly assigned	0.847	0.037	0.760	0.906

Table 5. Descriptive analysis of the investigative variables pertaining to the *Crime Scene* activities dimension, considered by means of proportion estimation (variables marked with an asterisk were included in the correspondent logistics model).

<i>Crime Scene activities dimension</i>	Proportion	Std.Err.	[95%_Conf	Interval]
* Crime scene access officer				
“Often”, “Rarely”, “Never”	0.786	0.042	0.692	0.857
“Always”	0.214	0.042	0.143	0.308
Crime scene entry log				
“Often”, “Rarely”, “Never”	0.847	0.037	0.760	0.906
“Always”	0.153	0.037	0.094	0.240
* Crime scene safe access corridor				
“Often”, “Rarely”, “Never”	0.714	0.046	0.615	0.796
“Always”	0.286	0.046	0.204	0.385
Crime scene equipment				
“Often”, “Rarely”, “Never”	0.316	0.047	0.231	0.416
“Always”	0.684	0.047	0.584	0.769
* SOP in CCTV camera locating				
“Often”, “Rarely”, “Never”	0.429	0.050	0.333	0.530
“Always”	0.571	0.050	0.470	0.667
SOP in canvassing neighborhood				
“Often”, “Rarely”, “Never”	0.531	0.051	0.430	0.629
“Always”	0.469	0.051	0.371	0.570
* Time taken to arrive on the scene				
Within 1 hour of the dispatch call	0.214	0.042	0.143	0.308
Within 2 hours of the dispatch call	0.480	0.051	0.381	0.580
Within 3 hours of the dispatch call	0.306	0.047	0.222	0.406
* Patrol unit checklist				
Yes	0.286	0.046	0.204	0.385
No	0.714	0.046	0.615	0.796
* Detectives’ checklist				
Yes	0.449	0.051	0.352	0.550
No	0.551	0.051	0.450	0.648

Table 6. Descriptive analysis of the investigative variables pertaining to the *Investigative Strategies* dimension, considered by means of proportion estimation (variables marked with an asterisk were included in the correspondent logistics model).

<i>Investigative Strategies dimension</i>	Proportion	Std.Err.	[95%_Conf	Interval]
* Decision-making process				
On the basis of rank	0.276	0.045	0.195	0.374
On the basis of seniority	0.531	0.051	0.430	0.629
Regardless of either rank or seniority	0.194	0.040	0.126	0.286
Presence of a cold case unit				
Yes	0.061	0.024	0.027	0.131
No	0.939	0.024	0.869	0.973
* Effective media coordination				
“Often”, “Rarely”, “Never”	0.571	0.050	0.470	0.667
“Always”	0.429	0.050	0.333	0.530
Relationship with Forensics				
“Very good”, “Satisfactory”, “Poor”	0.786	0.042	0.692	0.857
“Excellent”	0.214	0.042	0.143	0.308
Relationship with Coroner				
“Very good”, “Satisfactory”, “Poor”	0.694	0.047	0.594	0.778
“Excellent”	0.306	0.047	0.222	0.406
* Relationship with Public Prosecutor				
“Very good”, “Satisfactory”, “Poor”	0.857	0.036	0.771	0.914
“Excellent”	0.143	0.036	0.086	0.229
Police office waiting room tapped				
Yes	0.847	0.037	0.760	0.906
No	0.153	0.037	0.094	0.240
* Presence of an interrogation room				
Yes	0.704	0.046	0.605	0.787
No	0.296	0.046	0.213	0.395
* Interrogation room bugged				
Yes	0.398	0.050	0.305	0.499
No	0.602	0.050	0.501	0.695
Jail visiting room bugged				
“Often”, “Rarely”, “Never”	0.735	0.045	0.637	0.814
“Always”	0.265	0.045	0.186	0.363

Table 7. Descriptive analysis of the investigative variables pertaining to the *Investigative Techniques* dimension, considered by means of proportion estimation (variables marked with an asterisk were included in the correspondent logistics model).

<i>Investigative Techniques dimension</i>	Proportion	Std.Err.	[95% Conf Interval]	
Social media monitoring				
“Often”, “Rarely”, “Never”	0.898	0.031	0.819	0.945
“Always”	0.102	0.031	0.055	0.181
* Frequent briefing				
“Often”, “Rarely”, “Never”	0.439	0.050	0.342	0.540
“Always”	0.561	0.050	0.460	0.658
* Use of timeline				
“Often”, “Rarely”, “Never”	0.663	0.048	0.563	0.751
“Always”	0.337	0.048	0.249	0.437
Case analysis software				
Yes	0.082	0.028	0.041	0.157
No	0.918	0.028	0.843	0.959
* Phone records analysis software				
Yes	0.857	0.036	0.771	0.914
No	0.143	0.036	0.086	0.229
SOP for seizing electronic devices				
Yes	0.592	0.050	0.490	0.686
No	0.408	0.050	0.314	0.510
Forensic copying of electronic devices of persons of interest				
“Often”, “Rarely”, “Never”	0.857	0.036	0.771	0.914
“Always”	0.143	0.036	0.086	0.229
* Detectives’ autopsy attendance				
“Often”, “Rarely”, “Never”	0.459	0.051	0.362	0.560
“Always”	0.541	0.051	0.440	0.638

With reference to the variables chosen to be included in the four logistic models, the following considerations can be inferred from the descriptive analysis of data.

Regarding the *resource management* dimension, the *exclusivity* factor reported a prevalence of negative answers, which is to say that the interviewed units were not exclusively engaged in murder investigation. This means that 83% of the respondents were part of investigative units that also conducted other types of investigations besides homicide. The *detectives’ workload* was equally distributed among the three options (one, from one to three, and more than three cases handled at a time).

With respect to two of the tasks that were assigned on a permanent basis to the same detectives, *CCTV collection* and *phone records analysis*, the vast majority of the respondents provided a

positive answer, 70% and 84%, respectively, while regarding the *evidential chain of custody*, only one respondent out of three stated that they applied such a strategy.

With reference to the *crime scene activities dimension*, the majority of the respondents reported that they did not place an *officer to monitor access to the crime scene* (78%), nor did they set up a *safe corridor* (71%). Only half of the detectives declared to conduct *neighbourhood canvassing* following systematic SOP. Very few of the respondents (21%) reported *arriving on the scene* within one hour of the dispatch call. The provision of the *patrol unit personnel with standard operative guidelines* was a habit that was seldom adopted (28%), although it was more frequent among *detectives*, as half of the respondent reported doing it.

With respect to the *investigative strategies* dimension, the *decision-making process* was largely based on rank (53%), rather than seniority or not having any criteria. Establishing *effective coordination with media* was a practice confirmed by 42% of respondents, which would suggest that the remaining percentage of detectives did not consider this to be a relevant issue. Only 14% of the respondents reported having “excellent” relationships with the Public Prosecutor’s office. 70% of the interviewed units had an *interrogation room*, albeit only 39% *recorded interrogations*.

Finally, regarding *investigative techniques*, one third of the respondents reported using a *timeline* tool, while only half of the respondents held frequent *briefings* to ease the information flow between units. 85% of the detectives stated that they used appropriate software to perform phone records analysis. Finally, only one detective out of two generally attended *autopsy exams*.

Coding process

All the independent variables were classified according to the aforementioned four dimensions. Each survey question was either dichotomous or categorical, with the exception of several

voluntary open-ended questions that were used to gather richer observations and suggestions from the respondents.

In the case of dichotomous questions, two options were provided about the use of a specific strategy or technique (YES/NO), which left no room for any other answer (for example: “did you attend any training courses over the last five years?”).

In the case of categorical questions, via the use of multiple choice questions, there were four possible answers on a scale; for example, in response to how often a specific technique was used in their unit in 2014, respondents could answer “always”, “often”, “seldom” or “never”,⁴⁰ or when asked to state their degree of satisfaction/dissatisfaction with a given service or relationship, they could select “excellent”, “very good”, “satisfying” or “poor”.

No ‘middle-choice’ option was given, which served to force the respondent to take a stand on the given issue. In some instances, particularly concerning questions that referred to different value scales, which did not require a personal opinion (such as “timing” and “numerical parameters”), the aforementioned ‘forcing’ method was not needed.

Nevertheless, due to the limited number of observations ($N = 98$), a strategy to reduce the four options present within each survey question was adopted. To do so, certain categorical options have been converted into dummy variables, while others remained categorical but comprising only three categories instead of the original four.

The first strategy was used on those questions which pertained to the use of specific procedures, habits and techniques linked to the four possible options: “always”, “often”, “seldom” and “never”. In this case, I opted to distinguish between those who replied “always” from everyone

⁴⁰ The ordinary meanings of these words were used.

else. In so doing, all the categorical answers were coded as “1” (“always”) or “0” (“often”, “seldom”, “never”). The reasons for adopting such an approach are twofold:

- firstly, all the considered practices can be applied to every type of murder, irrespective of the specificity of the case. Therefore, replying to such questions with “often” would suggest both a lack of uniformity within the investigative unit apropos the use of such crucial tools and a lack of comprehension of the effectiveness of the instrument;
- secondly, said effectiveness is directly proportionate to the frequency with which these techniques are used, which is a long-term process during which personnel must get used to such procedures in order to get the most out of them. Consequently, choosing the option “often” may mean that the effectiveness represented by such practices and the potential effect that they can have on clearance was still not fully developed or exploited by the respondent.

In the case of questions which required respondents to evaluate the quality of relationships as “excellent”, “very good”, “satisfying” or “poor”, the same criterion was used, coding ‘1’ if the respondent reported having “excellent” relationships, while ‘0’ was used to designate the other options available (“very good”, “satisfying” and “poor”).

The aforesaid strategies were deemed to be unsuitable for other types of categorical questions that referred to different topics and value scales related to “numerical order” or “timing” measurements. In fact, in these cases, each category had an intrinsic value which deserved to be properly explored and measured. Nevertheless, in order to effectively deal with the limited number of observations, the adopted strategy that reduced the amount of categories from four to three was enabled by the following circumstances that occurred during the administration of the survey:

- in certain responses, none of the four options were selected by the respondents, which meant that they could easily be removed from the coding process;
- in other instances, one of the four options was seriously under represented, which led to these being grouped together with the nearest one in order to create a new comprehensive category if and when it was required.⁴¹

The chapter now proceeds to delineate in detail all the variables that were considered in the study, as well as the measures that were used in the codification process.

Resource Management

The *presence of a 24/7 fingerprints lab* and the *24/7 availability of a lab specializing in IT forensics activities* were coded as ‘1’ if yes and ‘0’ otherwise. Each type of lab result was coded on a different time basis according to the object of analysis: i) *speed of fingerprints* was coded as ‘1’ if within 24 hours; ‘2’ if within 48 hours; ‘3’ if more than 48 hours;⁴² ii) *speed of IT forensics* as ‘1’ if within 24 hours; ‘2’ if within 48 hours; ‘3’ if more than 48 hours;⁴³ iii) *speed of DNA tests* as ‘1’ if within 48 hours; ‘2’ if within 72 hours; ‘3’ if more than 72 hours;⁴⁴ iv) *speed of other labs speed* as ‘1’ if within 1 month; ‘2’ if within 2 months; ‘3’ if more than 2 months.⁴⁵

Exclusivity in terms of conducting only murder investigations was coded as ‘1’ if respondents’ office exclusively conducted murder investigations in 2014 and ‘0’ otherwise. *Detectives’ years of experience* was coded as ‘1’ if the respondent had between 10 to 20 years of experience;⁴⁶

⁴¹ For example, in coding “speed of other lab results”, among the four categories “within 15 days”, “within one month”, “within two months” and “more than two months”, the first (“within 15 days”) was poorly represented ($N = 2$) and thus the decision was made to encompass it within the closest one (“within one month”).

⁴² The original categories “within 72 hours” ($N = 5$) and “more than 72 hours” ($N = 5$) were merged into the new category “more than 48 hours”.

⁴³ The original category “within 12 hours” ($N = 1$) was merged into the closest “within 24 hours”.

⁴⁴ The original categories remained unchanged, as the option “within 12 hours” was never selected.

⁴⁵ The original category “within 15 days” ($N = 2$) was merged into the closest “within 1 month”.

⁴⁶ No respondents reported having less than 10 years of experience.

‘2’ from 21 to 30 years; and ‘3’ for more than 30 years.⁴⁷ *Detectives’ experience of managing murder investigations* was coded as ‘1’ if the respondent had managed 1 to 10 murder investigations during their career; ‘2’ if they had managed 11 to 20; and ‘3’ if it was more than 20.⁴⁸

Manpower was coded as ‘1’ if less than 5 detectives worked in the unit; ‘2’ from 6 to 10; and ‘3’ if there were more than 10.⁴⁹ The *training* factor was coded ‘1’ for yes and ‘0’ for no. The *workload* was operationalized by means of a categorical variable, in which ‘1’ corresponds to the respondent stating that they managed one case at a time; ‘2’ if they managed between 1 to 3 cases at the same time; and ‘3’ if they handled more than 3 cases simultaneously.⁵⁰

The following tasks were all coded as ‘1’ when the respondent replied “always”, while ‘0’ was used to designate all the remaining options: *evidential chain of custody*, *CCTV camera location*, *CCTV footage analysis*, *interception activities*, *paperwork needed to start the interception operations*, *phone records analysis*, and *witness management*.

Crime Scene

Both the possibility of assigning an *officer to authorize access to the crime scene* and *registering the ID* of personnel who entered the ‘crime scene entry log’ were coded ‘1’ for “always” and ‘0’ for all the other options. The opportunity to implement a *safe corridor* through which to reach the crime scene so as to preserve it was coded ‘1’ for “always” and ‘0’ for the other options. The use of the *correct equipment* to properly handle the crime scene environment was coded ‘1’ for “always” and ‘0’ for all other options.

⁴⁷ The original categories remained unchanged, as the option “less than 10 years” was never selected.

⁴⁸ The original categories “from 1 to 5” ($N = 4$) and “from 6 to 10” ($N = 29$) were merged into the new category “from 1 to 10”.

⁴⁹ The original categories remained unchanged.

⁵⁰ The original categories remained unchanged.

The habit of implementing standardized and rigorous procedures for the *process of collecting CCTV cameras* was coded ‘1’ for “always” and ‘0’ for all other options. The *canvassing of neighbours and bystanders* was coded ‘1’ for “always” and ‘0’ for other options. The *time taken to reach the scene* was coded ‘1’ if the time indicated by the respondent was within 1 hour from the dispatch call (omitted); ‘2’ if it was less than 2 hours; and ‘3’ if they reported taking more than two hours⁵¹. The option of providing *first responders* and *investigative units* with a sort of *checklist* comprising all the standard procedures to be carried out either at the scene or during the early stages of investigations was coded as ‘1’ for YES and ‘0’ for NO.

Investigative Strategies

The *approach used in managing the case* has been coded ‘1’ if the respondent stated that the investigative strategies were adopted regardless of rank or seniority; ‘2’ in case of rank based; ‘3’ in case of seniority based. The presence or lack of a *cold case unit* has been coded as ‘1’ in case the respondent affirmatively replied about the presence of this type of unit and ‘0’ otherwise.

An effective *communication with media* has been coded ‘1’ in case the respondent replied that an effective coordination with the media is “always” adopted, and ‘0’ in case of the rest of the options. The establishment of *good relationships among other stakeholders*, such as the Prosecutor Office, the Coroner Office and the Forensic, have all been coded ‘1’ if the respondent stated to have established “excellent” relationships and ‘0’ in case of the other options available (“very good”, “satisfying”, “poor”).

⁵¹ The original category “less than three hours” has been changed into the new “more than two hours” as the option “more than 3 hours” resulted never selected.

The possibility to *wire-tap the office waiting room*, the presence/absence of an *interrogation room* and the opportunity, in case of positive response to the previous one, *to have it monitored* by means of an audio/video recording system have all been coded ‘1’ if YES and ‘0’ if NO.

Investigative Techniques

The opportunity to scout the web for monitoring the persons of interest’s *social media account* has been coded ‘1’ if the respondent stated to use such a tool “always” and ‘0’ for the other options available (“often”, “seldom”, “never”). The implementation of a *timeline* has been coded ‘1’ if YES, namely if the respondent stated to use it, and ‘0’ if the reply was NO. The usage of *case analysis software* to manage the complexity of data which are implied in every murder investigation has been coded ‘1’ if YES and ‘0’ if NO.

The assessment of whether the respondent used specific software to perform *phone records analysis* was coded ‘1’ for YES and ‘0’ for NO. The implementation of *specific standard practices* to properly manipulate the *handling of technical devices*, such as smartphones, computers and so forth were coded ‘1’ for YES and ‘0’ for NO. The opportunity to carry out an *IT forensic copy of mobile phones of interest* was coded ‘1’ if the respondent stated that they “always” did this and ‘0’ for the other available options (“often”, “seldom” and “never”). The *autopsy attendance* was coded ‘1’ if the respondent stated that they “always” attended exams and ‘0’ for the other available options (“often”, “seldom” and “never”).

Finally, the opportunity to hold frequent *briefings* to brainstorm about the status of investigations was coded ‘1’ if the respondent reported that they “always” attended such meetings and ‘0’ for the other available options (“often”, “seldom” and “never”).

Control variables

The control variables were selected by examining the most common factors utilized in extant studies on homicide clearance: *victim's gender* and *race* and the *type of weapon* used. For the purposes of this study, rather than evaluating whether there was a potential correlation between these factors and clearance, I chose them as control variables since the focus of the research was solely investigative factors.

The selection process for the aforementioned variables derived from the selection of several other variables previously considered in the literature, namely: victims' age and socio-economic status; motive; and victims' criminal records. Indeed, due to the limitations associated with the scarcity of observations ($N = 98$), selecting control variables that have already been considered was unavoidable. Each variable was tested in a robust logistic dimension-level model in order to assess which variable would best fit the model. Victims' gender, victims' race, the weapon used and macro area location of the murder proved to be the control variables which best fitted each of the four models.

At the same time, I also added another control variable, which was based on the consideration that the murders considered in this study differed markedly in terms of motive, with there being a high volume of organized crime-related homicides in the South (44.9%) in comparison to those committed in the North (26.5%) and the Centre of Italy (28.6%). In order to control for such a discrepancy, I have also included the variable related to the *macro-area* in which the murders occurred.

Since the control variables are dichotomous, the descriptive analysis relies on the same proportion estimation that was utilized for the independent variables.

Table 8. Descriptive analysis of the control variables considered by means of proportion estimation.

	Proportion	Std.Err.	[95% Conf	Interval]
<i>Characteristics of the victims</i>				
<i>Gender</i>				
Male	0.837	0.038	0.748	0.898
Female	0.163	0.038	0.102	0.252
<i>Citizenship</i>				
Italian	0.837	0.038	0.748	0.898
Foreigner	0.163	0.038	0.102	0.252
<i>Geographical area</i>				
North of Italy	0.296	0.046	0.213	0.395
Centre of Italy	0.255	0.044	0.177	0.352
South of Italy	0.449	0.051	0.352	0.550
<i>Incident circumstances</i>				
<i>Use of firearms</i>				
Yes	0.459	0.051	0.362	0.560
No	0.541	0.051	0.440	0.638

From a descriptive perspective, among the control variables there was a high prevalence of male victims (83%). This is a natural consequence of the overall distribution of *victims' gender*, as males were represented in 67.1% (N = 281) of the overall cases and in 84.8% (N = 168) of the whodunit cases, in comparison to women who made up 28.2% (N = 118) and 12.1% (N = 24), respectively.

With respect to *victims' race*, there was a large preponderance of Italian victims (83%), as a result of the prevalence of Italian victims in the overall cases, with 78,5% (N = 329), and in the whodunit murders, with 79,8% (N = 158).

Data related to victims' gender, age and race were originally gathered by means of conducting an open source search of the police dataset, before subsequently being corroborated through specific questions in the survey. Victims' gender was coded as '1' in the event that one or more of the victims were female, and '0' if not. Victims' race was coded as '1' in the event that one or more victims were foreign, and '0' if not. Victims' age was not coded as there was an excessive degree of data uniformity in the range 18-64 (N = 76, namely 77,6%), along with only one juvenile and N = 21 (21,4%) who were over 64-years-old.

Regarding the type of weapon used, there was a slight prevalence (54%) towards other types of weapons than firearms. This data mirrors the situation in Italy, in which 68% of all murder cases (self-solved and whodunit) involve other types of weapons, while 31.4% are perpetrated by firearms. Nevertheless, if we focus our attention solely on whodunit cases, then the percentage of murders committed with firearms increases to 53%. Thus, in a sense, the values expressed in the survey regarding the weapons used in murders position detectives halfway between the values registered in the overall cases and those reported solely in whodunit cases. This variable was coded '1' for firearms and '0' for others.

Finally, with reference to the macro area in which homicides occurred, the South of Italy accounted for almost 45% of the cases, followed by the Centre (25%), and the North which accounted for 29% of cases. Moreover, in this case, the proportion also properly represented the percentage that was reported on a larger scale, as 42.0% of the overall cases were registered in the South, while the North and the Centre were almost equal, accounting for 29.8% and 28.2%, respectively. The disproportionate concentration of murders across the macro areas is exacerbated even further if we consider whodunit cases only; 51.0% of the whodunit cases were registered in the South, compared to 24.7% in the North and 24.2% in the South. This variable was coded as '1' North (omitted); '2' Centre; and '3' South⁵².

⁵² The traditional three-way split implemented by ISTAT was considered.

3.4 Analytical strategy

The aim of the present research is to assess how investigative factors (namely, the forty-six selected independent variables) affect the outcome of murder investigations (the dependent variable). That is to say, the research is examining the probability of an event occurring in light of specific predictors.

The best statistical method to use for our purposes here in this research is logistic regression, a model which enables researchers to establish the relationship between a binary outcome variable and a group of predictor variables (Addington, 2006; Alderden & Lavery, 2007; Braga & Dusseault, 2016; Hawk & Dabney, 2018; Lee, 2005; Lundman & Myers, 2012; McEwen, 2009; Puckett & Lundman, 2003; Regoeczi et al., 2008; Riedel & Jarvis, 1999; Schroeder & White, 2009). When a binary variable is modelled by means of logistic regression, it is assumed that the logit transformation of the outcome variable has a linear relationship with the predictor variable.

Formally, if y is the binary outcome variable that indicates failure/success with 0/1, and p is the probability of y being 1, hence $p = \text{prob}(y=1)$. If we have x_1, \dots, x_k as a set of predictor variables, then the logistic regression of y on x_1, \dots, x_k estimates parameter values for $\beta_0, \beta_1, \dots, \beta_k$ via a maximum likelihood method, which is represented by the following equation:

$$\text{logit}(p) = \log(p/(1-p)) = \beta_0 + \beta_1 * x_1 + \dots + \beta_k * x_k$$

Logistic regression works with binary data, namely the probability of an event happening (1) or an event not happening (0). In the context of the present study, the dichotomy to be considered concerned whether a murder, i.e., the dependent variable, was solved (1) or not (0).

In contradistinction to linear regression, logistic regression does not require a linear relationship between the dependent and independent variables. Moreover, the error terms (residuals) do not

need to be normally distributed. Finally, homoscedasticity is also not required (Hosmer Jr. & Lemeshow, 2004; Long & Freese, 2001).

Despite this, several different assumptions must be taken into account (Hosmer Jr. & Lemeshow, 2004; Long & Freese, 2001). First, binary logistic regression, as aforesaid, requires that the dependent variable is binary; this is the case in the present study, as the possible outcomes are limited to only two possibilities: either a case is solved (1) or it is not solved (0). Second, logistic regression requires the observations to be independent of each other; or, phrased otherwise, they should not come from repeated measurements or matched data. With this in mind, the observations made in the present research derive from 98 surveys administered to detectives.

Third, logistic regression requires there to be little or no multicollinearity among the independent variables, which is to say that the independent variables should not be too strongly correlated with one another. To assess this study's degree of compliance with this assumption, each of the forty-six variables were tested, by means of *pwcorr* STATA command, with a threshold of anything above 0.6 being seen as an indicator of possible multicollinearity.

The selection process that was used to choose the variables that were to be included in the logistic models prioritised those factors that had already been studied in previous research and, in the second instance, to those factors that, based on the qualitative data and my own experience, have been shown to clearly impact on investigations.

In order to select the factors and validate the findings, each one of the forty-six variables was preliminarily measured by means of bivariate analysis (see Annex I); hence, only selecting those factors significantly correlated ($p \leq .05$) with the dependent variable (case solved Yes/No). In the case of those factors that produced significant results, a decision was taken to drop those variables with multicollinearity problems.

What follows is a description of the results from the bivariate analysis, divided according to the ‘four dimensions’ classification.

Of the nineteen factors pertaining to **resource management**, eight were significantly correlated with solving:⁵³ *the circumstance that the LEA involved was specialized in performing murder investigations on an exclusive basis; the experience of detectives in terms of managing homicide cases in the past; the workload of each detective; the opportunity to assign to the same detectives, on a permanent basis, the execution of specific tasks, such as collecting evidence, the location of CCTV cameras, the analysis of CCTV footage; the paperwork needed to start interception activities; and conducting phone records analysis using specific software.*

The following variables were dropped because they were found to not be significantly correlated with solving: the 24/7 availability of an IT forensics unit and an IT forensics lab; the speed of IT forensic lab results; the 24/7 availability of a fingerprints forensics lab; the speed of the fingerprints forensic lab; the 24/7 availability of a DNA forensic lab; the speed of the forensic lab for other exams (ballistic, electronic microscopic, etc.); detectives’ experience in terms of their years of service; manpower available for each unit; detectives’ training; the opportunity to assign to the same detectives, on a permanent basis, the execution of witnesses interviews.

Due to collinearity with the location of CCTV cameras (0.7016), footage analysis was dropped. The former factor was privileged as, in the context of an investigation, it is chronologically antecedent to the latter factor. In addition to this, the workload variable proved to be collinear with detectives’ experience (0.7119). The latter factor was dropped as priority was given to a

⁵³ The variables that were later included in the logistics models are indicated in italics.

factor that is often measured in previous studies (Cook et al., 2017; Liska et al., 1985; Puckett & Lundman, 2003; Rydberg & Pizarro, 2014).

To summarize, after the execution of bivariate analysis, of the 19 variables considered in the resource management model, six factors (31,6%) produced significant results in the bivariate analysis and were shown to not be vitiated by collinearity: *the circumstance that the LEA involved was specialized in performing murder investigations on an exclusive basis; the workload of each detective; the opportunity to assign to the same detectives, on a permanent basis, the execution of specific tasks, such as collecting evidence, the location of CCTV cameras, the paperwork needed to start interception activities, and phone records analysis using specific software.*

Of the nine factors related to ***crime scene activities***, eight proved to be significantly correlated with solving: *the habit of having an officer monitor access to the crime scene; the habit of preserving the integrity of the scene by setting up a safe entry-corridor; the provision of proper equipment to be worn by all personnel who access the crime scene; the establishment of standardized procedures to systematically locate CCTV cameras around the scene and to canvass for potential witnesses; the time taken to reach the scene; the provision of standardized procedures or checklists for both patrol unit personnel and detectives.*

The following variable was dropped as it was shown to not be significantly correlated with solving: the habit of registering the ID of personnel who access the crime scene. Due to the multiple collinearity between the CCTV location factors and canvassing activity (0.6493), proper equipment (0.6968) and detectives' checklist (0.5330), the first variable was dropped.

At the same time, proper equipment was found to be collinear with canvassing activities (0.5958), and, hence, was also dropped. The priority in this case was given to canvassing activities, due to the fact that the use of proper equipment is a well-known standard that is

already implemented worldwide, while canvassing methodology, to the best of my knowledge, remains an underestimated factor in extant literature.

To summarize, of the nine factors associated with crime scene activities, six (66.6%) were found to be significantly correlated with solving and not vitiated by collinearity: *the habit of having an officer monitor access to the crime scene; the habit of preserving the integrity of the scene by setting up a safe entry-corridor; the establishment of standardized procedures to systematically canvass for potential witnesses; the time taken to reach the scene; the provision of standardized procedures or checklists for both patrol unit personnel and detectives.*

Of the ten factors pertaining to **investigative strategies**, five (50.0%) were found to be significantly correlated with solving: *the decision-making process employed by management (based on rank, experience, or irrespective of both); effective coordination with media; good relationships with forensics and Public Prosecutor; the presence of an interrogation room; the opportunity to wire-tap the interrogation room.*

The following variables were dropped as they were found to not be significantly correlated with solving: the presence of a cold case unit; good relationships with the coroner's office; the opportunity to wire-tap interrogation rooms; the opportunity to wire-tap visiting rooms in jail, so as to be able to listen to conversations between arrested individuals and their visitors.

Due to the multicollinearity between good relationships with forensics and the Public Prosecutor (0.6396), I opted to maintain the Public Prosecutor relationship, as it has been extensively considered in previous literature (Braga & Dusseault, 2016; Braga et al., 2018; Carter & Carter, 2016).

Of the eight factors pertaining to *investigative techniques*, four (50.0%) were shown to be significantly correlated with solving:⁵⁴ *the habit of conducting briefings between the stakeholders to facilitate the informational flow; the use of a timeline to pinpoint the investigative milestones in chronological order; the use of software to perform phone records analysis; detectives' attendance of autopsy exams.*

The following variables were dropped as they were found to not be significantly correlated with solving: the habit of monitoring social media profiles of persons of interest; the use of case management software; the habit of providing detectives with standardized procedures for seizing and preserving electronic devices; the habit of executing IT forensics copying of mobile devices belonging to persons of interest.

To sum up, of the eight factors related to investigative techniques, four (50.0%) were found to significantly correlate with solving:⁵⁵ *the habit of conducting briefings among the stakeholders to facilitate the informational flow; the use of a timeline to pinpoint the investigative milestones in chronological order; the use of software to perform phone records analysis; detectives' attendance of autopsy exams.*

In terms of internal consistency, all the aforesaid variables were subsequently tested by means of Cronbach's Alpha Coefficient (all above .60).

After selecting the variables to be included in the models, four robust standard error logistic models, one for each of the four dimensions considered,⁵⁶ were run with the selected variables, omitting those results that correlated with each other,⁵⁷ and controlling for both demographic

⁵⁴ In this case, no problems of multicollinearity were reported.

⁵⁵ In this case, no problems of multicollinearity were reported.

⁵⁶ Resource Management, Crime Scene, Investigative Strategies and Investigative Techniques.

⁵⁷ The threshold considered was a value above 0.6.

(victims' age and race) and case-related variables (weapon used and macro area in which murder occurred).

The methodological process consisted of testing the variables within their respective 'dimension-based' robust logistic models, before proceeding to measure together, in an overall robust logistic model, only those variables which were found to be significant in each 'dimension' ($p \leq .05$).

In order to validate this final model, a robust standard error logistic stepwise analysis was performed, observing the increase in the explained variance by adding one 'dimension' at a time.

Moreover, to further verify the robustness of the overall model, several further robust logistic models were built, which, in accordance with a 'jackknife' resampling technique methodology, removed, one at a time, each of the variables that were found to be significant in the final model in order to assess (observing the change in the pseudo R-squared) whether some variables were able to explain, by themselves, the whole model or the greater part of it (Miller, 1974).

The result of this process produced several predictors, some of which have already been considered in previous studies and others that were unique to this study, which affect, either positively or negatively, homicide clearance. The factors which were found to not be significant were subsequently analysed according to the findings generated from the descriptive analysis.

4. Findings

The findings presented in this chapter comprise both descriptive and inferential statistical analyses of the quantitative and qualitative data deriving from the following datasets: i) the incident dataset, which is composed of 419 murder cases that occurred in Italy in 2014; ii) the whodunit sub-assembly incident dataset (deriving from the aforesaid dataset), which consists of 198 whodunit murder cases that occurred in Italy in 2014; iii) the survey database (deriving from the whodunit sub-assembly incident dataset), which comprises the responses from the survey with 98 detectives who actively participated in an equal number of investigations from the aforementioned datasets.

In the first part of the chapter, *quantitative* data will be explored; for descriptive purposes, the chapter will address the two most common perspectives applied in extant homicide clearance literature: *subjects involved* and *incident-level circumstances*. Every outcome will be discussed through recourse to previous studies. With the express purpose of providing a richer and more complete picture of the nature of homicide in Italy, data will be analysed from both the incident dataset and the whodunit sub-assembly dataset, in order to discern the main differences between them.

For the purposes of this study, the survey dataset was not used, as it comprised only of results that concerned investigations handled by the Carabinieri Corp as opposed to also the State Police. As I will show later, given that there are several differences between the two police forces (not only in terms of the number of cases managed, but also in terms of clearance and geographic distribution), comparing the survey results with the incident-based and whodunit sub-assembly datasets would have introduced a clear bias into the study.

The second part of the chapter is dedicated to describing an interesting cross-analysis between the *qualitative* data that emerged out of the survey administered to detectives. From this point forward, the survey dataset (N = 98) will exclusively be used, due to the fact that information referring to investigative factors were not present in the other two databases.

The qualitative data deriving from the survey allows me to go deeper yet still in my analysis, in that the supplementary descriptive analysis will provide interesting insights into the self-evaluation of the respondents regarding the factors which, in their opinion, either facilitated or hampered the positive solution of the case considered.

The chapter will then proceed to delineate other insights deriving from the survey, firstly by analyzing the potential effect of victims' socio-economic status on the clearance rate, before moving on to examine additional factors that the detectives highlighted as being helpful in managing homicide investigations.

Finally, the concluding part of the chapter reports the results of the *inferential statistical analysis* that was performed on the investigative factors that arose out of the survey dataset. More specifically, the findings of the inferential statistical analysis will be distinguished from the results of the bivariate and logistic analyses of the selected investigative predictors. A step-by-step description of the results will be provided, with the aim of illustrating the whole process that made it possible to progressively isolate several investigative factors which were shown to be significantly correlated with homicide clearance.

4.1 Quantitative results

The analysis presented here considers a range of factors that regularly feature in previous studies on homicide clearance, and refers to the following dimensions:

- *Subjects Involved*: victims' gender, victims' age, victim's nationality, victims' criminal background, number of victims, authors' gender, authors' age, authors' nationality, victim/offender relationship;
- *Incident Circumstances*: murder location (outdoors/indoors); murder location (city/province); time of the murder (night/day); motive; number of arrested people; type of weapon used; type of law enforcement agency; length of the investigation; and the Macro Area (North/Centre/South) in which the murder occurred, which is a factor that exclusively pertains to the Italian context.

Subjects Involved

Regarding the gender of victims, there was a preponderance of male victims both in terms of the cases as a whole and in whodunit cases specifically. Indeed, males constituted 69.0% (N = 289) of the victims in the overall cases and 86.9% (N = 172) of the victims in whodunit cases, compared to women who constituted 30.5% (N = 128) and 13.1% (N = 26), respectively.⁵⁸ This result demonstrates that whodunit cases, which are often organized crime-related, typically involve males rather than women.

It is also interesting to note that, of the total amount of cases that involved female victims, 93.8% (N = 120) of the cases were solved. One must be careful here not to immediately see this

⁵⁸ Such data also comprises cases in which victims' gender was mixed, which amounted to 4.3% (N = 18) in overall cases and 3.0% (N = 6) in whodunit cases. Moreover, in two cases (0.5%) the victim's gender was undeterminable.

finding as corroborating the discretionary perspective; rather, it is a consequence of the fact that the vast majority (81.3%) of homicides committed against females are perpetrated by their spouses and boyfriends, and invariably occur in the domestic sphere, which, in turn, facilitates the subsequent investigative work. Indeed, if we consider only whodunit cases, the clearance rate drops to 76.9%.

More than 80.0% of the overall murder cases involving female victims stemmed from disputes or were motivated by psychotic breakdowns, which are homicides that are generally more straightforward to solve. Moreover, there were no criminal liquidation murders that had female victims. If we consider whodunit cases specifically, then the distribution becomes more balanced, with the key motivating factors being sexual and robbery-related, which are typically harder to solve. This helps us understand the abovementioned drop in the clearance rate (75.0%), which is nevertheless an appreciable result when compared to the situation with men.

With respect to male victims, motivations are less selective. In fact, they are characterized by a far greater degree of heterogeneity, with no one motive being more prevalent than another. In terms of whodunit cases specifically, criminal liquidation is clearly more prevalent, which, as aforesaid, is a motive that does not appear in the statistics related to female victims.

Regarding victims' age, only 5.3% (N = 22) of the overall cases and 2.0% (N = 4) of the whodunit cases involved underage victims. Having said this, the clearance rate for this specific type of victim is outstanding, with 100.0% of cases being cleared. In a similar vein to domestic disputes, more than this perfect clearance rate stemming from any extra commitment on the behalf of the police, the success rate may have more to do with the fact that this type of murder often involves a tight bond between the victim and the perpetrator, which, ultimately, provides far more clues to detectives. In fact, 81.8% of the cases were motivated by "disputes", while only 18.2% were driven by "other criminal" and "unknown" motives.

Concerning the other age-ranges, the outcome is practically equal between the overall cases and whodunit cases, with there being a clear prevalence of victims aged between 26 to 45-years-old: 37.0% (N = 155) in the overall sample and 39.9% (N = 79) in the whodunit cases. This group is followed by 46 to 65-year-olds, who constituted 26.0% (N = 109) and 28.8% (N = 57) of murder victims, respectively; over-65s represented 20.0% (N = 84) and 16.7% (N = 33) of victims, respectively. The least represented category was 18 to 25-year-olds, who accounted for 6.9% (N = 29) and 7.6% (N = 15) of victims in the overall cases and whodunit cases, respectively. Finally, cases in which the victims' ages were mixed represented 4.8% (N = 20) and 5.1% (N = 10), respectively.

In regards to this data, it would appear that homicide in Italy is a crime which is more likely to involve mature people, in light of the fact that 63.0% of the overall cases and 68.7% of the whodunit cases involved subjects ranging from 26 to 65-years-old, and there being only a limited presence of victims who were juveniles and aged between 18 to 25-years-old.

Regarding the race of victims, Italians constituted 78.5% (N = 329) of the victims in the total cases and 78.5% (N = 158) of the victims in whodunit cases. The most represented races, both with respect to overall cases and whodunit cases were: Romanian (5.3% and 5.1%), Albanian (2.6% and 3.0%), Tunisian (1.7% and 1.5%) and Moroccan (1.4% and 2.0%).

The clearance rate for the murders involving victims belonging to these ethnicities is incredibly high and well above the national average: Romanian (90.9%), Albanian (90.9%), Tunisian (85.7%) and Moroccan (83.3%). Consequently, this data contradicts the conception, predicated on a discretionary perspective, that foreigners receive less legal protection, more specifically, less commitment from the police (Black, 1976; Paternoster, 1984).

Figure 14. Clearance rate for homicides involving foreign victims (N = 90).

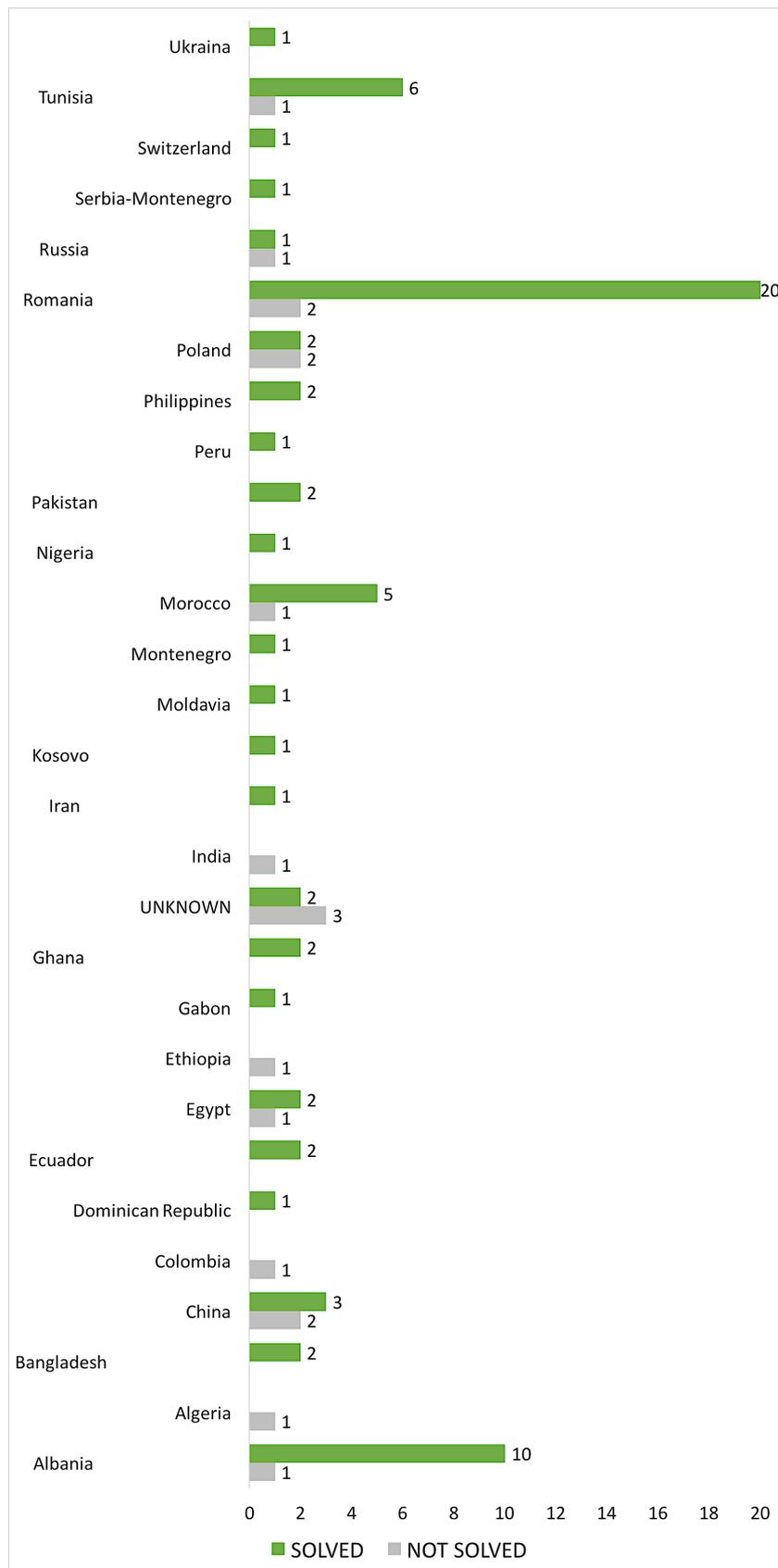


Figure 14 illustrates the clearance rate vis-à-vis the nationality of the victims. As one can discern, there is a preponderance of solved cases (depicted by the orange columns), albeit with the exception of Polish, Russian, Indian, Ethiopian, Colombian and Algerian citizens. In these specific cases, the unsolved investigations were all typically referred to as “hard-to-solve” murders,⁵⁹ and, as such, one could reasonably argue that the low clearance rate stemmed from the inherent difficulties of these cases, as opposed to any prejudice towards the victims.

Regarding victims’ potential criminal records, 50.0% of the victims in whodunit cases⁶⁰ had criminal records, while 48.0% did not.⁶¹ It is interesting to note that the clearance rate was particularly affected by this factor: indeed, among the first category (presence of criminal records), 37.6% of the whodunit cases were solved, compared to 62.4% of cases which involved victims without a criminal record.

Most researchers in the field would interpret this result as corroborating the discretionary perspective (Schroeder & White, 2009). However, it is my contention here that, rather than confirming alleged prejudices on the behalf of the police towards people with criminal records, such findings should be understood as a natural consequence of the inherent difficulties that detectives encounter when investigating individuals with multiple potential links to criminal settings. Indeed, such settings are characterized by the withholding of information from the police, scarce or zero cooperation with the police and, more often than not, outright obstructionism.

Shifting our attention to the analysis of the perpetrator’s perspective, 409 culprits were identified in the total number of solved cases (N = 322), 183 of which referred to solved

⁵⁹ The motives reported for the aforementioned cases were the following: “Criminal others” (Poland); “unknown” (Russia, Ethiopia, Colombia and Algeria); “robbery” (India).

⁶⁰ In this case, given that the aim of this specific analysis is to examine the possible influence of victims’ criminal records on the clearance rate, only whodunit cases were considered, as they comprised both solved and unsolved investigations.

⁶¹ For 2.0% of the cases, it was not possible to assess such data which referred to “unidentified victims”.

whodunit cases (N = 109). The number of authors identified ranged from one to seven. However, whereas in the overall cases the murders committed by one perpetrator were 84.7%, those perpetrated by two were 8.4%, while 3.4% of murders were committed by three perpetrators, these numbers changed markedly vis-à-vis whodunit cases. Specifically, 64.5% of whodunit cases involved one perpetrator, while there was an increase in murders committed by two (17.8%) and three (9.3%) perpetrators, respectively. Therefore, it would appear that whodunit murders are more likely to be committed by multiple perpetrators; indeed, almost one third (32.7%) of the cases reported involved two to four identified perpetrators. This data likely stems from the necessity, particularly in premeditated murders, of a certain level of organization in the execution of a murder.

From the author's perspective, these results confirm that murder is indeed a "male thing". This is because 89.0% of the perpetrators in the overall cases and 88.7% of perpetrators in whodunit cases were male, compared to females who accounted for 9.5% and 6.6% of perpetrators, respectively. There was a limited amount of cases in which the murderer's sex was mixed, accounting for 1.6% of the overall cases and 4.7% of the whodunit cases, respectively.

The results mimic a similar trend that was observed in relation to victims: 64.4% (N = 204) of the overall cases and 58.5% (N = 62) of whodunit cases were committed by adults in the age-range of 26 to 65-years-old. Juveniles were responsible for only 1.3% of the overall cases and 1.8% of whodunit cases.

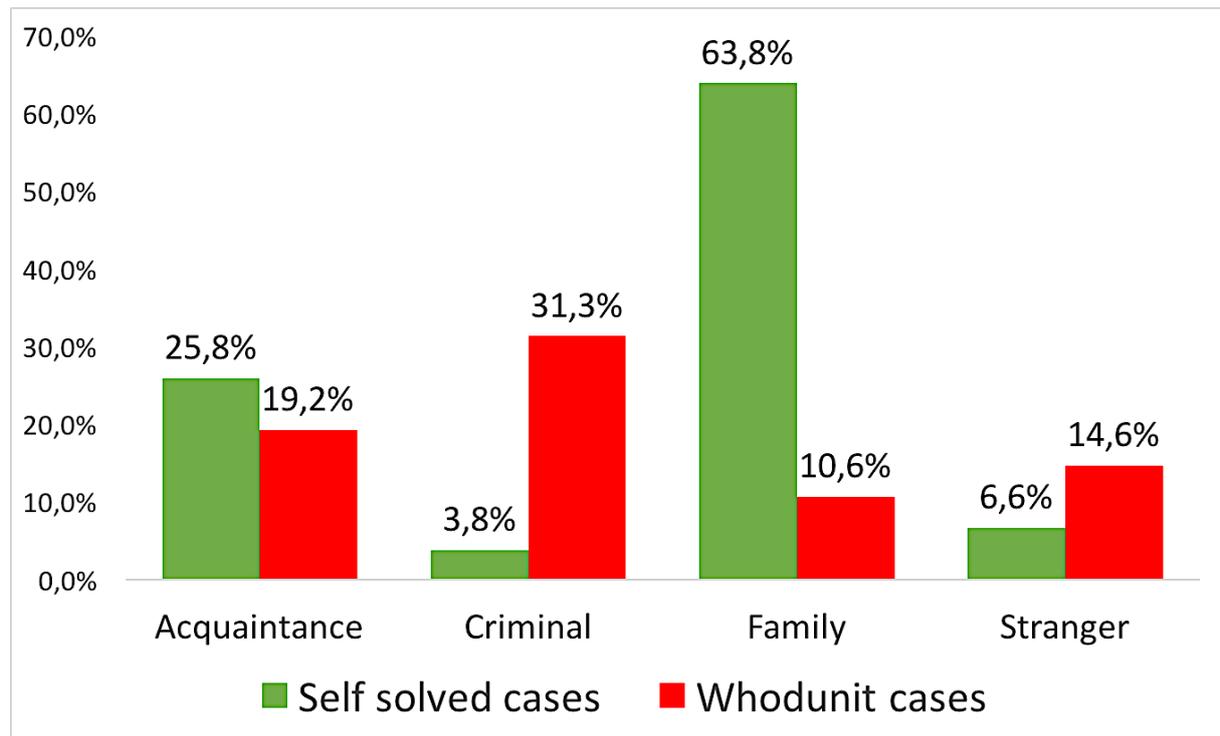
The ethnic distribution of perpetrators was practically identical to the ethnic distribution of victims, with Italians being the most represented group, in that they made up 58.9% (N = 247) of the perpetrators in the overall cases and 44.9% (N = 79) in the whodunit cases. The same aforementioned ethnic groups are represented in equally represented with respect to the overall cases and whodunit cases: Romanian (5.3% and 5.6%, respectively), Albanian (3.6% and 2.0%,

respectively), Tunisian (1.9% and 2.0%, respectively) and Moroccan (1.4% and 1.5%, respectively).

Regarding prior relationships between victims and perpetrators, all relationships designated as “unknown” that pertained to unsolved cases were removed, due to the fact that they involved undefinable relationships. The remaining data was classified according to the information gathered via the open source scanning into the following categories: “familiar relationship” (either kinship, marital or engagement); “acquaintances” (friends, work colleagues, neighbours, etc.); “criminal”; “strangers”.

Of the overall cases, 48.8% involved victims and perpetrators who had a “familiar relationship”, 28.9% involved “acquaintances”, 9.9% of victims had a “criminal” relationship with the perpetrator, while 12.4% were murders committed by “strangers”. With respect to whodunit cases, the percentages were inverted: in only 19.3% of cases did the victim have a “familiar relation” with the perpetrator; 34.9% of cases involved “acquaintances”; 22.0% of victims had a “criminal” relationship with the perpetrator; and 23.9% of murders were committed by “strangers”.

Figure 15. Percentages of different types of victim/perpetrator relationship, as distinguished by the total amount of *solved* cases (N = 322) and solved whodunit cases (N = 109).



Evidently, whodunit cases are those which pose greater difficulties for detectives, in that, generally speaking, there are no links between the victim and the perpetrator. Indeed, the data appears to corroborate this commonly held idea, as in 45.9% of whodunit cases the murderer was either a “stranger” to the victim, or had a “criminal” relationship with them, both of which make it profoundly harder to identify and contextualize.

Incident Circumstances

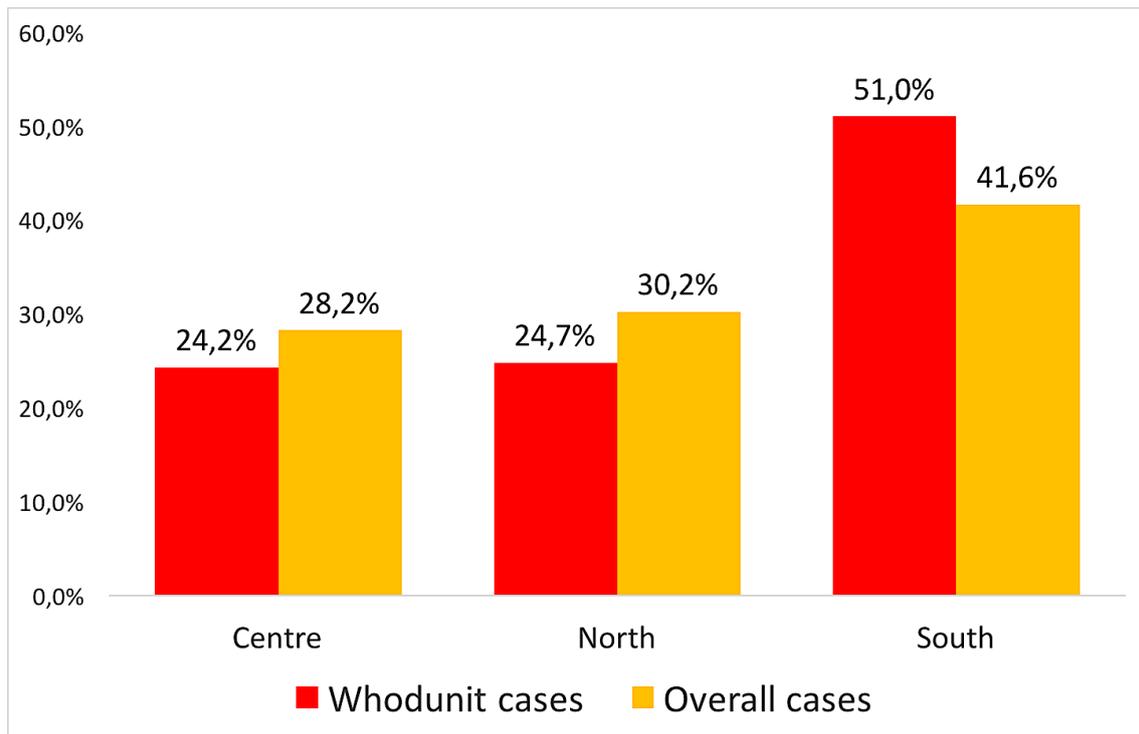
In regards to the factors associated with incident characteristics, the first considered aspect was the location of the murder, that is, whether it occurred indoors or outdoors. Here, the findings appear to corroborate the results from previous studies, which posit that indoor murders are more likely to be solved, due to the fact that the evidence is better preserved and because an indoor location often indicates a personal tie between the victim and perpetrator (Litwin, 2004; Regoeczi, Kennedy & Silverman, 2000; Wellford & Cronin, 1999).

In fact, if we consider all of the cases, 89.2% of them that occurred indoors were solved, compared to 69.2% of homicides that were committed outdoors. However, this assumption is problematized when we solely focus on whodunit cases, as clearance rates drop to 59.6% and 54.2%, respectively. Notwithstanding this finding, it is still remarkable to note that, even when referring to whodunit cases only, the clearance percentage was still higher for the murders that occurred indoors. However, when dealing with professional killers, as is often the case with organized crime-related murders, the clearance percentage plummets to 20.0% and 25.5%, respectively.

Regarding the differences in area in which the homicides occurred, namely either in metropolitan areas or in provinces, the overall dataset shows that slightly more murders are committed in the countryside: 78.9% compared to 72.7% in the cities. Nevertheless, such a difference is annulled in whodunit cases, in which the difference is 55.4% compared to 54.4%, respectively. This can be understood as a further indication that other circumstances (such as motive, presence/absence of evidence, and so forth) apart from mere location might have more to do with this observed variance in clearance rates.

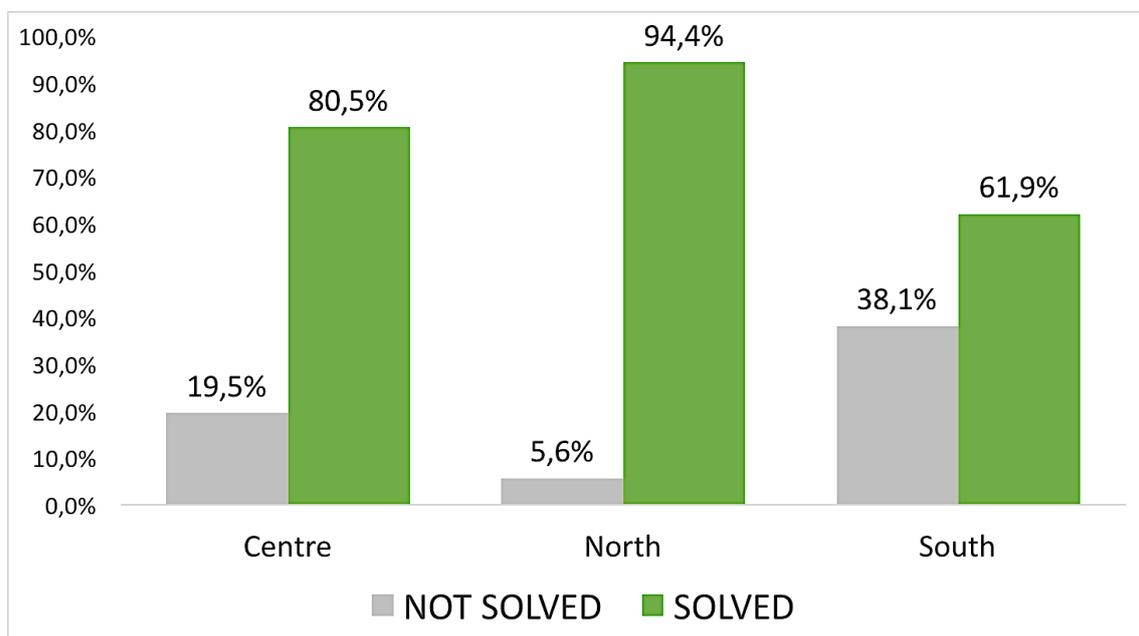
With the express aim of adopting a broader perspective, potential differences in clearance rates among the three macro areas devised to divide the peninsula, North, Centre and South, were also analysed. The first interesting observation was the disproportionate distribution of murder cases, with the South accounting for 42.0%, while the North and the Centre made up 29.8% and 28.2% of the cases, respectively. This uneven concentration of murders across the macro areas is exacerbated further yet still if we consider whodunit cases only: 51.0% of cases were registered in the South, compared to 24.7% in the North and 24.2% in the South. Moreover, following the same line of inquiry, 97.9% of “criminal liquidations” are committed in the South.

Figure 16. Distribution of murder cases across the three macro areas, North, Centre and South, as distinguished by the total amount of cases (N = 419) and whodunit cases (N = 198).



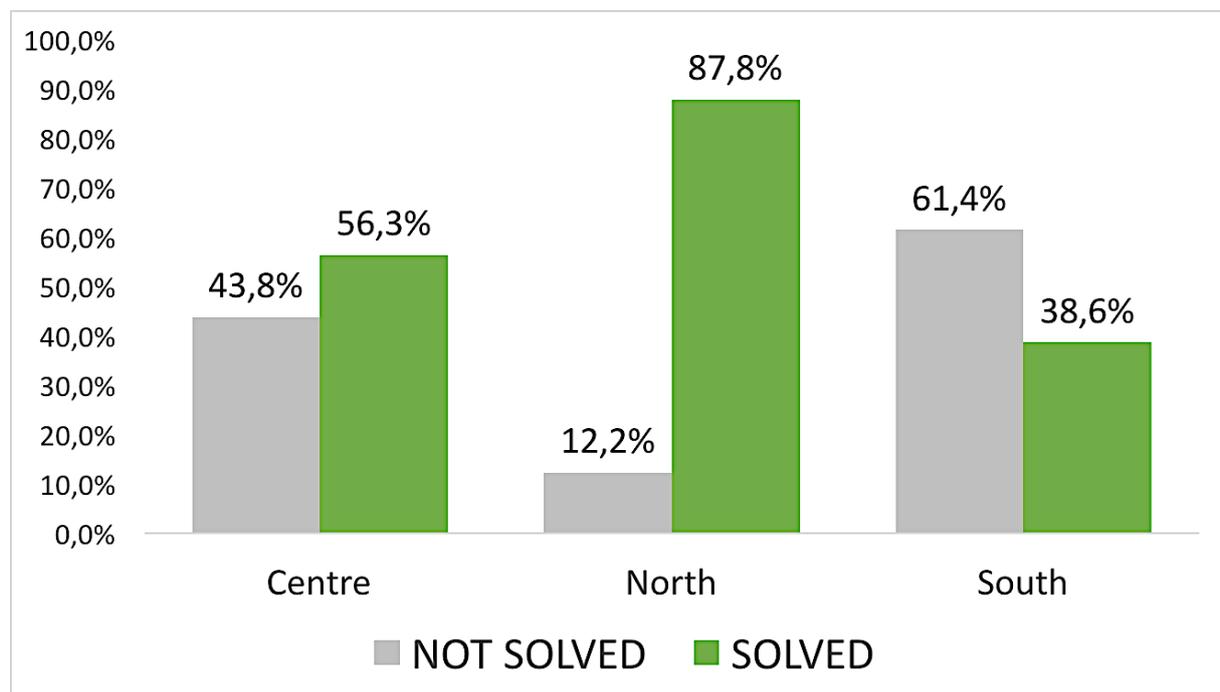
Furthermore, with respect to the clearance rate, the results indicate a massive discrepancy between the three areas, with the lowest value being reported by the South (61.9%), in comparison to a 94.4% clearance rate in the North and 80.5% in the Centre.

Figure 17. Distribution of overall murder cases (N = 419) across the three macro areas, North, Centre and South, as distinguished by solved and not solved cases.



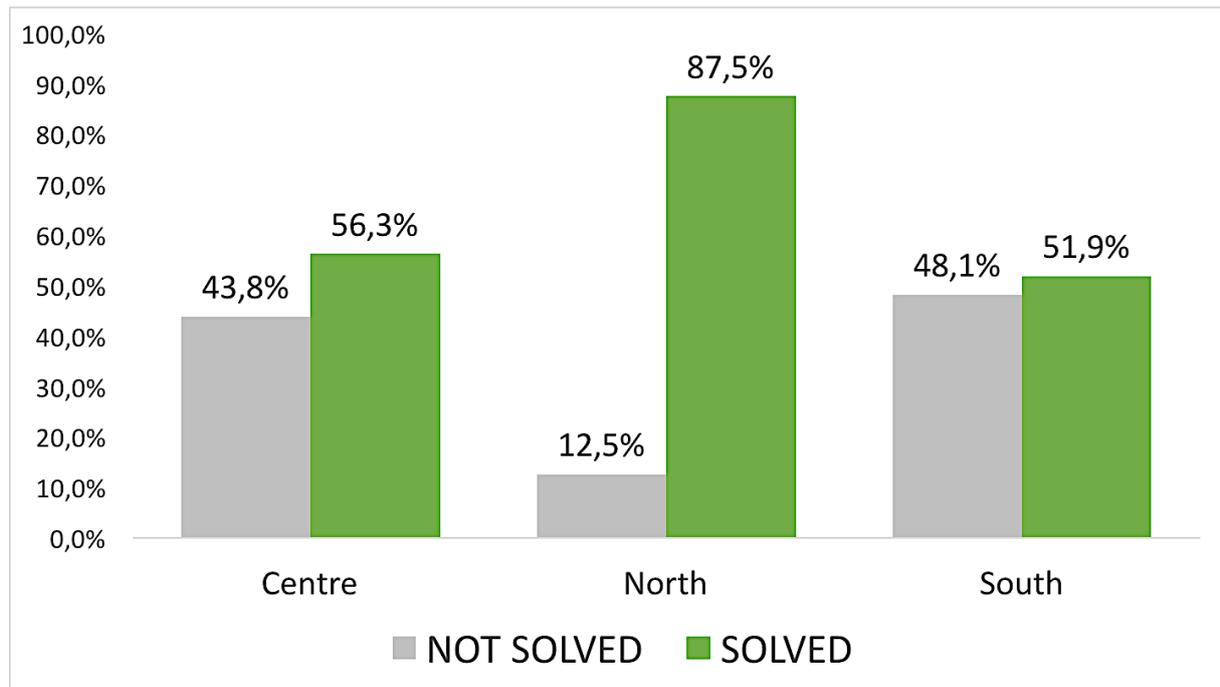
Of course, such an outcome is not surprising, as it is affected by the type of murders that are committed in the South, most of which are driven by the interests of organized crime. Indeed, if we were to focus solely on whodunit cases, then the clearance rate gets even worse, with only a 38.6% clearance rate registered in the South, in comparison to an 87.8% rate in the North and 56.3% in the Centre.

Figure 18. Distribution of whodunit murder cases ($N = 198$) across the three macro areas, North, Centre and South, as distinguished by solved and not solved cases.



On the contrary, if we remove the criminal liquidation cases from the whodunit dataset, then the clearance rate would be as follows: 51.9% in the South, 87.5% in the North and 56.3% in the Centre.

Figure 19. Distribution of whodunit murder cases ($N = 198$) with the exception of criminal liquidation cases across the three macro areas, North, Centre and South, as distinguished by solved and not solved cases.



On the one hand, this testifies to a higher level of performance by northern police forces but, on the other hand, it also reduces the apparent wholly unsuccessful performance of their southern colleagues.

The reasons for such a discrepancy in clearance rates, as will be described in greater detail in the next chapter, are manifold, centring on the high prevalence of criminal liquidation murders that occurred in the south, allied with a heavy workload and certain resistance on the behalf of southern agencies to adjust their procedures to the requisite standards.

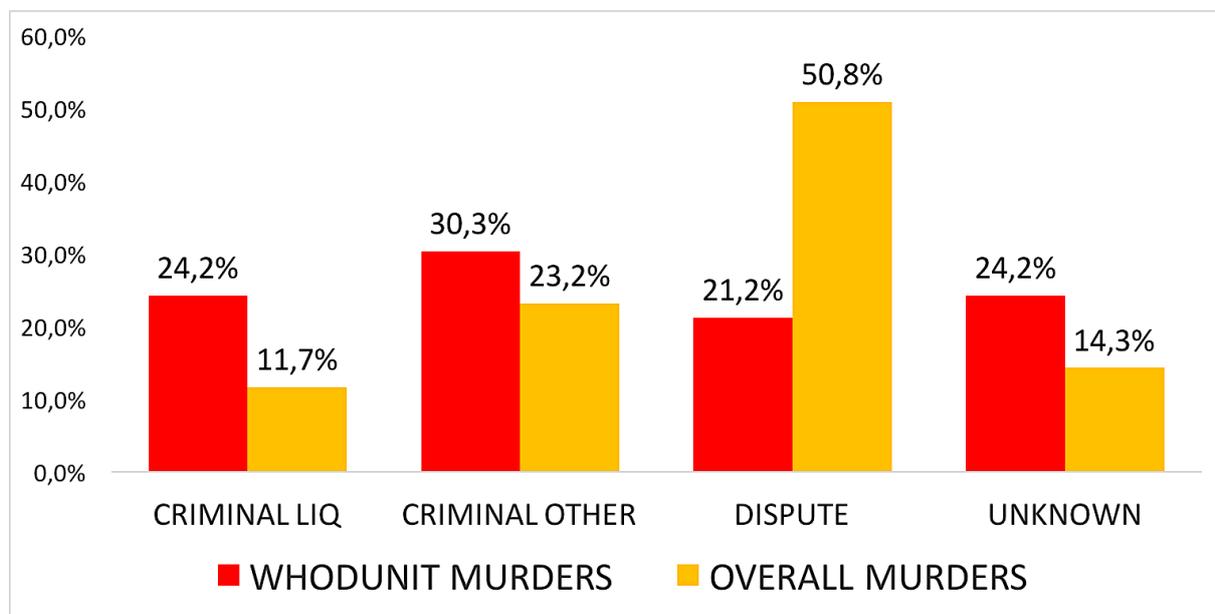
If one delves deeper, then one shall see that extremely interesting insights can be gained from analysing motives, which were classified into “disputes”,⁶² “criminal liquidations”,⁶³ “criminal other” and “unknown”. In addition to this, as per the victim/perpetrator relationship, those unsolved cases which were unquestionably characterized by execution-style mafia-related murders were classified as “criminal liquidations”.

Considering the cases as a whole, the most prevalent motive was dispute, which accounted for 50.8% (N = 213) of the murders, followed by criminal reasons, 23.2% (N = 97), unknown motivations, 14.3% (N = 60), and finally, criminal liquidations, which accounted for 11.7% (N = 49) of cases. If we solely observe whodunit cases, then the percentages become almost inverted, with the most common motive now being criminal, 30.3% (N = 60), followed by criminal liquidations, 24.2% (N = 48), unknown motive, 24.2% (N = 48) and dispute, which accounted for 21.2% (N = 42) of cases. Furthermore, these findings confirm that motives in whodunit cases are primarily grounded in the criminal environment itself, both at the lower- and higher-levels. Such data also corroborates the effectiveness of the criteria used by the police to discern between those cases which do indeed deserve greater investigative effort.

⁶² Comprising both familiarity and acquaintance-based relationships.

⁶³ Comprising only mafia-related murders.

Figure 20. Difference in motive, as distinguished by whodunit cases (N = 198) and overall cases (N = 419).



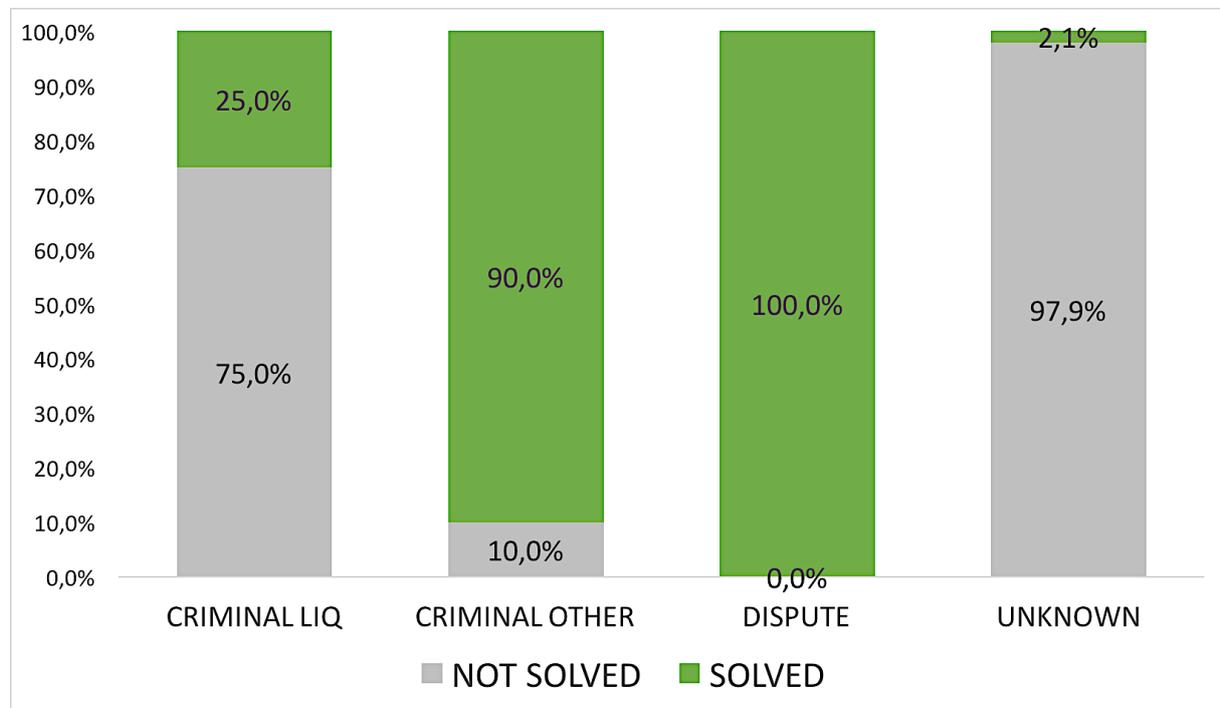
An interesting comparison can be made between whodunit cases if we consider the motive to be pivotal and observe its relationship with other factors considered so far. To cite an example, if we observe the identified perpetrators in the solved criminal liquidation cases (N = 12), we can see that they were all Italians. Given the well-established presence in Italy of multiple foreign criminal organizations (the so-called Russian, Chinese, Nigerian, Albanian “mafia”, and so forth), it is interesting to note that our home-grown criminality is still responsible for the bloodiest murder events.

Another important result concerns the relation between motive and clearance rates. Among whodunit cases, 100% of the cases that were motivated by a dispute were solved. An outstanding percentage was also reported with respect to criminal-related murders (90.0%), while, conversely, only 25.0% of criminal liquidation cases were solved.

If we consider the inherent difficulties of criminal-related murders, specifically in terms of investigating and operating within a criminal environment characterized by withholding information from the police, we can better appreciate such an outstanding result. At the same

time, if we consider the comparatively low clearance rate of organized crime-based murders, then we can understand the extreme difficulties the police face when dealing with these crimes.

Figure 21. Relationship between clearance rate and motive for whodunit cases (N = 198).



Another interesting line of inquiry was to assess the potential relation between murders and the time in which they took place. According to some authors, murders that occur during the night, assuming that there are less witnesses, are far more difficult to solve (Alderden & Lavery, 2007). To investigate the importance of this factor, the time of the murders in the cases considered were discerned from information provided by the media. In 51 cases (12.2% of the total cases), it was not possible to determine the time of the murder, and, hence, they were marked as “undeterminable”.

The results are somewhat surprising, in that there was an equal distribution between murders that occurred during the daytime (43.9%, N = 184) and those that took place at night (43.9%, N = 184). Moreover, the clearance rates are practically the same for night and daytime murders,

with there being only slightly more night time murders solved (79.9%) compared to the daytime (79.3%). Consequently, this suggests that the time factor has relatively little effect on clearance.

Furthermore, among the whodunit cases, the time factor again seems to be of scarce value, in that a higher percentage of night time murders are solved (59.3%) compared to daytime murders (51.3%).

The type of weapon that is used in murders has always received extensive interest from scholars in the field, as due to the commonly held belief that the use of weapon that entails a higher degree of physical contact between the players, such as knives, leads to more evidence (blood, fluids, parts of tissue, etc.), which, in turn, somehow makes detectives' work more straightforward (Alderden & Lavery, 2007; Baskin & Sommers, 2010; Geberth, 2006; Litwin, 2004; Litwin & Xu, 2007; Puckett & Lundman, 2003; Roberts, 2007; Rydberg & Pizarro, 2014; Schroeder & White, 2009; Wolfgang, 1958; Xu, 2008).

In order to evaluate this commonly held belief in extant literature, the different types of weapons were classified as “fire arms” (31.4%) and “other” (68.0%), as well as an “unknown” category, which applied to 3.1% of the overall cases.

The percentages described above indicate that the majority of murders in Italy were committed with weapons other than firearms, such as knives, blunt objects or via purely physical means, such as strangulation, beating, and so forth. Rather predictably, these percentages were reversed to some extent when it came to whodunit cases: 53.0% of whodunit murders were committed with firearms, 44.4% via other means, as well as 2.5% with unknown methods.

Regarding the clearance rate, there was a slightly higher number of murders committed via “other” means (56.8%) than murders committed with “firearms” (40.1%).⁶⁴ If we consider only

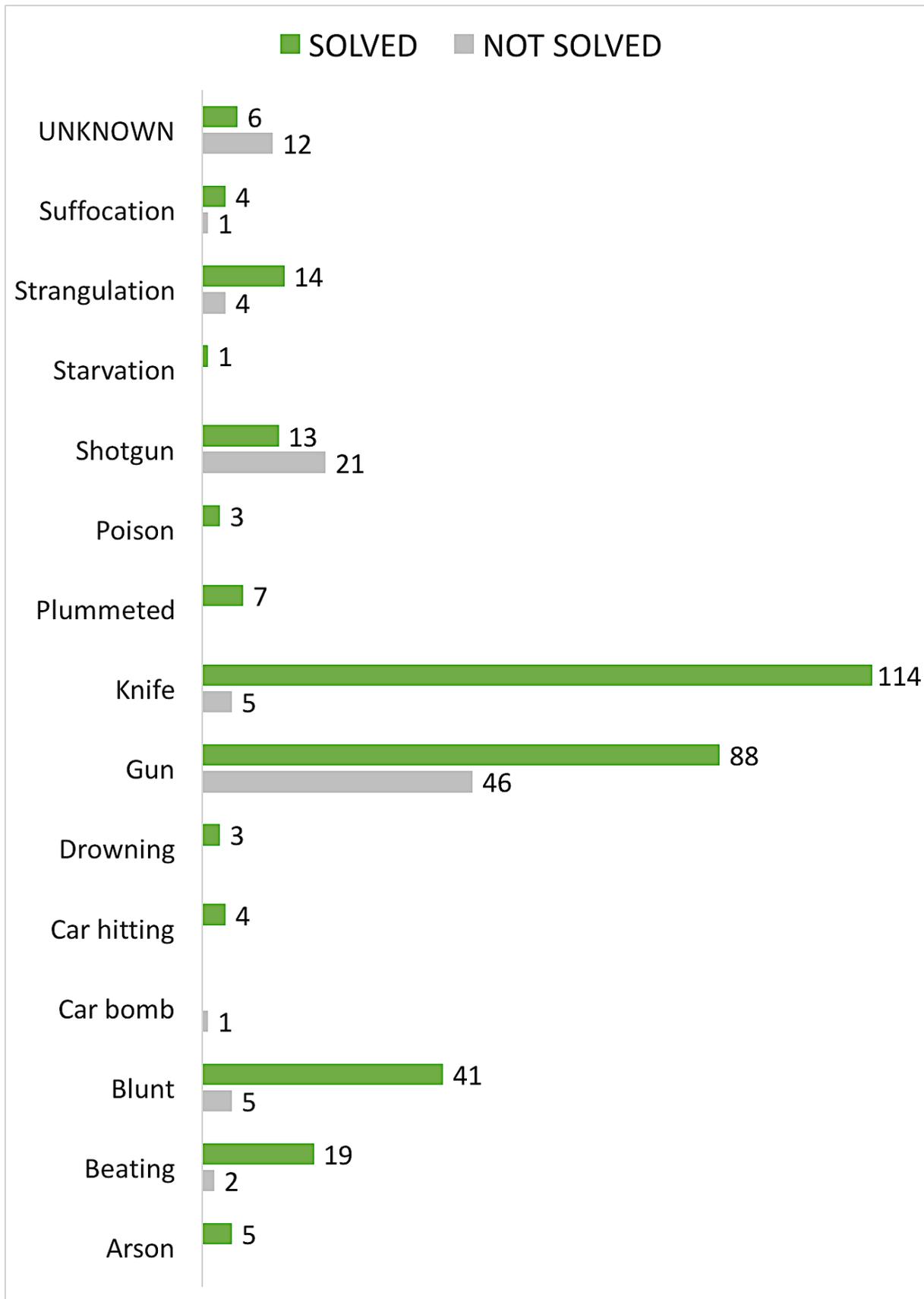
⁶⁴ 3.1% (N = 13) were classified as “unknown” weapons.

whodunit cases, then it is evident that the clearance rate is undoubtedly higher for murders committed by “other” means (78.4%) than murders committed with firearms (36.2%).

In order to mitigate the bias deriving from the inclusion of “criminal liquidation” cases, the same decision was made to drop organized crime-related murders from the whodunit panel. In this case, the clearance rate for whodunit cases not involving mafia killings that were committed via firearms climbed to 45.8%. This indicates that at least part of the difficulty in solving murders committed by firearms can be explained in terms of the intrinsic circumstances of the cases themselves, rather than exclusively being related to the use of these kinds of weapon per se. In summary, then, after removing these aforesaid considerations, it appears that the hypothesis that murders committed with firearms are more difficult to solve is substantially corroborated by the data.

For merely descriptive purposes, the graphic below summarizes all the methods of killing reported in the present study, along with the respective clearance rates for these methods, from which it can be inferred, in accordance with the aforementioned studies, that murders committed with firearms are less frequently solved.

Figure 22. Relationship between clearance rate and the type of weapon used in the overall cases (N = 419).



Since there are two different types of law enforcement agencies considered in the overall murder case dataset (Carabinieri Corp and State Police), it seemed interesting to compare several indicators within the overall cases, as well as looking at the geographical distribution of the cases, and the performance of both police forces.

With respect to the overall cases, Carabinieri Corp were found to be involved in 68.5% of murder cases, in comparison to the State Police who were involved in 28.6%, while 2.9% of cases were undetermined.⁶⁵ This result is not surprising if one is familiar with organization of the Italian police forces, as the Carabinieri Corp are traditionally more spread across the provinces, which accounted for 66.8% of the overall murders, in comparison to cities, which accounted for 33.2% of the total homicides.

Regarding the difference in clearance rate between the two police forces, the Carabinieri come out slightly on top, with 80.1% of the murders they investigated being solved, compared to the State Police's 75% clearance rate. The results are similar in regards to whodunit cases, in which the clearance rate for the Carabinieri Corp was 57.1%, while the State Police had a clearance rate of 52.4%.

Finally, the study considered the length of the investigations for solved cases, classifying the results as follows: i) cases solved within 24 hours; ii) cases solved within one week; iii) cases solved within one month; iv) cases solved within six months; v) cases solved within one year; vi) cases solved within two years; vii) cases that took more than two years to solve.

The above classification enables a comparison between the results from the present study with findings from previous scholars, who attempted to identify effective criteria through which to

⁶⁵ The presence of "undetermined" law enforcement agencies who handled a number of unsolved investigations (N = 12) persisted even after direct contact with detectives from both the Carabinieri Corp and State Police during the survey phase. On different occasions, both sides played a sort of 'blame game', stating that a given investigation had been handled by the other agency and vice versa (#124, #129, #156 of the "Homicide Case Based" dataset).

discern between self-solved and whodunit murders by considering the length of investigations (Puckett & Lundman, 2003; Schroeder & White, 2009; Alderden & Lavery, 2007). Such an approach assumes that self-solved cases are cases that are either solved within 24 hours (Puckett & Lundman, 2003), 48 hours (Schroeder & White, 2009), or one week (Alderden & Lavery, 2007).

Incidentally, for merely descriptive purposes, the last solved case registered in the present study was a “criminal liquidation” murder that occurred on June 17th, 2014 and was solved on July 25th, 2018, after 1499 days of investigating.

The data demonstrates that 53.1% of the overall cases were solved within the first 24 hours, while more than three quarters (75.8%) were cleared in the first month. The clearance rate percentage then progressively decreases thereafter, albeit with the exception of the six month benchmark, which is characterized by an unusual peak in the clearance rate.

If we consider only self-solved cases (N = 212), 99.5% of these were closed within one month and tend to disappear after a sixth month period. Such a latter long process might often be due to the flight of the perpetrators, which, in turn, slows down the time required to make an effective arrest.

The distribution of the clearance rate in whodunit cases (N = 198) is much lower, and, indeed, every time span is characterized by a high degree of fluctuation. The highest peak was witnessed within the first month of an investigation, while a second peak of equal relevance was reported within six months. It is also worthwhile to note that 17.4% of whodunit cases were solved more than one year after the investigations began. Consequently, it would appear that in order to achieve positive results, it is crucial that the police force establish an in-house organization that is granted the time and resources in the long-term to solely devote themselves to investigating the most challenging cases. Figure 22 presents a graph that summarizes the aforesaid data.

Figure 23. The length of investigations for solved cases, as distinguished by self-solved cases (N = 212) and whodunit cases (N = 198).



Finally, the in-depth analysis performed on the length of investigations in whodunit cases partially contradicts the findings of previous studies in the field (Puckett & Lundman, 2003; Schroeder & White, 2009; Alderden & Lavery, 2007). Specifically, data in this study indicate that there are a number of whodunit cases that were cleared both within the first 24 hours (4.6%) and the first week (30.3%). This finding is important, because it suggests that the criteria used to distinguish between self-solved and whodunit cases should be interpreted by other proxies than time.

4.2 Qualitative results

There are significant insights emerging out of the descriptive analysis of the rich data collected from the surveys with detectives. Due to the relative dearth of literature and the difficulties involved with accessing data pertaining to investigative work, the information provided in the survey by the detectives can help to shed light on a setting that is otherwise hard to examine.

Investigative factors

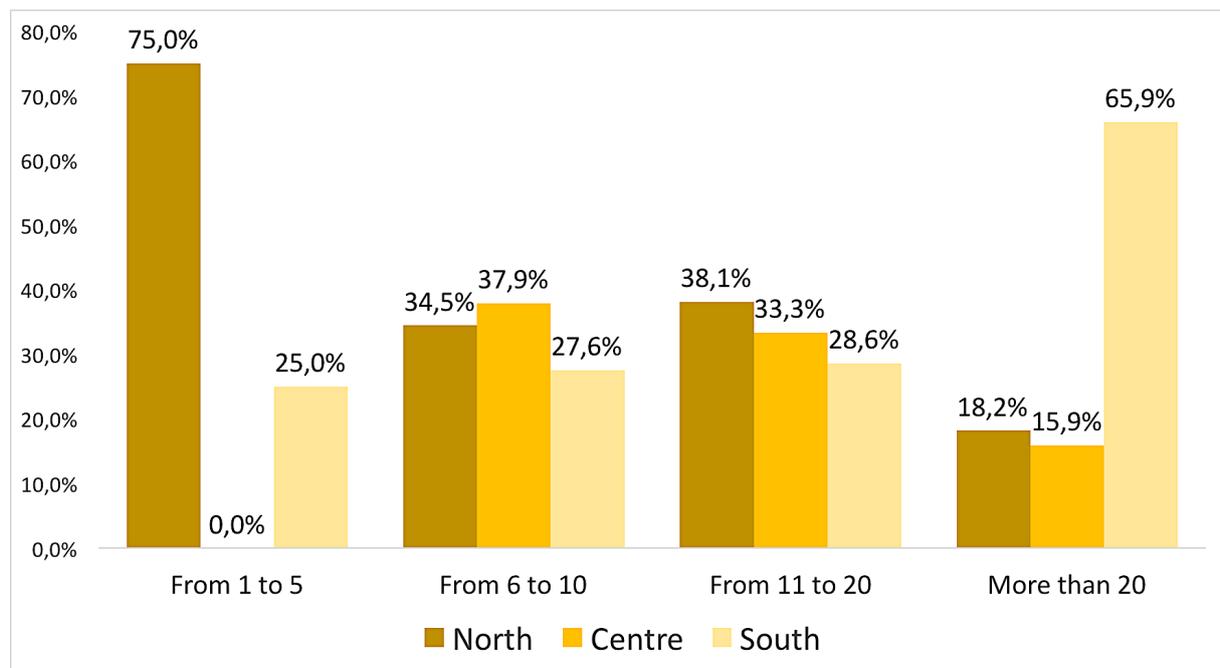
The level of experience held by detectives has received notable interest from researchers, despite the fact that there is a lack of uniformity in the criteria used to assess it, specifically because this type of information is not held in the police database (Puckett & Lundman, 2003). For the purposes of this study, detectives' experience was operationalized as the number of murder cases managed by the survey respondents over the duration of their career.

Somewhat surprisingly, although it is consistent with previous studies, the best performances were reported by detectives who had handled less than five murder investigations: in fact, they had solved four cases out of four (Pizarro et al., 2018). Moreover, three out of four of these cases were “hard-to-solve” cases, which refer to those in which the motives were either coded as “drug-related”, “trivial reasons” and “unknown”.

The detectives who had experience of managing 6 to 10 investigations and 11 to 20 cases performed equally well, reporting a clearance rate of 79.3% (N = 29) and 76.2% (N = 21), respectively. Investigators who had the highest level of experience, that is, who had managed more than 20 cases had a 50.0% (N = 44) clearance rate. Such results are tempered somewhat if we consider the intrinsic difficulties of the cases they managed: half of the 22 unsolved cases were organized crime-related murders, while in 8 cases the motivations were “unknown”.

A further point of interest regarding the experience of the respondents, which is depicted in Figure 26, is that the most experienced detectives operated in the South, while the least experienced worked in the North.

Figure 24. The distribution of detectives' experience (number of murder cases managed) across the three geographical macro areas (N = 98).



Another issue that has been routinely considered in previous studies is the training that detectives have undergone (Braga & Dusseault, 2016; Keel et al., 2009; Pinizzotto et al., 2004; Wright, 2013). 24.5% (N = 24) of the survey respondents stated that they had attended, in the previous five years, an official course on homicide investigation. The data confirmed the findings of previous studies about the positive effect of training on clearance rates; indeed, there was a marked difference in the clearance rates between detectives who had undergone training (79.2%) and their “untrained” counterparts (62.2%).

The data was also in accordance with previous findings on an additional staffing issue, namely workload, which found that the more workload increases, the more the clearance rate decreases (Cook et al., 2017). Indeed, the present study found that police agencies that managed “one

case at a time” had a 93.3% clearance rate, compared to the clearance rates of agencies that either handled “from 1 to 3 cases at a time” (75.0%) or “more than 3 cases” (31.3%).

The findings also strongly corroborated the original hypotheses of this study, which proposed that the implementation of specific best practices pertaining to resource management, crime scene activities, investigative strategies and techniques positively affects homicide clearance. To this end, I will now move onto examine the difference in clearance rate between those respondents who confirmed using a series of initiatives and those who reported that they did not.

As the following analysis shall demonstrate, the former group had a clearance rate that was markedly better than that of the latter group of respondents. It is important to note here that it is not only the strongest performances that are deserving of attention; rather, what is also of interest is the fact that the clearance rates decreased proportionally in a linear curve in relation to whether respondents responded “always” to “never” on the survey questions related to this aforesaid factor.

Although not all of these specific factors were corroborated by the inferential statistical analysis, the adoption of these types of solutions can be interpreted as indicative of a certain professional approach which, in my opinion, can manifest (even indirectly) in an overall increase in the efficiency of the police offices considered in this study.

With reference to the dimension of *crime scene activities*, interesting findings resulted from the practice of providing detectives with checklists comprising a to-do list. In fact, the respondents who reported using such a tool (N = 44) had a much higher clearance rate than those respondents who reported not using checklists (N = 54), specifically 84.1% and 51.9%, respectively. In consideration of this outstanding result, it cannot be excluded that the use of this tool might

affect clearance. This result is also in accordance with similar findings obtained in previous studies (Braga & Dusseault, 2016; Braga et al., 2018).

Other two examples of best practice returned similar results: the habit of having an officer monitor access to the crime scene and the use of an entry log. The latter has recently emerged in the literature as a result of a series of initiatives conducted by the Boston Police Department, which resulted in increased efficiency and a higher clearance rate (Braga & Dusseault, 2017). Similarly, in this study the difference in clearance rates between those who applied these strategies and those who did not were remarkable. Respondents who employed a crime scene monitoring officer either “always” or “often” obtained clearance rates of 85.7% and 93.5%, respectively, compared to those who either “seldom” used it or “never” used it, who had clearance rates of 39.5% and 37.5%, respectively. Regarding the use of an entry log, the differences were similarly evident, with the clearance rates being 86.7% and 95.7% compared to 54.3% and 35.7%, respectively.

The habit of creating a safe corridor through which to reach the crime scene in order to prevent it from contaminations, has hitherto not been considered in the literature, but was included as a result of my own personal experience. The difference in clearance rate between respondents who stated that they either “always” used it or used it “often” and those who “seldom” or “never” used it is quite striking. With respect to the former groups of respondents, the clearance rate was 85.7% and 81.8%, respectively, while for the latter group the clearance rate was 39.4% and 25.0%, respectively.

The adoption of systematic standard procedures to organize the locating of useful CCTV cameras resulted that the detectives who affirmed to use such a strategy “always” or “often” scored 87.5% and 44.8% of clearance rate against 16.7% of those who stated to use it “seldom”. In this case the “never” option obtained 100%, but it referred to only one case. With respect to the question of whether the detectives located potential witnesses via performing systematic

scanning based on standardized procedures, the clearance rates were 93.3%, 50.0% and 15.4% for those who responded “always”, “often” and “seldom”. While those respondents who selected “Never” had a clearance rate of 100%, the number of observations were too limited (N = 2) to draw broader conclusions.

Among the *investigative strategies* factors, the clearance rates achieved by those detectives who took advantage of the presence of an interrogation room that ensured a dedicated confidential space in which to perform interviews and interrogations, was 75.4% compared to a clearance rate of 44.8% for those respondents who replied otherwise. There were similar results if these aforementioned rooms were equipped with an audio/video recording system or not: 88.2% compared to 54.2%. Similar results were also reported vis-à-vis wiretapping the meeting rooms within penitentiaries in order to monitor meetings between people who have been arrested and their relatives, friends, and so on: the clearance rate was 76.9% for those who reported “always” doing so, 67.2% for those who selected “often”, and a 25.0% clearance rate for those who reported “seldom” doing so.

An effective coordination with media partially confirmed such trend, with 88.1%, 52.1% and 25.0% in case of “always”, “often” and “seldom” options. In this case the option “never” resulted 50.0% but with a limited number of observations (N = 4).

Regarding the dimension of *investigative techniques*, monitoring the social media accounts of persons of interest produced equally positive values, albeit they were not characterized by a linear downward trend: the clearance rates were 80.0%, 90.9%, 50.0% and 45.5% with respect to the respondents who selected “always”, “often”, “seldom” and “never” monitoring the social media accounts of persons of interest. The use of a *timeline* had similar results: 94.6%, 63.2%, 25.0% and 33.0%, respectively. Mutatis mutandis for the habit of holding periodic briefings: the clearance rates were 87.3%, 44.7% and 0.0% for those respondents who reported that they “always”, “often” and “seldom” did this. The phone records analysis performed by means of

specific software also replicated what has been described so far: the clearance rate was 72.6% for those who adopted this approach and 28.6% for those who did not. Finally, autopsy attendance also painted a similar picture, with the clearance rate being 90.6%, 75.0% and 11.1% for those who reported “always”, “often” and “seldom” attending autopsies. While there was an exception, in that there was a 100.0% clearance rate for those who “never” attended autopsies, this was only based on two observations.

Those who reported adopting standardized procedures to preserve the integrity of seized computing devices had a clearance of 72.4% compared to a clearance rate of 57.5% of those respondents who reported not adopting this practice. Continuing with this subject, those who reported “always”, “often” and “seldom” when asked whether they performed IT forensic copies of smartphones of persons of interest had clearance rates of 85.7%, 90.3% and 45.1%, respectively. While those who responded “never” had a 100.0% clearance rate, there were a limited number of observations (N = 2).

The only factor which goes against such a trend was the practice of wiretapping the police station waiting room, where the clearance rate of those who did not deploy this practice was higher (73.3%) than the clearance rate of the detectives who did adopt this strategy (65.1%).

The following tables provide an overall picture of the aforementioned analysis.

Table 9. Clearance rate comparison between the presence or lack of specific features pertaining to the *resource management* dimension.

RESOURCE MANAGEMENT DIMENSION	CLEARANCE RATE	N
<i>Detectives' experience (number of murder cases managed)</i>		
Less than 6 in their whole career	100%	4
From 6 to 10 in their whole career	79.3%	29
From 11 to 20 in their whole career	76.2%	21
More than 20 in their whole career	50.0%	44
<i>Detectives' training</i>		
“Yes”	79.2%	24
“No”	62.2%	74
<i>Workload</i>		
One case at a time	93.3%	30
From 1 to 3 cases at a time	75.0%	36
More than 3 cases at a time	31.3%	32

Table 10. Clearance rate comparison between those who used and did not use specific investigative tools pertaining to the *crime scene activities* dimension.

CRIME SCENE ACTIVITIES DIMENSION	CLEARANCE RATE	N
<i>Detectives' checklist</i>		
"Yes"	84.1%	44
"No"	51.9%	54
<i>Crime scene access officer</i>		
"Always"	85.7%	21
"Often"	93.5%	31
"Seldom"	39.5%	38
"Never"	37.5%	8
<i>Crime scene entry log</i>		
"Always"	86.7%	15
"Often"	95.7%	23
"Seldom"	54.3%	46
"Never"	35.7%	14
<i>Safe corridor to reach the scene</i>		
"Always"	85.7%	28
"Often"	81.8%	33
"Seldom"	39.4%	33
"Never"	25.0%	4
<i>Locating CCTV cameras SOP⁶⁶</i>		
"Always"	87.5%	56
"Often"	44.8%	29
"Seldom"	16.7%	12
"Never"	100%	1
<i>Neighbourhood canvassing SOP</i>		
"Always"	93.3%	45
"Often"	50.0%	38
"Seldom"	15.4%	13
"Never"	100%	2

Table 11. Clearance rate comparison between those who used or did not use specific investigative tools pertaining to the *investigative strategies* dimension.

INVESTIGATIVE STRATEGIES DIMENSION	CLEARANCE RATE	N
<i>Police station waiting room bugged</i>		
"Yes"	65.1%	83
"No"	73.3%	15
<i>Presence of an interrogation room</i>		
"Yes"	75.4%	69
"No"	44.8%	29
<i>Interrogation room bugged</i>		
"Yes"	88.2%	34
"No"	54.2%	59
<i>Jail meeting room bugged</i>		
"Always"	76.0%	26
"Often"	67.2%	64
"Seldom"	25.0%	8
"Never"	-	-
<i>Effective media coordination</i>		
"Always"	88.1%	42
"Often"	52.1%	48
"Seldom"	25.0%	4
"Never"	50.0%	4

⁶⁶ Standard Operating Procedures.

Table 12. Clearance rate comparison between those who used or did not use specific investigative tools pertaining to the *investigative techniques* dimension.

INVESTIGATIVE TECHNIQUES DIMENSION	CLEARANCE RATE	N
<i>Monitoring the social media accounts of persons of interest</i>		
“Always”	80.0%	10
“Often”	90.9%	33
“Seldom”	50.0%	44
“Never”	45.5%	11
<i>Use of a timeline</i>		
“Always”	94.6%	37
“Often”	63.2%	38
“Seldom”	25.0%	20
“Never”	33.0%	3
<i>Periodic briefings</i>		
“Always”	87.3%	55
“Often”	44.7%	38
“Seldom”	0.0%	5
“Never”	-	-
<i>Phone records analysis software</i>		
“Yes”	72.6%	84
“No”	28.6%	14
<i>Autopsy attendance</i>		
“Always”	90.6%	53
“Often”	75.0%	16
“Seldom”	11.1%	27
“Never”	100%	2
<i>Seizures of electronic devices SOP</i>		
“Yes”	72.4%	58
“No”	57.5%	40
<i>IT forensics copying of smartphones of interest</i>		
“Always”	85.7%	14
“Often”	90.3%	31
“Seldom”	45.1%	51
“Never”	100%	2

The present statistics also enabled the corroboration of the research hypothesis, which posited that an increase in specialization deriving from via the assignment of specific crucial tasks to the same detectives enhances the general level of efficiency of the unit, which, in turn, positively impacts upon their clearance rate. In this respect, the difference in clearance rate between the respondents who affirmed adopting this practice and those who did not was significant.

The following table summarizes the outcomes and demonstrates the discrepancy between the clearance rates of the two groups, with better performances being registered by those units who always assigned specific tasks to the same detectives.

Table 13. Relationship between clearance rate and the practice of assigning specific tasks to detectives (N = 98).

TASK	Clearance rate
<i>Evidential chain of custody</i>	
Units which assigned the task to the same detective	90.9%
Units which assigned the task randomly	53.8%
<i>Locating CCTV cameras</i>	
Units which assigned the task to the same detective	84.1%
Units which assigned the task randomly	24.1%
<i>CCTV footage analysis</i>	
Units which assigned the task to the same detective	87.5%
Units which assigned the task randomly	26.5%
<i>Paperwork required for interception activities</i>	
Units which assigned the task to the same detective	88.5%
Units which assigned the task randomly	41.3%
<i>Phone records analysis</i>	
Units which assigned the task to the same detective	75.9%
Units which assigned the task randomly	13.3%

Detectives' self-evaluations

This section delineates the qualitative evaluations provided by the respondents (N = 98) concerning the factors which, in their opinion, either facilitated or hindered positive solutions of their respective cases. The analysis is divided into two groups, according to whether the case was solved or not: the first contains evaluations made by the detectives about what they considered to be the most prominent factors that facilitated the solving of cases, while the second comprises what factors they believe hinder the positive solving of cases.

The first group of detectives, who reported solving their cases that were under consideration (N = 65), were asked to provide an evaluation⁶⁷ on the utility of the following potential factors: *the presence of either physical or oral evidence; the presence of CCTV footage; phone records; telephone interceptions; computer forensics activities; informants; cooperation with other agencies and supplementary manpower provision; proper preservation of the crime scene; use of criminal database; surveillance activities; speed of lab results; relationships with forensics,*

⁶⁷ The evaluation was based on the following scale: “very useful”, “quite useful”, “little use”, “factor not present in the investigation”.

coroner, Public Prosecutor and media; prior knowledge of the criminal environment; specificity of the modus operandi; detectives' experience, intuition, ability, commitment, creativity and chemistry within the unit; constructive dialogue among the investigators; executives' ability to provide detectives with the best conditions in which to do their job; use of specific software; interpreters' contributions; fortuity. The following table summarizes respondents' responses; more specifically, it only presents the highest percentages for those factors that the respondents selected as being "extremely useful".

Table 14. Positive Factors indicated by the respondents as being "very useful" for solving cases (N = 65).

<i>Positive factors</i>	North	Centre	South	Overall (average)
Physical evidence	74.1%	70.6%	47.6%	64.6%
Witnesses	77.8%	52.9%	38.1%	58.5%
Phone records analysis	51.9%	58.8%	47.6%	52.3%
Eavesdropping	33.3%	41.2%	42.9%	38.5%
CCTV cameras	25.9%	47.1%	28.6%	32.3%
Telephone interception	33.3%	23.5%	19.0%	26.2%
Fortuity	11.1%	11.8%	4.8%	9.2%

As one would expect, the data indicates that the presence of physical evidence and the availability of witnesses were the most relevant factors for successful investigations. One particularly striking result is that phone records analysis was considered by the detectives to be more important than interception activities. With respect to the latter, it is quite remarkable to see that eavesdropping was considered to be more relevant than traditional telephone interceptions, which, in turn, were deemed to be less relevant than the presence of CCTV footage. Fortuity, according to the detectives, is of little relevance.

In a similar vein, the second group of detectives, that is, those who reported not having solved their cases (N = 33), were asked to evaluate⁶⁸ the utility of the following factors: *the absence of either physical or oral evidence; the absence of CCTV footage; phone records; non-*

⁶⁸ The evaluation was based on the following scale: "extremely relevant", "moderately relevant", "not relevant", "factor not present in the investigation".

cooperative environment; potentially threatened witnesses; poor coordination with other LEAs; contamination of the crime scene; too long a time span between the death and discovery of the corpse; impossibility of determining the cause of death or the victim's identity; slow lab results; poor prior knowledge of the criminal environment; poor relationships with forensics, coroner, Public Prosecutor and media; detectives' lack of experience, chemistry or constructive dialogue; executives' inability to provide detectives with the best conditions in which to do their job; lack of manpower; lack of technical equipment; interception order request not granted by the Judicial Authority; excessive workload; personnel employed in different investigations; excessive media pressure; information leaks; lack of specific software; poor contributions by interpreters. Table 22 summarizes the responses to these factors, specifically the highest percentages reported for those factors that the respondents selected as being “extremely relevant”.

Table 15. Negative Factors indicated by the respondents as being “extremely relevant” to not having solved their cases (N = 33).

<i>Negative factors</i>	North	Centre	South	Overall (average)
Lack of witnesses	100.0%	75.0%	91.3%	87.9%
Lack of manpower	100.0%	62.5%	87.0%	81.8%
Lack of physical evidence	50.0%	25.0%	69.6%	57.6%
Excessive workload	0.0%	62.5%	69.6%	63.6%
Poor equipment	0.0%	0.0%	78.3%	54.5%
Other investigations	50.0%	50.0%	13.0%	24.2%
Inappropriate crime scene preservation	0.0%	0.0%	4.3%	3.0%

As predicted, the lack of witnesses was primarily considered to be the chief reason for investigations failing, especially in the South, which, as aforesaid, is an area characterized, especially in certain regions, by a non-cooperative attitude with the police. The scarcity of cooperation is something that has been identified in previous studies, which posit that a low clearance rate can often be explained as stemming from this non-cooperative attitude in specific communities (Regoeczi & Jarvis, 2013).

Interestingly, the lack of manpower was deemed as being of far greater importance than the lack of physical evidence, especially in the North. Excessive workload was another factor cited as being responsible for negative outcomes in investigations. The fact that detectives might be engaged in additional tasks to murder investigations appears to not be a major factor at all. Similarly, inappropriate preservation of the crime scene was also not considered to be an issue.

Socio-economic status of the victims

The data stemming from the surveys also provided interesting insights into the relationship between the socio-economic status of victims and the clearance rate. One of the central tenets of the discretionary perspective is the hypothesis that the police base their level of commitment upon the SES of either the victim or the place (neighbourhood) in which the murder occurred (Black, 1976; Borg & Parker, 2001; Corsianos, 2003; Litwin, 2004; Litwin & Xu, 2007; Xu, 2008). According to the discretionary perspective, then, disadvantaged victims or areas receive “less law”, and, consequently, result in lower levels of homicide clearance.

Although limited to only one proxy, the data emerging out of the survey phase did not corroborate this hypothesis. The respondents were asked to roughly assess the socio-economic status of the victims in the murder cases they had investigated, by classifying them into one of the following categories: “wealthy”, “middle-class”, “working-class”, “poor”. With the exception of those murders involving wealthy victims (of which there were only two,⁶⁹ not enough to be taken into consideration), the clearance rate for the other three categories, “middle-class”, “working-class”, “poor”, were 68.1%, 64.3% and 71.4%, respectively.

As one can discern from these figures, there was no significant discrepancy in the clearance rates for these three categories; indeed, the most remarkable result involved the “poor” category, which might be considered as the most underestimated type of victims. To

⁶⁹ Besides, one murder was solved and one not.

summarize, although only one SES factor was considered, there was no evidence deriving from the analysis of the survey data to support the discretionary perspective.

Other personal considerations of the detectives

The respondents were given the opportunity, by means of open-ended questions, to provide both statements about other factors which they believed either aided or hindered the positive solution of cases, along with personal considerations about what they found to be helpful in homicide investigations.

With respect to the first category of questions, the detective cited qualities such as tenacity and commitment as being of key importance (#9; #92). This indicates that one of the key factors in solving a homicide was perseverance, a factor which is not only about the personal dispositions of detectives, but rather also must be supported by the organizational structure of the police unit itself, insofar as they can put the investigator in a position to dedicate themselves to a single investigation even over a long period of time. The problem is that this often is undermined by the occurrence of multiple investigations, which are often not related to homicide and lead to a chronic shortage of manpower.

Another recurring consideration in the survey data pertained to the importance of efficient cooperation between investigative units and the local police force, who, due to their knowledge of the territory and the relationship circuits, can often provide extremely useful hints that can kickstart investigations (#94; #104). In order to take full advantage of such resources, it is important to develop and cultivate these kinds of ties, possibly by actively involving the local police Commander in the investigations and including them in any subsequent awards and recognition.

From a more technical point of view, several considerations were registered concerning the necessity of securing a phone records reports over a large period of time in order to have a

clearer picture of an individual's habits and their personal or criminal networks (#9; #92). Moreover, the importance of systematically gathering CCTV cameras, not only directly from the crime scene, but from a wider radius, was also indicated as critical to solving cases (#62; #64; #88).

On the other hand, some detectives were critical of what they saw as poor cooperation between investigative and local police units, and cited this as one of the key factors that hampered investigations (#100). Furthermore, the detectives expressed their dismay at the absence of investigative units that specialized in fighting crimes committed by specific ethnic groups, as this would enable a deeper comprehension of these environments and facilitate the development of potential informants (#102).

4.3 Inferential statistics

Given that the aim of the present study is to observe the possible effect that investigative factors have on the positive outcome of murder investigations, more specifically their relationship with clearance, the most expedient statistical method for analyzing such a relation is logistic regression, which is a model that enables researchers to establish the relationship between a binary outcome variable and a group of predictor variables (Addington, 2006; Alderden & Lavery, 2007; Braga & Dusseault, 2016; Hawk & Dabney, 2018; Lee, 2005; Lundman & Myers, 2012; McEwen, 2009; Puckett & Lundman, 2003; Regoeczi, Jarvis & Riedel, 2008; Riedel & Jarvis, 1999; Schroeder & White, 2009).

After executing the bivariate analysis, of the forty-six variables considered, twenty-one predictors were found to be significantly correlated with clearance rate (at $p \leq .05$), six with respect to the resource management dimension, six associated with crime scene activities, five related to investigative strategies and four concerning investigative techniques. What follows is a recap of those variables, as distinguished by the four considered dimensions.

Resource management: *the circumstance that the LEA involved was specialized in performing murder investigations on an exclusive basis; the workload of each detective; the opportunity to consistently assign specific tasks to the same detectives, such as the collection of evidence, the location of CCTV cameras, completion of paperwork required to start interception activities, and phone records analysis using specific software.*

Crime scene activities: *the habit of having an officer monitor access to the crime scene; the habit of preserving the integrity of the scene by setting up a safe corridor for entry; the establishment of standardized procedures to systematically canvass potential witnesses; the time taken to reach the scene; the provision of standardized procedures or checklists for both patrol unit personnel and detectives.*

***Investigative strategies:** the type of decision-making process used in case management (whether it is based on rank, by experience, or irrespective of both); effective coordination with the media; good relationships with the Public Prosecutor; the presence of an interrogation room; the opportunity of wire-tapping the interrogation room.*

***Investigative techniques:** the habit of conducting regular briefings with the stakeholders to facilitate the flow of information; the use of a timeline to plot the investigative milestones in chronological order; the use of software to perform phone records analysis; detectives' attendance of autopsy exams.*

Each variable was analyzed by means of robust logistic regressions and controlled for both demographic variables (victims' gender and race) and case-related variables (weapon used and the macro area in which the murder occurred), modelling four logistic models that were shaped according to the four dimensions. This methodology is consistent with extent literature on homicide clearance (Hawk, 2015; Keel et al., 2009; Lee, 2005; Litwin, 2004; Litwin & Xu, 2007; Puckett & Lundman, 2003; Wellford & Cronin, 1999a).

The methodological process consisted of testing each variable within its respective 'dimension-based' logistic model, before proceeding to measure in an overall robust logistic model only those variables which were found to be significant in each of the four models. What follows is a description of these results.

Resource Management**Table 16.** Robust logistic regression of the *Resource Management* dimension.

Solved	Odds ratio	St.Err.	t-value	p-value	[95% Conf	Interval]
Resources Management						
Specialized homicide unit	0.736	0.695	-0.33	0.745	0.116	4.683
Workload (one case at a time)	1.000	.	.	.	.	.
Workload (from 1 to 3 cases)	0.137	0.203	-1.34	0.180	0.007	2.500
Workload (more than 3 cases)	0.004 ***	0.005	-3.93	0.000	0.000	0.059
Chain of custody TASK	0.944	0.837	-0.07	0.948	0.166	5.363
CCTV locating TASK	12.552 ***	11.573	2.74	0.006	2.060	76.470
Paperwork needed for wire-tapping TASK	6.955 **	5.584	2.42	0.016	1.441	33.555
Phone records analysis TASK	100.779 ***	111.265	4.18	0.000	11.577	877.279
Controls						
Victim female	0.784	0.816	-0.23	0.815	0.102	6.026
Victim foreign	0.245 *	0.193	-1.78	0.074	0.052	1.148
North	1.000	.	.	.	.	.
Centre	0.166	0.189	-1.57	0.115	0.018	1.552
South	2.515	3.247	0.71	0.475	0.200	31.595
Firearms	1.512	1.347	0.46	0.642	0.264	8.663
Constant	0.060	0.145	-1.17	0.242	0.001	6.648
Mean dependent var		0.663		SD dependent var	0.475	
Pseudo r-squared		0.616		Number of obs	98.000	
Chi-square		44.862		Prob > chi2	0.000	
Akaike crit. (AIC)		74.128		Bayesian crit. (BIC)	107.733	
*** p<0.01, ** p<0.05, * p<0.1						

The model for Resource Management returned an appreciable pseudo R² (61.6%). Four out of the six variables were found to be significant: *heavy workload* (more than three cases managed at the same time); *assigning specific tasks to the same detectives, such as CCTV camera collection, phone records analysis, and preparing paperwork needed for interception activities.*

These results, which are in accordance with previous studies, demonstrate that in the cases of ‘*heavy workload*’ (which in the context of this study constitutes more than three murder investigations being managed at the same time), the odds of clearance are 99.6% lower than in the control case (managing one investigation at a time) (Carter & Carter, 2016; Cook et al., 2017; Wellford & Cronin, 1999a). Moreover, the hypothesis according to which specific and articulated tasks should be assigned to the same detectives to foster greater specialization, and, in turn, produce better results was confirmed by the analysis, in that they were each shown to have very high odds ratio values. Specifically, the *assignment of phone records analysis*

increased the odds of clearance by one-hundred times, *locating CCTV cameras* increased the odds of clearance by twelve times, while *preparation of the paperwork required to perform interception activities* increased the odds by six times. Consequently, for these three factors, the odds of solving a case were 99.0%, 92.6% and 87.4% higher than the control cases.

Lastly, in this case one extra-legal factor, the circumstance that the victim was foreigner, resulted negatively correlated with solving.

Crime Scene

Table 17. Robust logistic regression of the *Crime Scene* dimension.

Solved	Odds ratio	St.Err.	t-value	p-value	[95% Conf	Interval]
Crime Scene						
Crime scene access officer	0.752	0.580	-0.37	0.712	0.166	3.413
Safe corridor to reach the scene	0.896	0.594	-0.17	0.869	0.245	3.282
Neighbourhood canvassing S.O.P.	8.277 **	7.367	2.38	0.018	1.446	47.371
Time taken to get to scene <1h.	1.000	.	.	.	.	.
Time taken to get to scene <2h.	0.174 *	0.162	-1.88	0.060	0.028	1.080
Time taken to get to scene <3h.	0.071 **	0.080	-2.35	0.019	0.008	0.645
Patrol unit checklist	2.048	1.624	0.90	0.366	0.433	9.689
Detective checklist	2.505	1.618	1.42	0.155	0.706	8.886
Controls						
Victim female	0.603	0.597	-0.51	0.609	0.087	4.201
Victim foreign	0.780	0.708	-0.27	0.784	0.132	4.620
North	1.000	.	.	.	.	.
Centre	0.419	0.409	-0.89	0.373	0.062	2.837
South	0.447	0.414	-0.87	0.384	0.073	2.745
Firearms	0.379	0.242	-1.52	0.128	0.108	1.324
Constant	12.480 ***	10.022	3.14	0.002	2.586	60.226
Mean dependent var	0.663				SD dependent var	0.475
Pseudo r-squared	0.381				Number of obs	98.000
Chi-square	37.545				Prob > chi2	0.000
Akaike crit. (AIC)	103.530				Bayesian crit. (BIC)	137.135

*** p<0.01, ** p<0.05, * p<0.1

The Crime Scene model returned a pseudo R² of 38.1%. Two out of six of the factors were found to be significant to solving: *systematic neighbourhood canvassing by means of SOP* and *the time taken to reach the scene*.

The proper *system-based locating and interviewing of potential witnesses* increased the odds of solving by up to eight times, which is to say that the odds of solving the case were 89.2% higher

than the control case. This result corroborated previous work in the field (Braga & Dusseault, 2016). As predicted, and as has been observed in other research, a *delay in reaching the scene* was found to be negatively correlated with clearance, especially in the case of a delay of more than two hours, where the odds of clearance are 92.9% lower than in the control case (within one hour) (Wellford & Cronin, 1999a). Further, with respect to arriving on the scene with a delay of more than one hour and up to two hours, the odds of clearance were 82.6% lower.

Investigative Strategies

Table 18. Robust logistic regression of *Investigative Strategies* dimension.

Solved	Odds ratio	St.Err.	t-value	p-value	[95% Conf	Interval]
Investigative Strategies						
Decision-making process regardless of rank or seniority	1.000	.	.	.	.	.
Decision-making process based on seniority	0.143	0.173	-1.60	0.109	0.013	1.540
Decision-making process based on rank	0.759	0.935	-0.22	0.823	0.068	8.479
Effective media coordination	17.689 ***	16.572	3.07	0.002	2.820	110.959
Relationship with Public Prosecutor	11.075 *	15.110	1.76	0.078	0.764	160.584
Interrogation room	2.032	1.446	1.00	0.319	0.504	8.194
Interrogation room bugged	1.733	1.581	0.60	0.547	0.290	10.359
Controls						
Victim female	0.330	0.452	-0.81	0.418	0.023	4.833
Victim foreign	0.457	0.536	-0.67	0.504	0.046	4.545
North	1.000	.	.	.	.	.
Centre	0.118 **	0.121	-2.10	0.036	0.016	0.872
South	0.053 **	0.065	-2.40	0.016	0.005	0.581
Firearms	0.155 **	0.131	-2.20	0.028	0.029	0.815
Constant	31.686 **	52.185	2.10	0.036	1.256	799.356
Mean dependent var	0.663		SD dependent var	0.475		
Pseudo r-squared	0.498		Number of obs	98.000		
Chi-square	30.595		Prob > chi2	0.001		
Akaike crit. (AIC)	86.871		Bayesian crit. (BIC)	117.891		

*** p<0.01, ** p<0.05, * p<0.1

The Investigative Strategies model explains 49.8% of the solved cases. Among the factors considered, two produced significant results: *effective coordination with the media* and *good relationships with the Public Prosecutor*. The first was shown to increase the odds of solving by up to seventeen times, while the latter did so by almost eleven times, which means that the probability of solving cases was 94.6% and 91.7% higher than the corresponding control cases.

This result corroborates the findings of previous literature (Braga et al., 2018; Carter & Carter, 2016; Wellford & Cronin, 1999a).

In this case, more than one extra-legal factors, the circumstance that firearms have been used and the area in which the murders occurred, resulted negatively correlated with solving.

Investigative Techniques

Table 19. Robust logistic regression of *Investigative Techniques* dimension.

Solved	Odds ratio	St.Err.	t-value	p-value	[95% Conf	Interval]
Investigative Techniques						
Periodic briefings	6.292 ***	4.071	2.84	0.004	1.771	22.359
Timeline	4.207	3.774	1.60	0.109	0.725	24.412
Phone records analysis	1.560	1.198	0.58	0.563	0.346	7.030
Autopsy attendance	0.330	0.225	-1.63	0.104	0.087	1.254
Controls						
Victim female	0.498	0.372	-0.93	0.351	0.115	2.155
Victim foreign	0.463	0.408	-0.87	0.383	0.082	2.610
North	1.000	.	.	.	.	.
Centre	0.099 **	0.100	-2.30	0.022	0.014	0.712
South	0.127 **	0.111	-2.36	0.018	0.023	0.705
Firearms	0.309 *	0.213	-1.70	0.089	0.080	1.195
Constant	10.201 **	11.445	2.07	0.038	1.131	91.974
Mean dependent var	0.663			SD dependent var	0.475	
Pseudo r-squared	0.418			Number of obs	98.000	
Chi-square	39.772			Prob > chi2	0.000	
Akaike crit. (AIC)	92.872			Bayesian crit. (BIC)	118.721	
*** p<0.01, ** p<0.05, * p<0.1						

Finally, the Investigative Techniques model explained 41.8% of homicide investigation clearance. In this case, only one variable, which has already been proven to have a positive effect on clearance, that is, the habit of conducting *frequent briefings* to foster the flow of information between units, was found to be significantly correlated with clearance (Braga & Dusseault, 2016). The model returned a high correlation and increased the odds of solving by up to six times, in comparison to the non-utilisation of such a tool, which is to say that the probabilities of solving a case were 86.3% higher.

Also in this case, the use of firearms and the area in which the murders occurred, resulted negatively correlated with solving.

The Overall Model

All the aforementioned variables which were found to be significantly correlated with clearance in each respective dimension-based model, were then used to build an overall robust logistic model, with the specific aim of isolating those investigative factors that significantly impact on the overall investigative process.

Table 20. Robust logistic regression of the *Overall* dimension.

Solved	Odds ratio	St.Err.	t-value	p-value	[95% Conf	Interval]
Overall						
Workload (one case at a time)	1.000	.	.	.	.	.
Workload (from 1 to 3 cases)	0.187	0.271	-1.16	0.247	0.011	3.187
Workload (more than 3 cases)	0.002 ***	0.003	-4.19	0.000	0.000	0.036
CCTV locating TASK	11.811 *	17.141	1.70	0.089	0.687	203.050
Paperwork needed for wire-tapping	49.698 ***	69.628	2.79	0.005	3.190	774.271
Phone records analysis TASK	23.179 ***	25.637	2.84	0.004	2.652	202.568
Neighbourhood canvassing S.O.P.	0.680	1.130	-0.23	0.816	0.026	17.634
Time taken to get to scene <1h.	1.000	.	.	.	.	.
Time taken to get to scene <2h.	40.805	102.838	1.47	0.141	0.292	5700.654
Time taken to get to scene <3h.	3.554	8.385	0.54	0.591	0.035	362.427
Effective media coordination	65.655 ***	64.091	4.29	0.000	9.690	444.831
Relationship with Prosecutor	4.057	10.189	0.56	0.577	0.030	556.967
Periodic briefings	27.868 ***	30.440	3.05	0.002	3.276	237.076
Controls						
Victim female	0.078 **	0.084	-2.38	0.017	0.010	0.639
Victim foreign	0.181	0.211	-1.47	0.143	0.018	1.780
North	1.000	.	.	.	.	.
Centre	0.002 ***	0.004	-2.63	0.008	0.000	0.197
South	0.020 **	0.034	-2.25	0.024	0.001	0.602
Firearms	2.548	3.150	0.76	0.449	0.226	28.732
Constant	0.023	0.080	-1.08	0.280	0.000	21.473
Mean dependent var	0.663			SD dependent var	0.475	
Pseudo r-squared	0.753			Number of obs	98.000	
Chi-square	66.663			Prob > chi2	0.000	
Akaike crit. (AIC)	64.877			Bayesian crit. (BIC)	108.821	
*** p<0.01, ** p<0.05, * p<0.1						

The overall model explains 75.3% of the homicide investigation clearance. Six factors were found to be significant, two of which had already been identified in previous studies and four which have hitherto not been considered in the field of homicide clearance.

First, *heavy workload* was found to be negatively correlated with solving: in the case of managing “more than three” cases (compared to handling a single investigation at a time), this variable was shown, as it has been in previous studies, to have an extremely high negative odds

ratio (Carter & Carter, 2016; Schroeder & White, 2009; Wellford & Cronin, 1999a). More specifically, in the present study, the odds of clearance were 99.8% lower than in the control case. Moreover, a workload of managing more than one case at a time (from one to three) also produced a negative correlation, although it was not significant.

The hypothesis according to which specific tasks should be assigned to the same detectives to increase specialization and produce better results was also confirmed in the overall model. Specifically, the *assignment of phone records analysis* increased the odds of clearance by up to twenty-three times, the *locating of CCTV cameras* increased the odds by up to eighteen times, while *preparing the paperwork required to perform interception activities* increased them by almost fifty times. Statistically speaking, the probability of solving cases were 95.8%, 92.2% and 98.6% higher than the respective control cases.

The establishment of *effective cooperation with the media* was shown to increase clearance by up to sixty-five times more, while the habit of conducting *periodic briefings* among unit members increased the odds by up to twenty-seven times. That is to say, the chances of solving a case were 98.5% and 96.5% higher than the corresponding control case. With regards to the latter factor, such results corroborate the findings of previous studies (Braga & Dusseault, 2016; Carter & Carter, 2016).

Two extra-legal factors resulted negatively correlated with clearance: the circumstance that the victim was female and the area in which the murder occurred, which is like saying that the chance of clearance are 92% lower than in case of male victims and 99% or 98% lower if the murder occurred, respectively, in centre or south instead of north area.

In order to validate this overall model, an additional stepwise modelling strategy was performed in order to examine the independent and cumulative gain of prediction in the variance explained by adding each domain⁷⁰ (Hosmer Jr. & Lemeshow, 2004; Long & Freese, 2001).

Adding the Investigative Strategies dimension to the Resource Management one resulted in an appreciable increase (8%) in the model's explained variance, while also adding the Investigative Techniques dimension led to another scale up (3%).

Table 21. Supplemental Robust Standard Error Logistic Regressions of the Overall Model: Stepwise Analyses (Resource Management (RM); Investigative Strategies (IS); Investigative Techniques (IT))

	RM	IS	IT
INDEPENDENT VARIABLES			
Workload (one case at a time)	0.000 (.)	0.000 (.)	0.000 (.)
Workload (from 1 to 3 cases)	-1.987 (1.39)	-1.638 (1.23)	-2.129 (1.20)
Workload (more than 3 cases)	-5.754*** (1.42)	-6.292*** (1.62)	-5.594*** (1.44)
Locating CCTV cameras TASK	2.551* (0.99)	2.448* (1.15)	1.395 (1.30)
Paperwork needed for Wire-tapping TASK	1.944* (0.85)	2.416* (1.08)	2.424* (1.04)
Phone records analysis TASK	4.621*** (1.11)	5.013*** (1.41)	3.660*** (1.10)
Effective media coordination		2.938*** (0.82)	3.098** (0.96)
Periodic briefings			2.168* (1.00)
CONTROLS			
Victim female	-0.219 (1.05)	-1.000 (0.89)	-1.738 (1.03)
Victim foreign	-1.347 (0.73)	-1.710 (1.03)	-0.951 (1.15)
North	0.000 (.)	0.000 (.)	0.000 (.)
Centre	-1.766 (1.22)	-2.297 (1.53)	3.371* (1.67)
South	0.984 (1.29)	0.690 (1.26)	-1.286 (1.38)
Firearms	0.419 (0.90)	0.509 (1.08)	0.363 (1.14)
Constant	-2.920 (2.16)	-4.046 (2.66)	-2.044 (2.48)
Pseudo R2	0.6151	0.6962	0.7253

⁷⁰ The order of block entry was not theorized as being relevant.

To further verify the robustness of this model, six further robust logistic models were built, removing each of the aforementioned variables one at a time in order to assess, via observing the change in the pseudo R-squared, whether some variables were able to explain by themselves the whole model or the greater part of it (Miller, 1974).

The following table illustrates the results, which corroborate the robustness of the overall model. In fact, the removal of every variable resulted in a slight shift of the pseudo R-squared (within the range of 4 to 10 percentage points each), with the only exception being the ‘workload’ factor, which decreased by fifteen percentage points, a value which leaves the overall robustness of the model unchanged.

Table 22. Supplemental Robust Standard Error Logistic Regressions of the Overall Model: comparison of models with one significant independent variable removed at a time.

Omitted:	Workload	CCTV Task	Paper Task	Phone Task	Media coord.	Briefing
solved						
victim female	-1.072 (1.22)	-1.781 (0.93)	-1.634 (1.17)	-2.177 (1.11)	-0.496 (0.97)	-1.000 (0.89)
victim foreign	-0.499 (0.94)	-0.921 (1.46)	-0.763 (1.05)	-0.411 (1.08)	-1.375 (1.07)	-1.710 (1.03)
North	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Centre	-2.576* (1.01)	-4.217* (2.06)	-2.212 (1.32)	-3.799* (1.71)	-2.572* (1.27)	-2.297 (1.53)
South	-3.025** (0.97)	-2.438 (1.37)	-1.764 (1.37)	-2.918* (1.33)	0.285 (1.41)	0.690 (1.26)
Firearms	-0.503 (0.73)	0.083 (1.03)	-0.326 (0.90)	-0.283 (0.91)	0.632 (1.12)	0.509 (1.08)
Locating CCTV TASK	1.481 (0.77)		1.922* (0.95)	1.199 (1.19)	1.760 (1.05)	2.448* (1.15)
Paperwork TASK	1.682 (0.86)	2.764** (0.94)		2.338* (0.95)	2.110* (0.91)	2.416* (1.08)
Phone analysis TASK	1.602 (0.91)	3.360** (1.21)	3.725*** (0.88)		4.233*** (1.24)	5.013*** (1.41)
Media coordination	2.916** (1.12)	3.282*** (0.89)	3.254* (1.36)	3.814** (1.24)		2.938*** (0.82)
Periodic briefing	2.124* (0.90)	2.879** (1.08)	2.088* (0.94)	2.904** (1.09)	2.027* (0.89)	
Workload (1 case)		0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Workload (1 to 3)		-2.595* (1.26)	-2.204* (1.09)	-2.354* (1.10)	-2.094* (1.04)	-1.638 (1.23)
Workload (more than 3)		-5.567*** (1.51)	-4.510*** (0.96)	-4.718*** (1.10)	-5.767*** (1.53)	-6.292*** (1.62)
Constant	-1.492 (1.39)	-0.276 (1.78)	-1.233 (1.55)	2.020 (1.89)	-2.772 (2.19)	-4.046 (2.66)
Pseudo R2	0.6129	0.7149	0.6861	0.7019	0.6563	0.6962

Moreover, with respect to all the aforementioned significant variables, the VIF value that tests for collinearity was well below the threshold of 5.0.

Table 23. VIF test of the independent variables pertaining to the Overall dimension model.

VARIABLE	VIF	1/VIF
Workload (one case at a time)	-	-
Workload (from 1 to 3 cases at a time)	1.47	0.682014
Workload (more than 3 cases at a time)	2.23	0.447484
Locating CCTV TASK	1.77	0.566533
Paperwork needed for interception TASK	1.41	0.710135
Phone records analysis TASK	1.36	0.733002
Media coordination	1.21	0.826191
Periodic briefings	1.55	0.645892
Victim female	1.17	0.854746
Victim foreigner	1.12	0.894352
North	-	-
Centre	1.57	0.637659
South	2.87	0.348843
Firearms	1.48	0.673474
Mean VIF	1.60	

In summary, the following factors pertaining to Resource Management, Investigative Strategies and Investigative Techniques dimensions were found to be significant in the overall robust logistic model:

Resources Management: *Workload; Task management (CCTV footage collection); Task management (bureaucratic activities needed for wire-tapping); Task management (phone records analysis software).*

Investigative Strategies: *Media Coordination.*

Investigative Techniques: *Frequent briefings among units.*

The overall model proved to be robust, as none of the abovementioned variables was found to be capable of explaining, in and of themselves, neither the overall final model nor even an appreciable part of it. In contrast, none of the variables found to be significant in the **Crime Scene** model were shown to be significant in the overall model.

The statistical analyses conducted on each factor either corroborated the findings of previous studies (*workload* and *briefing*) or validated newly conceived predictors. Such findings emphasize the inherent complexity of investigative work, especially in the field of homicide. Above all, the results highlight the negative impact of excessive workload, such as managing more than three cases simultaneously, on a single police unit. The wide range of operations that must be performed, as well as the ability needed to manage the voluminous data generated in such investigations, are highly important responsibilities that require time and space for mental reflection, which does not sit well with the continuous assignment of tasks and duties associated with handling overlapping cases.

The *assignment of specific tasks to the same personnel* appears to positively impact upon outcomes, which confirms the hypothesis that the whole investigative process would benefit from an increase in professionalism among the unit (Braga & Dusseault, 2016; Carter & Carter, 2016; Pizarro et al., 2018).

Finally, murder investigations have also been confirmed as being a type of work in which the flow of information plays a crucial role. The large amount of data stemming from several sources, such as witnesses' statements, telephone interceptions, criminal database and so forth, must be properly conveyed and analysed in order to prevent the irreparable loss of information.

Factor analysis

Despite these aforesaid positive results, certain models did suffer from problems associated with overfitting, due to the high number of variables compared to the limited number of observations (N = 98).

In order to control for this specific issue, a factor analysis was implemented; factor analysis is a suitable correlational method which simplifies data by reducing individual items down into fewer dimensions (Bryant & Yarnold, 1995; Harman, 1960).

The purpose of factor analysis is to group similar variables into dimensions by identifying the correlation between them, with the specific aim of identifying and describing the so-called ‘underlying factors’, that is, the common pattern which explains the variance and covariance between the variables.

With this in mind, the variables that were used to conduct the four dimensions-based logistic regressions models (N = 21) were manipulated by factor analysis to identify a potential common pattern capable of explaining the variance between them.

Two of these variables, ‘good relationship with the Prosecutor’s Office’ and the ‘habit of using a timeline’ were dropped to enable the proper functioning of the measurements. The remaining variables were treated by means of a polychoric correlation, a technique which is commonly applied in survey research to estimate correlations by using rating scales with a limited number of response options. All the variables were further manipulated via a varimax rotation method in order to make the outputs more understandable.

This aforesaid process reported sixteen factors, two of which comprised two or more variables each: factor1 and factor5. The first identified a positive correlation between two variables that referred to technical issues (the habit of assigning CCTV camera locating to the same detective and the custom of using software devoted to phone records analysis); two pertaining to the crime scene (the establishing of a safe corridor to reach the scene, and the proper canvassing of the neighbourhood); and one that referred to the flow of information among the unit (periodic briefings). The second factor identified two variables, one related to the crime scene (the use of checklists by patrol units and detectives), and one pertaining to the interrogation process (presence of an interrogation room).

Therefore, from a content perspective, the factor analysis identified two, partially overlapping, underlying patterns: one that was more prone to the exploitation of new technologies and the

proper management of crime scenes, and another more ‘old-school’ oriented pattern that again referred to the effective handling of the crime scene and interview/interrogation techniques.

Table 24. Factors resulting from factor analysis. Rotate, varimax horst blanks (.4) command on STATA (blanks represent abs(loading)<.4). The columns highlighted in green colour represent the factors used to perform the subsequent robust logistic regression analysis.

Variable	Factor1	Factor2	Factor4	Factor4	Factor5
Resources Management					
Specialized homicide unit					
Excessive workload					
Chain of custody TASK					
Locating CCTV TASK	0.7663				
Paperwork needed for wire-tapping TASK			0.8868		
Phone records analysis TASK		0.5510	0.4757		
Crime Scene					
Crime scene access officer					
Safe corridor to reach the scene	0.8228				
Neighbourhood canvassing SOP	0.6901				
Delay in getting to crime scene					
Patrol unit checklist				0.4076	0.6789
Detective checklist					
Investigative Strategies					
Decision-making process				-0.9030	
Effective media coordination					
Relationship with Prosecutor					
Interrogation room	0.5157				0.7205
Interrogation room bugged					
Investigative Techniques					
Periodic briefings	0.9144				
Timeline					
Phone records analysis	0.5144				
Autopsy attendance		-0.9665			

Factor1 and factor5, that emerged out of factor analysis, were subsequently merged into a robust logistic regression model along with the control variables. Although only one of the two factors was found to be significant, both factors reported an acceptable odds ratio, which means that the factor analysis effectively managed the problem of overfitting.

Table 25. Robust logistic regression of the factors emerging out of the factor analysis.

Solved	Odds ratio	St.Err.	t-value	p-value	[95% Conf	Interval]
Factors						
Factor1	7.306 ***	4.626	3.14	0.002	2.112	25.270
Factor5	2.302	1.241	1.55	0.122	0.800	6.620
Controls						
Victim female	1.155	1.050	0.16	0.874	0.194	6.861
Victim foreign	0.264	0.227	-1.55	0.122	0.049	1.426
North	1.000	.	.	.	.	.
Centre	0.115 **	0.100	-2.49	0.013	0.021	0.630
South	0.097 ***	0.080	-2.83	0.005	0.019	0.488
Firearms	0.228 ***	0.126	-2.67	0.008	0.077	0.674
Constant	10.512 **	9.927	2.49	0.013	1.652	66.910
Mean dependent var	0.663			SD dependent var	0.475	
Pseudo r-squared	0.339			Number of obs	98.000	
Chi-square	33.899			Prob > chi2	0.000	
Akaike crit. (AIC)	98.762			Bayesian crit. (BIC)	119.441	
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$						

To summarize, as one can discern from the above table, the factor analysis produced remarkable results. Firstly, it corroborated findings of the logistic regression pertaining specifically to the use of new technologies (phone records analysis and CCTV camera locating) and the custom of conducting periodic briefings with investigators. Secondly, it introduced two factors that were associated with the only dimension that was dropped from the logistic analysis, namely the crime scene dimension, particularly the precautionary measure of establishing a safe corridor to reach the scene and the creation of SOP to effectively canvass the neighbourhood.

Furthermore, also in the case of use of factor analysis, some extra-legal factors resulted negatively correlated with clearance: the area in which the murder occurred and the use of firearms.

With the aim to describe the factor arisen both in the logistic and factor analysis, what follows are tables which summarise respective findings.

Table 26. Summary of the significant results from the logistic regression. Factors have been distinguished between each model and the overall model (red and green colours refer to negative and positive correlations, respectively).

Variable	R.M.	C.S.	I.S.	I.T.	Overall logistic Model
<i>Resources Management</i>					
Homicide specialized unit					
Workload (more than 3 cases)	-				-
Chain of custody TASK					
CCTV locating TASK	+				+
Wire-tap needed paperwork TASK	+				+
Phone records analysis TASK	+				+
<i>Crime Scene</i>					
Crime scene access officer					
Safe corridor to reach the scene					
Neighbourhood canvassing S.O.P.		+			
Time on scene <2h.		-			
Time on scene <3h.		-			
Patrol units checklist					
Detective checklist					
<i>Investigative Strategies</i>					
Decision-making process regardless of rank or seniority					
Decision-making process based on seniority					
Decision-making process based on rank					
Effective media coordination			+		+
Relationship with Public Prosecutor			+		
Interrogation room					
Interrogation room bugged					
<i>Investigative Techniques</i>					
Periodic briefings				+	+
Timeline					
Phone records analysis					
Autopsy attendance					

Table 27. Comparison of the significant results from the logistic regression and factor analysis.

Variable	Logistic overall model	Factor analysis
<i>Resources Management</i>		
Specialized homicide unit		
Workload		
Chain of custody TASK		
CCTV locating TASK		
Paperwork needed for wire-tapping TASK		
Phone records analysis TASK		
<i>Crime Scene</i>		
Crime scene access officer		
Safe corridor to reach the scene		
Neighbourhood canvassing SOP		
Time taken to get to scene		
Patrol unit checklist		
Detective checklist		
<i>Investigative Strategies</i>		
Decision-making process		
Effective media coordination		
Relationship with Prosecutor		
Interrogation room		
Interrogation room bugged		
<i>Investigative Techniques</i>		
Periodic briefings		
Timeline		
Phone records analysis		
Autopsy attendance		

In so doing, it appears that the factor analysis enabled the identification of a common pattern, which partially replicated the findings provided by the logistic regression analysis, along with the addition of certain factors pertaining to the crime scene.

Overall, then, the majority of the results arising from the logistic statistical analysis were found to be more closely related to the resource management dimension, whereas the results from the factor analysis were more spread across all the four dimensions. In a certain sense, the logistic measurements appear to emphasize personnel specialization with respect to the new technologies, while the factor analysis, although also underlining the relevance of these aspects, combined them with ‘old-fashioned’ forms of investigating, namely ‘talking to the right people’ (neighbourhood canvassing SOP) and proper preservation of the crime scene (safe corridor).

5 Discussion

The extensive information emerging out of the analysis of the considered databases, that is, the “homicide case-related” (N = 419), the “whodunit case-related” (N = 198) and the “survey” (N = 98), have provided crucial insights into the investigative process involved in homicide cases, which has been under-explored in the field, in conjunction with corroborating key aspects of the research hypotheses which underpinned this research.

In fact, the statistical analyses confirmed the impact of certain investigative factors on positive outcomes in homicide cases, which have been identified in extant research, and, in turn, corroborated the research hypotheses. While, interestingly, predictors that have been routinely considered in other research were not validated from an inferential perspective, they were nevertheless shown to have an indirect positive effect on clearance from a descriptive point of view.

At the same time, inferential statistics corroborated certain research hypotheses, for example, it empirically demonstrated the effect on clearance of several novel investigative factors that have either hitherto not been studied or only considered at an embryonic level. Moreover, while other newly conceived predictors were not validated by the inferential statistical analysis, they did produce remarkable results vis-à-vis their potential correlation with clearance in both the descriptive analysis and the rich data generated from the survey administered to detectives.

In order to provide the broadest possible picture of the phenomenon under consideration, the present chapter provides a summary of the overall results by not only considering the findings from the inferential statistical analysis, but also by cross-referencing these results with the information derived from the descriptive analysis. In addition to this, the chapter then proceeds

to consider the discrepancies that emerged between both the geographical regions in Italy and the different types of investigative units considered in the research.

With this aim in mind, the chapter is structured in the same order as the original hypotheses. That is to say, the chapter discusses the results in relation to the four dimensions, by first discussing those investigative factors which were corroborated in the inferential statistical analysis, before then focusing on those predictors which, although not statistically significant, were found to be of significance in the descriptive analysis.

5.1 Summary of the main findings

The findings reported an acceptable level of clearance rate in Italy, with 76.8% of overall murder cases being solved. This result ranks Italy's clearance rate as being higher than, for example, the US (65.0%) and Canada (75.0%), but still lower than other Western countries such as France (80.0%), England & Wales (85.0%), Netherlands (80.0%) or Germany (88.0%) (Liem et al., 2018).

From a geographical perspective, the South was found to have the lowest clearance rate of the macro areas, with only 61.9% of the overall cases being solved and only 38.6% of the whodunit cases, compared to the North that had clearance rates of 94.4% and 87.8% and the Centre which had clearance rates of 80.5% and 56.3%, respectively. As explicated in the findings chapter, these results are more likely a consequence of the intrinsic difficulties of the murders that occurred in the South (97.9% of the forty-nine mafia-related homicides that were perpetrated in Italy in 2014 were committed in the South), rather than signalling any incompetence on the behalf of the police units operating in that region.⁷¹

⁷¹ If we remove the 'criminal liquidation' cases from the whodunit dataset, we would get the following rebalancing of the clearance rate: 51.9% in the South, 87.5% in the North and 56.3% in the Centre, respectively.

There were also discrepancies found between the North, Centre and South regarding the implementation of the various best practices and techniques addressed in the present study; of particular note was the lack of adjustment to and implementation of innovative initiatives by southern commands.

Moreover, the *workload* appeared to be unequally distributed between the areas, with southern agencies invariably being constrained and forced to manage more than three cases simultaneously. Specifically, 56.5% of southern police detectives, 12.0% from the Centre, and 0.0% of detectives in the North managed more than three cases at the same time.

Another relevant result, which in some respects can be considered as the other side of the coin of the previous factor, pertained to *manpower*, specifically those units composed of less than five detectives each. This lack of manpower was extremely common in the Centre and the South, scoring 20.0% and 26.1% respectively, in comparison to 6.9% in the North. If we only consider unsolved cases, then these percentages increase to 25.0% in the Centre, 30.0% in the South, while the North decreases to 0.0%, respectively. This means that a quarter of the central units and one third of the southern units were forced to investigate cases with less than five detectives.

With respect to the outcomes deriving from both the police and survey data, it can be inferred that there are several reasons for such a discrepancy between the southern agencies and the rest of the country: on the one hand, they are an outcome of the difficult criminal and social environment in which the police must operate, and, on the other hand, they are a result of both ineffective resource management and a reluctance to change old investigative habits.

There were further discrepancies found in the clearance rates between the two police forces which conduct murder investigations, the Carabinieri Corp and State Police, with the former performing slightly better (80.1%) than the latter (75.0%). Due to the impossibility of acquiring

qualitative data from the State Police, the only objective data which could help to provide a potential explanation for this difference in the clearance rate was the fact that the State Police handle more criminal liquidation cases than the Carabinieri (28.6% compared to 22,6%).

Within each police force, there were also found to be relevant differences in the clearance rate between the primary (65.7%) and auxiliary units (82.0%), respectively. Considering the chronic shortage of manpower and material resources which auxiliary units have to deal with, this data demonstrates that the quality of the human resources that they have at their disposal are undoubtedly outstanding. The discrepancy in the clearance rate could instead be understood as resulting from the fact that primary units tend to handle more criminal liquidation cases than their auxiliary counterparts (26.1% compared to 17.1%).

Finally, the following is a summary of the remarkable results that were obtained by means of the logistic and factor analyses, which partially corroborated some of the research hypotheses that posit that certain investigative factors affect clearance. All the factors that were found to be significantly correlated with clearance will hereafter be described in relation to both their corresponding hypothesis and previous research in the field.

In addition to this, further support for the statistical outcomes will be provided by considering the insights deriving from the qualitative analysis of the survey responses of the detectives.

The remaining variables that were found to not be significant will be addressed solely for descriptive purposes, making reference to the qualitative data that emerged out of the survey.

Resource management dimension

Drawing our attention specifically to investigative factors, the statistical analyses enabled the partial corroboration of the two research hypotheses pertaining to the resource management dimension. The decision to evaluate the factors associated with the resource management dimension derives from the consideration that, despite the wide range of technical innovations at the disposal of investigators, what often makes the difference in every kind of investigation is the human factor.

Within such a framework, the objective was to investigate a complex and multi-faceted series of activities and procedures - established at the executive level – whose intention is to enable the effective use of both human and technical resources, namely: human resource management; training and deployment; lab exams organization; permanently assigning to the same detectives specific crucial tasks (neighbourhood canvassing and witness management, locating and subsequent footage analysis of CCTV cameras from the scene, specific paperwork activities, etc.).

The inferential statistics reported four significant variables as being correlated with clearance: a *heavy workload* (defined as more than three cases being handled at the same time); permanently assigning to the same detective the *paperwork needed to perform interception activities*; the *activities of gathering CCTV cameras*; and *phone records analysis* using specific software. In a similar vein, factor analysis also validated the relevance of assigning to the same detective the *activity of gathering CCTV cameras from in and around the crime scene*.

This partially confirms hypothesis n.1, according to which “specific investigative factors pertaining to the resource management dimension such as (...) the *detectives’ workload* are likely to affect the positive outcome of the investigations” (Cook et al., 2017; Wellford & Cronin, 1999a). At the same time, these findings also corroborate hypothesis n.2, according to

which “*the assignment of specific tasks always to the same detectives on a permanent basis* might foster their professionalism in executing such duties and is likely to produce better results in terms of homicide clearance”.

The other factors cited in hypothesis n.1, that is, the *speed of lab results*, *detectives’ experience*, *the manpower available*, and *investigators’ prior training*, were found to not corroborate the hypothesis, even in the descriptive statistics, albeit with the exception *investigators’ prior training*, which produced some interesting values in terms of the likelihood of clearance.

Detectives’ workload

Regarding detectives’ workload, the negative effect that such a factor can have on the efficiency of homicide units has already been investigated by several authors, albeit with different results. Specifically, while some researchers found either zero (Ousey & Lee, 2010; Puckett & Lundman, 2003) or a positive effect on solving (Rydberg & Pizarro, 2014), others found, as common sense would suggest, there to be a negative correlation between a heavy caseload and successful investigatory outcomes (Braga & Dusseault, 2016; Greenwood et al., 1977; Hawk, 2015; Hawk & Dabney, 2018; Marché, 1994).

In the present study, a heavy workload resulted in a negative correlation with solving. In accordance with other scholars, managing “more than three” cases at one time (compared to a single investigation being handled at one time) was found to have an extremely high negative odds ratio (Carter & Carter, 2016; Schroeder & White, 2009; Wellford & Cronin, 1999a). More specifically, the odds of clearance were 99.8% lower than the control case. Moreover, having a workload of more than one case at a time (from one to three) also produced a negative correlation, albeit it was not statistically significant.

The descriptive statistics confirmed this aforesaid data: the more the workload increases, the more the clearance rate decreases (Cook et al., 2017). Indeed, the police offices which managed

“one case at a time” had a 93.3% rate of clearance, compared to 75.0% and 31.3% clearance rates in the agencies which handled “from 1 to 3 cases” and “more than 3 cases”, respectively.

The qualitative data adds to these findings, inasmuch as of those 33 respondents who did not solve their case (33.7% of the total sample), 21 of them (63.6%) reported excessive workload as a “very relevant” reason for not having solved their investigations.

Moreover, in their hypothetical ranking of the thirty-three factors which negatively impact on investigations, the same respondents rated this variable as the third most important, just after the lack of witnesses (87.9%) and shortage of manpower (81.8%), which, incidentally, is directly linked to workload.

To give some idea of the importance that detectives gave to the issue of workload, it suffices to say that the fourth place was “occupied” by the lack of physical evidence (57.6%), which traditionally is considered, together with the lack of witnesses, as being the main reason for unsolved crimes (Wellford & Cronin, 1999).⁷²

Logistic statistics at the dimensional level, but especially in the overall model, demonstrated that the more the caseload overwhelms detectives, the greater the decrease in the likelihood of solving the murder. Indeed, a heavy workload does not only mean that there are less opportunities to interview potential witnesses, it also undermines detectives’ ability to diligently perform the vast amount of technical, procedural and human activities involved in murder investigations.

At first glance, this factor appears to have affected primary units more than their auxiliary counterparts. Regarding the former, 36.5% of the respondents reported managing more than

⁷² Those authors assessed that 17% of the unsolved cases observed were due to the lack of physical evidence.

three cases at a time, compared to 20.9% of respondents from auxiliary units. It is important to note that auxiliary units also have to deal with several other types of investigations, such as robberies, extortions, drug marketing, and so forth, all of which are likely to put those detectives in an even worse position than their primary unit colleagues. Hence, it would be advisable that policy-makers consider increasing the number of specialized detectives in those units that manage more than three cases at a time, especially in the South of Italy where, according to the survey results, the majority of the complaining respondents (69.6%) were based.

Assignment of specific tasks

The opportunity to assign, on a permanent basis, crucial activities to specific personnel indirectly stemmed from previous studies, which assumed that fostering professionalism in the execution of such duties is likely to produce better results in terms of homicide clearance (Braga & Dusseault, 2016; Carter & Carter, 2016; Pizarro et al., 2018). While these authors principally focussed on the importance of the supervisor role and the speed in which tasks were assigned to investigators, based on my experience, this approach can be extended to include several specific crucial activities, such as those indicated in research hypothesis n.2.

One of these activities concerns the bureaucratic activities that are necessary to get approval for beginning interceptions and eavesdropping. The inferential statistics validated the research hypothesis, in that the odds of solving were increased by forty-nine times. The descriptive statistics further corroborated these results, with the clearance rate for the units who use this kind of approach being 88.5%, in comparison to a 41.3% clearance rate for those agencies which did otherwise.

As aforementioned when outlining the research hypotheses, such activities involve a wide amount of tasks, chief among which is cultivating good relationships with telephone carrier operators, who have the ability to speed up the process. Having a member of staff dedicated to

an operation like this can relieve detectives from such bureaucratic duties, while, simultaneously, accelerating a process whose effectiveness is primarily based on celerity.

Unfortunately, there were also several geographical differences with respect to this variable; while the overall percentage of offices who used this kind of task was 53.1%, 72% of these were in the North, compared to only 37.8% in the South. With respect to different types of units, auxiliary units tended to use it more frequently (58.3%) than their primary unit counterparts (51.4%). Consequently, it would be advisable to conduct an institutional experiment, especially in the South, to assess whether or not such a procedure would be of help to investigators.

Assigning the task of locating CCTV cameras to the same detective was found to increase the odds of solving by eleven times. Despite the fact that this might appear to be a secondary task at first glance, this duty in fact demands great zeal and a high-level of professionalism. Indeed, the descriptive analysis confirmed the importance of this variable, as the clearance rate of those units which adopted such an approach were 84.1%, compared to a clearance rate of 24.1% for those police offices which assigned this task randomly.

Unfortunately, the importance of this activity is often underestimated, especially among police offices and particularly in the South, where, compared to an acceptable overall rate of 70.4%, only 53.3% of respondents used this gathering procedure, in comparison to 92.0% of their northern colleagues.

Scarce consideration of this factor often results in the concomitant loss of relevant information. In fact, gathering CCTV footage is an extremely complicated practice. As noted in the problem formulation chapter, after having located the cameras, there are several other duties that must be performed: downloading the data; verifying potential discrepancies between the real-time

and the display-time; locating additional cameras in the event of new information stemming from witness statements, and so on.

The survey data confirmed the strategic relevance of this issue on several occasions (surveys #62, #64, #88), were these respondents highlighted the importance of having “a systematic methodology to locate and gather CCTV footage” not only at the crime scene, but also “within a wide range of space” that uses the crime scene as its centre of gravity.

For all these reasons, it would be advisable that this topic is addressed and given the attention that it deserves at the executive level, with perhaps specific parts of the murder investigation training program being dedicated just to this issue, with especial focus being placed on the southern police offices and primary units.

The opportunity to assign, on a permanent basis, the same detectives to perform phone records analysis using specific software is a variable that has hitherto never been considered in previous studies. The statistical findings confirm the research hypothesis as this factor increases the odds of solving by up to twenty-three times. Moreover, the respective clearance rates for units that adopted such a strategy was 75.9% compared to 13.3% for units that did not adopt the strategy.

With regards to this specific task, the importance of having specialized phone records analysts was also confirmed by detectives themselves. In fact, out of the 65 participants who solved their murder, 34 of them (52.3%) defined such a tool as being “very relevant” to solving the case. Replicating the same sort of ranking noted previously, the detectives positioned such a tool as being the third most important, immediately below the presence of evidence (65.6%) and witnesses (59.4%). To gain a broader picture of this atypical finding, it is enlightening to note that phone records analysis precedes other crucial and established factors, such as eavesdropping (38.5%), presence of useful CCTV footage (32.8%), and telephone interceptions (26.1%).

If we also consider the statistics at the dimension-level, the importance of such a tool appears to be slightly even higher, as it was the most significant among the factors related to the ‘resource management model’, resulting in an increase in the odds of closure by up to one-hundred times.⁷³

Indeed, phone records analysis can be considered as a multifaceted activity which involves several skills and attitudes that should be performed by specialized operators to gain the most benefit from it. In fact, notwithstanding the necessary software capabilities, it entails a pronounced deductive disposition to be able to discern among such a massive amount of data what is useful for the investigation.

Given that phone records provide a vast amount of information, such as the location of individuals, their acquaintances, their whereabouts, habits, and so forth, the analyst must have an overall knowledge of the investigation and of the persons of interest in order to select and organize the sorts of data which, at first glance, may seem useless, such as: a sudden change of habits, incomprehensible phone switch-offs, geo-locating in an area never before frequented, and so forth.

This consideration was explicitly confirmed by means of the open-ended questions in the survey: respondents #108 and #109 stated that it would be advisable to gather phone records data for “up to twelve months prior to the murder, in order to have more significant information related to the habits of the persons of interest”. This is an important point, because in a case I managed in 2009 that involved the kidnapping and execution of a former ‘Ndrangheta cooperator, Lea Garofalo, the case was cracked as a result of this sort of information. The

⁷³ Since there are no missing values and given that the criteria used to create this dummy are equal to those involved in coding several similar categorical variables which reported less unusual odds ratio values, one possible explanation for such a high odds ratio might be sought in the extremely high clearance rate registered by those respondents who stated using this approach and the corresponding low clearance rate reported by those who reported not adopting it. Such an effect is undoubtedly enhanced by the exiguity of the overall sample ($N = 98$).

mobile phones of the killers popped up three days after she had went missing in an area in which they had never been during the whole prior year. We subsequently found out that this was the location that they had spent three days burning her remains.

Somewhat surprisingly, a striking finding from the survey data was that among the 98 respondents, 14.3% reported that phone records analysis was still conducted on paper, with the highest percentage (28.9%) being registered in the South. Similar differences were also observed with respect to the different types of LEA, with software mainly being used by the primary units (90.5%), compared to 70.8% of the auxiliary units.

In light of the results from the present research, it would be highly advisable for those at the top of the hierarchy to consider the possibility of speeding up the proliferation of this specific technical tool, by means of training courses and the provision of adequate technical support, especially at the auxiliary unit level and with a particular focus on the South of Italy.

Interestingly, statistics reported a negative correlation with one of the control variables, namely whether or not the victim was foreigner. A datum which leads to believe that it would be advisable to addresses the topic of homicide clearance from a holistic perspective so as to consider also discretionary theoretical approaches explored in the literature.

Not significant factors

Turning our attention to the other predictors that were not validated by inferential statistical analysis, the speed of the lab results, in all their various forms (fingerprints, computer forensics, biological, ballistics, etc.), found zero support. Although this is a factor which has been shown in a recent study to positively impact upon solving, a key finding of the present research centres upon the widespread dissatisfaction expressed by almost all the respondents about the overly long execution of the aforementioned exams (Braga et al., 2018).

Evidently, notwithstanding the rate of dissatisfaction with physiological-based lab results, what stands out the most here is the result about the speed of ‘other’ labs (biological, ballistics, and so forth), which in the case of specific analyses, such as those involved in biological examinations, can take up to two or even three months. This is likely due to the fact that, within the Carabinieri Corp, there are only four operative labs belonging to the RIS (Scientific Investigations Department). In fact, all the forensic units operating at the provincial level are capable of performing a limited number of exams, such as fingerprints and gunshot residue. The remainder of the specific exams are executed by the RIS. Each police office must deliver the evidence samples, ask for a specific exam to be executed after having gained clearance from the Prosecutor’s Office, before waiting, as the survey confirmed, for more than two months for the results.

It is clear that, especially in the case of homicide investigations, this length of time is unreasonable. To cite an example, more and more frequently, police offices rely on the Coroner’s Office to obtain DNA lab results in 48 hours, rather than delivering the sample to the RIS office.

Given that 53.0% of the whodunit murders are committed with firearms and only 36.2% of this category of cases is solved, demonstrable action should be taken by policy-makers on this issue, either by upping the manpower operating at each of the four RIS labs, or by increasing the autonomy of the forensics labs at the provincial level by providing them with the requisite staff, training and technologies to be able to extend the variety of exams they are capable of performing.

Detectives’ experience is another factor that has been extensively considered in previous literature, albeit the results conferred no significance to this variable (Chaiken et al., 1976; Puckett & Lundman, 2003). With respect to this matter, other scholars have stated that drawing such a distinction is useless inasmuch as every case, even if it is initially assigned to a “fresh”

detective, is always followed and monitored closely by more experienced investigators. Unfortunately, the results from the surveys indicate that this is not in fact always the case, despite the fact that such a policy has been explicitly cited as a best practice to be implemented; for example, respondent #76 aimed “to enhance the experience of young investigators by assigning them a seasoned detective to supervise their activities”.

The present research corroborates these inconsistent results. Indeed, the only category which was found to be correlated with solving (‘more than 20 murder cases investigated’) was a negative correlation. This result is somewhat unsurprising given that the hardest cases are always assigned to the most experienced detectives. Moreover, 65.9% of the most experienced investigators were based in the South, where the clearance rate is well below average for reasons I discussed earlier. Consequently, this aspect may have negatively impacted upon the results.

Regarding available manpower, the respondents were asked to choose among three options that best described their unit: less than five operators; five to ten; more than ten. While the descriptive analysis provided striking insights into the differences between primary and auxiliary units, this was not the case with regards to the three macro areas. In fact, 66.3% of all the respondents affirmed that their unit comprised five to ten detectives, which is an acceptable level.

There were no differences between the macro areas: 69.0% of northern detectives, 64.0% of southern detectives and 65.9% of detectives based in the Centre reported that their units were made up of five to ten personnel. Conversely, a wide disparity was observed in the availability of human resources in primary and auxiliary: 74.3% of primary units relied on units composed of five to ten detectives, compared to 41.7% in auxiliary units. Indeed, 54.2% of the auxiliary units were composed of less than five detectives, in comparison to 2.7% of primary units which relied on the same level of manpower.

It is obvious that units comprising less than five detectives, who are also assigned to several other “minor” investigations (such as small robberies, drug marketing, extortion, attempted homicides, and so forth), are simply not in a position to conduct extremely complex and time-consuming activities such as homicide investigations. In this regard, the outstanding performance of auxiliary units (82.0% overall clearance rate in comparison to 65.7% overall clearance rate for primary units) is not misleading, rather it helps us to better appreciate the value of the human factor that is embodied in Italian criminal investigators.

Moreover, if we also take into consideration the fact that 54.2% of the auxiliary unit respondents reported managing more than one murder case at a time, then it goes without saying that an urgent intervention, from the executive level down, should be undertaken in order to increase the number of detectives employed in these types of units.

Another important aspect of manpower concerns the possibility of devoting personnel to certain cases on a long-term basis. As delineated in the previous chapter, 17.4% of whodunit cases were solved more than one year after the onset of the investigation. Policy-makers should take note of such data and seek to implement the requisite internal organizational measures to ensure that both time and resources are dedicated to investigating the most challenging cases.

The training that detectives undergo is another factor that has been considered in previous studies, and shown to have a positive impact on clearance (Braga & Dusseault, 2016; Braga et al., 2018; Keel et al., 2009; Richardson & Kosa, 2001).

In the present study, the lack of correlation in the bivariate analysis hindered the possibility of validating these results. Nevertheless, due to the intrinsic and obvious relevance that such a factor plays in all types of criminal investigations, it is important to highlight the current use of this strategic tool.

Firstly, the descriptive statistics indicated a potential relation between clearance and this factor, as the clearance rate of detectives who reported attended training courses was 79.2%, compared to a clearance rate of 62.2% for those who did not.

Unfortunately, the results of the survey described a situation that fell well below expectations. In fact, overall, only 24.5% of detectives stated that they had taken part in a training course dedicated to the management of murder investigations (28.0% in the North, 25.0% in the Centre, and 22.2% in the South). Furthermore, even when training was provided, it invariably addressed crime scene techniques, rather than managerial, procedural, psychological or technical aspects of murder investigations. Moreover, only 21.6% of detectives from primary units stated that they had attended training workshops, compared to 33.3% of their auxiliary counterparts.

The aforementioned limited development of training is perhaps, in part, down to the fact that the adoption of a professional approach of this kind is a relatively recent phenomenon, especially for the Carabinieri Corp. Specific courses for detectives began to proliferate from 2010 onwards, so in 2014 (the year that the surveys referred to) the widespread availability of training courses was in its infancy. Prior to this, training had been addressed primarily to forensics operators, rather than detectives in the strictest sense. The fact that there is only one facility, in Velletri (RM), to administrate such courses is also likely to have caused a slowdown in the diffusion of this process.

It would be interesting to replicate this survey at some point in the future to assess more effectively whether training had any positive effect on the clearance rate, particularly if we take into account the results provided in the open-ended questions administered in the survey, which made it very clear that the respondents considered this to be a crucial issue. Indeed, the most frequent requests from the detectives were for: “specialization in IT forensics” (respondent #92); “constant updating of crime scene and strategic investigative skills” (respondent #45);

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“development and enhancement of techniques in interview/interrogation and body language analysis” (respondent #109).

Crime scene activities dimension

Due to both the wide array of activities that must be performed at the crime scene and the serious consequences that badly performing these activities have on the integrity of evidence, several factors have been taken into consideration, deriving from extant literature and my own personal experience.

Taking inspiration from previous studies, this hypothesis posited that “specific activities performed on the crime scene, that have frequently been addressed in the literature, such as *monitoring access to the scene, proper equipment being used by forensic investigators and detectives, the time taken to reach the scene, neighbourhood canvassing and the use of checklists or standardized operating procedures* are likely to affect the positive outcomes of murder investigations” (Block & Bell, 1976; Braga & Dusseault, 2016; Braga et al., 2018; McEwen & Regoeczi, 2015; Regoeczi & Jarvis, 2013; Schroeder & White, 2009; Wellford & Cronin, 1999a).

Despite these expectations, among the four considered dimensions, the crime scene was the only dimension where none of its factors were found to be significantly correlated with clearance in the overall logistic regression model. Only two factors were found to be significantly correlated with clearance in the crime scene ‘dimension-based’ multivariate analysis: *the time taken to reach the scene* and *neighbourhood canvassing*, which partially corroborates the research hypothesis n.3.

On the contrary, the factor analysis reported a correlation between using *SOP to perform neighbourhood canvassing* and the practice of creating a *safe corridor* for access to the corpse, which, in turn, preserves the integrity of the crime scene.

Neighbourhood canvassing

With respect to *neighbourhood canvassing*, the present research addressed the presence or lack of a procedure to systematically register the persons to be canvassed or who had yet to be interviewed, by means of a report or a log file. Other scholars have both highlighted the level of precision that is involved in this crucial step, and demonstrated its positive effects on clearance (Braga & Dusseault, 2016; Braga et al., 2018).

What often happens, in fact, especially in the early stages of investigations, is that the ensuing frenzy can cause an overlap in activities (chief among which being witness interviews) and, consequently, the duplication or loss of important information, and incomplete communication. To randomly assign the canvassing of the neighbourhood to more detectives, or even to patrol units, might result in a greater fragmentation of information. Moreover, frequently, especially in socio-economically disadvantaged areas, people either do not want to talk to the police, or they are only willing to talk with a specific police officer who they already know and trust.

It is for these reasons that canvassing is considered to be a sort of ‘art form’. Not all detectives are skilled in eliciting information from reluctant witnesses, who hold back what they know for a variety of reasons, often unrelated to the event being investigated. This is why it is so important to proceed systematically, by taking note of the persons who have already been interviewed, along with individuals who are to be contacted later for opportunistic reasons or simply because absent during the canvassing.

The proper and systematic locating and interviewing of potential witnesses resulted in an eightfold increase in the odds of solving an investigation, which means that the odds of solving the case were 89.2% higher than the control case. This result corroborated previous findings from the literature (Braga & Dusseault, 2016).

The descriptive analysis reported that the clearance rate of those detectives who reported using such an approach either “always” or “often” was remarkably higher than their colleagues who selected “seldomly”: 93.3%, 50.0% and 15.4%, respectively.

The analysis of the survey results highlighted a marked difference in the consideration paid to this tool from a geographical perspective, but not with respect to the type of LEA. In fact, while 84.7% of the overall respondents affirmed either using this tool “always” or “often”, the results were well-balanced among the agencies, with 83.8% of primary units and 87.5% of the auxiliary units confirming that they adopted it.

From a geographical perspective, the differences are more pronounced: in the Centre of Italy the percentage increased up to 100%, in the North it decreased to 92%, while, in the South, it fell to 71.1%. This means that, despite the clear value of this practice at the crime scene, a significant element of the police force, especially in the South, underestimates its importance.

Safe corridor

Regarding the creation of a safe corridor to reach the corpse, which, in turn, preserves the integrity of the scene, the statistical analysis reported that the difference in clearance rates between those respondents who stated “always” or “often” employing this measure and those who affirmed doing it “seldomly” or “never”, was quite striking. Regarding the first two options, the clearance rate was 85.7% and 81.8%, respectively, while the other two were 39.4% and 25.0%.

Moreover, there were several discrepancies registered, both geographically speaking and with respect to the type of unit. More specifically, of the 28.6% of all respondents who reported “always” using this technique, there was a marked disparity with 44.0% of these being registered in the Centre, 37.9% in the North, and only 13.5% in the South. Primary investigative

units were shown to be more likely to “always” use it, with 31.1% of detectives doing so compared to 20.8% of those in the auxiliary units.

To summarize, although this crucial tool is now widespread in everyday practice, it would nevertheless be useful to raise awareness about its further implementation within auxiliary units, especially in southern agencies.

Not significant factors

I turn now to address those factors that were not validated by the statistical analysis, firstly, the time taken to reach the scene, which was found to be negatively correlated with respect to arriving within two and three hours at the scene after the dispatch call, compared to arriving within one hour (omitted). Specifically, the odds of clearance were found to be directly proportional to the time taken, with an almost sixfold decrease in the first case and by fourteen times in the case of taking three hours to arrive at the scene.

This variable has already been considered by other scholars, who found that clearance was affected, among other things, by the quick deployment (within 30 minutes for Wellford & Cronin, 1999b) of murder detectives to the scene (Braga et al., 2018; Wellford & Cronin, 1999b). In my opinion, such speed is difficult to achieve in Italy; in fact, traditionally police forces do not have murder detectives who are on call 24/7. Moreover, since 53.6% of the whodunit cases occur during the night, it is often the case that homicide detectives are called at their home, with the subsequent delay being due to the distance between their residence and the crime scene.

In addition, there were also significant differences with respect to the geographical distribution of the responses: overall, 30.6% of the respondents affirmed arriving at the scene between two and three hours after the dispatch call, while in the North the percentage drops to 16.0%, and in the South it increases up to 40.0%.

With respect to the different agencies, auxiliary units were quicker in responding, with 25.0% of the respondents stating that they reached the scene within three hours, compared to 32.4% of primary unit detectives. This could be due to the fact that auxiliary units are often the first office activated by the local dispatcher, who only later calls upon the primary unit if the circumstances require it.

Having said that, although the speed at which investigators is undoubtedly important, what really makes the difference is being able to rely on professional patrol units who are capable of properly preserving the scene and locating as many witnesses as possible. Unfortunately, as will be delineated in the section on the ‘patrol unit checklist’ variable, the situation does not look good.

The other factors cited in the abovementioned hypothesis, *monitoring access to the crime scene, the use of proper equipment by forensics and detectives, and the use of checklists or standardized operating procedures*, although not statistically significant, found indirect support in the descriptive analysis, as well as in the observations of the respondents.

The factor of monitoring access to the crime scene has recently been introduced for the first time in the context of an experiment held within the Boston Police Department, which, along with other innovative best practices, was shown to be positively related to clearance (Braga & Dusseault, 2016). In the present research, such tools produced rather controversial results in the bivariate analysis: while the presence of an officer was positively correlated with clearance, registering the ID of individuals who entered the scene was negatively correlated.

The respondents who reported either “always” or “often” using a crime scene monitoring officer had 85.7% and 93.5% clearance rates, respectively, compared to the clearance rates of those who reported using it “seldomly” or “never”, whose clearance rates were 39.5% and 37.5%, respectively. Regarding the entry log, the differences were equally evident: the clearance rates

were 86.7% and 95.7% for those who “always” or “often” used it, in comparison to 54.3% and 35.7% for non-adoptees.

There was also a geographical discrepancy in the implementation of these practices. Specifically, while the presence of an officer was confirmed in 53.1% of the overall cases, the Centre and the North accounted for 75.0% and 68.0%, respectively, while the South only accounted for 31.1%.

A focused intervention on this very issue, especially, but not only, in southern offices would thus appear to be highly advisable. Moreover, the responses to the open-ended questions in the survey testify to the fact that this issue was a matter of concern for the detectives. One respondent (#104) hoped that in the future that the higher-ups would “assign full competence to the officers in charge of authorizing the access, giving them the authority to hinder the entrance of anybody except for the Public Prosecutor, forensics, Coroner and detectives explicitly assigned to the case”. In another survey (#108) the detective proposed giving “personnel assigned to manage the crime scene more decision-making autonomy and authority to prohibit people entering”.

The final two factors considered within the crime scene dimension pertained to the best practice of providing both patrol units and detectives with checklists that outline step-by-step the fundamental tasks that need to be executed at the scene (a to-do list). Despite the lack of statistical significance for this variable, the respondents who stated using such a tool (N = 44) had a much higher clearance rate than those respondents who confirmed not using it (N = 54), namely 84.1% compared to 51.9%, respectively. This result is in accordance with findings obtained in previous studies (Braga & Dusseault, 2016; Braga et al., 2018).

Irrespective of their statistical relationship to clearance, what strikes me the most are the descriptive outcomes emerging from the survey: only 28.6% of the respondents affirmed that

patrol units were equipped with such a tool, with the highest score being registered in the North (44.0%) and the lowest in the Centre (17.9%). Patrol units that operate in the provinces registered the worst result, with only 8.3% of auxiliary detectives reporting that their own patrol units used this type of solution, compared to 35.1% of detectives in larger metropolitan areas.

Things are slightly better with regards to detectives' use of checklists: 44.9% of all the respondents reported that they permanently used it, with the highest score once again being in the North (68.0%) and the lowest in the South (35.6%), with no significant differences between the different types of police offices.

In light of these results, it would be highly advisable that, at the executive level, the use of these two crucial tools could be extended in order to increase the personnel's level of professionalism, with an especial focus on the patrol units who operate in the provinces. Indeed, first responder units have a huge responsibility to properly manage the crime scene and locate potential witnesses, while waiting for the investigative units to arrive on the scene. As aforementioned, this can sometimes take hours after the discovery of a corpse.

The descriptive analysis also enabled the identification of a potential relationship between clearance and another novel factor cited in the research hypothesis n.4, according to which “the *systematic process to locate and collect CCTV camera footage* is likely to affect the positive outcome of investigations”.

Such factors can be understood as an evolution of the importance that some authors place on preserving the integrity of the crime scene (Braga & Dusseault, 2016; Carter & Carter, 2016; Wellford & Cronin, 1999a), as well as the attention dedicated in earlier research to implementing standardized procedures through which to systematically execute specific duties (Block & Weidman, 1975; Braga & Dusseault, 2016).

Finally, regarding the implementation of a *systematic process to locate and collect CCTV camera footage*, the statistical analysis showed that detectives who reported either “always” or “often” employing such a strategy had clearance rates of 87.5% and 44.8%, respectively, compared to a clearance rate of 16.7% for those detectives who stated that they “seldomly” used it. In this particular case, the “never” option had a 100% clearance rate, but this referred only to a single case.

It was also the case that the South registered the lowest rate of implementation of this systematic procedure, with only 38.6% of detectives from southern offices reporting that they “always” used it, in comparison to 56.0% from the Centre and 86.2% from the North. On this point, the auxiliary units tended to “always” use this procedure more frequently (62.5%) compared to their primary colleagues (55.4%). Hence, with regards to this factor, it is important that policy-makers develop a campaign to raise awareness, which might be especially targeted at the South and primary units.

Investigative strategies dimension

Another important part of the mosaic of managing murder investigations pertains to the wide range of investigative strategies, based upon long-term applications of policy and philosophy that aim to put detectives in the best possible condition to perform their tasks, namely: the decision-making process; the establishment of good relationships with the media, the Prosecutor's Office, and the Coroner's Office; the presence of a Cold Case unit; the opportunity to monitor and bug the office waiting room and the interrogation room; and so forth.

Among those factors, only one, the establishment of effective coordination with the media, was found to be significant in the overall multivariate logistic model. This confirms an aspect of hypothesis n.5, according to which “an *effective coordination with media* (...) is likely to positively affect the outcomes of murder investigations”.

At the same time, the results that stemmed from the inferential statistics also corroborated, albeit only at the ‘investigative strategies dimension-level’, one aspect of hypothesis n.5, as well as previous studies, according to which “specific investigative strategies, such as (...) the *establishment of good relationships with the various stakeholders involved in the investigation* are likely to affect the positive outcomes of murder investigations” (Addington, 2007; Allsop, 2013; Block & Bell, 1976; Block & Weidman, 1975; Braga & Dusseault, 2016; Carter & Carter, 2016).

Moreover, the descriptive statistics indirectly suggested a common pattern between clearance and other two novel factors cited in hypotheses n.6, namely the usage of *rooms (even wiretapped) that are specifically intended for conducting interviews and interrogations*.

Finally, other factors that had already been identified in extant literature found no corroboration in the present study: the *type of decision-making process* and the *presence of cold case units* (hypothesis n.5) (Addington, 2007; Allsop, 2013).

Media coordination

Media coordination has hitherto not been considered in the field as a predictor. The inspiration to measure such a factor derived from my own personal experience, as well as from the evaluations of other scholars who touched upon it in their research, but with altogether different purposes (Chermak & Weiss, 2005; Lee, 2005). The statistical analysis returned the highest odds ratio of the overall model: the odds of clearance in the case of effective coordination with media increased by up to sixty-five times.

The descriptive statistics further corroborated these results, as the clearance rate for those respondents who confirmed establishing good relationships “always”, “often” and “seldomly”, were 88.1%, 52.1% and 25.0%, respectively. From a descriptive perspective, the majority of the respondents (91.8%) replied that they commonly coordinated the information provided to the media, with the highest value of positive coordination registered in the North (100.0%) and the lowest in the Centre (82.1%).

In contradistinction to the other factors considered, this specific tool can have a tremendous effect on investigations, both positively and negatively. In fact, the leaking of sensitive information to the media can irremediably harm investigative work that has either just begun or has been running a long time. Conversely, proper coordination with the media can be of great help and, on occasion, be an expedient tool for cracking a case.

Not significant factors

The establishment of good relationships with other stakeholders (in this case, the Public Prosecutor) proved, although only at an ‘investigative strategies dimension-level’, to increase the odds of solving by up to almost eleven times, which means that the probability of solving the case was 91.7% higher than the correspondent control cases. This latter case corroborated

similar findings that were observed in earlier work (Braga et al., 2018; Carter & Carter, 2016; Wellford & Cronin, 1999a).

Such a relationship is strategic in the sense that it is not uncommon to observe an informative ‘short-circuit’ between detectives and the Prosecutor, which, in turn, can cause delays or even result in the failure of investigations. The Prosecutor’s Office must rely on the information and reconstruction provided to them by the police in order to authorize subsequent crucial investigative steps, such as telephone interceptions, search *subpoenas*, and so forth.

Evidently, professional and comprehensive police reports can put the Prosecutor’s office in the best possible position to evaluate all the evidence and potential responsibilities. Nevertheless, good personal relationships can facilitate this process, along with the development of a fruitful and cooperative working relationships, which may, indirectly, positively impact upon the overall investigative process.

From a descriptive perspective, the good relationship between detectives and the Prosecutor’s Office was accorded high values, with 86.7% of all respondents qualifying such relationships as being either “excellent” or “very good”. The only discrepancy was between primary and auxiliary units, in that the former provided an overall positive evaluation (91.9%), in comparison to the latter, which reported a lower value of 70.8%. It is with regards to this point that a specific suggestion arose from the survey, which, if adopted on a large-scale, would potentially contribute to the strengthening of such relationships: respondents #76 recommended that those with the power to do so should “flank the detectives who managed the case to the Public Prosecutor during the trial, in order to better understand [procedural dynamics] and so as to avoid in the future any of the possible pitfalls or mistakes made in the investigations”.

The use of *rooms (which have also been wiretapped) specifically intended for conducting interviews and interrogations*, although not found to be significant in the inferential analysis,

did produce interesting results in the descriptive analysis, with a marked difference in clearance rates between those who used an interrogation room and those who did not: 75.4% compared to 44.8%. With respect to the presence or lack of audio/video recording systems in these rooms, the clearance rate was 88.2% for those who did this, compared to 54.2% for those who did not.

The descriptive analysis confirmed that detectives used specific interrogation rooms. In fact, 70.4% of all respondents affirmed having a specific room intended for interviews and interrogations. Concerning the geographical distribution of those practice across the macro areas, the highest rate was registered in the North (80.0%) with the lowest in the Centre (64.3%). Unfortunately, only 45.9% of auxiliary units had such rooms, in comparison to 78.4% of primary units. Considering that such rooms can be used for interrogations not only in homicides, but rather in all types of crimes, it would be highly advisable to increase the use of such equipment also at the level of auxiliary units.

The ability to equip such rooms with audio/video surveillance systems is worthwhile for several reasons: firstly, it can help to corroborate or contradict later testimonies in the courtroom; secondly, it can help to quash potential lawsuits on alleged police misconduct; finally, it can assist detectives conducting interrogation by allowing a second operator outside the room, who specializes in body language, to provide assistance.

Despite the lack of statistical significance, it is worthwhile to highlight that, from the perspective of the descriptive analysis, too few respondents reported using this type of technique (36.6%). Geographically, the lowest percentage was registered in the Centre, with only 32.1% of detectives using this technology, while the highest was in the North, with 48.0% of respondents reporting that they used this. auxiliary units were poorly equipped with technology; in fact, only 20.8% of offices had it, compared to 46.0% of primary offices.

Despite the understandable budget constraints, the implementation of such technology, across the whole country and irrespective of the type of office and whether they handle murder investigations or otherwise, would be of great service to all police offices. Having said this, to get the best out of this technology and practice, it would be necessary to develop training courses dedicated to learning the basics of body language, as one of the respondents (# 109) explicitly noted.⁷⁴

Regarding the decision-making process, while it was also not statistically significant, interesting considerations emerged from the descriptive analysis. The so-called “horizontal” approach to case management and the “vertical” approach (either based on rank or seniority) has already been tested in previous studies, with positive results in terms of their effectiveness on homicide clearance (Block & Bell, 1976; Carter & Carter, 2016). Statistical analysis confirmed the old adage that “*good ideas have no rank*”. In fact, the vertical approach, whether based on rank or on the basis of experience, was found to be negatively correlated with clearance, while the horizontal approach was shown to be positively correlated.

The survey results depict that the horizontal approach to case management is more prevalent (56.1%) than the vertical one, both in terms of rank and seniority (24.5% and 19.4%, respectively). Such an approach seems to be more embedded in primary units (58.1%) and less so in auxiliary units (50.0%), and more prevalent in the North (72.0%) than in the Centre (46.4%).

Moreover, the respondents showed a certain degree of intolerance for the slowdown of the operative processes due to bureaucratic and hierarchical constraints, putting forward the subsequent proposal to “increase the decision-making autonomy of detectives” (#109). In another case, the detective proposed “to give detectives assigned to the case more decision-

⁷⁴ “It would be advisable to train the personnel on interview/interrogation techniques and on body language analysis”.

making autonomy, allowing them, for example, to directly get in touch with the Prosecutor's Office and with the media, or avoiding the need to wait to have every single piece of paper signed by officials, which causes a useless slowdown in the investigative process" (#105).

The final factor, the presence of a Cold Case unit, is a strategy that unfortunately was largely underestimated in Italy. In fact, only 4.1% of all respondents reported having one in their department, with neither the North or the South having one single cold case unit. Considering the great scientific advances that have been achieved, especially in the DNA field, it would be highly recommendable to develop specific units dedicated to working on cold case murder investigations.

Cold cases investigations are considered by practitioners to be "a different world" from traditional murder investigations. This, in part, is because time has a negative impact not only on the physical evidence in a case, but also on human memory itself. Having said this, time can also be helpful to a detective, inasmuch as a witness who was reluctant to talk at the time of a murder, because they were, for example, linked to the author via personal or business interests, may suddenly be more cooperative due to a change in their relationship with the perpetrator. Moreover, after a long time spent investigating a case, detectives tend to get 'hung up' on specific leads and overlook possible new lines of inquiry. A detective who has not been involved in the original investigation can thus often provide a new perspective on a case, which may lead to a consideration of new elements or different angles on existing data.

This is why the skills required to handle these sorts of investigations are quite different from those needed to work on a "fresh case". Unfortunately, the data indicated a relative dearth of cold units across the country. In this respect, a change of approach, combined with implementing specific training in the field, would be highly recommendable.

Lastly, also in this dimension, statistics reported a negative correlation with some of the control variables, namely whether or not a firearm has been used or whether the murder occurred in the Centre or South. Such data further corroborate the thesis that a holistic perspective which also consider discretionary theoretical approaches would be advisable.

Investigative techniques dimension

The final dimension to be considered pertains to a whole array of specific investigative techniques, such as: autopsy attendance; the habit of holding periodical briefings; using specific software for tasks such as phone records analysis and case management; and the practice of arranging IT forensic copies of mobile phones of persons of interest.

Of all the factors pertaining to investigative techniques, only one, the habit of holding periodic briefings to foster the flow of information, was found to be significant in the overall multivariate logistic model, as well as being validated by factor analysis. This confirms part of hypothesis n.7, as well as lending support to extant literature, according to which “the implementation of specific investigative techniques, such as (...) *the habit of holding briefings among the investigators* are likely to affect the positive outcomes of murder investigations” (Braga & Dusseault, 2016).

Factor analysis established that there was a positive correlation between *the use of phone records analysis software* and the clearance rate (regarding the relevance of this important tool, please refer to the considerations made in the previous paragraph on ‘assignment of specific tasks’ in resources management).

Conversely, the other factors already considered in extant literature and which made up part of the aforementioned hypothesis, namely *autopsy attendance*, and other novel factors cited in hypothesis n.8, *monitoring social media*, *the use of a timeline*, and *the habit of acquiring forensic copies of electronic devices belonging to persons of interest* only found partial support in the descriptive statistics.

Briefings

The practice of arranging frequent briefings to foster the flow of information among detectives returned an extremely high odds ratio, with the results reporting an increase in the odds of solving of up to twenty-seven times. Such an impressive result draws attention to one of the most challenging aspects for detectives in homicide investigations, that is, the large amount of information deriving from a wide array of sources, including witness statements, telephone interceptions, lab results, criminal records, confidential tips, and so forth.

Dealing with such a huge amount of data is a challenging activity, not to mention the fact that it is performed under extremely stressful circumstances due to the lack of manpower, potential media pressure, or simply the anxiety of trying to apprehend the responsible party in the shortest amount of time possible. For all these reasons, it is common that important pieces of information are underestimated or even mishandled and lost.

In this regard, the data from the descriptive analysis returned notable results. The clearance rate for those respondents who reported “rarely” adopting such a tool was 0.0%; it increased to 45.0% in the case of those who did so “often”, while those detectives who “always” used this tool had a clearance rate of 87.0%.

Frequent brainstorming sessions between investigators in order to touch base on the overall investigation, discuss the data gathered from the scene and information provided by the latest witness can ensure that all the stakeholders are on the same page, as well as fostering new lines of enquiry or aiding the decision to not pursue leads that turned out to be a dead end.

Not significant factors

Another important factor that has always been found to be significantly correlated with clearance in extant literature, is detectives’ attendance of autopsies, which was not validated in the inferential statistical analysis conducted in this research (Carter & Carter, 2016; Schroeder & White, 2009; Wellford & Cronin, 1999a).

From a practitioner perspective, this can be considered to be absolutely true, in that the post-mortem exam produces a wide range of useful information for detectives who attend. With respect to this point, the survey provided some insightful testimonies about the damage that can be caused by a lack of cooperation between the Coroner and the investigators during autopsies.

On one occasion (respondent #169), the detective complained that poor communication with the medical examiner, who was not aware of specific investigative aspects of the case, produced a medical report by means of which the perpetrators were subsequently only charged for corpse suppression rather than murder. In another investigation (respondent #173), the subsequent intervention by investigators, who were provided with new evidence during a second post-mortem exam, resulted in the dropping of a murder charge and the filing of the death as instead deriving from natural causes.

Unfortunately, according to the survey results, the overall percentage of detectives who assist in autopsies was lower than expected (70.4%), as well as varying greatly from place to place. That is to say, although a high percentage of detectives from the North and Centre of Italy confirmed attending the exam (88.0% and 82.1%, respectively), in the South this habit struggled to gain traction (53.3%). There was also a marked disparity vis-à-vis primary and auxiliary units, with 73.0% of primary unit detectives attending compared to 62.5% of their auxiliary colleagues.

It is important to note that almost all of the ‘criminal liquidation’ murders considered occurred in the South, and that these types of murders leave less evidence and, thus, at least to some extent, undermine the ‘relevance’ of this type of medical exam due to the unlikelihood of gathering relevant clues. Moreover, ‘criminal liquidations’ constitute 48.9% of the murders handled by southern area respondents. Despite these points, it would still be highly advisable, regardless of the results of the statistical analysis, that each chain of command raises awareness

about the strategic importance of this valuable practice, particularly in the South and at both the primary and auxiliary unit levels.

Despite the negative results from the inferential statistics, the descriptive analysis produced interesting data in which autopsy attendance appeared to regain the relevance accorded to it in previous studies, as the clearance rate of the detectives who attended these exams were 90.6% (“always”) 75.0% (“often”) and 11.1% (“seldomly”).

Other novel factors which were found to not be of statistical significance nevertheless achieved remarkable results in the descriptive component of the research: *monitoring of social media, the use of timelines, and the habit of acquiring a forensic copy of electronic devices belonging to persons of interest.*

Regarding monitoring the social media activity of potential persons of interest, despite the lack of statistical significance, the descriptive phase demonstrated that detectives who applied such a practice had a higher clearance rate than who did not do this. More specifically, the clearance rates were 80.0%, 90.9%, 50.0% and 45.5% with respect to the detectives who engaged in this practice “always”, “often”, “seldomly” and “never”.

One interesting aspect worthy of attention is the overall low level of interest showed in respect to this tool, especially in the South. In a world awash with social media communication, what is most striking is that only 10.2% of the southern respondents reported monitoring social media profiles “always”, and 33.7% reported doing so “often”.

As has been a recurring theme in this analysis, there is a disparity in the geographical distribution of the use of this tool. While northern detectives used this technique “always” or “often” in 60.0% of cases, and 60.7% of detectives in the Centre also did so, in the South the rate dropped dramatically to only 24.4%. Hence, an incisive campaign to raise awareness would

be highly advisable and urgently needed, especially considering that no further expenses for technical equipment would be required.

Regarding the use of a *timeline*, the descriptive statistics reported similar values, with clearance rates of 94.6% and 63.2% for detectives who used this tool compared to 25.0% and 33.0% for those colleagues who did not. The use of a timeline is a factor that has hitherto not been considered in the field of homicide studies. This lacuna in extant research is problematic given the ability of this tool to better identify the relationships among people, places, dates, and so forth. While the statistical analysis produced a positive odds ratio, it was not significant.

The descriptive analysis reported that 37.8% of all respondents confirmed that they “always” used it. In this case, the discrepancy between the macro areas was even more pronounced, with 62.1% of detectives in the North reporting that they “always” used it, compared to 48.0% in the Centre and 15.9% in the South. Furthermore, there was a slight prevalence in the use of such a tool among auxiliary units (41.7%) compared to their primary counterparts (36.5%).

Finally, another novel factor which did not turn out to be statistically significant was making *IT forensic copies of the mobile phones of persons of interest*. Once again, the descriptive statistics suggested a pattern between clearance and this investigative technique, in that the detectives who used this technique had clearance rates of 85.7% (“always”), 90.3% (“often”), and 45.1% (“seldomly”), respectively.

In this case, the overall percentage of respondents who affirmed using this technique “always” or “often” was relatively low: 46.0%. Once again, the macro areas were shown to be divergent: despite the acceptable usage rate for this technique in the Centre and the North (67.9% and 52.0%, respectively), the South was once again found to have a low uptake (28.9%). Such a disparity is greater yet still when we consider the rates between the different types of agencies:

while 52.7% of primary units frequently engaged in this practice, only 25.0% of auxiliary units did so.

Clearly, this technique must be performed by technicians who are often available only in primary units. Based on these results, it is important to raise awareness about the importance of this investigative technique, in conjunction with providing training and making available trained technicians, especially in the South, as was explicitly asked by some respondents (#82⁷⁵ and #87⁷⁶).

At the same time, so as to not overburden auxiliary units who already perform manifold activities, it would be expedient to perhaps train only one detective and provide them with the requisite instruments. Alternatively, so as to ensure effective cooperation at the provincial level, auxiliary units could also be permitted to use technicians who belong to primary units.

Lastly, also in this dimension the use of firearms and the area in which the murder occurred (Centre and South) resulted negatively correlated with solving.

⁷⁵ “Improve the number of units specialized in computer forensics”.

⁷⁶ “Availability of specific forensics units specializing in homicide investigations”.

Summary of findings

With the aim to summarise the above mentioned findings, what follows is a table which provides literature references for each significant factor, together with a brief description of possible initiatives to be taken to implement the adoption of such practices.

Table 28: Summary of significant variables, associated with previous literature citations and suggested measures.

Variable	Literature	Suggested measures
<i>Resources Management</i>		
Excessive workload	(Cook, Ho & Shilling, 2017; Braga & Dusseault, 2016; Greenwood et al., 1977; Hawk, 2015; Hawk & Dabney, 2018; Marché, 1994)	To adopt proper measures of internal organization aimed to reduce the excessive workload especially in auxiliary units and particularly in the southern agencies.
Task the same detective to execute the paperwork need to run the interception activities	(Braga & Dusseault, 2016; Carter & Carter, 2016; Pizarro et al., 2018)	To foster the implementation of such best practices especially in southern agencies and specifically in primary investigative units.
Task the same detective to execute the phone records analysis by means of specialized software	(Braga & Dusseault, 2016; Carter & Carter, 2016; Pizarro et al., 2018)	To foster the implementation of such best practices training personnel especially in southern agencies and specifically in auxiliary investigative units.
Task the same detective to execute the CCTV camera localization	(Braga & Dusseault, 2016; Carter & Carter, 2016; Pizarro et al., 2018)	To foster the implementation of such best practices especially in southern agencies and specifically in primary investigative units.
<i>Crime Scene</i>		
Safe corridor to reach the scene		To foster the implementation of such best practices especially in southern agencies and specifically in auxiliary investigative units.
S.O.P. for neighbourhood canvassing	(Braga & Dusseault, 2016; Braga et al., 2018)	To establish S.O.P., especially in southern agencies, to ensure the proper and systematic locating and interviewing of possible witnesses on the scene and nearby.
<i>Investigative Strategies</i>		
Effective media coordination	(Chermak & Weiss, 2005; Lee, 2005)	To foster effective relationships with local and national media
<i>Investigative Techniques</i>		
Habit to arrange frequent briefing among the investigators	(Braga & Dusseault, 2016)	To encourage the implementation of frequent briefing and peer review among the investigators.
Phone records analysis performed by the use of proper software		To foster the implementation of such best practices training personnel especially in southern agencies and specifically in auxiliary investigative units.

5.2 Methodological implications

The present research employed (in the context of a mixed-methods approach based both on quantitative and qualitative methods and data) a survey method of data collection, which is typically only used in single-site studies, and adapted it to a multi-site study.

Although this process was facilitated by the specificity of the Italian policing system, such an approach could nevertheless be adopted in future research on clearance conducted in other countries with similar policing structures that are organized on the national level, which is the case in the majority of Western countries.

In the case of such countries, the presence of unique police departments that operate on a national level would enable the researcher not only to acquire a full knowledge of the realities of this organizational structure, but also to perform comparative analyses and highlight potential differences in practices and procedures which, as assessed in the present study, can result in disparities in the clearance rate within different regions in the same country.

Regarding the survey tool and other forms of qualitative data collection (such as interviews or participant observation), it appears reasonable to affirm that future studies that aim to gain an in-depth understanding of investigative work can hardly overlook such methods. In fact, the broad spectrum of actions, procedures, tactics and strategies which compose the investigative process can only truly be comprehended by means of these kinds of qualitative tools.

Conversely, if the aim of a future study is to produce quantitative results, then the survey method would be highly effective, in that enables the possibility of converting qualitative data into quantitative data, which is crucial in terms of securing the internal and external consistency of such kinds of studies.

5.3 Theoretical implications

Given the results described over the course of the last two chapters, the assumption that investigative work impacts upon the homicide clearance would appear to be a plausible one. The implications for theory concern the fact that theoretical perspectives on victim and police devaluation, event characteristics and lifestyle are not able to provide univocal explanations for clearance.

This means that research which attempts to understand clearance without also considering the dynamic nature of the job of investigative work itself, as well as the manner in which it is carried out, can, at the very best, only offer a partial view of a much ‘bigger picture’.

With this in mind, the theoretical implications to be drawn from the present study pertain to the fact that future research in this field should seek to adopt a more holistic approach. Such an approach can only be achieved by attaching the same level of importance to all the theories mentioned above, which implies the consideration of both legal and extra-legal factors, as well as those stemming from investigative work.

5.4 Practical implications

The implications for practitioners, both in Italy and abroad, are manifold. From a global perspective, the results emerging from this study have highlighted specific critical issues and put forward a series of recommendations for police executives and policy-makers to take into consideration.

This study has pointed out the potentially negative impact of inadequate policies pertaining to human resource management (excessive workload and, consequently, a shortage in manpower) can have on the positive solution of investigations.

At the same time, this research has also indicated several best practices which turned out to have positive effects on clearance and, as such, can be implemented with little effort in every police department, regardless of the amount of available human resources.

Finally, the study has highlighted the necessity of implementing training strategies whose aims are to enhance detectives' capacity to cope with the new challenges imposed on modern investigators, specifically those which refer to the mastering of new technological tools, such as the use of dedicated software to manage big data, the exploitation of social media for investigative purposes, and the need to take advantage of the increased use of video-surveillance in public and residential places.

The Italian context

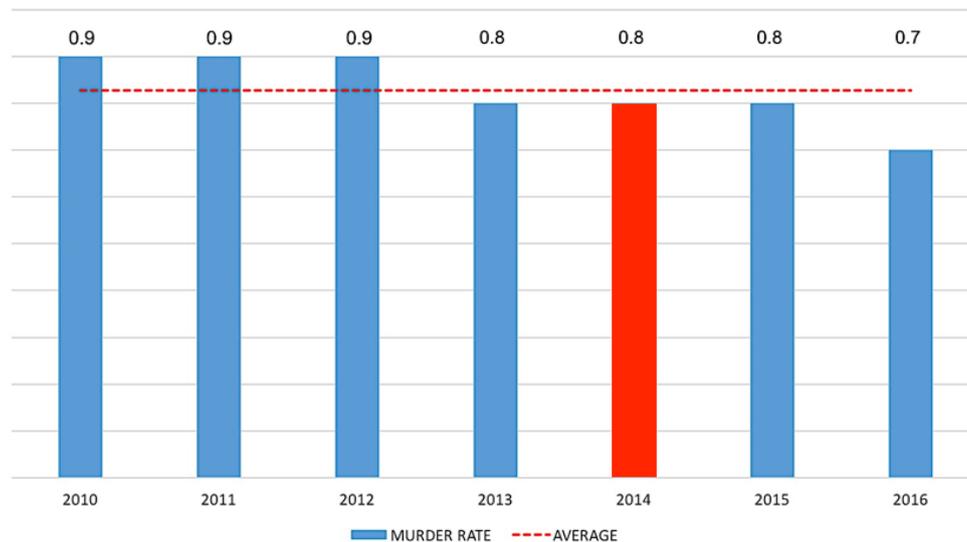
Regarding the Italian context, the study produced some notable results that were indicative of critical differences in the adoption of innovative practices within the macro areas in Italy, particularly in the South. *Ad hoc* measures geared towards raising awareness about the necessity to move away from some of the ineffective deep-rooted habits could positively affect the clearance rate, along with engendering a spirit of self-initiative in detectives that drives them to explore innovative working approaches.

At the same time, it appears that the chronic lack of manpower, especially in auxiliary units in the southern part of Italy, should be addressed through a greater level of commitment from Carabinieri's top executives. In fact, despite the outstanding results achieved by the personnel belonging to such units, the heavy workload reported in the survey along with the reported lack of technical and logistic resources at their disposal, is doomed to produce harmful effects on investigative outcomes, which no longer can be 'compensated' for via individual abilities.

5.5 Limitations

One relevant limitation is the fact that the only available police database referred to murders that occurred in 2014. Despite this, the 2014 national homicide rate was 0.78,⁷⁷ compared to an average of 0.9 over the course of 2010-2016. Moreover, the clearance rate turned out to be 62.1%,⁷⁸ compared to an average of 64.8% over the course of 2010-2016. For these reasons, as described in the following graphic, the use of data that referred exclusively to murders that occurred in 2014 can be considered an adequate representative sample.

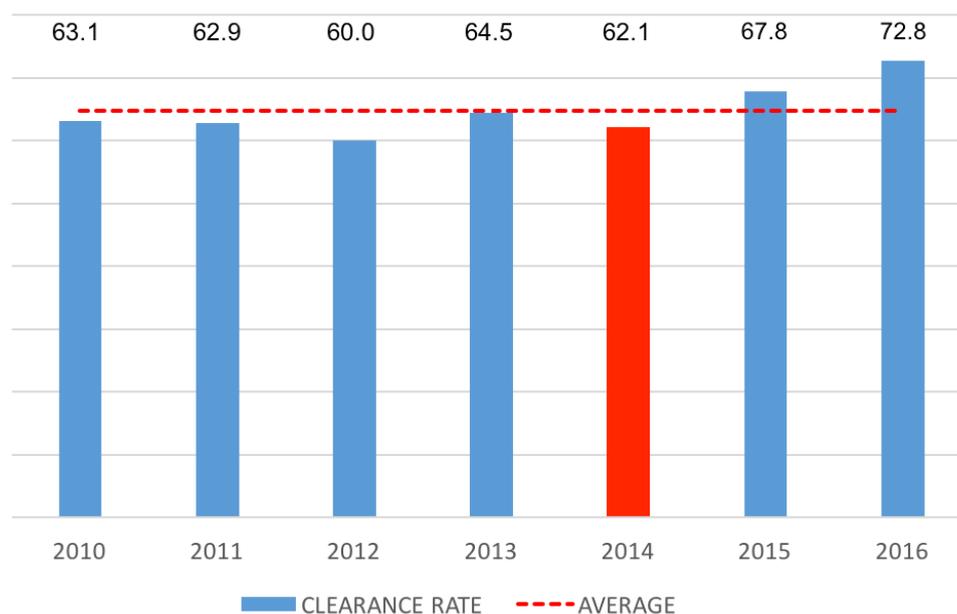
Figure 25. Comparison of the national homicide rate 2010-2016 (ISTAT data).



⁷⁷ ISTAT source.

⁷⁸ ISTAT source.

Figure 26. Comparison of the national clearance rate 2010-2016 (ISTAT data).



Another aspect that warrants further discussion concerns the exiguity of the survey sample size (N = 98), which posed difficulties primarily in the selection of the variables, in that it was not in accordance with the one-to-ten rule of thumb applied in statistical regressions. Although such a rule is commonly intended in a more relaxed manner in logistic regressions, starting from a database comprising almost one-hundred questions, and, thus, several possible factors, I was forced to make a preliminary selection based both on what factors extant literature had shown to be significant and what I found to be effective based on my extensive experience in the field.

This limitation also impacted upon the selection of the control variables, as I was forced to reduce the number of them, choosing among only two demographic variables that had been used in previous studies (victims' gender and race), one related to the circumstances of the murder (use of firearms) and one last that referred to discrepancies in geographical distribution (distinction between the three macro areas in which Italy is split).

A further issue concerned the fact that while I was able to detect the offices to administer the survey to, namely those LEA which managed the considered investigations, ultimately I had no

control over the selection of the respondents. Instead, each command was asked to assign the execution of the survey to one of the detectives who had actively participated in the selected investigation but, for privacy reasons, there was no way for me to verify their compliance with this recommendation.

The final limitation stems from the particular environment in which the survey was administered, as the Carabinieri Corp is primarily a military institution, albeit with policing competencies. Clearly, the perceived responsibilities stemming from this type of status are felt by each serviceman, who, in turn, have a strong sense of duty and deep respect for internal customs and procedures, perhaps even more so than in other types of civilian and corporate environments. For this reason, the possibility that some respondents may have provided “politically correct” responses cannot be entirely ruled out, especially when the questions referred to practices which, in all likelihood, require a certain level of compliance.

5.6 Delimitations

The fact that the survey respondents belonged exclusively to the Carabinieri Corp is an important delimitation. Unfortunately, the level of cooperation between academics and practitioners in Italy is still not fluid. After the negative response from the Carabinieri Corp headquarters with regards to officially authorizing the administering of the survey, I was forced to rely on my personal network to convince the respondents to reply to the survey, assuring absolute confidentiality to all involved. Such an obligation of confidentiality also threatened the possibility of being able to distinguish between the geographical provenance of the respondents. Luckily, most of the detectives indicated their duty station, while in the case of those who did not, I was able to place them within one of the three macro areas by means of the subsequent cross-referencing search of the available variables, such as the outcome of the

investigation, the victim's or author's gender, the motive of the murder, the number of victims, and so forth.

Had I been able to also recruit respondents from the State Police, then this would have provided another insightful perspective, especially in terms of highlighting the potential differences in procedures and methodologies between the two police forces. Nevertheless, gaining the cooperation of respondents from the Carabinieri Corp (which is the most widespread police agency in the territory) enabled me to obtain a broad picture of the current state of the situation with murder investigations in Italy. Moreover, it provided an interesting point of observation from which to examine the different methodologies employed by this police force that operates in both large metropolitan areas and provincial and rural contexts, as well as allowing for a comparison between the so-called Primary and auxiliary investigative units.

Moreover, I opted to select only one respondent for each survey in order to maintain a well-balanced sample from the different police offices that replied to the survey. While there was also the possibility in some cases to engage with more than one detective, employing such a methodology would have biased the overall survey results.

Furthermore, the first part of the survey, by design, pertained to the investigative practices that were 'usually' employed in 2014. Such a specification was chosen with the aim of getting an overview of the 'general attitude' of each investigative unit towards homicide investigations as a whole. More specifically, such an approach aimed to control for the potential bias deriving from variations in their usual behaviour caused by exceptional circumstances related to the case considered. For this reason, despite having a reasonable degree of confidence that the contents of this 'general' part of the survey correspond to how that specific investigation actually played out, this, of course, cannot be entirely guaranteed.

Finally, the fact that the research question specifically addressed *investigative* factors is why only whodunit murders were considered in the research, as too few investigative features would have been obtained by also analysing the self-solved cases which, by their very nature, do not require a high-degree of investigative effort.

5.7 Avenues for future research

Future research in homicide clearance cannot prescind from establishing close relationships between scholars and law enforcement agencies.

In fact, with respect to extant literature on the subject, those studies which used a mixed-methods approach, using both quantitative and qualitative modes of data collection and analysis, have produced a more realistic view of the factors which affect the solvability of these types of crimes, along with providing rich information, which would simply not be available without the direct involvement of investigators themselves (Braga & Dusseault, 2016; Brookman et al., 2018; Carter & Carter, 2016; Feist & Newiss, 2001; Hawk & Dabney, 2018; Keel et al., 2009; Pizarro et al., 2018; Wellford & Cronin, 1999a).

Such a methodology, of course, necessitates increased cooperation between academics and practitioners, based on both mutual respect of their respective roles and the overcoming of a certain reciprocal distrust which has, at times, thus far characterized these relations.

To cite an example here, although the Carabinieri Corps has, since 1999, made an agreement with the University of Bologna to use their teachers in its education courses for officials and warrant officers, and even to go as far as providing a bachelor's degree to trainees, the request to administer the survey for the present study was rejected without any official reason.

Therefore, it is clear that only candid dialogue and a genuine desire to cooperate can place both academics and law enforcement in the best possible position to mutual benefit from a fruitful exchange of information.

5.8 Conclusion

The majority of extant studies on homicide clearance approach the matter mainly from two distinct theoretical perspectives, victims' devaluation and case characteristics, and aim to assess the extent to which extra-legal factors or circumstances related to the incident might affect the positive outcome of investigations.

Although predominantly conflicting evidence has been found with respect to victims' devaluation, nonetheless there is a wealth of studies that have demonstrated the effect of extra-legal factors on clearance, specifically those pertaining to victims' age, gender and ethnicity (Addington, 2006; Alderden & Lavery, 2007; Jiao, 2007; Lee, 2005; Litwin, 2004; Litwin & Xu, 2007; McEwen, 2009; Puckett & Lundman, 2003; Regoeczi, Jarvis & Riedel, 2008; Regoeczi & Jarvis, 2013; Riedel & Rinehart, 1996; Wellford & Cronin, 1999).

At the same time, there is a number of studies that has positively corroborated the latter perspective reporting significant effect on clearance of factors such as the weapon used, the time and location of the murder, the presence/absence of witnesses and evidence, the nature of the victim/perpetrator relationship, and so forth (Alderden & Lavery, 2007; Baskin & Sommers, 2010; Carter & Carter, 2016; Keel et al., 2009; Litwin, 2004; Litwin & Xu, 2007; Mouzos & Muller, 2001; Puckett & Lundman, 2003; Roberts, 2007; Rydberg & Pizarro, 2014; Schroeder & White, 2009; Wellford & Cronin, 1999a; Wolfgang, 1958).

In addition to these aforementioned perspectives, some recent research has explored the possible impact of victims' lifestyle on clearance, finding that there was a negative correlation between the criminal background of the victim and clearance (Pizarro et al., 2018; Rydberg & Pizarro, 2014).

Conversely, as a consequence of the inherent difficulties of obtaining data pertaining to investigative work, only relatively few of these scholars have specifically addressed the potential impact of investigative factors upon clearance.

Despite the relative dearth of research on this issue, the findings appear to be promising, in that various studies have established a correlation between solving and a wide range of investigative factors, such as: adequate training; a strong community policing presence; collaboration with external agencies; a culture dedicated to innovation; the formal designation of a crime scene entry log scribe; the canvas supervisor role; increasing the deployment of forensics technicians to homicide scenes; good relationships with the Prosecutor's Office; checking the suspect's computer; investigator attending the autopsy; the practice of conducting brainstorming sessions and a peer review process between detectives; both the implementation of and fast access to technological tools; and so forth (Block & Bell, 1976; Braga & Dusseault, 2016; Braga et al., 2018; Carter & Carter, 2016; Hawk & Dabney, 2018; Hough et al., 2019; Keel et al., 2009; Pizarro et al., 2018; Richardson & Kosa, 2001; Wellford & Cronin, 1999a).

The present study explored this latter approach further by adopting a mixed-methods research design, which combined quantitative analysis of data acquired from a police dataset of all the murders that occurred in Italy in 2014, together with qualitative data which was gathered through administering a survey to detectives who participated in the investigations cited in the aforementioned database.

With the express aim of minimizing the impact that case characteristics, or legal factors, might potentially have on clearance, the study focussed specifically on those murder cases which required a certain degree of investigative effort, thus excluding self-solved cases.

Both the logistic regression and factor analysis provided significant findings, namely that those investigative factors that referred to human resources, crime scene management and investigative strategies and techniques were shown to be strongly correlated with clearance.

More specifically, certain factors that had already been identified as important in previous research, such as excessive workload, using standardized procedures to engage in neighbourhood canvassing, fruitful cooperation with the media, and conducting frequent briefings between investigators, were also found to be correlated with solving in this study (Wellford & Cronin, 1999a; Puckett & Lundman, 2003; Rydberg & Pizarro, 2014; Braga & Dusseault, 2016).

In conjunction with these factors, the statistical analyses performed as part of this study also found that some novel factors were equally correlated with clearance. First of these was the relevance of detectives' specialization in conducting specific tasks, particularly in terms of locating CCTV cameras and using dedicated software to conduct phone records analysis. Secondly, the practice of assigning specific personnel to perform time-consuming activities, such as producing the paperwork needed to authorize interception activities, which, in turn, enables other detectives to focus solely on investigative work, was also shown to be significantly correlated with clearance. Lastly, the practice of managing the crime scene in a secure manner, namely by creating a safe corridor to reach the corpse, was shown to be significant.

Also among those factors resulted not significant according to the inferential statistics, remarkable findings have been crystallised by qualitative information provided by detectives who participated the survey. As an example, the majority of the respondents complaint for the excessively long processing time of lab exams, which can take up to months to be delivered; furthermore, it has been reported a chronicle understaffing of auxiliary units, half of which is forced to operate with units composed of only five members, at the most.

At the same time, descriptive statistics provided interesting correlation patterns between clearance and a number of factors partially arisen in previous literature as well as novel. Regarding the first, highest clearance rates has been found among those units which ensured proper training for their members or which adopted practices like the provision of checklists for patrol and detectives; the attendance of detectives to the autopsy exam; the habit to register all the personnel who access to the crime scene (Carter & Carter, 2016; Block & Weidman, 1975; Keel et al., 2009; Pizarro et al., 2018; Wright, 2013; Braga & Dusseault, 2016; Innes, 2002b).

With respect to the latter, the best results in terms of clearance have been achieved by those units which made an everyday use of innovative practices such as: rooms (which have also been wiretapped) specifically intended for conducting interviews and interrogations; monitoring of social media; the use of timelines; the habit of acquiring a forensic copy of electronic devices belonging to persons of interest.

Furthermore, the study highlighted a marked discrepancy in the clearance rate of each of the three macro areas in which the Italian police agencies were located in during the survey phase. As the qualitative analysis indicates, such a result might be put in correlation with a certain less degree, in central and southern agencies, of their ability to adjust their consolidated working methods with respect to standardized procedures or innovative investigative methodologies.

Precisely so as to control for the potential effects of extra-legal factors like these last variables, certain predictors that have been noted in extant literature, such as victims' gender and ethnicity, weapon used and the area in which the murder occurred, were included in the statistical models. Interestingly, some models reported a significant correlation between these factors and solving.

Specifically, i) the logistic model that referred to resource management reported that the odds of clearance were lower for foreign victims than Italian victims; ii) the model that referred to investigative strategies reported that the clearance odds were lower when a firearm was used rather than any other form of murder weapon; iii) the logistic model derived from the factor analysis reported a decrease in clearance for the same factor.

Although such results should not be taken as a proof of victim devaluation, nevertheless they highlight the importance of adopting a holistic approach to the matter that should always take into consideration those extra-legal or legal perspectives adopted in the aforementioned studies (Alderden & Lavery, 2007; Baskin & Sommers, 2010; Jiao, 2007; Lee, 2005; Litwin & Xu, 2007; McEwen, 2009; Puckett & Lundman, 2003; Regoeczi et al., 2008; Roberts, 2007; Rydberg & Pizarro, 2014; Schroeder & White, 2009; Wolfgang, 1958; Xu, 2008).

Moreover, in almost all of the dimension-based logistic regression models, as well as in the logistic model deriving from the factor analysis, the odds of clearance were found to be lower in central and southern areas than they were in the North.

Although these latter findings are likely attributable, like the results emerging out of the qualitative analysis, to the aforementioned reluctance on the behalf of central and southern police agencies to adopt innovative standardized procedures, it would seem reasonable to infer from these results that future research on homicide clearance should endeavour to take into account as many theoretical frameworks as possible so as to be able to gain a more extensive overview of this issue.

By way of conclusion, the findings that have emerged out of the present study underscore the fact the importance of investigative factors for tipping the balance between solved and unsolved cases. Henceforth, any attempt to understand why murder cases are solved or otherwise cannot prescind from a deep understanding of the way in which investigations are actually conducted.

The discrepancies registered across the different geographical regions in Italy, which were shown to be a consequence of adopting diverse working strategies, corroborate this assumption that the way in which investigations are actually executed impacts upon the outcomes.

At the same time, the significance of certain extra-legal factors also suggests that, to fully comprehend such a complex matter as homicide clearance, it would be advisable that future research addresses the topic from a holistic perspective, in turn, considering all the aforementioned theoretical approaches hitherto explored in the literature.

From a more practical perspective, the findings of this study also offer a wide range of insights and suggestions, that have been summarized within several tables, which could guide police executives either in the development of training programmes or in terms of the dissemination of standardized best practices and guidelines, which, in turn, could help improve the effectiveness of investigative units or, at the very least, reduce the risk of making irreversible mistakes, particularly in the early stages of investigations.

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Annex I

Correlation matrix between solved cases and the independent variables of the *Resources Management* dimension.

	1	2	3	4	5	6	7
1.Solved	1.0000						
2.IT Lab 24/7 supply	0.1657	1.0000					
3.IT Unit 24/7 supply	0.1422	0.1366	1.0000				
4.IT Lab results speed	-0.1786	-0.2602*	-0.2607*	1.0000			
5.Finger Lab 24/7 supply	0.0226	0.5734*	0.0644	-0.2207*	1.0000		
6.Finger Lab res. speed	0.0906	-0.1812	0.0056	0.2676*	-0.4084*	1.0000	
7.DNA results speed	0.1186	0.0348	-0.1186	0.1784	-0.1633	0.5268*	1.0000
8.Other lab exams Speed	-0.0266	0.0903	-0.0362	0.0597	-0.0674	0.1634	0.1146
9.Experience (years)	-0.0628	-0.1066	0.1728	0.2169*	-0.1446	0.2756*	0.2790*
10.Exclusivity	-0.2110*	0.2119*	0.2694*	-0.0988	0.2237*	-0.1506	-0.1998*
11.Experience (murders)	-0.3019*	-0.0374	0.1055	0.2621*	-0.0041	-0.0737	-0.0775
12.Unit manpower	-0.1114	0.2279*	-0.0004	-0.1221	0.0467	0.0931	-0.0059
13.Training	0.1547	-0.1066	0.0461	0.1326	-0.0703	0.1934	0.1092
14.Workload	-0.5248*	-0.0005	-0.0183	0.0746	0.1261	-0.2088*	-0.1896
15.Evidence custody TASK	0.3706*	0.0071	0.0406	-0.0241	-0.1097	0.3582*	0.1955
16.CCTV locating TASK	0.5787*	0.2592*	0.2254*	-0.2399*	0.0575	-0.0694	-0.1311
17.CCTV analysis TASK	0.6147*	0.1864	0.1111	-0.2732*	0.0899	0.0097	0.0032
18.Interview TASK	0.0103	-0.2034*	0.1738	0.0195	-0.1772	-0.1503	-0.3182*
19.Paperwork TASK	0.4980*	0.0192	0.1942	-0.0457	-0.0076	0.0626	-0.0812
20.Phone analysis TASK	0.4767*	0.0370	0.0031	0.0507	0.1952	0.0502	-0.1073
	8	9	10	11	12	13	14
8.Other lab exams Speed	1.0000						
9.Experience (years)	0.1872	1.0000					
10.Exclusivity	-0.1344	0.1540	1.0000				
11.Experience (murders)	0.0666	0.4644*	0.3204*	1.0000			
12.Unit manpower	-0.1121	0.0726	0.0243	0.0934	1.0000		
13.Training	-0.0352	-0.0633	-0.1874	-0.1806	-0.1939	1.0000	
14.Workload	-0.0731	0.1805	0.3359*	0.7119*	0.2644*	-0.3130*	1.0000
15.Evidence custody TASK	0.0894	0.1728	-0.1395	-0.1892	0.2604*	0.1967	-0.2627*
16.CCTV locating TASK	0.0428	-0.0434	-0.1370	-0.1206	-0.1586	0.1613	-0.2926*
17.CCTV analysis TASK	0.0191	-0.0312	-0.1420	-0.2483*	-0.0725	0.0661	-0.3318*
18.Interview TASK	-0.1046	0.0158	-0.0457	0.0394	-0.1885	0.1435	0.0179
19.Paperwork TASK	-0.0856	-0.0198	-0.0824	-0.1357	-0.0209	0.1077	-0.2330*
20.Phone analysis TASK	-0.1283	-0.0550	-0.0423	-0.1069	-0.0754	0.1103	-0.1673
	15	16	17	18	19	20	
15.Evidence custody TASK	1.0000						
15.Evidence custody TASK	0.2727*	1.0000					
16.CCTV locating TASK	0.4286*	0.7016*	1.0000				
18.Interview TASK	0.0818	0.1206	0.0410	1.0000			
19.Paperwork TASK	0.3673*	0.3309*	0.4743*	0.2607*	1.0000		
20.Phone analysis TASK	0.1830	0.3453*	0.4046*	0.0062	0.3384*	1.0000	

Correlation matrix between solved cases and the independent variables of the *Crime Scene activities* dimension.

	1	2	3	4	5	6	7
1.Solved	1.0000						
2.Scene access officer	0.2142*	1.0000					
3.Scene access log	0.1830	0.7450*	1.0000				
4.Safe corridor	0.2595*	0.4404*	0.4840*	1.0000			
5.Crime scene equipment	0.4439*	0.3018*	0.2282*	0.4302*	1.0000		
6.CCTV locating SOP ⁷⁹	0.5173*	0.3518*	0.2536*	0.4108*	0.6968*	1.0000	
7.Canvassing SOP	0.4971*	0.3559*	0.3384*	0.4914*	0.5958*	0.6493*	1.0000
8.Time on the scene <2h	-0.0075	-0.3022*	-0.2946*	-0.1098	0.0381	-0.0767	-0.0434
9.Time on the scene <3h	-0.2295*	-0.1310	-0.2209*	-0.0770	-0.0719	-0.0064	-0.0036

⁷⁹ Standard Operative Procedures.

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10.Time on the scene <1h		0.2669*	0.5152*	0.6068*	0.2202*	0.0344	0.1005	0.0569
11.Patrol unit checklist		0.2117*	-0.0550	0.0448	0.0500	0.0416	0.1826	0.2198*
12.Detectives checklist	|	0.3393*	0.0786	0.0151	0.2011*	0.3493*	0.5330*	0.4664*
	|	8	9	10	11	12		

8.Time on the scene <2h	|	1.0000						
9.Time on the scene <3h	|	-0.6376*	1.0000					
10.Time on the scene <1h	|	-0.5013*	-0.3469*	1.0000				
11.Patrol unit checklist	|	-0.0646	0.1680	-0.1101	1.0000			
12.Detectives checklist	|	0.0779	0.1126	-0.2214*	0.4282*	1.0000		

Correlation matrix between solved cases and the independent variables of the *Investigative Strategies* dimension.

	|	1	2	3	4	5	6	7

1.Solved	|	1.0000						
2.Decision making proces	|	-0.2442*	1.0000					
3.Cold case unit	|	-0.1783	-0.0319	1.0000				
4.Media coordination	|	0.3989*	-0.1992*	-0.1352	1.0000			
5.Forensic relationship	|	0.2142*	-0.0470	-0.0296	0.1508	1.0000		
6.Coroner relationship	|	0.1922	0.0146	-0.0773	0.0064	0.5165*	1.0000	
7.Prosecutor relation.	|	0.2292*	-0.0367	-0.1043	0.1179	0.6396*	0.4881*	1.0000
8.Waiting room bugged	|	-0.0630	0.0323	-0.1279	-0.0327	-0.2615*	-0.1481	-0.5554*
9.Interview room	|	0.2949*	-0.1435	-0.2074*	0.2452*	0.1751	0.1396	-0.0548
10.Interview room bugged	|	0.3146*	-0.4541*	-0.1207	0.1805	0.0327	0.0480	0.0851
11.Jail meeting bugged	|	0.1347	-0.1657	-0.1535	0.4137*	0.1368	0.1525	0.2170*
	|	8	9	10	11			

8.Waiting room bugged	|	1.0000						
9.Interview room	|	0.2832*	1.0000					
10.Interview room bugged	|	0.0561	0.2074*	1.0000				
11.Jail meeting bugged	|	-0.1297	0.1364	0.2197*	1.0000			

Correlation matrix between solved cases and the independent variables of the *Investigative Techniques* dimension.

	|	1	2	3	4	5	6	7

1.Solved	|	1.0000						
2.Social media monitor.	|	0.0975	1.0000					
3.Briefing	|	0.5013*	0.2301*	1.0000				
4.Timeline	|	0.4163*	0.4018*	0.4995*	1.0000			
5.Case analysis software	|	0.0547	0.1457	-0.1119	0.0241	1.0000		
6.Phone records software	|	0.3261*	0.1376	0.3442*	0.2292*	0.1217	1.0000	
7.IT device seizing SOP	|	0.1551	-0.0630	0.1443	-0.0233	-0.0557	-0.1017	1.0000
8.Mobile phone IT copy	|	0.1675	0.4404*	0.1259	0.2027*	0.1978	0.0833	-0.0170
9.Autopsy attendance	|	-0.2666*	0.0400	-0.1545	0.1799	0.0504	-0.2006*	-0.1820
	|	8	9					

8.Mobile phone IT copy	|	1.0000						
9.Autopsy attendance	|	0.0251	1.0000					

Annex II

Summary of variables significance in bivariate and multivariate statistics analysis.

ORIGINAL FACTORS	BIVARIATE ANALYSIS	LOGISTIC MODELS	OVERALL LOGISTIC MODEL
<i>Resources Management</i>			
Presence of an IT forensic unit	Exclusivity	Workload	Workload
24/7 availability of an IT forensic lab	Workload	CCTV cameras location TASK	CCTV cameras location TASK
IT forensic lab speed	Evidence chain of custody TASK	Interception paperwork TASK	Interception paperwork TASK
24/7 availability of a fingerprints forensic lab	CCTV cameras location TASK	Phone records analysis TASK	Phone records analysis TASK
Fingerprints forensic lab speed	Interception paperwork TASK		
24/7 availability of a DNA forensic lab	Phone records analysis TASK		
Forensic lab speed for other exams (ballistic, electronic microscopic, etc.)			
Experience (years)			
Exclusivity			
Exclusivity			
Experience (murders)			
Manpower for each unit			
Detectives' training			
Workload of each detective			
Evidence chain of custody TASK			
CCTV cameras location TASK			
CCTV cameras analysis TASK			
Interception paperwork TASK			
Witnesses interview TASK			
Phone records analysis TASK			
<i>Crime Scene Activities</i>			
Crime scene access officer	Crime scene access officer	Canvassing S.O.P.	
Crime scene entry log	Safe corridor	Time to reach the scene	
Safe corridor	Canvassing S.O.P.		
Equipment	Time to reach the scene		
CCTV cameras gathering S.O.P.	Patrol unit checklist		
Canvassing S.O.P.	Detectives' checklist		
Time to reach the scene			
Patrol unit checklist			
Detectives' checklist			

<i>Investigative Strategies</i>			
Decision making process Cold case unit	Decision making process Media coordination	Media coordination Prosecutor Office relationship	Media coordination
Media coordination	Prosecutor Office relationships		
Forensic relationships Coroner’s Office relationships Prosecutor Office relationships Waiting room bugged Interrogation room Interrogation room bugged Jail bugged	Interrogation room Interrogation room bugged		
<i>Investigative Techniques</i>			
Briefing Timeline Case analysis software	Briefing Timeline Phone records analysis software	Briefing	Briefing
Phone records analysis software IT seizure S.O.P. IT forensic mobile phone copy Autopsy attendance	Autopsy attendance		

Annex III

Official request of cooperation submitted to the General Command of Carabinieri Corp.



COMANDO GENERALE DELL'ARMA DEI CARABINIERI
V Reparto
SM - Ufficio Cerimoniale
Viale Romania 45
00197 Roma

Alla c.a. del Sig. Comandante del Reparto
Col. Salvatore Cagnazzo

carabinieri@pec.carabinieri.it

Milano, 5 luglio 2018

Oggetto: Richiesta di collaborazione per finalità di ricerca scientifica.

Egregio Colonnello,

In qualità di Coordinatore del Dottorato Internazionale in Criminologia dell'Università Cattolica del Sacro Cuore, le scrivo per chiedere la collaborazione dell'Arma dei Carabinieri allo studio *La risoluzione dei casi di omicidio: valutazione dei modelli più efficaci in funzione della tipologia di omicidio*, condotto dal dott. Christian Persurich nell'ambito del dottorato che coordino.

L'obiettivo dello studio è esaminare i fattori che possono influenzare positivamente o negativamente l'esito delle indagini per omicidio nel contesto italiano. La ricerca si basa sull'analisi delle tecniche investigative e le modalità operative adottate dalla polizia giudiziaria nelle indagini riguardanti tutti gli omicidi volontari consumati nel 2014 che abbiano comportato un certo grado di impegno investigativo. Le informazioni raccolte saranno analizzate e comparate con analoghe ricerche effettuate nella letteratura internazionale. I risultati miglioreranno la comprensione di quali fattori risultino aumentare le probabilità di risoluzione di un'indagine di omicidio. La ricerca nasce dall'esperienza decennale del dott. Persurich all'interno della Squadra Omicidi del Nucleo Investigativo Carabinieri di Milano.

Per acquisire le informazioni necessarie all'analisi, il dott. Persurich ha predisposto sotto la mia supervisione un questionario, allegato alla presente, destinato ad una serie di Comandi dell'Arma (Nuclei Investigativi e Comandi Compagnia, riportati in un secondo allegato alla presente) che risultano avere proceduto su casi di omicidio nel 2014.

Administration & Research
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UNIVERSITÀ
CATTOLICA
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La collaborazione richiesta all'Arma consiste nell'inoltro per via gerarchica del questionario a ciascuno dei predetti Comandi unitamente alla richiesta di delegare alla compilazione del medesimo un militare che abbia partecipato attivamente all'indagine oggetto di analisi.

Sia la compilazione che l'inoltro potranno essere effettuati, in forma totalmente anonima, mediante l'accesso ad una piattaforma web specializzata in sondaggi online (www.surveo.com) o, in alternativa, compilando un questionario cartaceo che potrà essere inviato via fax al numero 02 7234 3721.

Le informazioni raccolte verranno considerate di natura riservata e verranno impiegate in forma totalmente anonima. I dati verranno analizzati a livello aggregato esclusivamente per fini statistici legati alla ricerca sopra descritta. Non è rilevante per lo studio l'analisi di singoli casi e/o divulgare informazioni che violerebbero la privacy dei soggetti coinvolti.

Sono a Sua disposizione per qualsiasi chiarimento o approfondimento ritenga necessario. In caso di necessità La prego di non esitare a contattarmi per email (francesco.calderoni@unicatt.it) o telefonicamente (0272343715). Può inoltre fare riferimento direttamente al dott. Christian Persurich (email: christianfabio.persurich@unicatt.it cel: 3496900600).

In attesa di un Suo cortese riscontro e ringraziandoLa anticipatamente per la collaborazione, porgo

cordiali saluti,

Francesco Calderoni
Professore associato di Criminologia
Coordinatore del Dottorato Internazionale in Criminologia
Transcrime, Centro Interuniversitario di ricerca sulla criminalità transnazionale www.transcrime.it
Università Cattolica del Sacro Cuore di Milano
Largo Gemelli 1, 20123, Milano
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Email: francesco.calderoni@unicatt.it

Allegati:

- Le tecniche investigative e le modalità operative della Polizia Giudiziaria - Questionario di raccolta dati
- Elenco comandi dell'Arma dei Carabinieri da contattare

Annex IV

Refusal letter of the General Command of Carabinieri Corp.

Comando Generale dell'Arma dei Carabinieri
S.M. – Ufficio Cerimoniale

Il Capo Ufficio

Roma, 18 luglio 2018

Egg. Prof. Calderoni

Le comunico che nonostante ogni migliore predisposizione, non è stato possibile aderire alla Sua richiesta di collaborazione per la realizzazione di uno studio sul tema "La risoluzione dei casi di omicidio: valutazione dei modelli più efficaci in funzione della tipologia di omicidio".

L'occasione mi è gradita per farLe pervenire

Beni per carità delusi

Col. t.ISSMI Salvatore Cagnazzo

Prof.
Francesco CALDERONI
Università Cattolica Sacro Cuore di Milano

e-mail: francesco.calderoni@unicatt.it

Annex V: Survey

Police investigative techniques and operational methods

Data collection questionnaire

Preliminary information

The present survey aims to gather information on the investigative techniques and operational methods used in homicide investigations by police forces in Italy.

The information collected will be processed and compared with the techniques used by foreign counterparts in the context of a doctoral thesis project, whose ultimate aim is to understand what factors positively or negatively influence the outcome of murder investigations.

The PhD project

This survey is part of a larger process of data collection that the candidate, dr. Christian Persurich, is conducting as part of the thesis component of the International Doctorate in Criminology - Catholic University of the Sacred Heart of Milan.

The project stems from the personal experience of dr. Persurich, who was a member of the Homicide Squad of the Carabinieri Investigation Unit in Milan from 2008 to 2017.

Thesis title: “The role of Investigative Factors in Whodunit Homicide Clearance: the Italian Case”.

The questionnaire

The questionnaire concerns 131 Carabinieri Commands (both at the company and investigative levels), who, in 2014, dealt with homicide cases that involved a high degree of investigative commitment. With this latter point in mind, those cases that were solved immediately (e.g., murder-suicides, author caught “red handed”, and so forth) were removed from consideration. For each of the aforementioned Police Commands, a detective, who actively participated in the investigation, should be selected by the commanding officer to complete the survey.

The questionnaire is structured in two parts:

- general (section A to F): deals with topics such as the selection of personnel, the organization of human resources, procedures for managing the crime scene, relations with other actors in the investigation;
- specific (section G): analyses specific issues of the cases in 2014 involving the respondents.

Estimated time

The estimated time to complete the survey is around 15-20 minutes.

Confidentiality

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The information collected will be treated in a confidential manner, and will be used in a completely anonymous fashion exclusively for the purposes of statistical analysis and purely in relation to this doctoral thesis.

If you require any further information about the study, you can contact me directly via the following email address:
christianfabio.persurich@unicatt.it

If you would prefer to complete the questionnaire manually, then you can send it back via fax to 02.72343721 or to the following address: Transcrime Research Center, Catholic University of the Sacro Cuore, Largo Gemelli 1, 20123 Milan.

I hope that the content of the questionnaire is of interest to you and I thank you in advance for your availability and willingness to take part.

I also remind you that there are no correct or wrong answers. Your opinion is the only thing that matters.

Kind Regards,

Christian Persurich

GENERAL PART

A. Recruitment and training

A1. Please choose the type of investigative office you were employed in at the time of the murder investigation you conducted in 2014

- Primary investigative unit
- Auxiliary investigative unit

A2. Please provide the location of the office you were employed in at the time of the murder investigation you conducted in 2014

- Municipality (Province)

A3. Sex

- Male
- Female

A4. Current age

- 20-30
- 31-40
- 41-50
- Over 50

A5. Please provide your rank at the time of the murder investigation you conducted in 2014

- Official
- Inspector
- Superintendent
- Agent

A6. Current length of service

- Less than 10 years
- From 10 to 20 years
- From 21 to 30 years
- More than 30 years

A7. Did your office exclusively manage homicide investigations in 2014?

- Yes
- No

A8. How long had you been serving in that office in 2014?

- For less than a year
- For less than 5 years
- For less than 10 years
- For more than 10 years

A9. How many homicide investigations did you manage over the course of your career?

- 1 to 5
- 6 to 10

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- 11 to 20
- More than 20

A10. How many operators did your unit comprise in 2014?

- Less than 5
- 5 to 10
- More than 10

A11. At that time, did the newly assigned staff undergo specific training courses for operators in murder investigations (for example: analysis and reconstruction of the crime scene, interview and interrogation techniques, Bloodstain Pattern Analysis, etc.)?

- Yes
- No

A12. Have you ever attended training sessions organized or managed by your administration on specific investigative techniques for murder or crime scene management?

- Yes
- No

A13. If yes, please indicate the most relevant training activities carried out and in which year.

A14. At that time, did the first responder personnel have standardized operating procedures/ a check list outlining the correct management of the crime scene, or did they attend institutional training courses on how to correctly manage crime scenes?

- Yes
- No
- I do not know

B. Human resource management

B1. In 2014, how many murder cases, on average, were you handling at the same time?

- One at a time
- From one to three
- More than three

B2. Did you also investigate on attempted murder cases?

- Yes, always
- Yes, sometimes
- No

B3. In the event of a positive or partially positive response to the previous question, to what extent did the effort exerted on attempted murders affect your overall workload?

- Less than 10%
- Between 10 and 30%
- Between 30 and 60%
- More than 60%

B4. Was there a “Cold Case” unit exclusively dedicated to solving old unsolved murders?

- Yes
- No

B5. In the five-year period prior to 2014, were you offered any kind of institutional psychological support?

- Yes
- No

B6. Have you or any members of your team ever participated in institutional training activities concerning how to manage relationships with the families of murder victims?

- Yes
- No

C. Organization of crime scene activities

C1. In 2014, how quickly, on average, did your unit reach the crime scene?

- Within 60 minutes of the report from the operations centre
- Within two hours of the report from the operations centre
- Within three hours of the report from the operations centre
- Over three hours from the report from the operations centre

C2. Was your unit's staff equipped with standardized operating procedures or a checklist of the tasks to be performed on the scene?

- Yes
- No

C3. Who generally used to direct the crime scene activities?

- The officer of the department
- The oldest soldier in the Unit
- The most charismatic / capable military person in the Unit, regardless of seniority, depending on the circumstances

C4. Did you engage in the practice of assigning an operator with the sole responsibility of authorizing access to the crime scene?

- Never
- Rarely
- Often
- Always

C5. Did access to the scene have to be authorized and were names annotated and kept on file?

- Never
- Rarely
- Often
- Always

C6. Did you engage in the practice of setting up a single corridor through which to access the body from outside the perimeter, so as to preserve the integrity of the scene?

- Never

- Rarely
- Often
- Always

C7. Did those who were granted access to the crime scene use the proper equipment, such as shoe covers, disposable gloves and masks?

- Never
- Rarely
- Often
- Always

C8. Did you construct a map that included, for example, the locations of the CCTV cameras, whether they were operating or malfunctioning, the date and nature of the fault, and the conversion of the displayed time vs real time?

- Never
- Rarely
- Often
- Always

C9. What criteria did you use to assign the following tasks?

- Randomly
- Always assigned to the same detective
- ✓ Evidential chain of custody
- ✓ CCTV Camera acquisition
- ✓ CCTV Camera analysis
- ✓ Witness interviewing
- ✓ Interrogation of suspects
- ✓ Preliminary report to the Judicial Authority
- ✓ Subsequent reports to the Judicial Authority
- ✓ Interceptions, listening and analysis
- ✓ Phone records analysis
- ✓ Relationships with forensics
- ✓ Relationships with Coroner's office
- ✓ Relationships with other LEA
- ✓ Relationships with foreign LEA
- ✓ Relationships with phone carriers
- ✓ Relationships with banks
- ✓ Relationships with public institutions
- ✓ Relationships with interpreters

D. Interrogations and neighbourhood interviews

D1. Was the waiting room equipped with environmental interception devices in 2014?

- Yes
- No

D2. Was there an interrogation room available, or at least silent rooms you could reserve for the purpose of conducting interrogations?

- Yes
- No

D3. In the case of a positive response, were these aforementioned rooms bugged and monitored with video cameras or via a two-way mirror?

- Yes
- No

D4. Did you engage in the practice of constructing a map which annotated absent neighbours, apartments to be re-contacted, etc.?

- Never
- Rarely
- Often
- Always

E. Internal organization and office activities

E1. What kind of decision-making approach was used in 2014?

- The guidelines and investigative strategies were usually decided by the staff member with the highest rank
- The guidelines and investigative strategies were usually decided by the staff with the most seniority
- Guidelines and investigative strategies were usually proposed by anyone, regardless of their grade or seniority.

E2. In 2014, did you engage in the practice of eavesdropping on the jail waiting room?

- Never
- Rarely
- Often
- Always

E3. Were fake profiles used for the purposes of social media monitoring?

- Never
- Rarely
- Often
- Always

E4. Was a “timeline” used to describe and analyze the movements of victims and subjects of interest?

- Never
- Rarely
- Often
- Always

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E5. Were briefings and a complete review of the case made at pre-arranged intervals (24 hours, 72 hours, 1 week, 2 weeks, 1 month, 3 months, etc.)?

- Never
- Rarely
- Often
- Always

E6. Did you use investigation management software?

- Yes
- No

E7. Was the analysis of phone records carried out using dedicated software?

- Yes
- No

E8. Were the details to be communicated to the press agreed in advance between executives and investigators?

- Never
- Rarely
- Often
- Always

E9. Did you engage in the practice of providing cooperation and assistance to the Prosecutor's Office during the trial via the constant presence of one detective who managed the investigation?

- Never
- Rarely
- Often
- Always

F. Scientific / Computer forensics / Forensics medicine

F1. In 2014, was a team of forensics operators available 24/7?

- Never
- Rarely
- Often
- Always

F2. Did the detectives in your unit attend the autopsy exam?

- Never
- Rarely
- Often
- Always

F3. Was there a unit dedicated to IT forensics activities and analysis (of smartphones, computers, etc.)?

- Yes

- No

F4. Were the members of your unit provided with a checklist outlining the correct procedures for seizing computer equipment and smartphones at the scene?

- Yes
- No

F5. Did you engage in the practice of forensically copying the smartphones used by the victim and subjects of interest?

- Never
- Rarely
- Often
- Always

F6. How quickly did the results from the computer forensics activity become available?

- Within 12 hours
- Within 24 hours
- Within 48 hours
- Over 48 hours

F7. Was the fingerprint lab available 24/7?

- Never
- Rarely
- Often
- Always

F8. How quickly did the fingerprint results generally become available?

- Within 24 hours
- Within 48 hours
- Within 72 hours
- Over 72 hours

F9. How quickly did the results of DNA analysis generally become available?

- Within 24 hours
- Within 48 hours
- Within 72 hours
- Over 72 hours

F10. How fast did the results from the other analyzes (microscopy, biology, ballistics, etc.) generally become available?

- Within 15 days
- Within one month
- Within two months
- Over two months

F11. Was Crime Scene Reconstruction software used at the time?

- Yes
- No

F12. Who performed the function of ‘Crime Scene Analyst’ during the murder trials (namely the operator who analyzes and summarizes the results of ballistics, fingerprints, biological, etc., examinations and provides an overall interpretation)?

- By a unit operator
- By a forensic operator
- By our commander
- It was not planned

F13. With respect to the entire year of 2014, what is your overall assessment of the speed of execution of the following exams?

- Very satisfying
 - Satisfactory
 - Unsatisfactory
 - Bad
 - Never done
-
- ✓ Fingerprint results
 - ✓ DNA results
 - ✓ Computer Forensics
 - ✓ Other laboratory tests (biology, microscopy, ballistics, etc.)

SPECIFIC PART

G. Analysis of the investigation you carried out in 2014

G1. With respect to the present study, the investigation you conducted in 2014 pertained to:

- Murder
- Double homicide
- Triple homicide

G2. Did the outcome of the investigative activity you carried out lead to at least one arrest? (please consider even if it was not possible to execute an arrest due to unavailability, escape or the death of the subject)

- Yes
- No

G4. Please indicate the sex of the victim (or victims in the case of a double or triple homicide)

- Victim or victim were all male
- Victim or victim were all female
- Victims were different sexes, both male and female
- Unknown sex

G5. Please indicate the nationality of the victim (or victims in the case of double or triple homicide)

- Victim or victims were all of Italian nationality

- Victim or victims were all foreign nationals
- Victims were all from different nationalities, both Italian and foreign
- Nationality unknown

G3. Did the victim or at least one of the victims have a criminal record?

- Yes
- No
- I do not remember

G6. Indicate, where possible, the socio-economic status of the victim(s).

- Wealthy
- Middle Class
- Working Class
- Poor

G7. How would you define the working relationship between the police and the social context in which the murder took place?

- Collaborative
- Indifferent
- Hostile

G8. Please indicate the motive

- Organized crime
- Common crime
- Drugs
- Robbery
- Sexual purposes
- Family dispute
- Dispute between acquaintances
- Trivial reasons
- Unknown
- Other...

G9. If the murder you selected was classified as organized crime-related, how important was the investigative activity carried out on this association? (please consider not only the activity conducted by your unit, but also by other LEAs prior to the murder occurring)

- It was useful for clarifying the criminal context in which the murder eventually occurred
- It was not particularly useful
- It was useful in terms of shedding light on the murder
- It was more effective than the activity carried out specifically on the murder
- It was useful because it created the conditions to promote the emergence of an informant, whose information subsequently led to the identification of those responsible for the murder
- It was useful for indirectly acquiring relevant information about the murder as a result of ongoing technical activities (telephone / environmental interceptions)
- It was useful because I believe that the probable perpetrators of the murder, who went unpunished, were in any case arrested for associated crimes

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- It was useful because in high-density mafia environments classic homicide investigation techniques often do not allow for the collection of evidence to identify and arrest the responsible party
- Other

G10. Please indicate the nationality of the author(s), if identified

G11. Only in the event that the 2014 case ended with at least one arrest, please assign how important each factor was in contributing to the success of the investigation

- Very useful
 - Partially useful
 - Not of use
 - Factor did not emerge in the considered investigations
-
- ✓ Witnesses
 - ✓ Physical evidence
 - ✓ CCTV Cameras
 - ✓ Fingerprints
 - ✓ Telephone tapping
 - ✓ Environmental interceptions
 - ✓ Computer forensics
 - ✓ Effective coordination with other LEA
 - ✓ Confidential information
 - ✓ Statements from informants
 - ✓ Proper crime scene preservation
 - ✓ Effective use of the criminal database
 - ✓ Surveillance
 - ✓ Speed of lab results
 - ✓ Speed of Computer forensics analysis
 - ✓ Relationship with Coroner's office
 - ✓ Prior knowledge of the criminal environment in which the murder occurred
 - ✓ Help from experts in the area
 - ✓ Technical assistance from specialized units
 - ✓ Clear Modus Operandi
 - ✓ Staff experience
 - ✓ Investigative acumen
 - ✓ Dedication
 - ✓ Creativity
 - ✓ Teamwork within the department
 - ✓ Tenacity
 - ✓ Appeal for challenging circumstances
 - ✓ Possibility of employing support staff
 - ✓ Constructive dialogue between investigators
 - ✓ Relationship with Forensics
 - ✓ Relationship with the Prosecutor's Office
 - ✓ Executives' ability to solve problems and facilitate the work of the investigators
 - ✓ Relationship with media
 - ✓ Intuition of the interpreters
 - ✓ Use of specific software for managing the investigation

- ✓ Fortuity

G12. Other relevant factors believed to have been key to the outcome of the investigation.

G13. Only if the 2014 investigation was concluded without any arrest, please assign to each factor listed below how relevant they were to the failure of the investigation

- Very relevant
 - Partially relevant
 - Not relevant
 - Factor did not emerge in the considered investigations
-
- ✓ Absence of witnesses
 - ✓ Absence of physical evidence
 - ✓ Absence of useful CCTV cameras
 - ✓ Absence of useful phone records
 - ✓ Uncooperative environment
 - ✓ Potential witness intimidation
 - ✓ Poor coordination with another LEA
 - ✓ Bad preservation of the scene
 - ✓ Excessively long time between the murder and discovery of the corpse
 - ✓ Impossibility of establishing with any degree of certainty the cause of death
 - ✓ Inability to identify the victim
 - ✓ Slow lab results
 - ✓ Slow computer forensics analysis
 - ✓ Poor communication with the Coroner's office
 - ✓ Poor prior knowledge of the criminal environment in which the murder occurred
 - ✓ Absence of experts on the area
 - ✓ Poor level of staff experience
 - ✓ Poor sense of harmony within the department
 - ✓ Poor dialogue between the investigators
 - ✓ Poor communication with Forensics
 - ✓ Poor communication with the Prosecutor's office
 - ✓ Inability of executives to solve problems that facilitate the work of investigators
 - ✓ Interception requests not accepted by the Judicial Authority
 - ✓ Difficulty / impossibility of intercepting chats and Voice Over IP calls
 - ✓ Individual errors
 - ✓ Shortage of equipment
 - ✓ Shortage of personnel
 - ✓ Excessive number of investigations being handled simultaneously
 - ✓ Personnel distracted from the investigation due to performing other services
 - ✓ Excessive media pressure
 - ✓ News leaks
 - ✓ Lack of ability by interpreters
 - ✓ Lack of specific software for managing investigations

G14. Other factors that you believe contributed to preventing the resolution of the case.

G15. If useful testimonies were located during the investigative activity you conducted in 2014, how were the witnesses identified?

- Directly at the crime scene, thanks to the work carried out by first responder operators and my office
- The first witnesses had indicated useful witnesses, thanks to the persuasive activity carried out by members of my office
- Thanks to the analysis of technical activity carried out during the investigations (printouts, wiretapping, eavesdropping, computer forensics, etc.)
- Thanks to results obtained from the analysis of criminal databases
- Thanks to a collaboration with another LEA
- Other...

G16. If the previous question was answered, how long was it necessary to acquire useful information from key witnesses?

- Already during the first verbalization
- At the second verbalization
- Beyond the second verbalization
- No key witnesses emerged

G17. Please indicate the utility of the witnesses in your case

- To reconstruct the dynamics of the murder
- To localize evidence sources (physical traces)
- To identify the victim
- To identify the author
- To define the relational or criminal network of the victim
- To define the criminal environment in which the murder occurred
- To outline the motive
- To verify / refute an alibi
- To consolidate the framework that had already been acquired
- More ...

G18. Please indicate the utility of the information provided from each category of witness

- Very useful
- Partially useful
- Not useful
- Factor did not emerge in the considered investigations

- ✓ First responder officers
- ✓ Medical staff
- ✓ Other LEA
- ✓ Family of the victim
- ✓ Partners (boyfriends, lovers)
- ✓ Friends of the victim
- ✓ Victim's work colleagues
- ✓ Criminal partners of the victim
- ✓ Acquaintances of the victim
- ✓ Neighbours
- ✓ Strangers

- ✓ Others

G19. Please rate the quality of the relationships between your office and the persons indicated during the 2014 murder investigation

- Excellent
- Very good
- Satisfactory
- Unsatisfactory
- Very bad
- Not relevant

- ✓ Relationship with Forensics
- ✓ Relationship with RIS (specialized Forensics Department for Major Crimes)
- ✓ Relationship with the Coroner's office
- ✓ Relationship with the Prosecutor's Office

G20. Based on your experience, how would you evaluate the investigation carried out by your office in 2014?

- Options: from 1 to 10 stars

G21. For each item, give an overall evaluation of your unit in 2014

- Excellent
- Very good
- Satisfactory
- Unsatisfactory
- Very bad
- Not relevant

- ✓ Team spirit, chemistry, constructive dialogue between investigators
- ✓ Experience, investigative acumen
- ✓ Tenacity, spirit of sacrifice, zeal
- ✓ Creativity
- ✓ Empathy

G22. In addition to what has already been indicated, please feel free to provide any other suggestions or proposals that you believe could be useful to increase the effectiveness of homicide investigations.