



The Rhythms of Interaction with Mobile Technologies

Tales from the Police

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TO MY MOTHER

THESES

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ABSTRACT

This dissertation is concerned with understanding the dynamics surrounding the usage of Mobile Information and Communication Technologies (MICT) within the context of the police force in the United Kingdom. The opportunities arising from MICT and their rapid uptake have led to a great number of texts studying their impact and effectiveness. However, these studies have a superficial understanding of the context of use of MICT, are mainly concerned with improving the efficiency of one particular police task, and consider little usage of MICT as a technological, organizational or individual failure. Given the pervasive nature of MICT and the strong link that these create between institutions and geographically dispersed individuals, this dissertation argues that there is a need to investigate the process of MICT use as interconnected to the situations of its use. This further requires an appreciation of context not only at the situated level but also at the institutional level. The dissertation argues that such appreciation is afforded by a phenomenological understanding of police work and of MICT use that centers upon the concept of intentionality.

The dissertation examines how MICT usage evolves through a number of situations as faced by various police units. The *Framework of Virtuality* is constructed to delineate the concept of context and is later applied to a qualitative ethnographic case study presented through narratives. The findings illuminate the dynamics of MICT use and illustrate that MICT use is neither linear, nor dependent on the functional capabilities of the technology. Rather, MICT use is discontinuous. MICT need to disappear from the context of work to permit for the intentionality of police action to surface in situated activities. This leads the dissertation to infer that the intentionality of policing is at odds with the projected activities suggested by MICT – and with the rhetoric surrounding its use and implementation. The thesis is that the current orientation and understanding of MICT influence the intentionality of policing in the UK directing towards a more mechanistic relation with the public.

The dissertation makes a theoretical contribution by proposing the *Framework of Virtuality* for understanding and studying MICT in work contexts. It further offers methodological insights for studying MICT through observational ethnographic techniques and narrative. Finally, it provides practical implications regarding the deployment of MICT in police forces.

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LIST OF ACRONYMS

AI – Artificial Intelligence

ANPR – Automatic Number Plate Recognition

AQ – Active Queue of Incidents on the MDT

CAD – Computer Aided Dispatching

CCTV – Closed Circuit Television

CID – Investigating Police Branch

CIS – Crime Information System

CSCW – Computer-Supported Collaborative Work

G83 – Property Storage Room

GPS – Global Positioning System

HCI – Human-Computer Interaction

ICCS – Integrated Telephone and Radio System

ICT – Information and Communication Technologies

IS – Information Systems

IT – Information Technology

KB – Force wide radio

MICT – Mobile Information and Communication Technologies

MDT – Mobile Data Terminal

OIS – Command and Control System

PC – Police Constable

PDA – Personal Digital Assistant

PNC – Police National Computer Background Check on people and vehicles

PR – Personal Radio

RV – Response Vehicle

SCT – Social Contract Theory

SMS – Short Messaging Service

SOCO – Scene of Crime Officer

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CHAPTER ONE: INTRODUCTION TO RESEARCH ISSUES

The use of mobile information and communication technologies (MICT) such as laptops, mobile phones, personal digital assistants (PDAs) and global positioning systems (GPS) has increased dramatically over the past two decades. Once considered a mere extension of stationary equipment, for their technical ability of being portable, MICT and their services are now at the center of the interest of many commercial and governmental organizations. Far from being the mere mobilization of stationary equipment, MICT are a radical enabler of change in the way people work, interact and keep in contact in a variety of settings, and have thus attracted scientific attention from industry and academia alike. The change in both practical and theoretical terms brought about by MICT in work and social settings is far more than stationary equipment, as it obviously involves a larger proportion of work in terms of time and space of use than stationary equipment ever did. This has led to new ways of thinking about designing technology as a social artifact (Dourish 2001). Furthermore, MICT are becoming a central resource to many organizations, both public and private. This change is due largely to the availability and functional capabilities of micro technologies, and the increased expectation of customers of better, faster, and always-available services. Public and private service companies are employing MICT in large-scale implementation projects. The police force, because of its geographical mobility, has been at the forefront of the introduction of MICT, and thus presents itself as an archetypical case for the study of these particular technologies.

Despite the recognition of the importance of MICT, the police force, as with many other organizations, fails to achieve effective strategies for managing these technologies, at least in the theoretical potential on which these technologies are benchmarked (Pica and Sørensen 2004). As a consequence, MICT are used ineffectively and do not produce the results hoped for. Furthermore, MICT produce, like many other technologies, unintended consequences of both positive and negative nature, for the application of information systems (IS) inevitably leads to drifts in scope, scale and practical usage of technologies (Ciborra and Associates 2000). These unintended consequences are important to observe especially in public service organizations such as the police. However, these drifts are observable not in the planned or reported usage of technology but in the phenomenology of use – the actual practice of

technological use in a specific context. Despite these considerations, few studies address such issues directly. Modeling the understanding of the dynamics of use of MICT and their possible consequences for police work is the focus of this research. In turn, the phenomenon of use of MICT in the particular context of the police in the United Kingdom (UK) is the central empirical ground on which this dissertation lies. This chapter begins with a discussion of the motivations and scope of this research, followed by a brief definition of what is understood in this dissertation by the terms Information and Communication Technologies (ICT) and MICT. The current state of research on MICT and police work is then addressed with section 1.5 examining the research objectives. The chapter concludes with an outline of the structure of the dissertation.

1.1 Motivation and Scope of the Research

This research has a general interest in MICT, their application in modern organizations, and the consequences of their use in work contexts. It has a more specific interest in the reasons surrounding the actual usage of these devices as influenced by the particular work context of highly mobile individuals, represented in the case of this dissertation by operational police officers. Operational police officers are broadly defined as those who have an interaction with the world outside the organization, in this case with the victims and the perpetrators of crimes and incidents.

This genre of research comes under the umbrella term of *mobile informatics*, the sub-field of Information Systems (IS) concerned with services and concepts of mobile Information Technology (IT) use (Dahlbom and Ljungberg 1999). While there is a large quantity of literature concerned with MICT in terms of technical functions, users' requirements and task requirements (Burrell, Treadwell et al. 2000; Dix, Rodden et al. 2000; Barry, Green et al. 2001; Kim, Kim et al. 2002), this dissertation addresses the issue of the dynamics between the context of work and the use of MICT. In more concrete terms, this dissertation tries to conceptualize the way a context of work influences MICT use and in turn, how MICT use influence the understanding of a context.

In the past decade, organizations have become increasingly reliant on MICT to increase the quality of the services provided, promote efficiency and security, and better manage and organize workers (Fortunati 2000; Kakihara and Sørensen 2002b; Boggan 2004). Yet those

benefits are far from being achieved in most organizations, in part for the technical complexity of integrating these devices into existing infrastructures, and in part because of the novel state of *mobile informatics* (Kakihara 2003; Pica and Kakihara 2003). Despite the apparent agreement that the *context* of work can offer insight into the understanding of MICT in organizations, there are few texts analyzing in depth the concept of *context* and its relation to MICT use. Context is a term that has acquired such a general connotation that it is hardly definable and usable as a concept (Ciborra 2004). It is the intention of this dissertation to narrow down the understanding of context so as to be able to apply it meaningfully to the case of police work and MICT use.

In turn, the issue of *context* forms the core of this research. This dissertation questions the conventional understanding of context in current research and tries to uncover how interaction with MICT comes into being. In order to do so, the dissertation employs a phenomenological understanding of context as situation (Ciborra 2004). To this end the dissertation assesses the value of a phenomenological approach to information systems, which will come to be defined as the *Framework of Virtuality*. The *Framework of Virtuality* addresses specifically the dichotomy between a mediated (e.g. through MICT) and unmediated (e.g. through the five bodily senses) relationship with an environment. It thus actively seeks out to document the way a context as situation influences technological use, and in turn how technological use redefines a context. It thus brings forth a hermeneutical understanding of technology that is common in social constructivist approaches to studying technology.

The *Framework of Virtuality* proposes an understanding of context connected to the *intentionality* of individuals and of organizations. In more concrete terms the dissertation argues that a context is not simply made of objects, people and tasks, which by themselves would not make sense, but are all underlined by a greater logic that is contained in the understanding of intentionality. It is worth noting that intentionality is a central concern of phenomenological approaches. By *intentionality*, this dissertation refers to the purpose, beliefs and desires of an organization and of individuals, represented by a collective and individual state of mind towards an aim that has been refined through the experience of an organization and its members (Reidel 1982). Drawing on a vast number of phenomenological studies on technology, this framework is an attempt at offering a new *ad-hoc* perspective into the relatively uncultivated area of MICT use in work contexts.

Given the technical orientation of most writing regarding MICT, it is of little surprise to learn that very few texts explore the context of work in a serious manner. This does not mean that current research neglects the factors related to the environment of work that influence and that are influenced by MICT use, but rather that most analysis rest on non-theoretical and non-generalizable notions that fail to explain the reasons of particular modes and patterns of interaction with MICT (this is particularly true in the Scandinavian ethnographic tradition). This current research, however, penetrates the context of work of a police organization to discover the underlying contextual factors driving particular uses of MICT whilst also considering those situations in which MICT are neglected. Within the understanding of context, differently than most current research, this dissertation places the issue of individual and organizational intentionality as the underlying contextual factor influencing MICT use. A more transparent understanding of the relationship between MICT and work contexts, and their mutual influences, would be of great interest to practitioners who try to implement those technologies across a variety of different work contexts within a single organization with the aim of improving product and services.

There are a number of differing speculations on the possible relationship between MICT and work contexts. From the most idealistic approach that sees MICT as the enabler of always available and connected work, to the most critical approach that sees MICT as the concretization of the idea of *panopticon*, most of these speculation rest solely on the technical potential of MICT, thus on a unidirectional influence of MICT on a context. Furthermore, despite the disagreement on the value, role and effectiveness of MICT, *context* is only discussed at the surface level (Ciborra 2004), and in most research is thought of as an obvious and clear concept overshadowed for the most part by the technical potential of MICT. When this research refers to relationship, it means to encapsulate the outcome of introducing MICT with its relevant usability issues, be it regarded as a success or a failure, and further, the way a context, particularly viewed through the lens of intentionality, shapes the uses of MICT. In practical procedural terms this means incorporating hermeneutics into the analysis of MICT.

The majority of *mobile informatics* studies have focused on the close relationship between the user of technology and the technology through ethnographic techniques, seldom taking into serious consideration the organizational or institutional environment in which the technology is used. Somehow, the potential of MICT tends to obscure the aim of their

introduction in a work setting. The intentionality of work contexts is rarely revealed in current IS research. Therefore, in its empirical effort, this dissertation explores the action, motives and intentions of individuals in workplace settings, and how this connects to actual

In the literature concerning MICT there is a scarce concern with the relation between context of work and MICT use. The crux of the problem is in the superficial and general understanding of the term *context*, which is often associated with the immediate task at hand. Such association is myopic and tends to obscure the intentionality of individuals and of organizations. A poor understanding of the relationship between MICT use and context in terms of intentionality can effectively damage the effectiveness of mobile strategies.

MICT use (see Table 1 for a summary of the problem statement).

Table 1 - The Problem Statement

The dissertation argues that the problems of understanding usability issues of MICT reside in the under-researched area of the phenomenology of MICT use. It is the motivation of this dissertation to bring light to this relationship and thus unravel the complexities of the context of use of MICT.

1.2 Definition of ICT and MICT

This research draws on the works of Kallinikos (1995, 1996, 2001b, 2001a, 2002) for an understanding and definition of ICT and MICT. Furthermore, in accordance with Kakihara and Sørensen (2002b) when the dissertation looks at MICT it considers not only the mobilization of objects, symbols and images but also the temporal and contextual mobilization. This translates in looking at all the patterns of how interaction gets mobilized. Departing from these authors, the dissertation formulates a framework termed the *Framework of Virtuality* as a phenomenological lens for analyzing technology. In accordance with the tenets of this framework, rather than considering ICT as a separate entity of analysis (e.g. the technical device and its user interface), this dissertation tries to look holistically at the situation of use of ICT. When looking at ICT in work contexts this dissertation analytically divides situated action, whereby individuals interact through the five senses with an environment, and virtual action, whereby individuals interact through mediating technologies. The virtual way of interacting is comprised of activities that have been formalized and abstracted, while the situated interaction consists of improvisation and bricolage that emerge through the unfolding of action (Ciborra 2002).

Consequently this framework proceeds from a notion of ICT not exclusively contained in the technical factors, and argues for an understanding of how these components operate in the unfolding of action in a specific context at both a macro and micro level – transcending the institutional arrangement of police and the situated action of policing. Taking into consideration how these two elements interact is at the heart of this framework of technology. Within the distinction between situated action and virtual interaction, there is the issue of intentionality. The framework proceeds to uncover the peculiarities of the context in which interaction occurs by understanding the purpose of performing a particular task. For instance, in this dissertation the intentionality of police officers is explored by looking at historical, social and political factors related to being a police officer. Such analysis tries to bridge the gap between micro and macro, and proposes an holistic understanding of context as situation (Ciborra 2004)

An example can further illustrate the power of the *Framework of Virtuality* in generating new understanding of existing problems. Generally when employing MICT in an organization, a number of common considerations are given. Firstly, there is an analysis of the functionalities required by these devices. In a police organization, connection speed, bandwidth, autonomy and pricing are the most important considerations. Secondly, there are concerns about the legality of the instruments, in terms of privacy and data safety. All of these considerations, although being important, are not satisfactory and rarely explain poor usage of a technology. They tend to look at the context in terms of the functionality and see the *new* opportunities in the technology. In terms of designing and understanding technology, most of the research looks at issues of interface change, assuming a linear relationship between changes in technology and changes in tasks (Pica and Sørensen 2004). On the contrary the *Framework of Virtuality* does not take these factors for granted. It takes one step backwards and asks a more fundamental question that is related to what it means to be a police officer by looking at how technology supports and hinders the primary role of police officers in society. That means that the *Virtuality* framework takes not only the technical nature of these devices into consideration, but also the socio-technical nature of interaction in a particular context. It looks at how the intentionalities of technology and of police work interact and ultimately at the product of such interaction. The *Virtuality* framework, through a consideration of how the virtual and situated actions interact, provides a more transparent understanding of why MICT fail or succeed in specific circumstances.

As a consequence of adopting the *Virtuality* framework, the method of inquiry of the dissertation is ethnographically inspired. Ethnography allows for a holistic understanding of an organization, especially police organizations (Van Maanen 1988). The particular method employed in the dissertation to understand interaction with MICT in the context of police officers in the UK is comprised of three main parts: the first is to analyze the context in which the interaction comes into being. Thus instead of following single occurrences of MICT use, these are analyzed all together. In so doing the relationships in which these occurrences come into being are analyzed, thus stressing an understanding of the environment in which interaction occurs. The second is to not concentrate on analyzing a single peculiar occurrence of interaction but understanding the structure of it. The third is to analyze this entire pattern to understand how police think and operate within their environment of work. In addition, the historical understanding of the police in the UK further enriches this empirical understanding.

1.3 The Research Questions Throughout the Dissertation

The departure point of this dissertation is the question: How do MICT influence a work context? Although this question is appealing to answer, it is not feasible for a single dissertation to do so. In order to make way for further research to answer this question, this dissertation will explore a relevant issue concerning MICT; that being how the *Framework of Virtuality* can suggest an understanding of MICT use in the specific setting of the UK police. The focus will be on the phenomenon of interaction with MICT and the reasons surrounding this occurrence. In order to understand the phenomenon of interaction with MICT, this dissertation explores a number of inter-related research questions in a narrow domain of study. To begin with, the dissertation focuses on police organizations in the United Kingdom. This choice was dictated by the fact that police officers represent an archetypical domain of mobile work (Pica and Sørensen 2004).

In the specific terms of the empirical study conducted, and of the theory employed, this dissertation tries to answer the question: **How does MICT use affect and is affected by the intentionality of the UK police?** This question, however, is broken down in a number of sub-questions that are explored throughout the dissertation (Table 2).

Literature Review Chapter	How is the influence of MICT understood with respect to police work in the current literature? In what terms is a context understood?
Theory and Methodology Chapter	How can we model and study this influence?
Analysis Chapter	What is it to be a police officer? What are the relevant characteristics of the context of work of police officers in relation to Virtuality? What is the nature of MICT in relation to the work context of police officers?
Discussion Chapter	What are the dynamics of mutual influence between the use of MICT and the context of work in the UK Police? How does Virtuality influence the understanding of the context of work of police officers in the United Kingdom? What is the outcome of this dynamic in the understanding of the context of work by police officer? How do MICT influence work contexts?

Table 2 - The Research Question Throughout the Dissertation

1.4 Current Status of Research on MICT and Police

Current studies on MICT address a number of issues. There are a number of studies exploring the technical characteristics of MICT, for instance power and connectivity issues (e.g. Nielsen and Sodergaard 2000; Schiller 2000; Chu 2001; Su, Lee et al. 2001; Woods 2002; Extended Systems 2003). These studies fall into the domain of positivist approaches, which consider MICT as a stand-alone domain of study. This dissertation does not try to challenge these set of texts, as they are important for the advancement of the artifacts in terms of functions and possibilities. However, as will be explored in more depth in the Literature Review Chapter, these texts are often inconclusive in explaining the reason surrounding usage and reduce this to a mere functional task in a vacuum. These texts largely fail to reveal the context of use in terms of the intentionality of the individuals and of the organization. MICT have created a closer and closer interrelation between actors, technology and institutions (Kakihara and Sørensen 2002b, 2004), which demands a reappraisal of the problem domain, and new methods and theories to map such phenomenon (Urry 2000a; Kakihara and Sørensen 2002b).

A second stream of literature addresses the more symbolic and interpretive aspects of MICT use (e.g. Ackroyd 1992; Perry, O'Hara et al. 1999; Ljungstrand 2000; Palen 2000; Weilenmann and Larsson 2000; Chan, Brereton et al. 2001; Wiberg 2001; Katz and Aakhus 2002). Rather than looking only at the technical side of MICT, these texts address the changing nature of work and organizations looking particularly at how language and communication have changed. Although founded in a socio-technical tradition, these writings

tend to undermine the agency of technology or pay poor attention to the issues of context and intentionality.

A third branch of literature addresses the more critical aspect of MICT. Rather than looking at the technical aspects of MICT, it focuses on the possible consequences of large scale, always connected and available technologies (e.g. Manwaring-White 1983; Marx 1988; Norris and Armstrong 1999). These texts mainly explore the issues of privacy, politics and control. Contrary to the previous stream of literature, these writing tend to undermine human agency and focus on a conflictual and negative view of technology.

While all three groups of research directly or indirectly address the issue of *context*, they fail to link back to the use of MICT. On the contrary though the understanding of context and intentionality, this dissertation directly addresses such a link. In addition, as a consequence of an incomplete understanding of context, previous studies employed research techniques that tend to concentrate on a single occurrence of MICT use and not on the structure of these occurrences.

It must be noted that there are a number of exceptions to these shortcoming by a few authors (e.g. Allen 2001, Nulden 2002, Tapia and Sawyer 2005 and Manning 2003)). The findings of these authors are the starting point of this dissertation.

This tripartite of research streams, together with the shortcomings explored briefly beforehand, is further reflected in literature concerning police work and the use of MICT (Table 3). In the Literature Review Chapter, a further exploration of these streams in terms of police studies will be presented. As of now, it is important to understand that there are three main schools of thought concerned with MICT.

Positivist	Interpretivist	Critical
Technical Studies Police Studies	Social Studies Socio-Technical Studies Linguistic Studies HCI Studies	Phenomenological Studies Privacy Studies Political Science Studies

Table 3 - An Outline of the Literature on MICT in Work and Police Contexts adopted from Orlikowski and Baroudi (1991)

Consistent with the phenomenological approach to Mobile Informatics advocated in the previous section, the *Virtuality* framework allows for an in-depth consideration of the context of work. In more specific terms, this framework places context in center stage to explain interaction with MICT. To this extent, this dissertation is interested in understanding the role of context in the constitution of interaction with MICT.

1.5 Objectives of Research

The primary objective of this dissertation is to assess the practicability of the Phenomenological Framework of MICT, represented by the *Framework of Virtuality*. The framework draws on a number of IS theories primarily from the phenomenological tradition, and thus belongs to a more critically inclined tradition. In turn, the importance of such framework into the field of IS and that of police studies can be considered as an objective of this research in its own right. Although phenomenology has been used for studying ICT and MICT (e.g. Dourish 2001, 2005 and Suchman 1987)), or to study police work (e.g. Manning (2003) and Bittner (1990)), such an approach has not been taken comprehensively on both domains. One deficiency in MICT studies is the lack of theory both used and advocated by researchers. The position taken in this study is that insight into the action of mobile workers (in this case police officers) can be afforded through the application of a phenomenological theory into the MICT domain.

A further objective is to advance the research strategy utilized in the study. Ethnography, narrative, immersive studies and observation-based techniques are at the base of this dissertation’s empirical effort. All these methods are aimed at producing a holistic understanding of the phenomenon of MICT use by looking at the structure of interaction and the entire pattern of work of a particular organization. Furthermore, the methods used are

aimed at producing qualitative data and a number of real use scenarios presented through a narrative style (see Table 4 for a summary).

As it will be noted later in the dissertation, the new perspective has additional insights because the body of theory not only provides new understanding of existing and emerging problems with the use of MICT, but also it can be used to underpin mobile application practices. In more practical terms, it means that this theory tries to direct the way mobile strategies are formulated and understood. At present mobile strategies, because of the lack of theoretical models (Pica and Kakihara 2003), are trial and error exercises, which are based on loose conceptual frameworks.

Theoretical Objectives	Assess the practicability of the <i>Framework of Virtuality</i> as a phenomenological framework to study MICT
Methodological Objectives	Advance the research strategy of ethnographic observational studies in the field of MICT Exposition of data through narrative
Practical Objectives	Provide new understanding of existing and emerging problems with the use of MICT to underpin new implementation and selection practices

Table 4 - Objectives of Research

1.6 Structure of Dissertation

This dissertation is divided into eight chapters. Chapter One begins exploring the motivation and scope of the study. This is followed by a definition of what is understood by the terms ICT and MICT. The current status of MICT and Police studies is then briefly addressed. The research questions and objectives of the dissertation form the next sections. The chapter concludes outlining the dissertation’s structure.

The literature review forms Chapter Two. The chapter opens with an overview of police work and the usage of ICT arguing for a definition of police work as *mobile* work. Following, the studies concerning MICT and police work are reconnected to the major IS paradigms. The writings that address directly MICT in police work fall into one of three groups. First, there are the texts that assess how MICT change or can change work contexts in terms of the technical possibilities of the artifacts. These writings primarily address the issues of user interface and technical design. Second, there are writings that address the symbolic value of MICT. Rather than looking at the technology as self-contained, these writings uncover the possible social effect of MICT use, thus moving towards a socio-technical understanding of

the context of work. Third, there are writings critically analyzing MICT, concentrating particularly on issues of privacy, politics and control. After a scrutiny of the existing literature, the chapter moves into the shortcomings of the existing literature.

Chapter Three explores the research theory. The chapter begins with a discussion of the shortcomings of current research, namely the understanding of *context*. It then addresses more specifically phenomenological frameworks in order to understand interaction with MICT. The *Framework of Virtuality* is built upon previous phenomenological approaches. Central to this approach is the aim of uncovering the context of interaction in terms of situation through looking at intentionality at both macro and micro levels.

Chapter Four presents the methodology of research. The research strategy is unfolded, drawing on the ethnographic tradition. The reasons for choosing this approach are discussed with particular attention to observation-based ethnographic approaches and a narrative style of data presentation. The final part of this chapter describes the techniques of data collection analysis and presentation.

The background and empirical materials form Chapter Five. The chapter opens with a brief overview of the police force studied and the various MICT. It then presents a series of three tales of operational police work. The accounts focus on the usage of MICT by three operational police units in the UK. Following each of the three narratives some background material pertaining to the unit studied is presented to give an idea of typical MICT usage scenarios.

The analysis of the narratives forms Chapter Six. In this section of the dissertation, the practicability of the *Framework of Virtuality* is assessed at both a macro and micro level. First, an understanding of the intentionality of police work as a whole, congruent with the tales, is presented. Following, employing the tales from the field as an empirical base, the chapter examines the extent to which the concepts of the framework can enrich the understanding of MICT in the context of the police in the UK by making sense of the different usage of these technologies across the units. The chapter concludes by linking intentionality to the observed usage of MICT.

The discussion of the findings forms Chapter Seven. A number of related themes are addressed. The issues of uncertainty and peacekeeping are addressed. The chapter argues for an understanding of MICT beyond the functional domain. It does so by proposing the incorporation of intentionality of work context and of technology into the analysis of MICT. Following, this chapter proposes a scenario of MICT use in the police in the UK, looking at the themes of discretion and control. The chapter concludes by presenting a balanced view of MICT in police settings.

Chapter Eight opens with an overview of the dissertation. This is followed by a description of the contributions of this study in terms of theoretical, methodological and practical manners. Following the research design limitation and the capability of the theoretical framework are discussed. The chapter concludes with a discussion of areas for further research in the area of MICT in work context and in particular in police organizations.

CHAPTER TWO: LITERATURE REVIEW

This chapter reviews the literature on current studies of MICT, focusing mainly on texts related to police work. In doing so, the dissertation explores a number of areas of research, namely *mobile informatics (mobility)*, *computer supported collaborative work (CSCW)* and *police studies*. It is suitable to picture this dissertation at the intersection of these three domains of study (Figure 1). This chapter discusses some of the relevant literature from each domain and presents the current debates and shortcomings of current research. By so doing, the chapter sets the general perspective of this dissertation.

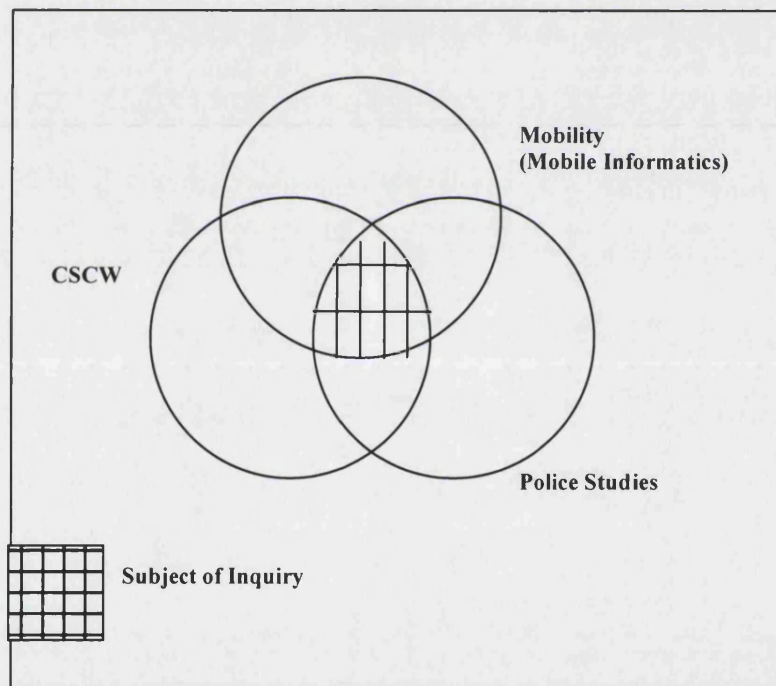


Figure 1 - The Three Domains of Study

The first part of this chapter explores the idea of police work and its connection to the use of a number of ICT. The second part contextualizes police work in the wider area of CSCW, Workplace Studies and Mobile Work Studies. Following, the third part categorizes the subject of inquiry according to the traditional paradigms present in IS research. This section allows for an analytically useful distinction between the various schools of thoughts in terms of epistemological and ontological grounds. Of these texts that directly address MICT we can

recognize three distinct approaches, which specifically apply to police related studies as well. The three approaches do not only differ in the findings and aims of research, but also and more fundamentally in the ontological and epistemological grounds on which they lie. The first group looks at how ICT and MICT can add efficiency to work practices through the advancement of technological factors. The second group indicates how a mixture of technological and social/organizational factors can create a suitable environment for the uptake of ICT and MICT. The main argument of the second group of texts is that the nature of ICT is socio-technical, and cannot be studied in isolation of the environment in which technologies are unfolded. The third group attests that ICT and MICT are a political tool that shifts work practices towards the wants of management to create a more strict command and control culture. The chapter concludes with a discussion on the current deficiencies with regards to the literature on MICT in police work by addressing ontological and epistemological weaknesses.

2.1 Police Work and ICT

This section will discuss police work with the purpose of reviewing the current understandings of this particular area of research. This is accomplished by historically defining the work of police officers, specifically in the UK, and exploring research documenting their use of ICT and MICT.

2.1.1 A Brief History of Police Work in the UK

The institution of police is a social phenomenon that pervades most modern societies. According to Silver (1967), *some modern nations have been police states; all however, are policed societies (p.10)*. Historically, the police are the consequence of the more anonymous and unaccountable population of large urban areas. Arguably, since the advent of market-oriented, industrial, and urban order, there has been a shift from informal mechanisms of control of authority to legal rational means of formal control (Weber 1947). The inhabitants of such areas come from different backgrounds and cannot see the consequence of their action on the surrounding society. Formal mechanisms, such as the police, are meant to replace the informal mechanisms once in place in small communities.

The UK police institution has existed in its present form for the past 150 years. However, the tradition of policing in the UK is derivative from earlier historical developments. As far as history tells us, the first informal policing system in England dates to the Norman Conquest, under which a system of social obligation in which all males were responsible for the good behaviors of others was implemented under the name of frankpledge. In 1066, the frankpledge method was complemented by the constable system, a post of the royal court. The constable was responsible for guarding the city gates, lighting lamps, calling the time and reporting conditions of unrest. However, even with those two systems in place, the prosecution and investigation of crimes was left to be handled by the victims. In 1285, the statute of Winchester put forward a formal system of social obligations that was to last till the 19th century. This system dictated that it was everyone's duty to maintain the king's peace and any citizen could arrest an offender. A great change came in 1856 when police activities were institutionalized. This mandated police departments across England. This new institution was to be financed by local and central government much like the one in place today. The modus operandi of police officers was based on foot patrol and criminal investigation.

In the words of Silver (1967), the rhetoric of the birth of police institutions in the UK draws on: *an indignant sense of pervasive insecurity; a mounting current crime and violence as a result of both unaccustomed prosperity and prolonged poverty; the bad example of the self-indulgent wealthy; the violent proclivities of immigrants and other newcomers; and the ironic contrast between the greatness of the metropolis and the continued spread of crime (p.8).* Furthermore, according to Silver (1967) *the demand for law and order became what it was not before – a constitutional imperative stemming from an unprecedentedly pervasive consensus and personified and enforced by the police (p. 18).*

Thus, the rise of the police as an institution in the UK is not only due to the advent of urban centers and the consequent criminal activity of the less well to do, but also to the rising expectations by citizens about the level of public peace. In the early 19th century, the introduction of the London Metropolitan Police was greeted by great public disapproval. In part, this was due to the radical politics of the time and to the fear of too great of a power to the government. But even more importantly, this was due to the intrusion of a new institution into people's daily lives with danger for the *liberties of Englishmen*. In fact, the first Commissioners, Rowan and Mayne, adopted a deliberate policy delineating a due process

that maintained order and reduced the fears of police oppression (Miller 1975). This was also the awareness that *without poor people willing to come forward as witnesses and as prosecutors, or simply point a breathless constable in the direction of the running figure who had just vanished down an alley, the police would have been powerless over all but the most transparent street illegal behavior* (p. 27). This is to point out, as done eloquently by Homans (1950), that social control is a property of states of social relations and not a thing imposed from the outside. Thus, *the police ultimately depend on the voluntary compliance of most citizens with their authority...the combination of strength and restraint became the foundation of the London Bobby's public image* (Miller (1975), p. 32).

Policing in the United Kingdom (UK) is based on the 1829 Metropolitan Police Act, the New Police (1829), which has three main tenets still held to be true. The police are to be unarmed, uniformed and only for the prevention of crime¹. In short, the law, traditions and politics of a particular country regulate police responsibilities. The situations in which the police are supposed to intervene are confined to two major events: helping citizens who approached them in the street and engaging in situations that, according to the officer, required their attention. These interventions render the police visible in order to prevent crime, and involve the apolitical use of power in that the police respond indiscriminately to the call of citizens. In addition, the UK police are based on the principle of accountable officers. For one thing, the uniform is used as a symbol of accountability. Most importantly, technology has been and is increasingly used as a mechanism of accountability (Manning 1988).

Since the beginning, police institutions have relied on organizational and coordinating capabilities to overcome crime and disorder as clearly pointed out by an early Westminster Review (1873): *As each police constable being alone might easily be over-powered, and as the men of each section, or even division, might be inferior in numbers to some aggregation of roughs or criminals collected in a given spot, it is arranged that...reserves of force can be gathered...and concentrated upon the disquieted area, and as the commissioners command the whole district, and the force is organized and united, while roughs act in small areas, and*

¹ These tenets of reactive policing are radically different from the ones observed in most western countries including the United States, Italy, France and Spain, where police forces have a more Para-military and proactive character Manning, P. K. (2003). *Policing contingencies*. Chicago, University of Chicago Press., and evolved in some cases from continental despotism.

have diverse and selfish interests, the peace of London may be held secure against violence (p.16).

But the coordinating power was not all the police had to show for. The symbolic power of police in society may be considered as much of a central character of the effective functioning of this sort of organization as expressed in the following passage published by in the London Quarterly Review (1870): *The baton may be a very ineffective weapon of offence, but it is backed by the combined power of the Crown, the Government and the Constituencies. Armed with it alone, the constable will usually be found ready, in obedience to orders, to face any mob, or brave any danger. The mob quails before the simple baton of the police officer, and flies before it, well knowing the moral as well as physical force of the Nation whose will, as embodied in law, it represents. And take any man from that mob, place a baton in his hand and a blue coat on his back, put him forward as the representative of the law, and he too will be found equally ready to face the mob from which he was taken, and exhibit the same steadfastness and courage in defence of constituted order (p. 48).*

To sum up, police work has always been geographically mobile, information intensive, and has relied on distributed coordinating and symbolic powers for its functioning in civil societies. In the next subsection, the predominant form of policing in western societies will be explored in more depth.

2.1.2 The Mobile Nature of Police Work

Police have traditionally relied upon operational patrol based techniques representing 70% of police staff (Ackroyd 1992), which is patrolling to respond to citizens' calls for help, and increasingly upon achieving faster response time (Clarke and Sykes 1974). In most areas in the UK, in fact, patrols are performed by one or more constables in a police vehicle. In addition, constables patrol on foot, on bicycles and on horses to have a more direct relation with the community and thus gather more information. At present, in all modes of patrolling, police constables have personal radios to get into communication with the police station's information rooms. This communication is set up in order for police officers to ask for help quickly. In addition, because of the increase in the use of motor vehicles by civilians in the second quarter of the 20th century and the consequent increase in accidents and traffic jams, the police set up a special Traffic unit to deal with these emerging problems. Traffic officers

and Police constables represent the core of operational policing and the prevalent form of interaction with the public.

American and British police forces are based on the concept of operational policing. This form of organization is necessarily a hierarchical and pyramidal one for various reasons. Firstly, the majority of police officers are operational officers. This is not as many authors of police claim a military inspired structure. It is just the natural consequence of running a force that relies on distributed coordinating and documenting efforts as the vehicle to interact with the public and with which to enforce coercive or persuasive power (Manning 1988). The skills necessary to be a good operational officer have nothing to do with the skills of a good administrator. It is important at this point to stress the fact that most police work is demand driven (Ackroyd 1992). The domain of operational police work is the street and forms the core of police work (Manning 2003). As Bittner (1990, p. 224) states, drawing on Heidegger (1962), *the role of the police is best understood as a mechanism for the distribution of nonnegotiable coercive force employed in accordance with the dictates of an intuitive grasp of situational exigencies*. Once in the street, the police are supposed to gain compliance through authority, power and persuasion rather than by the use of arms (Klockars 1985). Arguably, this power and authority depends upon people acting and coordinating in concert.

Operational policing has undergone major changes due to the introduction of modern technologies (Ericson and Haggerty 1997, Manning 2003, Ackroyd 1992). In fact, the end of the 19th century saw a radical change in organizational and symbolic aspects of the UK police force because of the introduction of modern technologies. However, the specific duties of police forces have not changed significantly since the founding of the New Police in 1829. The way their duties are carried out, however, has undergone major changes caused mostly by advances in technology. Following the more specific terms of this technological change will be uncovered.

2.1.3 The Four Periods of Technological Development in the Police Force

What follows is an historical conceptualization of the introduction of ICT and MICT in police organizations. This historical reconstruction draws on a number of authors (Manning 1988; Ericson and Haggerty 1997; Seaskate 1998; Soulliere 1999; Manning 2003) and tries to bring their separate analysis into one coherent one.

Four periods can be characterized in the development of police work in conjunction with major technological developments in the UK. Throughout these periods the role of technology changed in terms of the scope and scale of usage. The first (end of 19th century till end of Second World War) was characterized by the creation of localized police forces. Arguably the first stage in the development of modern police technologies started at the end of the 19th century with the introduction of the motor vehicle, radio communication and advances in forensic science. Before then officers worked in nearly complete isolation. Although it might be tempting to consider the telegraph as the first major technological development in policing, it is not until the call box appeared that police work is recorded to have changed considerably. A call box was a metal box containing a direct line telephone used as a way to contact the police central office from a remote location.

The second period was characterized by an integration of the various police forces because of the advances in database technologies and the introduction of automobiles. The second stage is arguably between 1946 and 1959. This was a period of assimilation of new technologies, with the most important ones, the generator-operated portable walkie-talkie, and the advent of 999 lines, which started to change police work considerably. Arguably, thanks to those there was a better security and faster response time. This also resulted in a drive towards centralization and further bureaucratization. As argued by many researchers, the single most significant technological introduction in police work was the transistor, which in the 1950s flourished in the introduction of the radio transmitter-receiver. This was the beginning of the spread of mobile technologies, which coupled with the introduction of all sorts of motor vehicles and information control centers increase police mobility; the radio gave them more informational mobility. The control center following the advent of 999 calls and radio technology, served several function, the most important of which being to process calls from the public, to dispatch resources, and to support the information needs of patrol officers. In 1957, because more people were phoning the police for help and to give information about crimes, forces began to operate Information Rooms. All public calls went through to these rooms, and the public and police began to help each other more. All this meant much more work for the police.

The car increased police geographical mobility. The rationale for using automobiles was manifold. Police cars moving randomly and quickly through city streets would create a

feeling of police omnipresence to deter criminals and reassure citizens of their safety. Rapidly patrolling police also would be able to spot and intercept crimes in progress. The use of radios in police cars increased the value of automobile patrols. The rapid response to calls for assistance would either deter criminals or help in their immediate apprehension.

The third stage (1960-1979) was concerned with modern management and reorganization. This was the period in which computers were making their first appearance in organizations. This brought an improved 999 system together with better coordination technologies such as the computer-aided dispatch (CAD). During this stage there was a drive toward the centralization of decision-making and information.

The fourth and current stage (1980s to present) is characterized by a mixture of all other stages in terms of organizational directions. Technologically speaking this stage is the fastest of all in terms of the rate at which technology (mainly computer technology) is developing. There is an equal stress on centralization and decentralization, and a return to the original ideas of community policing (this is represented by the advent of the Community Support Officers² in major metropolitan areas). This stage is characterized by a further integration of information systems and force-wide codes of practice, together with a touch of localized policing as in the first stage. In this last stage the drive toward wireless information access is great (see Table 5 for a synthesis).

Stage	Main Technologies	Main Organizational Forms	Preferred Policing Method
1st (1890-1945)	Telegraph/Callbox/First Cars	Localized and Independent	Community relations
2nd (1946-1959)	Databases/Cars/Walkie-Talkie/999	Slight Centralization	Community relations through Bobbies and beginning of rapid response
3rd (1960-1979)	CAD/Advanced 999/Better Radios	Centralization	Rapid resolution of crimes through encounters
4th (1980-Present)	GPS/Mobile Phones/Laptops	Centralization and Localization	Rapid resolution of crimes and improved community relations through CSO

Table 5 – The Four Stages of Technological Development in Police Forces inspired by Soulliere (1999)

Although wireless communication is not new in that it has been around for almost 70 years, the fast and dramatic technological advances seen in wireless communication and the

² For more information on CSO go to <http://police.homeoffice.gov.uk/community-policing/community-support-officers/>

increase in usage of MICT by police officers draw particular attention on what can be called a fourth major technological change. The use of data while on the go has meant new jobs and different expectations from within and outside the organization. In addition, this stage captures the totality of policing in the last century, namely localized problem-solving policing and universal information access. Whether or not these two objectives are compatible is still under great dispute (Manning 2003). In addition, this stage has witnessed a controversial view on technologies.

The most notable example of the controversy surrounding police technologies came about in the 1980s. The Scarman (1982) report, the product of an official inquiry, argued that police had lost their roots in local problem solving, resulting in a less effective police force. The results of this report were no surprise given the fact that the dominant ideology of the 50s and 60s, which saw the introduction of computer technology, assumed that the central activity of police officers was of law enforcement with little discretion left to the individual officer. In addition, as it will be argued extensively later in the dissertation, law enforcement activities account only for a small part of police activities (approximately 1/4 of police activities). The Scarman report further argued that the methods of rapid response by automobile did not effectively reduce crime or increase citizens' satisfaction with police services. This was also mirrored in preceding studies (e.g. Slonick 1966; Rubinstein 1973; Pate 1976), which argued that there is no apparent value in having more patrol cars for rapid response except in violent incidents, where a feeling of security could be created. Furthermore, Cohen (1979) argued that the more resources – including technology – are allocated to increasing the efficiency of authoritarian and proactive policing, the more manpower has to be dedicated into building community relations to stabilize the public image of the police force. Following the findings of the report, in the 1980s community policing loosely based on the ancient system of social obligation was reintroduced with the assumption that only closeness with citizens could improve the role of police in society, while police preventive action by itself is of little value. This goes to show that the relationship between technological introduction and police work is far from simple in its dynamic.

This brief history of police technologies with its changes in individual and organizational roles is a strong pointer to important concepts surrounding police work and technologies. First, technology is extremely important as much as it is ambiguous for police work. Any view that advocates an a-technological view of police is un-pragmatic and idealistic. Both

pushed by the Home Office and the expectations of civilians, technology is irreversibly linked to police work (Povey 2001; Woods 2002). In addition, police work is for the most parts performed *in the field*.

Therefore police work can be seen as an archetypical form of mobile work which heavily relies on MICT for its functioning. In the field of Information Systems, studies directly related to police work and the uses of MICT are scarce. In the next section an exploration of the wider field of mobile work and MICT is conducted with the purpose of reconnecting police work to the more general field of *mobile informatics, CSCW and Workplace Studies*.

2.2 Police Work as Mobile Work

As assessed in the previous section, police work is, for its most parts, dependent upon the mobilization of a number of human and non-human resources, and the coordination and control of these. In addition, police work is populated and supported by a large number of MICT and has been for more than 70 years. However, the study of mobile artifacts and mobile work is a recent phenomenon, as the mass diffusion of MICT dates to the mid eighties. The study of these particular technologies has been labeled mobility studies and is covered by a wide range of texts. In what follows, this section will review a number of different perspectives on mobile work and on MICT. Different *spins* have been applied to mobility, so much that it is difficult to recognize an homogeneous body of literature (Kakihara 2003).

The views of mobility, when referring to MICT and their consequences on work settings, span a large number of disciplines. The most common discipline to address MICT is computer science. However, there are a number of texts spanning Computer Supported Collaborative Work (CSCW), Human-Computer Interaction (HCI), Workplace studies, Sociology, Psychology, Philosophy and Police Science that address directly the issues of MICT use. More recently, from the Scandinavian tradition of Information Systems, there has been an attempt to group the efforts in understanding MICT under the label of *Mobile Informatics* (Dahlbom and Ljungberg 1999). However, the studies grounded in the Scandinavian tradition seldom provide generalizable results as they are centered around grounded-theory and ethno-methodology (Kakihara 2003). In general, the less focused

Information Systems domain has provided more theoretically informed coverage of mobile work and MICT.

From the Information System arena there are a number of studies looking at the effects of MICT on work practices in a number of domains. Al-Taitoon (2005) studied the effects of MICT for out-of-office financial trading. His findings are centered around the issue of trust in mobile work. He argues that a degree of freedom is necessary for mobile work to be fluid. Wiredu (2005) studied the issue of MICT for remote work-integrated learning in UK healthcare. His findings show that there are inherent contradictions in distributed activities that are difficult to resolve and require an alignment of goals in technology and work practices. Kakahara (2003), in his study of mobile professionals argues that the fluidity of work is grounded in the context of interaction, and thus in the nature of the task. Although mobile work displays an apparent fluidity, it is grounded in the stability of social practices. Wiberg (2001) argues that interaction through MICT in order to accomplish work must be supported and compensated by face-to-face meetings. This is echoed in the Workplace Studies by Heath, Knoblauch et al. (2000) and Luff and Heath (1998), who try to understand mobile work in terms of the degree of local mobility. They argue that there are different requirements in terms of technology, dependent upon the nature of the task. This means that MICT are not to be seen as an all-encompassing solution for enabling mobile work.

The major debate to date relating to mobile work and MICT that stems from the literature is the idea of anytime-anywhere communication. A number of authors (e.g. Urry 2000a; Cairncross 2001; Katz and Aakhus 2002) have argued that work is moving out of the office and is becoming increasingly *fluid*. This implies that the way in which one makes contact and interacts is reshaped and defined by MICT. This unilateral view of MICT as the driving and determinant force behind social change forms the core of the anytime-anywhere idea. In addition, however, there is an equally strong opposition to this idea, where distance still matters and where the idea of sometimes-somewhere reigns (e.g. Olson and Olson 2000; Bradner and Mark 2002; Pica and Kakahara 2003; Sørensen and Pica 2005). These concepts have great significance for the study of mobile work and MICT as they conceptually underpin the research effort. The anytime-anywhere concept and the sometimes-somewhere concept have been applied and explored explicitly or implicitly in a number of Information Systems texts. These differing ideas have created a number of different approaches to mobile

work and MICT both in terms of ontologies and epistemologies (look at Section 2.3.2 for more information).

While rich in a variety of contextual settings, within the field of Information Systems research, there are few texts analyzing ICT and MICT in police settings. The most notable authors are Allen (2001), Allen and Shoard (2005), Nulden (2002) and Tapia and Sawyer (2005). All of these authors take an interpretive stance towards understanding MICT in work settings. However, all of these texts lack specificity in describing the context in which these technologies unfold or bring this specificity only at one level of analysis (either the micro or the macro context). The issue of *context* will be discussed in more lengths in the last section of this chapter.

In addition, the area cannot offer a definitive theoretical or methodological way to approach mobile work and MICT. As Lyytinen and Yoo (2002) and Lyytinen, Yoo et al. (2004) outline, the directions and methodologies in the field of mobile work and mobile technologies are many. In fact, more than anything the area of research lacks a consolidated theoretical drive that could add more scientific validity to the various thesis surrounding these technologies.

As it was discussed, the literature approaches MICT from a number of perspectives. Some try to disclose the changes to work in terms of how coordination and collaboration are carried out. Others focus on the shifts in the degree of individuality, the macro changes of how societies work and conduct business, and the change of relationship with cities and countries, as well as leisure time and work time. As much as one can agree with all of these perspectives, it is difficult to reconcile and categorize the findings and approaches of previous texts as those come from a number of different disciplines. Thus, in order analytically to understand, appreciate and criticize such texts, a method of categorization has to be put forward. To this end the dissertation will try to make sense of the various studies related to MICT in terms of the major paradigms found in IS research.

2.3 Reconnecting MICT Studies in Police Settings to IS Paradigms

The study of technologies in the police is carried out by a large number of academic disciplines (e.g. Police Science, Criminology, Sociology, Anthropology, Law and Information Systems). Whilst the understanding of technology is generally patched on to current disciplines, the Information System discipline is now at the vanguard of these studies as it is designed to address specifically the concern of technologies in organizations (Avgerou 2000). Although being a fairly new academic discipline – dating to the beginning of the 1970s – Information Systems has grown diverse in its approaches and motives (Galliers 1985, 1991, 1993). As Avgerou (2000) argues, the field of information systems has taken a multitude of directions in terms of interests of research: studying the applications of information technologies to support the functioning of an organization, the process of system development, information systems management, and the social impact of information systems. This dissertation takes an Information Systems approach to studying MICT in police setting. However, doing so requires an appreciation of the current literature in terms of the various ontological and epistemological facets belonging to this field. Such appreciation serves the purpose of reconnecting current studies of police and technology to major paradigms in Information Systems research and formulating a specific research question that takes into account the shortcomings of current research.

In what follows, first the major paradigms of Information Systems research are explored. The categorization of the paradigms is then used to schematize current studies of police work and MICT in the following section.

2.3.1 Information Systems Paradigms

As an information system researcher, one of the first obstacles when embarking in a research endeavor is the concept of technology. To the question of “*what is technology?*” there are a variety of answers (*technology is an instrument of economic benefit, or it is a power system, or it is a proxy*, etc.). Not surprisingly, such diverse and at times contradictory characterizations of technology are well documented in comparative studies and, furthermore, pervade the non-unified discipline of information systems research (see for example (Galliers 1985, 1991; Orlikowski and Baroudi 1991; Galliers 1993). Scholars are

still arguing about a common base from which to see technology and the resolution of the argument seems unlikely. The argument, however, does not end at technology but extends to the very understanding of organization. Again the field is scattered around many definitions of an organization (e.g. a collective of individuals working towards a common goal, a system of distribution of income; a contractual agreement; a social experience etc.). However, as argued by Avgerou (2000), *organizational rationalism* is the dominant view in information systems research. *Organizational rationalism* takes its roots in the works of Max Weber and Frederick Taylor. It is concerned with developing principles to maximize the efficiency of an organization. Implicitly, *organizational rationalism* sees the organization as measurable and controllable and the role of technology as an improver of the control function as in the case of cybernetics. *Organizational rationalism* has received many attacks, most notably by Ciborra (1993; and Associates 2000; 2002) through Transaction Cost Economics, the theory of competition through improvisation and tinkering, and hospitality as a way of understanding technological acceptance. It is not, however, the scope of this chapter to discuss organizational theory, but just to show that different views of technology influence and are influenced by the view of the organization (e.g. If one believes that an organization can be fully controlled, one is likely to believe that technology will improve such control in a mechanistic, measurable, and predictable way).

This diversity of opinion regarding the definition of technology and organizations has led the way to debates about the impossibility to unify the discipline and to concerns of unwarranted eclecticism that disintegrates the principle of the discipline as a formal and unified field of academic inquiry. There have been critics who have used this diversity of opinion to predict a collapse of the discipline (Benbasat and Weber 1996). However, this dissertation, together with many authoritative authors (e.g. Orlikowski and Baroudi 1991; Galliers 1993; Mingers 2001b, 2001a, 2001c) celebrates this diversity as it allows for a more holistic understanding of the problem domain and leads to constant innovation. Yet, this diversity does present problems for a researcher for it requires an appreciation and understanding of a large number of competing paradigms and how these can be reconciled in understanding a phenomenon.

There have been several attempts to categorize Information Systems research (e.g. Hirschheim and Klein 1989; Avgerou 2000). These attempts at categorization are generally in terms of the ontological and epistemological inclination of the surveyed research. As a consequence of these, it is now common to refer to three major schools of thought in the

Information Systems discipline; the Interpretive, the Positivist and the Critical. Each school contributes to differing aspects of the Information Systems discipline. Drawing on Orlikowski and Baroudi (1991), this section will briefly describe each of the three paradigms in terms of *beliefs about social and physical reality* (ontology), *beliefs about knowledge* (epistemology and methodology) and *beliefs about the relationship between theory and practice* (purpose and motifs of research) through table 6.

	Positivist	Interpretive	Critical
Ontology	<ul style="list-style-type: none"> *Objective reality and social world exist independent of humans and it can be discovered. *Human action is intentional and rational (or bounded rational). *Conflict and contradiction are not endemic to social relations and must be corrected 	<ul style="list-style-type: none"> *Reality is subjective and is constructed by actors and lived through a shared understanding which can be interpreted and not discovered. *Meaning and intentionality are of paramount importance for they constitute behaviors. 	<ul style="list-style-type: none"> *Social reality is historically constituted. *The elements of study are always connected to a totality (e.g. society). *Stress on institutional and historical situation *Social reality is produced and reproduced by actors.
Epistemology	<ul style="list-style-type: none"> *Researcher is neutral. *Based on verification and falsification (theory testing). *Search for universal laws and principles. *Use of strict categorization and tight coupling among explanation, prediction and control. *Quantitative methods. 	<ul style="list-style-type: none"> *Researcher is not neutral but involved in the phenomenon. *Social processes cannot be captured by hypothetical deductions. *Primacy of experience. *Description of events from the participants' perspectives. *Qualitative methods. 	<ul style="list-style-type: none"> *Knowledge is grounded in historical and social practices. *Interpretation of the world is not enough as the structure must be also uncovered. *Mixed methodologies.
Purpose	<ul style="list-style-type: none"> *Discover the objective physical world by precise measure and predict future. *Create a <i>technical</i> link between theory and practice. *Manipulation and control of the world. 	<ul style="list-style-type: none"> *Discover a version or various versions of the physical world *By approximation and not precision *Prove relativism 	<ul style="list-style-type: none"> *Discover the forces at work in society as a totality finding links in the micro and macro contexts. *Critique the status quo in society. *Promote emancipation.
Shortcomings	<ul style="list-style-type: none"> *Close minded in terms of alternative approaches. *Disregard for historical and contextual factors. *Deterministic in focusing on only one aspect of a phenomenon. 	<ul style="list-style-type: none"> *Too concentrated on the micro-context of interaction. *Does not look at unintended consequences of action. *Does not address structural and historical conflicts within society and ignores contradictions. 	<ul style="list-style-type: none"> *Determinism of the struggle upon classes and economic considerations. *Too much stress on contradiction as endemic to human condition. *No common philosophical standard to evaluate a theory.

Table 6 - The Three Research Paradigms Explored (adopted from Galliers (1991), Avgerou (2000) and Orlikowski and Iacono (2001))

Each analytical lens offers a stress on a particular facet of technology and organizations depending on the understood essence and constitutive elements that concern the technological process. For instance, the view of technology as an instrument stresses the quantitative effects of technology on organizations and on quantifiable economic benefits resulting from usage. On the contrary, the view of technology as a human activity will stress on the qualitative effect of technology and on socio-political issues resulting from usage. These roles of technology, as Orlikowski and Baroudi (1991) point out, depend on our interpretation of it and the links to human activity and organizations. Thus, each analytical lens claims an expert ground of competence centered on the proposed essence of technology. The two most notable counter-posing fields of technology studies in terms of methods and ontological views are the engineering school (positivist) and social studies of technology schools (interpretivist)

(Galliers 1991). Most recently, both schools have moved closer to a compromise, recognizing the virtues and faults of each school. This has led the way to multi-methodological approaches³ from both schools (Mingers 2001c). However, while there is a theoretical strength to multi-methodology, such approach has received strong criticism from all sides (Mingers 2001b). Regardless of the inclination chosen, while methods can be accepted and used, the underlying philosophy is often disregarded or forgotten (Ciborra 2002). Methods however tend to be justified by the theoretical view, and thus the result is that they have to be read within the framework of the theory, otherwise they risk losing value (Ciborra 2002).

No one particular analytical lens is better than any other, at least in principle (Galliers 1991). However, in practice one's view of the essence of technology, assuming such view is internally coherent, has many effects on the practice of technology both in terms of methods of evaluation and those of design (Orlikowski and Baroudi 1991). By practice, this dissertation refers to the employment of technology in daily life, be it at work or social life, and the set of assumptions – usually partly disclosed in academic works – governing such employment. Thus, one has to make an informed choice about a particular ontology acknowledging not only the shortcomings that such an analytical lens can hold, but also the strengths. To date, however, the positivist view of technology is the *status quo*, although the interpretive school is slowly gaining momentum (Mingers 2001a).

At this point, it will be useful to understand how the IT artifact is understood in current information systems research. Drawing on Orlikowski and Iacono (2001), technology in organizations can be viewed in a variety of ways. Orlikowski and Iacono (2001) claim that there are five major ways in which one can understand technology that emerges from the current literature in information systems: the tool view, the proxy view, the ensemble view, the computational view, and the nominal view. These views can be seen as a continuum of technical and social studies where at the extremes technology is self-contained (Computational) or unimportant (Nominal) (see Figure 2).

³ The most common usage of multi-methodologies is the Critical School of Technology Mingers, J. (2001 c). *The Paucity of Multimethod Research: a Review of the IS Literature. Warwick Business School Research Papers*. Coventry.. This school draws mainly on the works of philosopher from the Frankfurt School of the 1930's and 1940's. The most notable members are Herbert Marcuse and Jürgen Habermas. The above discussion of the major schools of thoughts of technology leaves the Critical School little discussed as it comprises only a very small part of studies of technology.

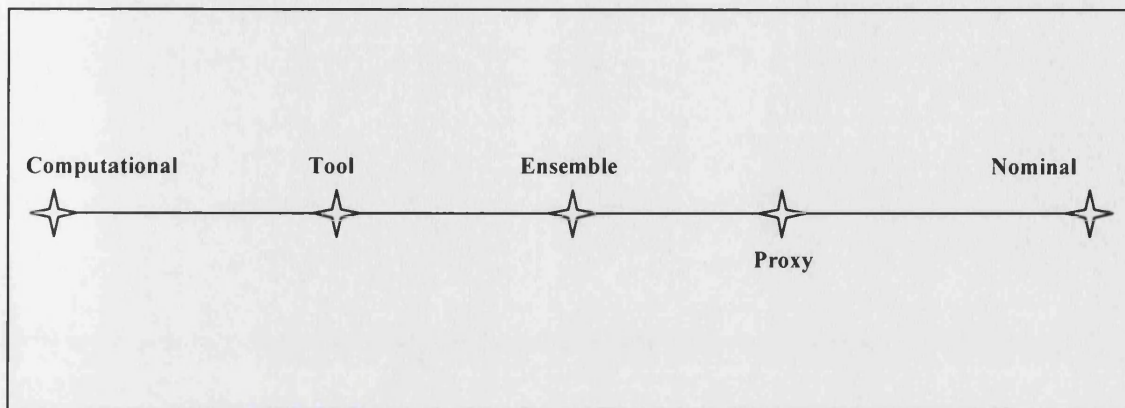


Figure 2 - Different Views of the IT Artifact from left with the characteristic of technology being dominant to right being unconsidered (adopted from Orlikowski and Iacono (2001))

The computational view of technology is not concerned with the social dynamics surrounding technological use. It is the extreme technical view concerned primarily in constructing algorithms and models to *represent, manipulate, store, retrieve and transmit information, thereby supporting, processing, modeling, or simulating aspects of the world* (Orlikowski and Iacono 2001, p. 127). The tool view, the most common one in information systems research, thinks of technology in terms of a means to an end, independent from the organizational arrangements in which it is developed and used. Such a view draws mainly on economics and management and sees technology as a labor substitution tool, a productivity tool, an information-processing tool, or a social relation tool. The ensemble view is somewhat the balance between social and technical issues and tries to tone down the tool view to incorporate considerations of organizational arrangements in which IT is developed and used. This implies that in order to understand technology one has to understand the context of use; the interplay between social and technical. In this view IT is seen as a development project (e.g. a social process of design in a specific organization in which power moves and symbolic acts become a paramount concern for the researcher), as a production network (as in Latour (2005)'s Actor-Network Theory), as an embedded system (with a stress on socio-historical, cultural and political accounts), and as a structure (drawing on Giddens (1984)' *Structuration* theory). In the ensemble view, technology and society are seen as inseparable and constantly feeding on each other. Consequently, technology starts losing the idealistic potentials and starts showing drifts (Ciborra and Associates 2000). The proxy view believes that critical aspects of IT can be understood through some set of substitutes (e.g. individuals' perceptions,

diffusion rates and costs). In this view technology tends to disappear to make room for social issues and quantitative effects in terms of money spent on hardware, software and training. Finally, the nominal view does not conceptualize IT, or at least any specific technology, in favor of issues surrounding technology as in the case of development methodologies.

Clearly, as there are multitudes of disciplines studying technologies in general, so there are when studying MICT in police settings. Even though it is a more specific field of study, the division of ontological and epistemological positions presented is useful in capturing the major shortcomings and debates in the field. In what follows, the current dominant views of ICT and MICT in police organizations will be outlined – although each view presented has a dominant methodological inclination, it often crosses the boundaries of any given paradigm.

2.3.2 Conceptualizing Research of ICT and MICT in Police Settings

Within the study of MICT in police settings, one can recognize the same conceptualizations of technologies. In fact, the role and implications of mobile technologies range from the most idealistic (e.g. the permanently connected individual who can always work) to the most pessimistic (e.g. the enslaved, over-controlled individual who has no place to hide). What is the role of mobile technology in present accounts of police work? What are the police expecting from these technologies? How does current research understand the implications of mobile technologies in police organizations?

One of the ways in which police guidelines are enforced is through documenting and coordinating activities (Jones and Newburn 2002). An officer must follow a standard lawful conduct and the documenting and coordinating technique is integral part of this. Failure to comply with documenting guidelines can have serious consequences. MICT populate the environment of operational policing, and have received particular attention as a rather unique phenomenon that encapsulates the transformation of the activities of documenting and coordinating (Manning 1988). Unarguably the power of coordinating resources and the computerized systemic intelligence are the two most important assets for operational policing. In turn, mobile technologies can be considered a key technology in the practice of operational policing (Chan, Brereton et al. 2001). According to most official reports (e.g., Povey 2001), the police are expecting two distinguishable benefits from mobile technologies; better-informed officers, and improved coordination of limited resources at both individual

and organizational level. This is, for example, accomplished through allowing officers to access crime information systems while in the field without the help of any human intermediary. It also implies providing the individual officer better awareness of the state of affairs. Furthermore, it allows for the organization to monitor effectively and care for the actions of individual officers in real-time. In practical terms, it implies providing officers with a list of active incidents and allowing them to pull more information from the system on a particular incident in progress. It also implies the support for interaction with other officers or controllers through mobile technologies such as the personal radio and the mobile phone. This coordinating and documenting effort is carried out through various technologies that allow work to be distributed across space and time (Ackroyd 1992).

Unarguably, the rhetoric of coordinating resources and of having computerized systemic intelligence are the two most important aspect of modern police work (Manning 1997). Due to dropping prices of technologies and advances in human-computer interfaces, MICT have attracted so much attention and interests that special consortia have been established for the sole purpose of mobilizing information in the field of operations (Woods 2002). ICT have been proven to play a key role in the creation of new approaches to operational policing in the UK and other parts of Europe, particularly in intra-agency co-operation for the reduction of crime and disorder and in intelligence led policing (Anon 1997; O'Dowd 1998; Anon 2001). The promise of technology to improve the effectiveness of controlling crime, as well as enhancing professional status and organizational legitimacy, has resulted in a long-lasting close affinity between technology and police work (Ericson and Haggerty 1997; Manning 1997). In fact as Manning (2003) forcefully argues; *the image and practice of police is shaped by information technologies*.

Thus, on an abstract and functional level, mobile technologies are implemented for four reasons: documenting, coordinating, controlling and automating police work (Manning 1988). The documenting function is used to help police officers in the performance of tasks (e.g. the assessment of risk) and to monitor officers' performance to enforce accountability. The coordinating function is used to resolve incidents by *fluidly* organizing and to transmit an image of power. The controlling function is used to monitor behaviors and direct orders. Finally, the automating function is used to convert a work routine into a computer-automated task as in the case of speed cameras and specific reporting activities.

Police forces in the UK are at the forefront of the use of information technology to support all aspects of their service delivery in operational terms (O'Dowd 1998; Povey 2001). This development has been labeled *e-policing* and is strongly supported by the UK government through Home Office initiatives (Povey 2001). The main aspect of e-policing is that of mobilizing information in order to make it available to officers through mobile computing (Povey 2001).

Different perspectives have emerged from the available literature on the extent to which information technology has changed police practices in operational terms. These perspectives on the role of mobile technology in police organizations, drawing on our previous discussion, can be roughly divided into three school of thought: the functionalist view (with strong ties to the computational and tool views), the symbolic view (with strong ties to the tool, the ensemble and the proxy views) and the critical view (with strong ties to the proxy and nominal views). The dissertation will explore each of these views through various examples from the available literature. However, since the functionalist view has been the most dominant, the dissertation will examine the symbolic and critical views at more lengths.

The functionalist view sees MICT as an improver of police organizations and crime control. The rationale of this angle is rather straightforward. As technology provides more, better and faster information about any given setting, the act of policing is improved. Furthermore, the view of police is that of a collection of individuals working for a common goal, which can be rationalized and divided into distinct steps. This is reflected in the 80s and 90s emphasis on scientific policing and the *rational organization* (Manning 1988). Chu (2001) offers an archetypical functional view that purposefully attacks any negative views of technology stating: *Luddites in policing beware: the train is leaving the station* (p.3). According to Chu (2001) properly implemented IT will increase the ability of the police to attend emergency and non-emergency incidents, increase the personal safety of police officers, increase intelligence gathering, and decrease costs of administration and operations. Speaking specifically of mobile technologies, Chu (2001) argues for the vision of *anytime and anywhere* access to data through ubiquitous, ever present mobile artifacts.

In contrast, the symbolic view does not necessarily suggest that MICT improves crime control. However, it does suggest that it helps in transmitting an image of more power. Thus, technology is seen as a proxy or as embedded. This effect is seen ultimately as a deterrent for

crime and disorder control. This specific view of the role of mobile technologies is reflected in the academic debate against perpetual contact and against the idea of *anytime and anywhere*. The symbolic view suggests that ICT and MICT *have been constrained by the traditional structure of policing and by the traditional role of the officer* (Manning 1992, p. 250) and that they do not provide an instant solution to police problems but creates contradictions and problems (Ackroyd 1992). For instance, drawing on evaluation studies published in the 1970s and 1980s, Manning outlines the disappointing results of various technological innovations such as computer-aided dispatch systems, attempts to reduce response time, car locator and tracking systems, crime mapping techniques, and management information systems, which failed to reach expectations and in some ways exacerbated original problems (Manning 1988). He concluded that *such research as exists is often inconclusive or suggests that new technologies have less effect on police practices than their proponents predict or prefer* (Manning 1992, p. 382). Manning's conclusions demonstrate the failure of looking at technology from a purely functional viewpoint, and instead focus on the symbolic function of technology within police organization. Manning (1997) argues that ICT are not only employed because of their functions, but also because of the image of police that the police themselves seek to transmit with the assumption that when a police force is effective in transmitting an image of efficient coordination, respect of laws and order tend to increase.

Apart from the obvious uniform and weapons, the police transmit the image of efficiency through the highly technological tools they choose to use. For instance, in Italy, a few special police officers are equipped with Lamborghini super cars (BBC 2004). Regardless of the functional characteristics of these cars, which might be desirable or not, the mere image of speed is enough to desist citizens from speeding or resisting arrest. The same is true for the various radio and data terminals that police use. The mere sound of the radio can decrease the chance of an offender from running away (Manning 1997). In fact, it has been noted by various ethnographies of police work, that officers tend not to silence the radio when knocking on a suspect's door. In addition, police officers tend to use these technologies as to transmit an image of know-all, even if no information is available about the offender (Manning 2003). Before the advent of mobile data technologies, this used to be done primarily during the course of interviews in police stations, but it is now a common occurrence also *on the beat*. Thus MICT can be used to give an image of efficiency and overall as the symbolic extension of police organization into individual officers' daily

activities. In addition, as argued by Ackroyd (1992), the image of professionalism and management give the police more legitimacy. Thus, the façade of the police is as important as the actual power granted by new technologies.

In a more moderate symbolic way, the study of Canadian police organizations conducted by Ericson and Haggerty (1997) showed the profound unintended impact of ICT on the daily work of police officers. Reporting system rules curbed individual officers' discretion and the supervision of activities in the system intensified by storing more details. The information technology supported auditing, monitoring, and managing risk (Ericson and Haggerty 1997, p. 398). The study concludes that the use of information and communication technologies changed the structural aspects of policing through limited individual discretion, leveling hierarchies, and questioning traditional divisions of labor. Traditional police command and control structures were replaced by mechanisms regulating police conduct through surveillance of the police themselves (Ericson and Haggerty 1997, p. 388).

Still following a symbolic tradition, Ackroyd (1992) take a more theoretically inspired stance – which can be argued to be close to a structurational analysis of technologies. He concludes that technology displaces and redistributes tasks in police settings and ultimately drives police work toward a managerial and professional organization. This managerial and professional stance is further reinforced by the belief that technology improves effectiveness in the fight against crime and efficiency in the deployment of resources. These criteria, according to the authors, are confusing to say the least. In an attempt to understand technologies in police settings better, Ackroyd (1992) differentiates between three primary observed roles: basic record and support services (e.g. payroll, statistics, and document processing); work facilitation systems (e.g. radio and data terminals for record checking); and management and control systems (e.g. Computer-aided dispatching and MIS). He notes that while the first of these systems is successful and straightforward in its role within the organization of police, the latter two are not because of the ever-changing exigencies of working in the street and because of a lack of training in using these systems.

In stark contrast, the critical view suggests that mobile technologies do not improve crime control – or even if they do so in specific situations they bring with use new fundamental problems to the enforcement of order that could potentially displace and dwarf the potential of the technology (BSSRS 1985). In these critical studies, Marx (1988, p. 222) presents a

gloomy vision of the effect of new technologies in crime control; *the new surveillance goes beyond merely invading privacy, as this term has conventionally been understood, to making irrelevant many of the constraints that protected privacy. Beyond the boundaries protected by custom and law, privacy has depended on certain inviolable physical, special and temporal barriers – varying from distance to darkness to doors to the right to remain silent... with much of the new technology, many of them cease to be barriers.* Marx (1988, p.227) further argues that *each small extension of surveillance can shift the balance between the liberties and rights of individual and the state... cumulatively they [new technologies] can change relationships and principles central to our form of government [democracy].* Generally, the critical view is concerned with the social contract and the delicate balance between freedom and social control in democratic society advancing the idea that privacy is indispensable for a democracy to live up to its ideals. This extends both to the relationship between citizens and police officers as well as police officers and the central organization of police.

Manwaring-White (1983, p. 219) echoes Marx's concerns. In the closing pages of her book, *The Policing Revolution*, she affirms that it is precisely in the field of technology that far too little discussion has taken place, both in parliament and in the public forum... new technology threatens our rights as individuals, and is expensive too... in the case of communications, the new equipment has enabled the police to respond more quickly to reports of crime but this does not appear to have prevented crimes from being committed in the first place. Information gathering, daily on the increase, does not prevent crime either but it does attack the liberty of the individual to hold certain political beliefs or to support certain political causes, because the knowledge that files are kept on such beliefs intimidates. She concludes with the bald statement that no amount of technology can replace the need to face up to the fundamental problems of our society that reside outside of the competencies of technology (e.g. alienation, unemployment and feeling of oppression). Following a more moderate critical tradition, Norris and Armstrong (1999), in their book *The Maximum Surveillance Society*, explore these claims by mainly looking at the use of CCTV and various other technologies (e.g. Automatic Number Plate Identification Systems) in Britain. Their analysis is not as gloomy as the preceding one for they concede that there are actual benefits in the use of these technologies in aiding the police function. Yet they also give more empirical claim to the vision of total control by algorithms where the freedom of citizen is dwarfed and where police officers become bureaucratic machines – which would suggest more accountability and less discrimination or simply discrimination transferred inside of the

algorithm. They finally argue that new legislation and scrutiny is needed to restrict and monitor the use of technology by police in order to preserve democratic ideas.

Paradigm	View of Technology	View of Organization	Context
Functionalist (Computational/Tool)	An Controllable Instrument of Improvement	Decision-making is pyramidal and it flows from top to bottom	Police work is a series of routine tasks
Symbolic (Ensemble/Proxy/Nominal)	A Black Box with many meanings depending on context	Decision-making is emergent and starts from different points in the organization	Police work is emergent and idiosyncratic in nature
Critical (Ensemble/Proxy/Nominal)	A potential instrument/weapon of oppression	Decision-making flows from dominant political ideology (institution)	Police work is political and represents a dominant ideology

Table 7 – The Three Schools of Study of Police Work and ICT inspired by Ackroyd (1992) and Manning (2003) – in bold the positions of this dissertation

To sum up, from a functionalist view, technology is the *holy grail* of policing and as such the drive of current mainstream research is to see how to pump more technology into police work. From a symbolic view, technology can be both positive and negative; thus a number of considerations have to be made before implementing it. From a critical view, technology, although affording efficiency, is an instrument of control that can have highly negative consequences on society.

In turn, when studied in a police work setting, MICT have been associated with many implications. MICT are often seen as an instrument of efficiency maximization in the dispatching and management of resources, as the extension of the symbolic power of the institution of police, as a socialization mechanism for the officer in the field, as an emancipator mechanism in the theoretical flexibility it affords, and as a command and control system.

It is worth noting that although the three schools of thought differ on many levels, they do present an important commonality. They all have a strong assumption of the context of deployment of MICT; that is they all take for granted the work of police officers as one of imposing order in society. This dissertation locates itself between the symbolic and the critical paradigms. Through phenomenology the dissertation complements the symbolic understanding of technology with a critical and politically oriented understanding of it. Such approach has proven useful in general IS literature concerning IT failures to understand contexts (see Mitev 2000). Relating to this last point, in the next section, the dissertation will uncover a major shortcoming of current research.

2.4 Debates and Shortcomings of Current Research

It is clear from the preceding discussion that symbolic and functional aspects of mobile technologies tend to reinforce each other in a hermeneutical cycle and tend to be attacked by the critical view. This complicates the understanding of mobile technologies in the practice of police because the boundaries between the potential and actual use of technology blur; where the myths, the perception of citizens, and the perception of the media tend to be confused with the actual use made of individual experiences, drifts, and failures. In line with Manning (1988) we argue that the communication problem of the police is more than a technological problem that can be fixed by technology alone. Manning's, Ericson's and Marx's findings suggest that there may be another implication brought in by MICT beyond the mere functional and symbolic aspects of information technologies in policing. As Manning (2003) drawing on Thompson (1963), argues the use of technology by police is non-routine, non-systematic and situational rather than theoretically derived and causal.

As Manning (1992) points out, the mere availability and accessibility of information does not necessarily mean that police officers and managers use information effectively or appropriately. Officers will make better decisions if they have the relevant and accurate information in the appropriate way, and at the appropriate time. Thus, the extent to which mobile technologies lead to more efficient and effective operational police work is a matter of more than just the technical characteristics of the devices. In turn, to understand the constitution of interaction with mobile technologies in operational policing, it is important to examine the nature and purpose of the organization, the nature of mobile technology and the situational factors that affect the usage of technology in particular ways. However, in current literature there is little preoccupation with these issues. In short, success is highly dependent upon detailed understanding of how mobile technologies are relevant to the context⁴ of operational police work.

Yet, Manning (1988, 2003) and other authors in the symbolic tradition fail to articulate the relation with mobile technologies in terms of a coherent framework that can explain the dynamic of the use of technology through a number of different situations. In turn, present accounts of technology in policing appear to largely ignore this ambiguity and tend to fall in

⁴ The circumstances, situations or events that form the environment within which something exists or takes place.

the trap that technological challenges in policing can be most effectively resolved by technological solutions that only seek to alter – generally in favor of technology – the use of technology. This ambiguity is clear only when we understand technology in a *transcendental* way and not as a tool or human activity (this discussion will be continued in Chapter Three). This study can be considered as a continuation of Manning's (1988) study of the relation between the realm of technology and the realm of situated action. However, while Manning (1988) primarily seeks to understand the relationship between the environments of abstract communication and the environment of the phenomenon from the view of the control room, we are more concerned with the conditions necessary for the constitution of interaction with mobile technologies from the view of operational police officers. This dissertation sees the relationship between the virtual and the physical as a property of interaction with mobile technologies rather than a consequence of it. It is more of a constitutive element rather than a constituted one. In turn, the dissertation is more concerned with the state of affairs that constitute interaction with mobile technologies, and in doing that it seeks to understand the relationship between the usage of mobile devices and the locales and situations in which such usage is observable. The locales and situations of interest are of course not confined to the immediate ones but extend to the institution from which the interaction is shaped. That is the reasons why the dissertation seeks to understand why the police operate in the way they do and their job as a way of being. In the preceding discussion it is clear that no normative definition of police and police work can help us in the endeavor of understanding the macro-context of use of technologies. A practice-based definition is more effective in delivering a beginning sketch of the object of study as it starts from the micro environment of work.

To summarize, there are a variety of views of the role of mobile technologies in a police setting. Each particular view stresses particular points for understanding and implementing mobile technologies in organizations. We have discussed a number of contradicting views from issues of privacy and accountability, to practicalities of the work place, to the idea of perpetual contact. Some views are more skeptical than others in terms of the practical application of these technologies in work contexts. However, most views do not explore the *context* of police officers in depth. This is probably due to the fact that meaning of the term context is regarded as obvious and hence there is little reason to examine the subject. Thus there is very little written about the links between a context and the usage of MICT. Consequently, a general understanding of context has not allowed for an appropriate evaluation of the functioning of MICT in the context of police. To be clearer, this dissertation

is not preoccupied with the actual design of MICT, or with their particular technical or ergonomic characteristics, but with the actual phenomenon of interaction with MICT in the particular setting of the UK police.

However, there are some exceptions, which are to be found in the more anthropological literature concerning computer supported collaborative work and that take the issue of context seriously. The CSCW tradition has brought a rich theoretical background to the study of technologies. Suchman's (1987) seminal work on plans and situated actions has added a wealth of material to draw from to understand the idea of *context*. Dourish (2001, 2005) has brought the phenomenological tradition of studying situated action at the core of the debate of HCI. In turn, it is the belief of this dissertation that the embedded nature of MICT requires a deep understanding of the *context* in which these technologies unfold. In addition, because of the a-theoretical drive of most mobile work literature, the problem is exacerbated in comparatively similar studies.

As a consequence of this superficial understanding of *context*, the texts surveyed are valid either from a macro or a micro angle. Thus these texts suffer from a range of problems ranging from poor generalizability (e.g. ethnographic accounts) to the overemphasis of technological factors (e.g. critical and positivist studies). In turn, in the field of information systems as well as police studies there is a need to explore the issue of context in a holistic manner. The dichotomy between the macro and micro is still strongly present in current texts. This is mirrored in the tripartite of research streams in police work and MICT. There needs to be a breakdown of the barriers between the two in order to explore and understand the dynamics of MICT in police organizations. That means that the understanding of context not only needs to encapsulate the *situatedness* of action but also the institutional dynamics that influence and inform local behaviors. In line with Ciborra (2004), this dissertation tries to capture *context* in its original phenomenological expression. In order to do so, this dissertation has to shift the current paradigms to a new direction by building a theoretical framework and consequently choosing a research method that can allow for *context* to emerge. This also means putting forward a framework that can enrich the literature on mobile work and MICT.

In turn, a number of questions are raised in regards to studying MICT in the context of the police in the UK. How does one study the interaction with MICT in a context? How does one

account for both the micro and macro aspects of a context in regards to MICT? Fundamentally, how can one demarcate the issue of context in order to address it?

2.5 Summary

The core of police work is in the street. Operational policing is the front-line of police practices⁵. It is the public face of police work, the one most often seen on TV and read about in newspapers. Operational policing involves groups of people coordinating and sharing information across space and time. Furthermore, it can take place virtually anywhere within the boundaries of a jurisdiction, and as such forms a paradigmatic case of distributed collaborative work. It is the everyday reality of dealing with emergent social phenomena that are deemed unlawful or that can potentially result in unlawful behavior. It is in the street the foundational and formative training of most police officers is situated (Manning 2003). According to Manning (1992, pp. 389-90), research on the use of technology for policing has focused narrowly on managerial as well as control room aspects rather than on *employee morale or performance, control or management of crime, or delivery of enhanced services that improve the quality of community life and citizens' satisfaction with policing*. This dissertation takes this last statement seriously and asks the questions of how MICT support and are supported by the *context* of police work. It does so by unfolding the context of police officers at both a situated and institutional level.

The following chapter has the principal aim to describe a framework known as the *Framework of Virtuality* as an attempt to overcome the most evident shortcoming of current research. This as was discussed resides in the understanding and analysis of *context* in relation to MICT use. In order to counter this shortcoming, which clouds the understanding of MICT in police settings, this dissertation proposes a phenomenological understanding of *context* in order to reconnect the local and institutional understandings of MICT use.

⁵ This study is not concerned with Problem-Oriented Policing (PoP), a form of preventive policing not dependent on the use of the criminal justice system Goldstein, H. (1990). *Problem-Oriented Policing*. London, McGraw-Hill., but on the more classic patrol-based policing.

CHAPTER THREE: THEORY

It is customary in social sciences to disclose the ontological belief of the research undertaken (Orlikowski and Baroudi 1991; Galliers 1993; Avgerou 2000). More importantly, given concurrent and evolving theories surrounding technology and organizations, as outlined in Chapter Two, it is of paramount significance to expose a coherent idea of the reasons surrounding the choice of a particular focus and inclination to certain elements or categories. Taking a clear ontological stance is no easy task. An ontological position is both a way of seeing and not seeing (Ciborra 2002); it is a selection mechanism to narrow down the domain of study to few important elements that can be managed and can be related to each other. The nature of these elements and their relationship is the focus of the ontology. The elements of focus, in the case of this dissertation are MICT, police officers, and the police organization in the UK. The way in which we view these three elements and their interaction is what constitutes ontology of research in IS. This dissertation builds several assumptions about the use of MICT in police settings. These assumptions govern the scope and direction of this inquiry and model the epistemological tools and subjects chosen in Chapter Four. Furthermore, these motivate the researcher through the questioning of mobile technology use in and for police work in the specifics of its participation in the construction of police officers' relationship with the environment of work through relating such use to intentionality.

In turn, this chapter will concentrate on conceptualizing MICT starting with a general understanding of mobile technologies in organizations with the purpose of narrowing down their specific application in police settings. The analytical lens is built around the shortcomings of current approaches to mobile technologies, specifically in police settings. This chapter argues for an alternative analytical lens that draws upon a hermeneutic phenomenological understanding of the research endeavor. This shifts the focus of study to more fundamental issues concerning MICT in police organizations. In fact, while in the literature there is both theoretical and empirical evidence that MICT influence behavior; this finding is rarely explored in work settings especially in terms of the effect of MICT use on the willful outcome of work activities. This more fundamental focus builds an understanding of mobile technologies in terms of police officers' disposition and formal relationships to the

environment of work. The phenomenological analytical lens rather than seeing the elements of study – MICT, police officers, and the police organization in the UK – as independent, deterministic, or socially constructed, sees them as co-constituting.

Thus, rather than adopting a view of MICT in which the device and the context of the users are viewed as separate entities, a view that will fail to take into consideration essential aspects governing the individual users choices regarding its use, this dissertation moves to the understanding of context as the phenomenological idea of situation (Ciborra 2004), which is similar to the ensemble view of technology. Hence, this dissertation will address this phenomenon and place it within a wider academic debate by building a phenomenology-based theory of interaction with mobile technology. The way in which the dissertation questions mobile technology is strongly influenced by the phenomenological tradition of Heidegger (1962). The quest of this chapter is in fact that of understanding the object of study to be able to ask a meaningful question about it, and ultimately to build a strategy to approach such question.

The dissertation argues that mobile technology must be understood in the context of human disposition towards it – this disposition is the way of being with technology in the particular context of the UK police. The level of analysis chosen is more fundamental for the development of an understanding of mobile technologies, yet it is the one most often taken for granted. In fact, this level of analysis points toward the importance of the dichotomy between virtual and situated encounters within intentionality and action, as opposed to the derived functional understanding of technologies. This chapter is divided into three main sections. The first deals with reframing the issue of context in terms of the phenomenological idea of situation. The second lays the philosophical grounds for a framework to study MICT in the police in the UK. The final section presents the *Framework of Virtuality*.

3.1 The Problem of Context for MICT Research

This section explores the problem of understanding the context of use of MICT. The first part deals with the current challenges with understanding context. The second part proposes a phenomenological understanding of context as situation.

3.1.1 The Problem Domain

Organizations are implementing mobile devices to support a new kind of *fluid, always-available* workforce – defined in most recent research as *postmodern* professionals (Kakihara and Sørensen 2002b, 2004). Mobile technologies are the emblem of these future organizational visions. On a general level, interaction with mobile technologies is a form of mediated communication through laptop computers, PDAs and mobile phones, with other human agents and/or technologies for achieving a goal. However, despite many investigations, there is little agreement on the understanding of the phenomenon of interaction with mobile technologies in work contexts (Kakihara 2003).

In fact, while the growth in usage of mobile devices is at unprecedented levels, the dynamics surrounding successful usage in formal organizations are far from being understood. In fact as Agre (2001, p.13) argues *by allowing any social institution to structure activity in any place, wireless information services break down the traditional mapping between institutions and places. This phenomenon greatly complicates the analysis of context for purposes of designing context-aware computing systems.* In turn, formulations of *mobile strategies* are still at an embryonic stage across most industries and well-documented studies are often contradicting about the requirements of mobile devices in work environments (Pica and Sørensen 2004). Furthermore, organizations that have traditionally operated in a geographically distributed manner are under increased pressures both from the outside and the inside to mobilize resources and increase efficiency and effectiveness through mobile technologies. Like other organizations, the police, being geographically distributed for the performance of the job, are reliant on technologically mediated communication in the hope to fulfill the potentially unlimited and idiosyncratic demands from citizens (Manning 1988). This is no surprise given that industrial societies are technologically driven (Bell 1973).

Organizations are highly puzzled by mobile devices and generally do not know how to approach the problem of poor and/or inappropriate usage (Sørensen and Pica 2003). A number of answers to the problems of usability have been developed. However, the explanations for failure or success of interaction with mobile technologies are often conflicting. For instance, from a technologically deterministic viewpoint, interaction with mobile technologies is the outcome of appropriate computational and ergonomical choices (Schiller 2000). Following suit, from a socio-organizational viewpoint, interaction with

mobile technologies is the outcome of appropriate organizational configurations, which balance emancipation and control of workers (Sørensen 2004). Lastly, studies concentrating on individuals point to the phenomenon of interaction with mobile technologies as the outcome of a human need to keep in touch (Jakobson 1960) – many times regardless of the content transmitted – which must be immediate and intuitive (Iacucci 2000). Hence, the blame for failed interaction with mobile technologies often falls upon the user interface (Nielsen and Sodergaard 2000), ergonomics of the devices (Katz and Aakhus 2002), infrastructural issues (Dix, Rodden et al. 2000), and organizational/social arrangements (Green 2001). In turn, a mobile technology can be technically advanced, can have accommodating organizational arrangements, and could well be serving a social function important to the individual; yet, the mobile technology might not be used. It is important to note that what is common about all these studies is the assumption that when MICT is not used extensively it is perceived to be a failure.

This dissertation's empirical effort was born out of a call from the police to explain the limited usage of the potential mobile technologies can, in theory, afford. However, rather than concentrating only on usage of MICT, as it is the inclination of previous paradigms, this dissertation will focus on the whole activity, without assuming that non usage of MICT is a failure. The following quote, gathered from this dissertation's own extensive fieldwork of usability problems in police settings, can illustrate the puzzling nature of the problems of interaction with mobile technologies and how the context of work becomes the focal point of inquiry when approaching mobile technologies.

Police Officer: It is a very advanced technology...I mean we can do a lot of things with it...

Researcher: Do you use it?

Police Officer: Not really... we really don't have the time...you know it is difficult when you are working...

(From a conversation with a Scene of Crime Officer about their usage of the Laptop in the scene of crime)

Strictly speaking mobile devices are a technical solution to support work in the field. If so, the core of the problem would lie simply in understanding the various places where the worker goes and incorporate core functions as related to such places in the mobile technology (e.g. Grange, Friday et al. 2002). However, this is not the case. Providing mobile services, ranging from voice to data, does not guarantee usage. The police are no exception. Where

does this confusion and uncertainty originate? Mobile devices create an opportunity for new kinds of *modus operandi* in work contexts. This displaces and changes the concept of context itself, the somewhat fixed element of analysis. The notion of drift reveals itself, in fact, when actualities of technological usage are contrasted with envisioned and hoped-for usage (Ciborra and Associates 2000). In turn, the dynamics between the context of work and mobile devices become central to understanding the role of these technologies in police work.

Although scarcely approached in the literature, work context incompatibilities in terms of the dialectical relationship between work contexts and mobile device usage, are intrinsically important. This dissertation argues that this issue is under-researched and yet perhaps is the most important to understand. It is also the most problematic since it is the one *where the action is* (Dourish 2001). Effective action involves being able to reorient oneself towards the technology, turning it from an object of enquiry and examination into an information tool or communication medium that can be used (Kallinikos 1996). As Dourish (2001) argues; *traditionally the study of human computer interaction has in mind the human interacting with a computer interface on a screen*; this is what mobile technologies have challenged most (Lyytinen and Yoo 2002; Lyytinen, Yoo et al. 2004). Given the considerations made in Chapter Two, to this can be added that interaction with traditional computer interfaces has been based on the idea of continuous and engaging contact. This idea, as it will be demonstrated, is inappropriate for mobile technologies.

This chapter argues that what is needed is a re-examination of the concept of context. Such re-examination is needed because mobile technologies are the episteme of technology entering the action and being embedded in the daily practices at work (Dourish 2001). In the next sub-section the concept of context will be addressed.

3.1.2 Context as the Phenomenological Idea of Situation

As argued in Chapter Two, the understanding of context is taken for granted in the current literature studying MICT in police settings. The idea of context has been taken rather seriously by recent IS literature under the umbrella term of *situated* perspective. Robertson (2003) argues that the phenomenological approach to situated action has greatly enriched the study of Computer Supported Collaborative Work. The most notable examples of this inclination are Suchman (1987) with her distinction between planned and situated action,

whereby she suggests that developers should take into account the emerging circumstances of action, Weick (1993) with his findings that bricolage and improvisation are situated activities indispensable in a time of crisis, and Orlikowski (1996) with her analysis of organizational change in which situated change is contrasted and compared to planned, radical, and deterministic change.

Suchman's (1987) definition of situated action is probably the most often cited in IS literature. For Suchman (1987, p. viii – ix) *situated action is actions taken in the context of particular, concrete circumstances...the circumstances of our actions are never fully anticipated and are continuously changing around us...situated actions are essentially ad hoc*, where the grounding of action is in *local interactions with our environment, more or less informed by reference to abstract representation of situations and of actions* (p.188), and as *such a situation is outside our heads that, precisely because it is non-problematically there, we do not think about* (p.48).

Suchman's (1987) final suggestion is to keep plans vague as to allow for situated action to take place because machines cannot access the moment by moment contingencies of situated interaction with an environment. In the words of Ciborra (2004, p.13) *temporality of situated action is the moment by moment. It points to the fleeting circumstances on which the making sense of the action relies, but which these accounts of action routinely ignore. In contrast, plans, while providing sense or meaning to an action through a formalized representation of events, resources and interactions over (clock) time, do not help cope with unexpected breakdowns and more generally emerging circumstances.*

Although the *situated* perspective is useful in uncovering the complexities of a context, such as that of the police, it is worth noting that the terms context and situation still end up meaning just *emerging circumstances of action and knowledge* (Ciborra 2004, p.7). That means that the all-encompassing understanding of the whole person is not learned and as Guignon (2002, p.86) argues *the self comes to appear as a detached spectator making observations – one item among others in the space-time coordinate system... The world is “dis-worlded” and the stream of life is robbed of its character as living...it gives us a misleading picture of reality and our own selves.*

Ciborra (2004) argues that this is so because of a lack of proper reference to phenomenology whereby the focus on power and historicity has been lost in favor of a *consensus and stability framework for organizational analysis and design* (p.8). In addition Ciborra (2004, p.25)

goes on to argue that a situation *captures the multiplicity of meanings of being in a (inner and outer simultaneously) situation*. In comparison, the current renditions of situatedness are much narrower. This means that by recognizing these shortcomings the focus of a phenomenological inquiry shifts towards the wholeness of being. Heidegger (1962) explains that what it means to be is to care, and caring is meaningful. In fact, for Heidegger, intentionality is intrinsic to caring (*Sorge*) and further it is only in relation to the physical day-to-day encounter world – it is thus the *I* embedded and immersed in an environment.

Hence, a situation has a background intention, a disposition towards a direction that builds a meaningful narrative. In turn, *intentional action emerges out of the interplay between representations (as featured in plans) and local circumstances that typically lay outside pre-designed plans* (Ciborra 2004, p.15). Consequently to these considerations, this dissertation sees context in terms of the phenomenological view of situation as Heidegger (1962) meant it. In order to do so, however, the dissertation needs to build a strong philosophical base. This is the task of the following section.

3.2 Philosophical Underpinnings of Research: Hermeneutic Phenomenology

This dissertation follows hermeneutic phenomenology in its overall approach to the problem domain of mobile technologies in the context of police. In doing so, it hopes to achieve an understanding of MICT in police settings, which reveals the experience of the phenomenon of mobile technology use, correlates the valid standpoint of each paradigm, and uncovers the context in which MICT are unfolded in terms of what Ciborra (2004) defines as situation.

Throughout this inquiry, this dissertation tries to bring to light the relational nature between police officers and mobile technologies by investigating the fundamental character of and the relationship between the subjects of study. In order to do so, the hermeneutic tradition has been chosen as the philosophical underpinning of the framework that will be constructed later in the chapter. Hermeneutics has a long tradition and a variety of approaches. It takes its roots from Vico (1984), who argues that thinking always originates in a cultural context that is historically grounded. This means that to understand oneself, one has to look at the historical horizon. Spinoza (2001) proposes that in order to understand ancient texts, in his case the Holy Scriptures, a researcher must not only explore the historical horizon of the time in which the texts were written, but also the background and inclinations of the author. This way

of thinking was instrumental in introducing the idea of the *hermeneutic circle*. A *hermeneutic circle* is the constant influence between the whole and its parts, and it suggests that in order to understand a phenomenon both macro and micro considerations must be uncovered and related. In other words, there is a co-determination between macro and macro analysis, and thus between MICT use and police work. For Heidegger (1962) in particular, hermeneutic phenomenology means the art of interpretation of a social context, and how individuals engage with the world without making a distinction between the individual and the world – hence being-in-the-world. In addition, hermeneutics suggests that a phenomenon cannot be conceptualized once and for all. Thus, for instance, understanding police work and MICT use is an ongoing activity, which needs to be refined through time.

Hermeneutic phenomenology tries to find the link between the real (what one can observe in practice) and the ideal (what one is told of the potential or future scenarios) – as it recognizes the importance of both future projection and current applications of technology (Haynes 2002). In this way, the method of hermeneutic phenomenology is a rather pragmatic approach to the problem of use of mobile technologies in policing. Hermeneutic phenomenology allows this dissertation not to be dissociated from the phenomenon of technology use as it occurs in the operational settings of police and at the same time its significance in the wider sociological, political, and economic spheres. Hermeneutic Phenomenology influences this inquiry in four distinguishable ways; the way in which the research question is formulated and understood; the way in which the micro and macro spheres of analysis are connected; the inclination of the empirical effort; and the view of technology. The following sub-sections will explore each of these components.

3.2.1 Ontic and Ontological Inquiries

Hermeneutic Phenomenology addresses the issue of the difference in questioning of the various paradigms. The first to elaborate this difference clearly and comprehensively was Heidegger (1962). Heidegger realized that there are two ways of inquiring into a problem domain: an ontic and an ontological. An inquiry into what it means *to be* is called ontological and an inquiry about an entity is called ontic. While the ontic inquiry makes use of categories, the ontological looks for dispositions towards the world (e.g. feelings, emotions, moods etc.). As this dissertation is not studying an object but a process, being with mobile technologies in a police setting cannot be analyzed in an ontic way. All three paradigms

described in Chapter Two (positivist, interpretive and critical) are ontic inquiries as technology is seen either in terms of an instrument or a human activity (actual or potential) (Heidegger 1977). In terms of this dissertation's understanding of technology, hermeneutic phenomenology portrays technology as *enframing* – and thus in terms of humans' relationship to it.

To clarify this discussion further it is useful to present an example of ontic and ontological inquiries by asking the question of what a university is. One can start answering this question by describing the university in terms of a variety of departments, a number of faculty members, a number of students, a library etc. In this sort of inquiry, one would look for entities and categories. However, if one were to ask what it means to be in a university, one would need to answer in a different way; one would answer that to be in a university means to seek knowledge, to strive for answers, to question the status quo etc. This sort of inquiry separates itself from the previous one because it looks for intentionality, experiences, and a disposition towards life that exists at both an individual and collective level.

But what is the relation between ontic and ontological inquiries? Heidegger argues that the ontological inquiry precedes the ontic one and is thus more fundamental. Thus, to answer any ontic inquiry one needs first to answer the ontological questions associated to the subjects of study. In a sense, Information Systems, when pursued through its present paradigms, fails when one tries to understand the use of mobile technologies by the police because it is impeded by the little emphasis on processes and on the lived experience – the purpose of this dissertation is to remove these impediments by transcending the paradigms. Transcending the three approaches through hermeneutic phenomenology allows pursuing a more fundamental understanding of the phenomenon of mobile technologies in the police. For the question of the role of technologies in policing cannot take for granted, either the activities and intentionality of policing or the effect of technology on being-in-the-world. Being-in-the-world does not merely mean to be in a place or situation, but to be affected by and affect the situation. This is a departure from the space-time locus. Hence, the categories that account for such locations or situations do not explain fully one's being in the world. On the contrary, being-in-the-world has more to do with one's disposition towards other people, objects, and situations. This direction of analysis is more fundamental because the question of what it means *to be* precedes the question of *what is* (Heidegger 1962).

Shifting the question from ontic to ontological does this. So rather than asking what is mobile technology, this dissertation asks what it means to be with mobile technology. Rather than asking *what is* a police officer, this dissertation asks what it means *to be* a police officer. While the first set of questions begs for categories, the second looks at processes. It is this dissertation's contention that only if the processes are understood can a framework for understanding mobile technologies in the police be provided. For the question asked is a question of the process or activity of using mobile technologies in police setting and not about what mobile technologies or police are. It must be clear that when these questions are posed they are not asking for psychological states or determinant factors in an environment but for modes of being (dispositions). This does not mean that the other paradigms are disregarded, but rather that their discrepancies and strengths are used as a starting point.

3.2.2 *Intentionality*

Secondly, hermeneutic phenomenology looks for intentionality. Husserl (2000), the father of modern phenomenology, understood intentionality as the movement of something beyond its own point of initiation towards some intended meaning. Therefore, an object cannot be understood in the abstract without the context of its intentionality towards something. Heidegger (1962) presents intentionality in terms of the projection of oneself upon possibilities, or in his own words *an entity which in each case is its possibilities, and is them in such a way that it understands itself in these possibilities and in terms of them projecting itself upon them* (p.18)⁶. This means that intentionality results from the environment in which an individual operates, from the practical involvement in the world. Thus, intentionality is not separable from the world at which it is directed, and it is essentially a disposition towards something outside of oneself and at the same time directed to oneself. Hence, intentionality is both an inward and outward property of being-in-the-world.

In turn, context as situation demands the understanding and appreciation of the meaning or purpose of the subjects involved. This is why this dissertation needs to build an understanding that encompasses both the actual work of police officers and their intended task in society. That means that both the macro context of the institution of police, made of rules, social pressures, political pressure and due process, and the micro context of police

⁶ Thus the temporality of Being is always in the future and it always cares because the world has a pre-ontological meaning. This is different than the temporality of technological use that is shifted more towards the present and the past.

officers, made of situated encounters with the world, need to be harmoniously connected into a coherent definition of police intentionality.

3.2.3 Lived Experience

Thirdly, hermeneutic phenomenology gives primacy to the experience in the everyday, and tries to make sense of an organization as a text analogue – that is, it tries to build a narrative of a phenomenon and analyze it as such. In fact for Heidegger (1962), being-in-the-world includes being with other people, being with oneself and the relationship between these two states of being. The main methodological proposition of phenomenology is the exploration of a context in all its richness of details, and letting the facts speak for themselves. In a way, it allows a first-person perspective on the experience of the subjects of study. In order to do so, the dissertation follows the method of ethnography as a technique to reveal the everydayness of police work and mobile technology use, and narrative as the method of exposition. Hermeneutic phenomenology is a way of questioning and a way of analyzing that wants to bring to light the various ways in which individuals exist in a particular context without destroying the way in which this meaning manifests itself in everyday life. In terms of this study, hermeneutic phenomenology allows to question what it means to be with mobile technologies in an everyday police setting by looking for ways of *being* with mobile technologies as they reveal themselves in the everyday work of police officers. Thus, hermeneutic phenomenology suggests a method in which the implicit meaning of a phenomenon is made explicit.

3.2.4 The Phenomenological View of ICT

Fourthly hermeneutic phenomenology looks at ICT in a unique way. For a phenomenologist, the views of information technologies as tools – as portrayed in the positivist tradition – and as social constructions – as portrayed in the interpretive tradition – are valid but not satisfactory (Flores and Winograd 1986; Dreyfus 1992). In the phenomenological tradition, information technology and society co-constitute each other. Thus, information technology is not just an artifact but a consequence of a technological attitude towards the world (Heidegger 1977). This is a strong counter current against the present drive towards improving communication amongst individuals through technological solutions, which both the functionalist and most of the constructivist positions implicitly advocate.

Heidegger's (1977) view of technology can be considered as one of the most radical and refined of present times as well as the one that acts as the base for contemporary phenomenological studies of ICT. Heidegger starts his journey into the essence of technology with a bald statement; *the essence of technology is by no means technological* (p. 4). For Heidegger (1977) the essence of technology is contained in the way one sees the world in modernity – that is as something to be ordered, or in Heidegger (1977) words as a *standing reserve*. This technological way of seeing the world transforms the world into an object to be utilized, exploited, and precisely measured. Thus, for Heidegger (1977), it is this utility maximizing view and the *will to master* that make technology meaningful and necessary. This is termed by Heidegger (1977) as *enframing*. In order to explain *enframing* further, Heidegger (1977) compares this technological way of seeing the world in modern times with the ancient Greek culture's relationship with the world and technologies. He finds that the view of ancient Greeks contrary to the present technology driven one is one that is poetic and aesthetic, as well as willingly imprecise in its measurements. To further illustrate this concept, Heidegger (1977) resorts to the example of a river; in ancient times *the old wooden bridge would let the river run its course*; the river not only provided a source of food and water, but also a beauty to be admired; in modern times, the hydroelectric plant turns the river into a resource; thus, the value of the river resides in how much utility it can hold in producing electric energy and not anymore in its beauty and poetics. Thus, *enframing challenges forth into the frenziedness of ordering that blocks every view into the coming-to-pass of revealing and so radically endangers the relation to the essence of truth* (p.12). This implies that both the symbolic and functional views of mobile technologies explored share a common shortcoming; that is, technology is simply a means of getting things done and thus *the will to mastery becomes all the more urgent the more technology threatens to slip from human control* (Heidegger 1977, p.5). In a nutshell technology is the will to instrumentalize.

In the information systems discipline, there are a number of researchers who have expanded the basic idea of *enframing*, the most notables of which being Borgmann (1984), Dreyfus (1992), Kallinikos (1995) and Ihde (2002). Dreyfus (1992) tackles the problem of artificial intelligence (AI). He states that AI, and technologies in general, do not make sense in themselves. He further states that technologies lack a fundamental character in comparison to human beings; this is the familiarity with the world – a familiarity that makes a human being a skilled actor. Most of this familiarity is learned throughout a person's life and seldom gets

articulated, but rather remains in the background of the everyday; of the taken for granted. This familiarity is situated and intuitive, two qualities which computer systems lack a priori.

Borgmann (1984) also departs from the concept of *enframing* stating that a technological device hides the full referentiality of the world. Referentiality is understood by Borgmann (1984) as the rich context in which actors operate and with which actors relate in an intuitive way. His view of technology sees a great risk that can potentially project individuals towards a solitary and disengaged relation with the world. Thus, Borgmann (1984) envisions the same danger as Heidegger as individuals might become the devices of devices. In addition, technology does not disclose the necessary condition for its functioning to come into being (e.g. individuals seldom think of the resources needed for a motor vehicle to function as a means of transportation). Hence, the relationship with the world is reduced to a set of controlled activities that disconnect individuals from the full context of everyday life. He refers to this process as *de-world*. It must be also said though that Borgmann (1984) concedes that there are cases in which this *de-worlding* is necessary to simplify the complexity of everyday life; yet, the danger remains.

All of these concepts relate directly to the concept of MICT mediated interaction. From the preceding discussion on *enframing* and its ramifications, it is clear that overly positive accounts of mediated interaction are to say the least naïve. Rheingold (1993b, 1993a) and Turkle (1996) represent the core of these optimistic studies that propose mediated interaction as synonymous to the real, and propose that technology allows for new ways to enrich contacts, create new identities and ultimately emancipate human beings.

However, for a phenomenologist, social relations, meanings and motivations are local and situated (Borgmann 1999; Ihde 2002). Dreyfus (1999, 2001) forcefully argues against these kinds of optimistic studies stating that without a situated engagement there can be no commitment and no risk – for human relations become unimportant in a technologically mediated world because of the limits of the technologically mediated world itself. In addition, Searle (1983) argues that computer systems have no semantics and thus lack meaning in themselves. But what are the limits of the properties of mediated interaction as experienced with mobile ICT? In what follows, the dissertation concentrates particularly on Kallinikos (1995) to shape the understanding of mobile technology use for the policing context.

3.3 Understanding the Situation of MICT Use: The Virtuality Framework

What is the quality of mobile technologies that precedes any specific application of them? In order to answer this question this dissertation reconnects to the *nature of modern technology* as explained in the previous section. In the quest to unfold the fundamental characteristics of being-with-mobile-technologies, the dissertation is not concerned solely in terms of their physical properties – e.g. the various functionalities of a technological device – for such a focus is specialized and abstract. The question of what mobile technologies actually are is replaced by the question of what it means for one to be with mobile technologies in a particular setting – that is the transcendental presuppositions of use of mobile technologies. This investigation assumes that causality is *a priori* (Kant 1899) and one cannot find cause and effect in empirical observation alone (Hume 1969). Thus, the work of this section is to uncover the implications of mobile technology use, by disclosing the effect technology has on one's relationship with the world. This *a priori* relationship is only a preparation for developing a framework that can guide an inquiry into mobile technology use in police practices. It is only a preparation because the intentionality of use of mobile technologies in police setting has yet to be uncovered.

The examination of mobile technologies is done from an everyday perspective. The question is about the process or activity of using mobile technologies, not what mobile technologies are. From the initial question of what mobile technologies are, the dissertation makes the phenomenological shift and asks what it means to be with mobile technologies. Drawing on Heidegger (1962), the normal way of investigating anything is to consider the object of inquiry as an entity (*Das Seiende*) while the phenomenological approach is concerned with what it means to be with such an entity. This distinguishes this inquiry as fundamental in that it is concerned with a *primordial* relationship to mobile technologies. As this dissertation is looking for the *a priori* presuppositions of using mobile technologies, it is not looking for categories but existentials, as it is not studying the object of mobile technologies but the process of technologies entering in individuals' relationship with the world. The question then is, what is particular about being-with-mobile-technologies? This question is a transcendental one.

This section presents a framework to conceptualize interaction with mobile information and communication technologies. This framework tries to transcend both the symbolic, functional, and critical views of MICT in policing, tone down the overly optimistic or pessimistic tones of the previously discussed approaches, and finally unite the sociological and technical character of the consequences of MICT implementation.

3.3.1 Reframing the Question Concerning MICT

The mass-diffusion of mobile ICT digitizing and converging interaction has allowed information and communication behaviors to leave fixed geographical locations and instead to follow the work (Lyytinen and Yoo 2002; Kakihara 2003). Working is constituted by a mixture of mediated and unmediated interactions whereby mediated interaction allows for the mobility of communicative networks and with them symbols, images and data (Urry 2000a; Kakihara and Sørensen 2002b). Mobile technologies assume the character of a bridge that makes a distant and absent reality present. Thus, the main property of being-with-MICT is that of creating a virtual environment of interaction in a variety of contexts. The mass diffusion of such mobile devices have rendered actors interactive whilst situated in or moving between different working contexts, for example by sending and receiving SMS text messages while traveling between home and work.

The introduction of new technologies that populate the daily encounter with the workplace has generated an ongoing debate on the changing nature of human interaction patterns and overall disposition toward the world (Lee and Perry 2001). At the heart of this debate lie the concepts of virtual worlds and Virtuality. Discussion of the physical and virtual worlds, their differences and relationship, has proliferated in information systems literature, from tangible and social computing in the HCI tradition (Heath and Luff 2000; Dourish 2001) to more general philosophical accounts in the organizational and social science literature (Kallinikos 1995; Castells 1996; Urry 2000a, 2000b; Castells 2001).

The ideas of Kallinikos (1996) on the nature and modality of interaction with the virtual are particularly pertinent to the analysis of mobile technologies as a form of mediated interaction between humans and humans, and humans and machines. The way in which this dissertation understands a virtual space is in terms of the nature of the encounter with it, and one way to benchmark this encounter is by contra-posing it with situated action. This does not imply that

situated and virtual interactions are two bipolar forces, but that one can only understand the latter in terms of the former (Castells 1996). Thus, their relationship is both complimentary and substitutive, depending on the situation in which this encounter takes place (Mitra and Schwartz 2001).

Virtuality was not born with modern technologies or with the advent of digitalization as can be found in Yates (1989) and Standage (1998). Ong (1988) traces *Virtuality* to shifts from orality to literacy where attention gradually shifted away from natural communication, fragmenting the totality of communication (voice, tone of voice, facial expression, physical disposition etc.). Following literacy, Ong (1988, p.136) recognizes the coming of a secondary orality, which is *essentially a more deliberate and self conscious orality, based permanently on the use of writing and print* through technologies such as the telephone, the radio, and the television.

3.3.2 *Modularization and Decontextualization*

This virtualization of interaction results in *modularization* where only one or two of the human senses are predominant (Kallinikos 2004). One becomes a big ear or a big eye because the symbol system (in the form of books, computers, telephones etc.) demands only one or at most two of the senses. The devaluing of natural communication has permitted the emptying of physical presence in space and thus a weakening of the link between content and context in favor of a precise symbol system (Kallinikos 1995, 1996; Kallinikos 2001b).

This modularization has many effects such as emphasizing individuality (Bunzel 2002), for example the reading of a book requires complete visual attention and a non-oral environment. Modularization results in a *de-contextualization* of interaction and emphasis on *modularity* (Bunzel 2002). In order for information to be transmitted across contexts a form of standardized codification is required. The standardization itself is separated from the context-embedded action of individuals but allows the very act of mobility of symbols (Kallinikos 2001b). The abstraction itself is needed for symbols, images and data be transferred across contexts.

Thus, as stated in the previous section, the encounter with the world with and through technology is only partial when compared with the natural (through the body and the five

senses) encounter with it (Heidegger 1977). The physical world is a world of *reference*. One comes into being by orienting oneself to the world. In sharp contrast, *representation*, characterized by technology and Virtuality, is an abstraction of the physical world modeled upon rules and regulation decided by the agents designing and implementing technology. These tensions between representation and reference are sources of misinterpretation and ambiguity (Agre 2003). Agre (2003) uses the example of a map and how it can be interpreted wrongly and differently by a number of individuals.

In turn, technologically supported encounters cannot in principle represent the richness of the context that they seek to mediate and support, because of the very nature of modern technology, which seeks to separate and categorize interaction in terms of the various senses, e.g., vocal interaction, visual interaction etc. (Kallinikos 1995; Kallinikos 2001b). Representation and thus technology is not to be understood solely as the virtualization of a particular technique or set of techniques, but also as a worldview whose orientation filters out all other techniques (Kallinikos 1996). The separation and categorization of interaction modalities seek to capture a facet of the way in which an individual interacts with the world and not the totality of the experience. For instance, while a CCTV (Closed Circuit TV) camera can show events in distant parts of the city it can never replace the sense of being there. As Gibson (1979) puts it *one sees the environment not just with the eyes but with the eyes in the head*. Hence, while the CCTV camera can easily replicate the function of the eyes, it cannot replicate being there and experiencing the situation (Neyland 2004).

It is appropriate at this point to elaborate further on the phenomenon of cameras. Many cameras today are used to control and punish excessive speed. A possible unfortunate situation can be used as an example; an elder relative feels sick suddenly and one has to transport him to the nearest hospital. As one starts driving the vehicle to the hospital one breaks the speed limit, gets photographed and automatically gets a fine. The reason for breaking the speed limit is common sense, clearly between the boundaries of non-reckless speeds (e.g. 10-15 MPH faster than the limit). However, the speed camera does not recognize these reasons. If a police officer was there instead of the speed camera, contrary to the speed camera, the police officer might have stopped the individual to inquire about the reasons for breaking the speed limit; however, after having inquired and understood the reasons the officer, if the reasons were deemed serious enough, let alone not sanctioning the driver, would have escorted the vehicle to the hospital.

Thus, for a police officer, being there is irreplaceable since using all five senses in combination is essential for resolving emerging conflicts, and since visibility is an essential role of the police. Hence, the usage of technology cannot be discussed *in separation from the body, its mediations with the surrounding world and the coherence of an acting self* (Giddens 1984). Thus, when one acts with technology one is engaging in a process of *coupling* (Maturana and Varela 1992), that is an intentional reference made effective. When one acts without technology, engaging in a process of decoupling, one effectively dissociates it from the acting self. *Coupling* and *decoupling* imply building or breaking a relationship with a particular technology or set of technologies in order to take action (Dourish 2001). Thus, the coupling and decoupling of MICT is constituted by a wide range of elements spanning the specific characteristics of the technology, the routines of the user, specific idiosyncratic choices by the user, the actualities of the situation, the norms, values and rules governing the role played by the user, and the institutional context in which the technology is residing.

3.3.3 *The Dichotomy of Virtual Interaction and Situated Action: The Framework of Virtuality*

It is argued that interaction with mobile technologies can be encapsulated by the concept of Virtuality. Interaction with the virtual is different from situated communication in that one selectively uses only one or at most two of the senses. Furthermore, technology by virtue of being representation is de-contextualized from the situated context of interaction and tends to increase ambiguity and misunderstanding (Kallinikos 1996; Lee and Liebenau 1999, 2002).

Luff and Heath (1998) suggest that *individual orientations toward objects are continually shifting and being transformed with respect to the ongoing interaction and activities*. Thus it can be assumed that mobile devices, by bringing along the ability to interact with the virtual, change situated actions. Therefore, understanding the situation of the user becomes of paramount importance. Distinguishing between situated interaction in the world on one hand, and interaction through technologies on the other, is at the heart of the Virtuality idea.

The paradigmatic perspective on social action motivating this approach is the *situated* perspective, which is grounded in the relationship between social action and the setting in which it unfolds (Suchman 1987; Clancey 1997). However, differently than current *situated*

perspective studies, the dissertation reconnects more strongly to the original phenomenological of context as situation. From a phenomenological perspective, technology can be seen as *representation* (Kallinikos 1995), and is then intrinsically linked with the user, the context and all its political, economical, and social rules (macro context). But even more so, the context is the immediate one in which action occur – with its people, moods, routines and idiosyncrasies (micro context). These sets of circumstances are bundled together in this dissertation's understanding of context as situation and within intentionality. It must be noted that the dichotomy between situated action and virtual interaction is used not so much as a term of comparison between these two activities, but as a way to map analytically technology use in a particular situation.

To sum up, in order to understand the context or situation of police officers' use of MICT the dissertation has to explore the narrative of interaction. The dissertation has to take into account the intentionality of policing at both an individual level, whereby dispositions and moods surface, and an institutional level, whereby rational and planned actions surface. The dichotomy of situated action and virtual interaction has to be explored in the field of operation in order to uncover the relational nature between MICT and police work. In addition, through deduction from the observations in the field of operation and through an institutional historical understanding of the intentionality of the police as an organization, an understanding of intentionality that transcends micro and macro analysis must be constructed. Such understanding of intentionality has a hermeneutic influential relation with the wholeness of acting in an environment.

This dissertation focuses on specific situations, namely police work contexts. Work context refers to the way in which spaces become vested with social meaning and behavioral norms that develop when the spatial, the physical and the mechanical elements of the environment are inhabited (Dourish 2001). Work context and technology can be seen as complimentary in that they both contain structuring elements, a set of norms, procedures, and rules that govern the proper functioning of a meaningful process (Orlikowski 1992). However, they also differ in that technology is *society made durable* (Latour 1991) while work contexts are constantly negotiated in terms of the rules that govern work (Dourish 2001). The framework of *Virtuality* further suggests that there is a tendency toward bureaucratization of the interaction with the work context – a tendency that if read within a classical economic understanding of an organization suggests due process and efficiency (Simon 1976, 1981).

Kallinikos (2004, p.12) argues that *the study of technology and its social impact cannot be exhausted at the very interface upon which humans encounter technology. Essential strips of reality are not observable or even describable at the level of contextual encounters... Situated accounts of technology must be supplemented by wider reflection that captures the complex web of dependencies, interoperabilities, and institutional relations that sustain the embeddedness of technology in local contexts. Such a complex web of relations surpass the horizon of the present, and involve the mediation of history and culture in ways that cannot be reduced to the study of actor networks... History and culture reach down into mundane technological operations in a variety of ways... the need to comply with the constraints (solutions, standards, organizational arrangements, etc.) that the march of technology has produced through time.* Reconnected to the dichotomy between situated action and virtual interaction, such a statement suggests that while situated action has a similar nature to the intentionality of the individual, virtual interaction has a similar nature to the intentionality of the institution, or the macro context. In addition, given the considerations of Suchman (1987) and Ciborra (2004), there are inherent conflicts between situated action and virtual interaction, and hence between individual and institutional intentionality.

Understanding the interaction context in terms of intentionality is hermeneutical in nature because intentionality is towards the world. Intentionality is then translated into an action – and within this action some tools might be used. The action may or may not reflect the intentionality. Designers and IS scholars have to make sure that intentionality is met through the appropriate implementation of ICT. Technology is not society made durable as Latour argued but intentionality made durable – thus a direction made durable. Figure 3 below captures all the ideas explored and visually represents the *Framework of Virtuality* for understanding MICT in police settings.

UNFOLDING THE SITUATION OF MICT USE IN POLICE SETTINGS

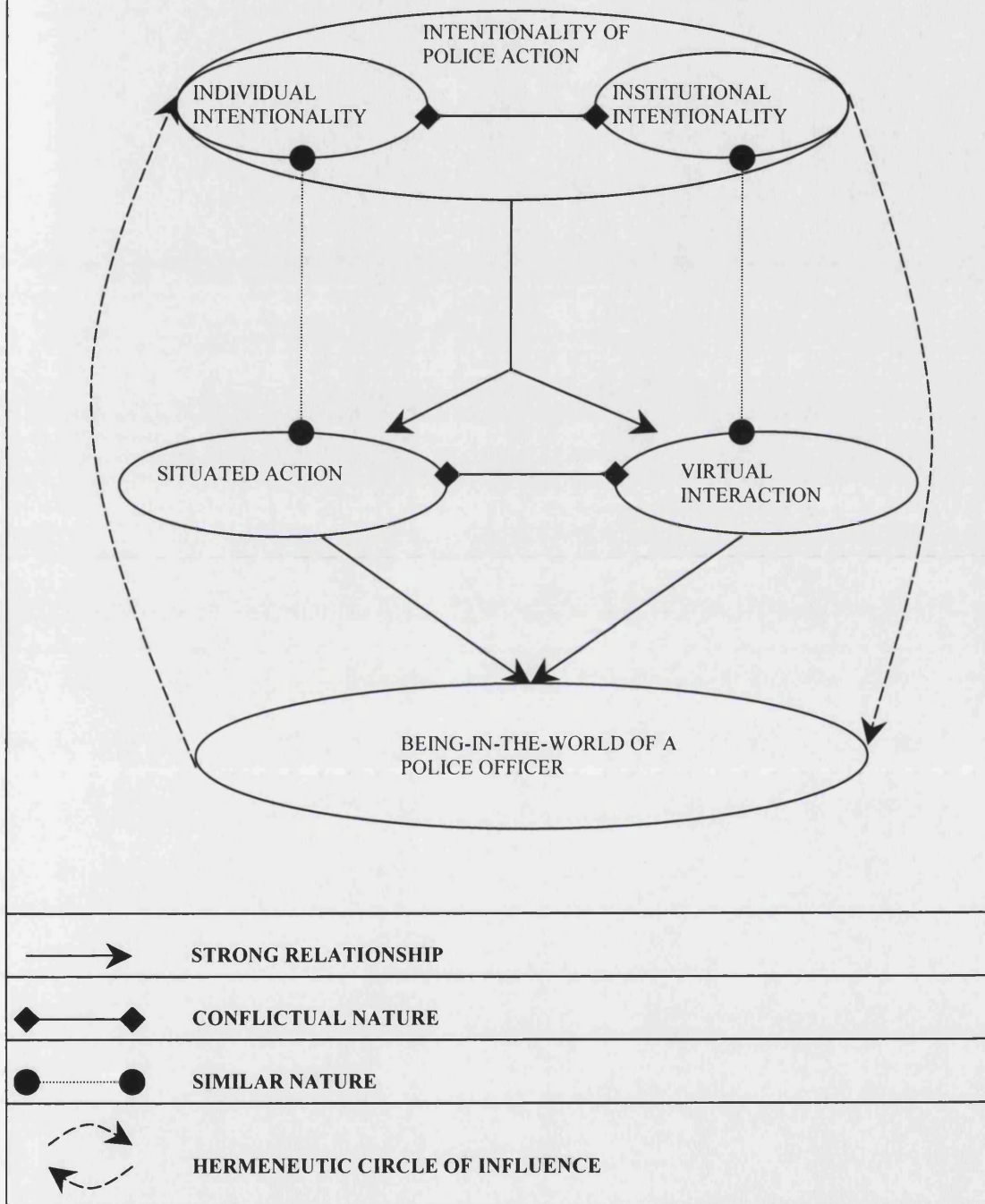


Figure 3 - The Framework of Virtuality

3.4 Summary

To sum up, this chapter has argued that current studies of mobile technologies in police settings have looked at the implications of technology from functionalist, symbolic and critical angles. These angles of inquiry share an instrumental and human activity view of technology grounded in positivism and in social constructivism. These views see a particular relation between technology and its context. The functionalist sees technology as a tool that allows society to do particular activities, which were not possible without that particular technology. In turn, the integration of these new technologies in everyday activities is unquestionably both positive and measurable. On the other hand, the symbolic view believes in an influence between technology and its context, whereby the relational nature between the two is non-conflictual, non-historical, and at times symmetrical. In contrast, without negating any of the previous views, the phenomenological view believes that technology and its context co-constitute each other. In turn, technology cannot exist without a disposition that makes it appear meaningful and necessary. The disposition itself, which was expressed in terms of the *Framework of Virtuality*, encapsulates the nature of mobile technologies in organizations. But where do these observations guide this dissertation in terms of this inquiry and how do these differ from previous inquiries? While the functionalist view tries to construct a set of deliberations that will help maximize the use of technology through technological fixes and training programs aimed at coupling individuals and technology, and the symbolic view tries to understand the assumptions, values and interests built into a technological system for the purpose of improving individuals relationship to it, the phenomenological view traces back the attitude that these technologies create and questions the fundamental participation of these in a well defined and purposeful process.

It is argued that the lens of the *Framework of Virtuality* calls for a qualitatively rich methodology, which understands and documents the context of inquiry in depth. The phenomenon of interaction is present in the field, and there it must be studied. The *Framework of Virtuality* stresses the dichotomy of the situated and the virtual encounter with the world and this is particularly suited for police since their domain of work is increasingly being invaded by mobile technologies. Furthermore, such dichotomy incorporates a central and controversial issue surrounding police work, namely the tension between local and global contexts, between central control and local action (Manning 1988). Providing more advanced services in forms of multimedia is a mundane task that will get better as technology gets better. The more challenging task instead is that of matching technological use and function to a task.

The method of inquiry is hermeneutical. The dissertation asks how MICT participate in the construction of the environment of policing. In order to proceed in a sound empirical effort the dissertation has to understand the situation that surrounds the phenomenon of interaction with mobile technologies. In turn, the study of mobile technologies in policing will not concentrate only on the instance of use of mobile technologies, since this is only one of the possible ways in which mobile technologies participate in one's being in the world. To counter the shortcomings of previous research, this study employs the ideas of mobile technology use as *Virtuality*. This implies that only when interaction occurs, can one hope to unlock the complexities and problems surrounding mobile technology. Thus, the *phenomenon* of interaction with mobile technology becomes the point of focus and one to be witnessed in the field of operations. To study this phenomenon ethnographic techniques will be employed as they permit a close encounter with the phenomenon and with the context surrounding it, without ignoring the larger socio-political context in which it occurs. In turn, in the next chapter, the issue of methodology will be addressed. Ethnographic tools that will help document the *phenomenon* of the interaction with mobile technologies will be described in relation to police work and in relation to the disposition of police officers in the field of operations. The study of technology then assumes a different scope, more holistic as technology is not self-contained, but between individuals and their encounter with the world. This is in itself, the study of the virtual in the situated act of policing. In order to answer the question a fundamental step must be taken. An appropriate epistemological model to deal with the problem domain must be constructed. Such a model has to be sensitive to the micro-context of police work and document the encounter with mobile technologies in a localized manner. It has to describe the qualities of interaction with mobile technologies within a real story of technology use – thus in the field of operations – and at the same time must not forget the bigger picture of the intentionality of police work.

CHAPTER FOUR: METHODOLOGY

This chapter describes the methods of the research project and has the aim to build a coherent and consequential research methodology to study the particular case of the UK police and their use of MICT⁷. The first section of this chapter outlines the overall research strategy; ethnography is presented as the primary mode of investigation of this dissertation. The main characteristics of this approach are discussed, including its strengths and limitations. The second section describes the data collection and presentation methods of this dissertation.

4.1 Research Strategy: The Ethnographic Approach

This study is concerned with interaction with and through mobile devices in distributed collaborative situations. More specifically, it is interested in understanding the extent to which mobile technologies influence the work of police officers, and in turn, how this shapes their relationship with the environment of interaction (e.g. the public, a community etc.). This dissertation, in line with the *Framework of Virtuality*, intends to transform these sets of relationships into a coherent narrative of everyday realities. In turn, the particular epistemological model presented therein has been chosen to capture the reality of the case studied. To recapitulate, operational policing is highly regulated, involves a high degree of improvisation through its emergence and uncertainty, and is reliant on mobile technologies due to the geographically distributed nature of work.

This calls for a conceptual framework reflecting such structural arrangements allowing for the tension between virtual and situated environments to emerge, or more specifically, how users with mobile devices interact in various physical contexts. This requires an initial understanding of the contexts of operational policing and the capacity of mobile technologies to be used effectively across changing situations. As argued, mobile technology use is encapsulated by the *Framework of Virtuality*. This assumption focuses the understanding and guides this inquiry in the detailed analysis of how mobile technologies and users interact in practice and the effect of this interaction on the relationship with the public. Such understanding is possible only at a micro level (Kallinikos 2004). In the words of Manning

⁷ For more information about the research strategy and background on policing in the UK turn to Appendix C.

(2003), the dissertation initiates by looking *up and out from the car, rather than down from the subtleties of the changing post-industrial society*.

The dissertation has to examine the main characteristics of interaction with mobile technologies and the work context of police officers. The concepts emerging from the discussions presented in Chapter Three are applied in the design, execution and analysis of the case study. In turn, inspired by phenomenology, the analysis places the context of operational policing at center stage by avoiding the view of mobile technology as a self-contained entity but rather as a highly contextualized tool and medium, which is affected by the social setting in which it is deployed and which in turn affects the social setting. Consequently, central to this research is the belief that technology is never an isolated body in a de-contextualized space, nor is it self-contained. Technology is significant as much for the degree to which it is part of a persuasive narrative that binds the object – the technology – and the user together in a shared system of beliefs as for its functional qualities. Consequently, the method of this examination relies mainly on interpretive qualitative techniques (Yin 1994; Creswell 1998; Seale 1999; Lee and Baskerville 2003).

Interpretive methods are *aimed at producing an understanding of the context of the information system, and the process whereby the information system influences and is influenced by the context* (Walsham 1993). Interpretive research methods enable researchers to study social and cultural phenomena through observation and participant observation, interviews and questionnaires. This means investigating a contemporary phenomenon *within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident* (Yin 1994). In addition, these methods allow for the researcher's impressions and reactions to be recorded and be incorporated in enriching the understanding of a phenomenon.

Researching ICT in their context of use has generally demanded ethnographic approaches (Pettigrew 1985; Lee 1991; Wynn 1991; Davis and Nielsen 1992; Harvey and Myers 1995). Ethnographic research stems from the disciplines of social and cultural anthropology. As the *Framework of Virtuality* needs to consider the context of the research, it suggests this sort of qualitative techniques (Lee 1991). The Ethnographic approach, as adopted in Information Systems research, has its root in the anthropological work of Malinowski (1922), who distinguishes himself from previous anthropologists by contextualizing the data to give it

meaning, and thus avoiding *ethnocentrism*. According to Wolcott (1987, p.43) *the purpose of ethnography is to describe and interpret cultural behavior*. The issue of culture is thus fundamental and is what underlines situated action. Goodenough (1976, p.5) states that *the culture of any society is made up of concepts, beliefs, and principles of action and organization that an ethnographer has found could be attributed successfully to the members of that society in the context of his dealings with them*. As a consequence, ethnographers build what is termed a *thick description* (Geertz 1973), an understanding of a situation within the meaning it holds for the individuals who live it. Such concept is parallel to the idea of intentionality as described by the *Framework of Virtuality*. However, diverging from the *Framework of Virtuality*, generally ethnographers give primacy to local knowledge alone (Prasad 1997).

In the Information Systems discipline there are a number of studies that employ ethnography, the most notable of which being Suchman (1987) and Zuboff (1987) who helped lay the foundations for accepting ethnography as a legitimate research method in Information Systems studies. Following these two authors, ethnography, through the methods of interviews and participant observation, has been used to tackle a number of issues; Wagner (1993) examines the ethical issues in systems development; Myers (1997a) explores the political dimension of IS development in the medical domain; Star and Ruhleder (1996) study the development of infrastructures; Davis (1991) and Davis and Nielsen (1992) explore the relationship between organizational culture and IS strategy. Participant observations and informal interviews constitute the primary modes of investigation for ethnographers. Participant observation suggests spending a considerable amount of time observing the activities of the subjects of study (Hammersley and Atkinson 1993). Informal interviews are generally conducted throughout the participant observation and *do not usually ask each interviewee the same questions, though they will usually enter the interviews with a list of issues to be covered* (Hammersley and Atkinson 1993, p.152). Thus, both techniques, besides being the most often used by ethnographers, are highly complementary.

Ethnographically inspired observation techniques allow this study to obtain a deep understanding of the intricate interrelationships between the context of work and the application of a variety of mobile technologies in the context of UK police. According to Myers (1997b, 1999), ethnography, as a research method, is well suited to provide an IS researcher with rich insights into the human, social and organizational aspects of information

systems applications. The aim of ethnography, in fact, is that of improving the understanding of a phenomenon through the extensive exploration of a context (Lewis 1985). It is simply not possible to understand in-depth the nature of this relationship through interview methods. The very specific nature of some police work, for example encountering highly uncertain situations potentially involving personal risk for the officers, creates working conditions that must be experienced to be properly understood. The feeling of being there when routine and at times boredom rules, to the rapid changes into uncertain situations is of the essence of appreciating the possible motives for officers to couple or de-couple with particular mobile technologies in particular situations. The common depiction of police work as seen on TV and in movies does most often not convey the drama of real life or the relatively mundane nature of everyday work. Loud sirens, blue lights and high speed only gives a big adrenalin rush the first few times, then even this becomes part of everyday life. Also, most of the incidents attended were relatively mundane — much to the relief of the officers involved. However, each uncertain situation attended is dramatic in the sense that there always is the danger that someone can get injured.

In terms of strengths, ethnography affords an insight into human, social, and organizational aspects of ICT use (Harvey and Myers 1995), in the real world setting in which these unfold. As a consequence, ethnographic studies can question the *status quo*, the assumptions that govern inquiries into particular settings. But even more importantly, ethnography uncovers *the distinct qualities of their [users of technology] experience* (Zuboff 1987, p.13). As far as limitations, ethnography tends to give primacy to local knowledge and by doing so it creates great difficulty in the act of generalizing findings (Walsham 1993). This has resulted in ethnography being attacked on the failing to address social and historical contexts in which IS development takes place. Tinker (1998), for instance, criticizes ethnography on three levels. First he argues that ethnography has a myopic perception of the conflictual nature of technology – a view that Marxists would not take lightly. Second, he argues that by letting only the actors speak, the expert voice of the observer tends to be silenced. Finally, Tinker (1998, pp.24-25) argues that there is an a-historical view of IS whereby *the larger picture is, in part, a historical one that recognizes that the current innovation in IS are not virgin experiences but belong to a long lineage of events...Capitalism is the unfinished revolution that continues today with upheavals in the work practices of printers, airline employees, managers etc...If ethnographers are to be more than technology's cheerleaders (humanistic or otherwise) they need to give more balanced consideration to the impact of their discipline.*

In a final note, ethnography suffers from a pragmatic limitation being contained in the long time it requires for the researcher to gather the data.

Despite these limitations, ethnography offers a holistic perspective on the activities of police and their use of MICT through the methods of participant observation and informal interviews. In addition, it offers a novel view on the functioning of MICT in police organization since there are few studies collecting data in such way. In turn, the ethnographic approach seems suitable for the following two reasons. It allows a holistic perspective of the process of using MICT in police settings through allowing a *cultural portrait* of a group (Creswell 1998), and it allows for MICT to be studied in the emergence of the act of policing thus showing the interrelated nature of MICT use and its context. Furthermore, as Goldstein (1964, p.145) argues *inquiry [of police work] must focus on the operating level...Serious research into the problems police handle requires observing police officers over a period of time. This means accompanying them as they perform their regular assignments and cultivating the kind of relationship that enable them to talk candidly about the way in which they handle specific aspects of their job.* Hence, ethnography represents just such tool for studying police and MICT.

4.2 Data Collection and Presentation

In this section the data collection and data presentation techniques are presented.

4.2.1 Data Collection

The particular method employed in the dissertation to understand interaction with MICT in the context of police officers in the UK is comprised of three main parts – all of which relate to the phenomenological character of the ontology as expressed in Chapter Three. The first part is concerned with analyzing and documenting the situations in which the interaction with MICT comes into being in a holistic and narrative manner. Thus instead of following single occurrences of MICT usage or non-usage, these are analyzed together. In addition, these activities are analyzed within an understanding of intentionality at both macro and micro levels. In so doing, the relationships of these occurrences are analyzed within an understanding of the environment in which interaction occurs. The second part is not to concentrate on analyzing a single peculiar occurrence of interaction with a particular MICT

but rather to understand the structure of interaction as a meaningful and situated activity. The third is to analyze this entire pattern to understand how police think and operate within their environment of work, and within the historical understanding of the police in the UK.

The main data sources are divided into literature concerning police work and ethnographic observations of police work. Thus the literature concerning police work, particularly in the UK, was surveyed with the aim of building an understanding of the intentionality of the police as an institution in society. This view, however, could not be skewed towards the abstract or ideal environment that a politician or policymaker would wish to offer, but be derived from a pragmatic understanding of police work as observed in the field. Hence, the institutional or macro understanding of police work can be offered and constructed only after the situated narratives are constructed – they must be in accordance with the situated understanding of police work.

The data was collected with the aid of pen and paper, and a mobile phone camera. The use of pen and notepad mirrored how the officers themselves gathered evidence. This method for collecting and documenting data helped foster trust between the officers and the researchers because of the delicate nature of police work (Van Maanen 1988). For instance, while having nothing to hide, most officers were concerned that more invasive data collection techniques would be used to evaluate their performance with technologies. Thus, the usage of more *invasive* data collection tools such as audio-visual recording equipment was considered inappropriate for the subjects of study. The confidential nature of the information and the delicate nature of police job almost dictated a low profile gathering technique. Furthermore, pen and paper was the most appropriate technique when considering the rapid changes in the context of documentation and in particular due to the frequent bumpy rides on the backseat of patrol cars driving very fast down narrow English country roads.

A total of almost 300 hours of observation of police officers were conducted over 7 months in 2003. The study involved Response Vehicle (RV) officers attending emergency calls, Traffic officers covering large areas for traffic accidents and other vehicle related policing, Scenes of Crime Officers (SOCO) lifting forensic evidence at scenes of crime, and the Emergency Control Room responsible for taking calls from the public and coordinating operational policing. For the purpose of the analysis to follow in Chapter Six, the dissertation focuses on the three operational police roles of Response Vehicle officers, Traffic officers

and Scene of Crime Officers (SOCO). These three units together represent the core of the operational function in policing in the UK. The study purposefully excluded studying Detectives and the top-administrative aspects of policing. In contrast, the study of SOCO was conducted to demark the difference in work settings represented by different degree of uncertainty. The study of the control room was performed to acquire a pragmatic view of coordination techniques.

The ethnographic study produced over 300 pages of handwritten observations and notes. These were transcribed into a digital format. Content analysis was performed with a focus on the mode of interaction with mobile technologies in operational policing and the situational characteristics and the nature of the incident attended. In addition, during the course of the analysis, interaction count was used to quantify the various variables in an attempt to provide a theoretical generalization of the findings (Silverman 1993). The combination of generalization based on both qualitative and quantitative analysis of the extensive data from the observations and interviews provided a sound basis for establishing generalizability of a theory within a setting (Lee and Baskerville 2003). The time spent on each police activity was logged and used to create simple statistical data of the amount of time spent by each officer performing a certain activity in terms of the usage of mobile technologies. Some outliers were identified and excluded from the analysis. Member validation was used as an integral part of the research method (Lincoln and Guba 1985). Lincoln and Guba (1985, p.314) see member validation as *the most crucial technique for establishing credibility*, for it allows the presentation of a convincing account using the perspective of the people under study. More specifically, member validation was used to confirm the descriptions of the work context of officers and the results of interaction counts. Executive and detailed reports describing the job of and giving recommendations for officers were presented to key-representatives for the roles studied. This resulted in minor changes as the officers generally approved the descriptions as representative and precise. This exercise of validation is in accordance with Shutz's (1970, p.17) postulate of adequacy whereby *each term in a scientific model of human action must be constructed in such a way that a human act performed within the real world by an individual actor as indicated by the typical construct would be understandable to the actor himself as well as to his fellow-men in terms of commonsense interpretation of everyday life*. In practical terms this means showing the subjects of study a description of them in a particular setting, to be used later in more complex analysis. In these reports, key activities were identified. The average amount of time spent per activity was then

presented to the subjects of study for validation and a number of keywords were used (e.g. work, problem, contact etc.) from which some categories emerged (e.g. Activity Type and Environment Type). These findings were used to construct narratives to be used as empirical material in the analysis.

4.2.2 Data Presentation

In the ethnographic tradition, the presentation of the data is as important as the fieldwork itself (Atkinson, 1990; Clifford, 1988; Clifford and Marcus, 1986). In fact, ethnography is a perspective suited to phenomenology, which is not only an approach to gathering data but also of presenting it (Frake 1983; Wolcott 1987). Van Maanen (1998) states that narratives are a distinct kind of qualitative method for studying organizations. According to Czarniawska (1998, p.v) this kind of inquiry is useful in understanding organizations because it *connects individual stories, experiences and actions to social events, processes and organizational achievements*. Thus, narratives provide a wealth of empirical material for a theoretical analysis of the context of the study (Van Maanen 1998). Brown (1998, p.53) states that *a focus on narrative is valuable because it facilitates recognition of the extent to which interpretive research involves the creation and ascription of meaning in ways that require authorial reflexivity*. In turn, narratives are the outcome of a process of interpretation of the research context and are a subjective reflection on the power relations within an organization (Mumby 1987; Czarniawska 1999). Furthermore, Bruner (1990) argues that narratives are the main mode of knowing, communicating, and articulating the world in organizations. In turn narratives are build to explain why things are the way they are (Bruner 1990; Czarniawska 1998), by focusing on the intentionality of the actors within their activities in the world. The patterns of the narratives are the most important empirical object for the researcher to analyze.

According to Van Maanen (1988) there are three main styles of presentation: the realist, the impressionistic and the confessional. The realist approach *narrates in a dispassionate third voice...realist tales push more firmly for the authenticity of the cultural representations conveyed by the text* (Van Maanen 1988, p.45). The confessional approach *constitutes the field experience of the author. This human bundle of exposed nerve-endings stands alone in the culture supposedly perceiving and registering the various happenings around him* (Van Maanen 1988, p.73). Finally, the impressionist approach *presents the doing of fieldwork*

rather than simply the doer or the done. They reconstruct in dramatic form those periods the author regards as especially notable and hence reportable. Tales often initiate an analysis of the nature of cultural understanding and the fieldworker's role as a student.... The story itself, the impressionist's tale, is a representational means of cracking open the culture and the fieldworker's way of knowing it so that both can be jointly examined. Impressionist writing tries to keep both subject and object in constant view. The epistemological aim is then to braid the knower with the known (Van Maanen 1988, p.102).

The study of police work and MICT use is presented through three impressionistic narratives. The specific value of narrative is to catapult the reader into a particular context (Van Maanen 1988). The three tales of operational policing aim at providing an accurate and detailed account of how mobile technologies were used in the field, and also serve as evocative accounts of the emotional richness of the situations. The tales are more concerned with the perspective of the users and the situations, and less about the mobile technologies. They are about being there and observing and thinking about the setting, the people and the technology as one, and interaction as the phenomenon at the intersection between these, during which the actors perform their work through and with the technology. The tales are presented in a similar manner, as one would tell them to colleagues, informal and impressionistic accounts open to discussion and falsification. The aim is to convey the feeling of being there without resorting to journalistic methods of simplifying reality (Manning 2003). In addition, descriptions summarizing typical operational policing activities for the three roles of RV officers, Traffic officers and SOCO are included with the aim of providing rich background information on for example geographical and interaction aspects of the work.

4.3 Summary

The aim of this chapter has been to describe the research methods used in the study. The opening section explores the tenants of the ethnographic approach, its strengths and limitations, and the reasons for adopting such an approach. In addition, it shows how the *Framework of Virtuality* is used as a guiding framework for defining the way the elements of study are grouped and analyzed. To sum up, ethnographic techniques allow for a holistic understanding of the problem domain. Second, they allow for the researcher to observe the real world practices of police officers. Third, they permit to offer *thick descriptions* of work activities. All of these characteristics are in concordance with the *Framework of Virtuality*.

In the second section of this chapter, the data collection and presentation methods are described as they will appear later in the dissertation. Both the micro level, as afforded by ethnography, and the macro level, as afforded by a reading of the literature concerning police work, are analyzed later in the dissertation. The way in which the data is presented is in terms of narrative. In the next chapter, the tales and an extensive description of the units surveyed will be presented. Differently than the other chapters, such presentation will be done in the first person to preserve the original experience of the researcher in the field.

CHAPTER FIVE: EMPIRICAL TALES FROM THE FIELD

We are in the business of descriptions. Everyone else is trading on clichés...Very simply it is called fieldwork. Good fieldwork always produces a lot of descriptions. (Latour 2004)

This chapter presents the empirical material collected in the field in terms of three narratives. The narratives have as a common focus the usage of mobile technologies by three operational police units whilst out of the office. It must be noted that also the control room has been studied – although it is not included in the analysis for the purpose of this dissertation. The study of the control room is included as Appendix A. It is important to understand the control room, if only marginally, for two reasons. The first is the consideration that the control room is the enabler of interaction with MICT, and thus it is as much a part of the context of operational policing as the immediate context of interaction. The second is to highlight the essential human problems related to the process of de-contextualization of information, which is a relevant component of the *Framework of Virtuality*.

The structure of this chapter is straightforward. In order of appearance, section 5.1 will briefly outline the particular police force studied and describe the functional characteristics of the MICT studied. Following sections 5.2 to 5.4 will narrate the usage of mobile technologies by rapid response vehicle officers, traffic officers, and scene of crime officers. The stories tend to follow one main incident in detail and several peripheral ones less so. A description of typical activities and technological usage will follow each story to paint the surroundings of the particular tale. As stated in Chapter Four, the description of the unit following each story has been discussed with and approved by the officers in the course of presentations to the various police units. Following, concluding remarks about the stories are brought forward for the later purpose of analysis. In this chapter, the dissertation begins a rudimentary analysis of the police units studied that will be explored in greater detail in Chapter Six. In addition, this chapter explores the accomplishment of operational policing from the perspectives of the officers. Furthermore, the tales are written in first person to maintain the authenticity of the fieldwork.

5.1 The Institution and the MICT Studied: Some Relevant Facts

Before proceeding to the tales it is useful to explore some background information concerning the police organization studied and the various MICT.

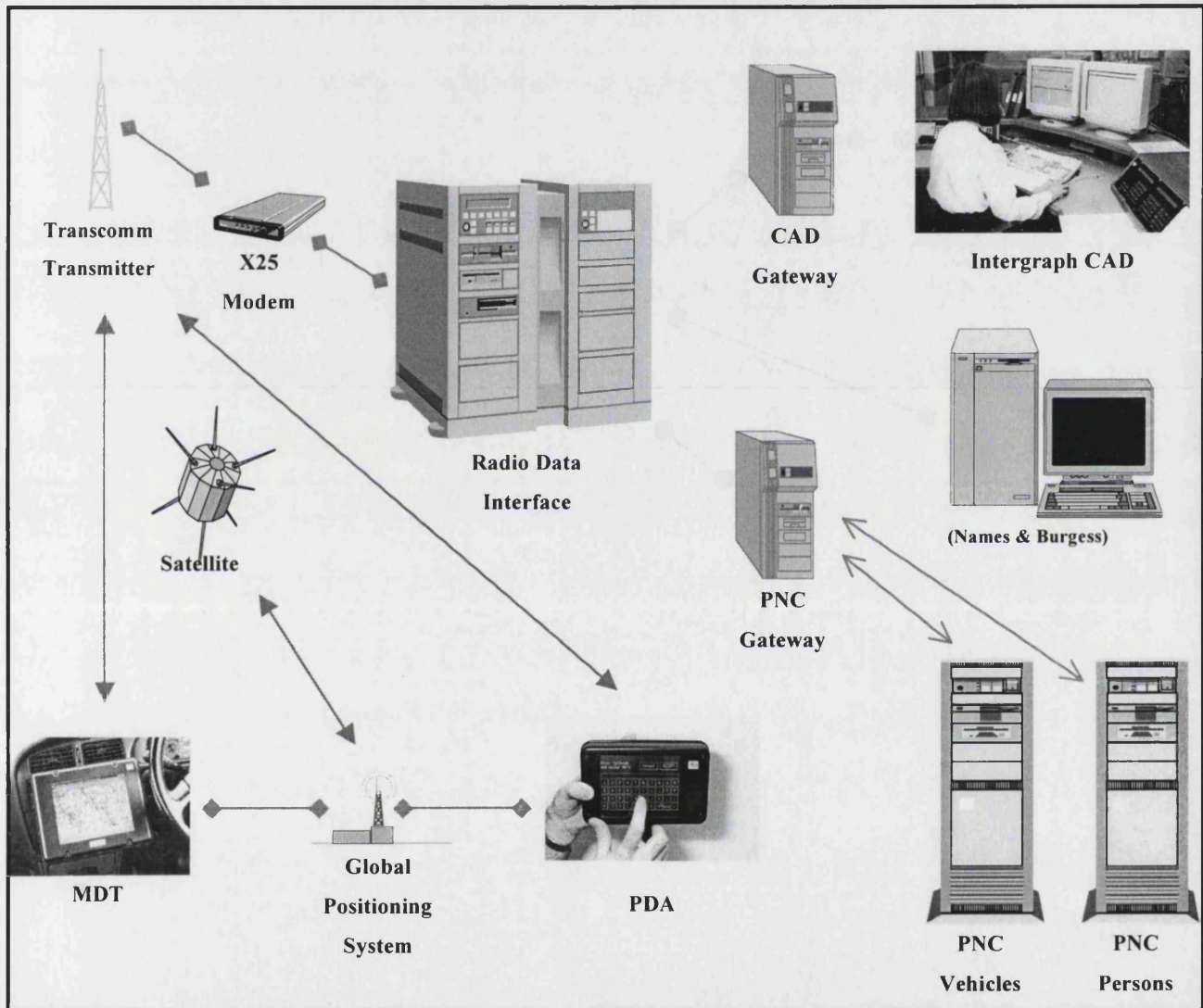
The researcher has entered three distinct police forces in the UK, X, Y, and Z. Most of the presented material, however, pertains mainly to one police force, police force X. Police force X is different to Y and Z specifically in two ways: the environment of work and the size of the force. Compared to Y and Z, police force X is geographically situated in a highly deprived zone in England, which figures in the top ten as far as crime rate per thousand of inhabitants is concerned. In addition, police force X counted on less than half the number of police officers given an equal number of citizens as Y and Z. Furthermore, police force X was considered as highly technological in terms of adoption of MICT as compared to other police forces in the UK. This relative high level of technological adoption was attributed internally to the high number of incidents that had to be attended in a given work-shift and to an understaffing problem. In addition, as some police officers in police forces Y and Z have remarked *Police force X is a good training ground...if you can make it in police force X you can make it anywhere in England.*

In terms of MICT, there are a number of these observed within the units studied. It is useful to outline briefly and describe each MICT encountered during the course of the research (See Table 8 in the next page). Also it is useful to present visually how information is generally transmitted in the police force (Fig.4) and how the vehicle has evolved though the years into an information infrastructure that integrates in the working patterns of police officers (Fig.5).

<p>- Mobile Data Terminal (MDT): The MDT is a system that provides information access and communication services to police officers via dashboard mounted touch sensitive displays. It can be used to get the log of incidents, communicate with other cars, do background checks and view and accept a list of incidents.</p>
<p>- Roger Terminal: The Roger terminal is essentially a stripped down version of the MDT. It has no touch screen and displays information on a two-line black and white screen. Police officers report it hard to use since it has a poor input mechanism consisting in a range of a few buttons.</p>
<p>- Personal Radio (PR): Short range radio. Walkie-talkie used for local communication among officers and control room.</p>
<p>- Force-wide Radio (KB): Long range radio. Usually only traffic units are equipped with it, since they tend to travel long distances and in rural areas.</p>
<p>- Speed-Check and Video-Recorder: Mounted into Traffic Vehicles to record and playback traffic violations to the offenders and/or the courts of law.</p>
<p>- SOCO KIT: The SOCO kit has a number of components. There is a photographic camera together with a number of filters and lenses. Also there is aluminum powder for lifting fingerprints and magnetic footprint lifters. Also they have a number of bags for preserving DNA evidence.</p>
<p>- Mobile Phone: The mobile phones are generally of 2 or 2.5 generations Nokia running on a GSM network. Every car is equipped with one. However, most officers carry and use their own personal handsets.</p>
<p>- Laptop: The laptops run Windows 2000 and are mid-range 15-inch screen with a moderate power processor. They are equipped with a GSM network card and can run a number of networked services such as the Crime Information System.</p>

Table 8 - The MICT in the Units Studied

Figure 4 - The Technical Functioning of the MDT (from police forces X, Y and Z)



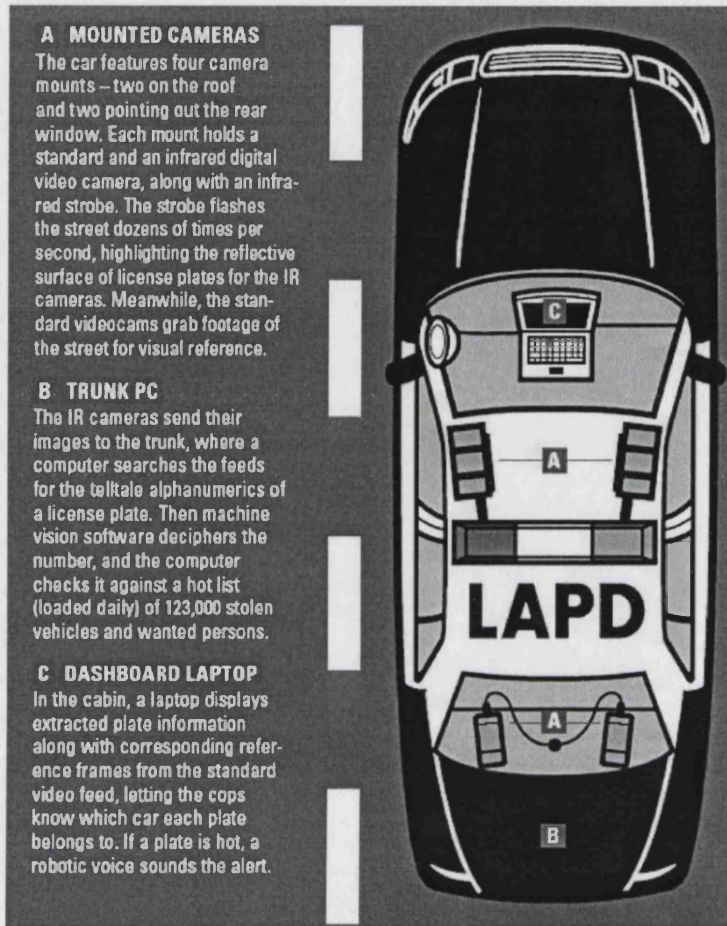


Figure 5 - A View of the Modern Police Vehicle from Downs (2006)

In the following sections, the chapter will proceed to narrate the stories of the three units studied.

5.2 Tales from the Field: Response Vehicle Officers (RV)

In the spirit of this chapter, I would like to start with my first impressions and my first picture (Fig. 6):



Figure 6 - Entering the police

Finally, I got to start my case study. It is a police force in the UK. My first day working with them was a success but it was scary. The area I study is considered quite dangerous and socially deprived. The officers I met were all friendly and were not afraid of showing me what they liked and disliked about the various technologies. The first thing I made clear when I met each new officer was the fact that I would not be evaluating their usage of technology or their modus operandi in general, but rather report the problems they encountered on a daily basis. This simple fact surprised most of the officers in that they claimed such bottom-up approach was unusual but highly welcomed. It has been clear throughout my first eight hours of fieldwork that officers are suspicious of outsiders and are highly concerned with issues of privacy... (From my notebook, 20th of June 2003, 22:14).

In the following two subsections, 5.2.1 and 5.2.2, a tale about a domestic abuse, arguably the most common crime witnessed during the course of fieldwork, is described. Following, the context of work of RV officers in terms of typical activities and mobile technology use is presented.

5.2.1 A Domestic with RV: The Story of John and Mary

It is three in the afternoon. It is a sunny and hot summer day, almost atypical in the UK. John, a rapid response vehicle officer, has just arrived at work and he exchanges some comments with the chief inspector:

The day is nice so they [the public] are going to get drunk and cause trouble!

The chief inspector nods. John turns to me and tells me that today they have a very long list of immediate response incidents to take care of and that we are going to have *fun*. It is my

first day in the field, and I am still not aware of what awaits me. I am going to ride in a rapid response vehicle with John and his partner and witness real incidents. During the previous hour, I had been sitting in the chief inspector's office, together with the chief inspector, signing a number of forms pertaining to confidentiality and security issues. As I understood it, as a participant observer, I was waving my rights to sue the police in case of an *accident*.

The chief inspector is a kind and knowledgeable individual. Throughout the hour, he has drilled me with questions about the reasons I wanted to conduct such immersive study and he was satisfied only when I said:

It's the only way to understand how technology works or doesn't!

A smile went across his face and it was only then that he picked up the phone, dialled an internal extension, and asked for a willing RV officer to be accompanied by a civilian observer; that is how John came into the picture.

John has been an officer for 7 years. He is my first contact operational officer and he is the one that is going to show me around and keep me safe, at least for the day. I have a number of questions in my head but I still do not know where to start. All I have at my disposal is the book knowledge about police work and mobile technologies. John invites me for a tea in the tearoom. We sit down at the table and begin speaking:

So why are you here? John asks.

I am trying to study your usage of mobile technologies and find out the main problems you officers encounter...

Oh, that is some news. So you want to know what we like and don't like?

In a way, yes. I want to see when you use mobile technology and for what purpose...

Well you are going to see it for yourself soon, there are a lot of problems...but they keep pushing and pushing new technologies. I mean, at times it depends on how positive to technology the chief constable is and the pressures from up there...

What do you mean by pressure from up there?

The government, the Home Officer that wants to make all sorts of statistics and performance measures...

John finishes his tea and tells me to follow him to his shift meeting. I follow John to the briefing room (Fig. 7). The sergeant makes about fifteen PC sit down.

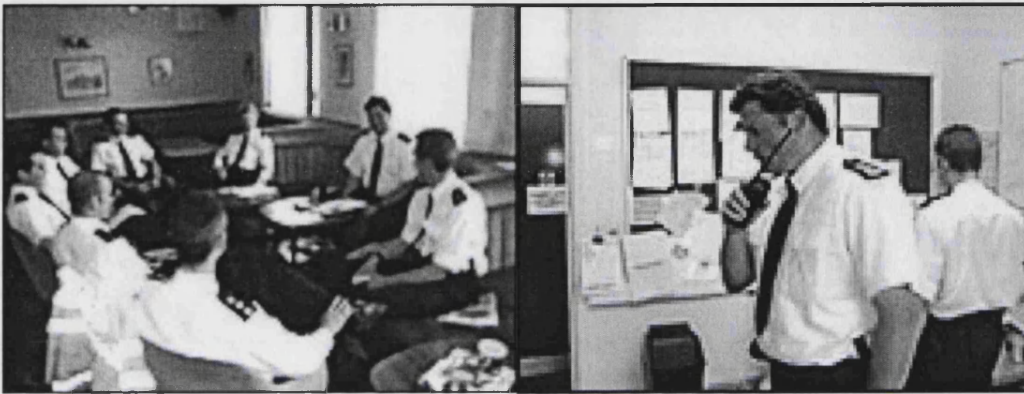


Figure 7 - Inside the briefing room

He then projects the latest incidents on the wall through an Internet gateway Crime Database. Pictures and texts are displayed on a large screen in a blog-like fashion. With a touch of sarcasm, every incident is gone through and discussed by the various PCs.

Then after three discussed burglaries the quiet atmosphere is broken:

I recognize this guy! He's Brown! He's extremely violent, John says.

That sneaky criminal did it again; another car theft replied another PC. *I think his sister lives close to the train station... I have warned her a couple of times for drunken behaviour; somebody could go pay her a visit.*

Good! Who wants to go? Asks the sergeant.

We'll go later on today, says John.

Another ten incident are further discussed. Most of them have to do with small thefts. John, his partner Mary and I proceed to the open space in the back of the station where RV officers compile their paperwork, check e-mail, input data in computer systems and exchange informal information.

John tells me that he has to finish some paperwork from the previous day and only after that can we be on our way. Half an hour later, we are ready. We are going to a domestic violence incident that just came in through the radio. John takes a Personal Radio (PR) and equips all of us with stab-proof vests. We go to the vehicle parking lot just behind the police station (Fig. 8).



Figure 8 - The parking and vehicle

We jump in the vehicle, turn on the blue light and sirens, and drive out of the station (Fig.9).



Figure 9 - Siren Control/ Mobile Phone/ MDT Screen

Mary is sitting in the passenger seat. While John is driving, Mary asks the control center to send her more details about the domestic in progress. Few seconds later an alarm sound goes on and Mary is reading from a small computer screen the details of the incident (the MDT in

fig. 9). While this goes on John asks Mary also to look at the log of the crime to see when the call took place and if there is a history at that address.

The log tells us that the woman is in a state of distress and that the control room has organised for an ambulance. Mary informs John that the location has a history of domestic violence and could be dangerous because the alleged perpetrator tried to attack an officer last time they were there. John tells Mary to ask for some backup if other cars are in the area. Through the PR Mary asks a controller for backup. We arrive at the incident. It is a council estate. Some people are standing outside. While John starts making his way to the apartment, Mary is calling the victim via the mobile phone to check the status of the incident. However, we get no answer. Mary keeps updating their position and situation via the radio (Fig. 10). We decide to go up to the third floor. While we go up we hear the ambulance arriving and we see another RV from the window.



Figure 10 - Using the PR

John repeatedly knocks on the door with no answer. The neighbour comes out of her house and claims she was the one making the call to the police and that the woman, as far as she knows, is inside the house. She adds that the guy that beat her has run away probably with a car. While we speak with the woman collecting some details the door starts opening slowly. John and Mary ask me to step back. Mary, through the PR, updates the control room of the current situation. From the door, a woman emerges, clearly in a state of shock and bleeding from the nose. She is pregnant and keeps her hands on her stomach. Mary asks her if there is anyone in the house but she doesn't answer. Mary keeps asking the question with a calmer tone and finally she answers that there is nobody and that the perpetrator escaped using her car. John cautiously makes his way into the apartment to discover that there are no more people inside. Mary gives permission to proceed to paramedics to enter the scene after it is cleared of any possible danger.

While the woman is in the care of paramedics, Mary asks her some questions regarding the domestic abuse. The woman gives the registration number of the vehicle used by the perpetrator to escape and the name of the perpetrator. Mary, using the PR, puts a warrant on the vehicle registration number. She then tells the woman that they are going to look for the man and asks how he was dressed and how he looks like. She keeps updating the control room with details as well as taking notes in her police issued notebook. Mary proceeds to tell the woman to be calm and that they are going to take care of it.

We go back downstairs *Let's go back to the castle [the police station in police jargon]!* Says John. We jump back in the car and slowly drive back to the police station. The MDT is off and the radio keeps broadcasting crimes happening around us. We all know it is time to go back to the office and document the incident we have just witnessed. Since it is almost the end of the shift, unlike other times where we would *stand-by* and enquire about other incidents in the area through the MDT and Radio, we go back to the office and document the incident we have just witnessed.

5.2.2 Setting the Scene of Work of RV Officers and Technologies

RV officers attend immediate response incidents. These mainly involve domestic abuse, burglaries, and fights in public space. In addition RV officers have to keep public peace, escort prisoners, look for wanted people, patrol hot-spots, give a sense of police presence, appear in court as witness, collect information about crimes, and advice and calm down victims. Table 9 outlines the main tasks of RV officers, as observed and as described by the RV officers themselves.

Described Tasks	Observed Incidents
Attend immediate and prompt response incidents (mainly Domestic, Burglaries and Fights in public)	7 incidents of missing people
Keep public peace	Argument in a park between families and young teenagers
Escort prisoners	Traveling looking for wanted people
Look for wanted people	Drunk and disorderly woman stopped in the street for provoking a fight
Patrol hot-spots	5 Instances of reassuring victims
Give a sense of police presence	Taking statement from victim of a robbery
Appear in court as witness	Asking shopkeeper about missing girl
Collect information about crimes	Searching a house for stolen goods. Officers go in, prisoner resists arrest. Actions coordinated by mobile phone.
Advice and calm down victims	Serving a warrant for appearance in court
	10 Domestic violence incidents
	Looking for a man who was exposing himself to teenager
	Attending burglary in a house
	Taking statements from witnesses of crimes in various premises
	Teenager throwing bottles at cars

Table 9 - Described Task and Observed Incidents of RV

While an RV officer faces a multitude of tasks, the majority falls into attending immediate response crimes such as domestic abuse and advising or calming down victims. As it can be seen from the observed incidents, most RV police work is social work. Officers must have social skills in order to operate in highly idiosyncratic environments. As one officer put it *...in order to be a good officer you have to develop common sense and have public relation skills...it is also about reassuring the victim...to show that we care...*

The key people with whom RV officers interact while on the move are shown in figure 11.

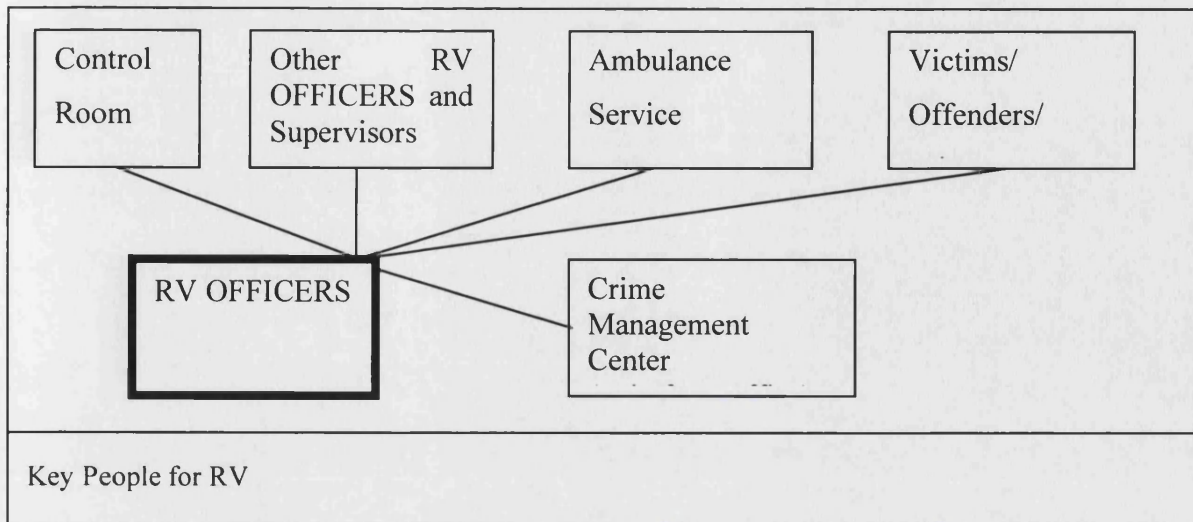


Figure 11 - Key People for RV

The control room can be seen as the closest and most important link for RV. Communication between control room and officers is intense and ongoing. Other RV officers and victims are the most common people with whom RV officers interact through mobile technologies. Mobile technologies are social technologies that are noted for having the most potential in opening such horizontal channels of communication. Their context of work revolves around the office (33%), the crime scene (20%), the vehicle (25%), custody (20%) and the briefing room (2%). The context of the work is showed in figure 12.

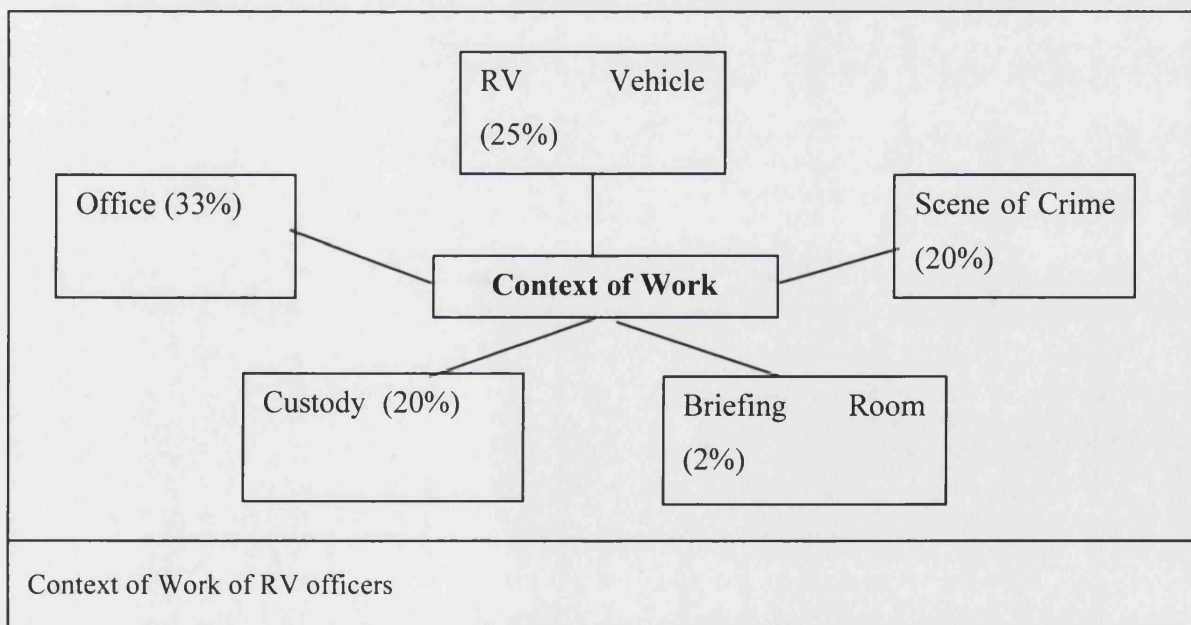


Figure 12 - Context of Work of RV officers

Most of the working hours are spent in the office. The vehicle and scene of crime are the second most common settings. Most officers expressed a wish to spend more time out in the field. The office and custody are seen as the most time consuming environments. Some RV officers spend entire days doing paperwork in the office. However, RV officers see their core job - and thus receive the most job satisfaction - in the field. Realistically, considering the limited amount of officers, the degree to which migrating activities in the field is possible is limited. In fact, these activities are still part of the RV officer's job – namely to bring the prisoner in custody, to take statements and to conduct interviews.

RV officers spend a considerable amount of time in an open office space where they fill both paper and computer forms and exchange informal communication on various jobs. The briefing room is another way for the officers to share important information about the current police priorities in an informal way. On a typical workday, RV officers do office work for the first 1 to 2 hours. After that, they go in the field and attend 1 to 3 immediate response incidents to then go back to the office or custody. The average amount of jobs per shift - A shift is about 8 hours long with a one-hour lunch break – is about five. However, the number can go as low as two and as high as nine. If an arrest is made the number will tend to be lower.

The main technologies they use in decreasing order of frequency are: Personal radio (PR), mobile phone, and mobile data terminal (MDT). Even though the MDT theoretically provides all the necessary information required by officers on the move, it is not used nearly as much as the PR or even the mobile phone. A range of explanations has been surveyed and the most relevant ones are reported. Firstly, the MDT requires the officer to divert his/her visual attention from the physical environment of interaction. The way in which the officer inputs and outputs information is clearly at odds with an environment that requires continuous active engagement outside of the car. In contrast, voice technologies can assist even in the most physically engaging situations because of their immediacy.

For instance, PNC (Police National Computer Background Check on people and vehicles) were performed through the radio – rather than through the MDT – more than in 50% of the observed incidents. Secondly, the coordinating and documenting function that renders mobile phones and PR radios so used and appealing, is not well integrated both in the technology and the training surrounding the MDT. The MDT is rather an instrument of documenting and

does not fully exploit the organizing capabilities of mobile devices. The social functions of the MDT, such as the capability to send short SMS like messages from car to car, is not advertised to the officers in the field.

The most commonly used paper-based forms that must be completed, both in the field and in the office, were studied in order to understand the type of information required, and the format styles that the officer must use. As can be noticed in Table 9 above, missing people is one of the most frequent incidents. The form for missing people has to be recompiled every time a person is missing and this can take as much as 20 minutes. The details from this form are then transferred to a computerized form. This is a lengthy form, which replicates 90% of the information that is already on file if a person has gone missing before. According to officers most of the missing people are repeated incidents. The statement forms are also often used. The officers remarked that a digital way to input statements on the spot would be appreciated. However, given the environment of work, it is hard to imagine an officer walking around unsecured premises with a laptop. At present smaller and *thinner* devices (e.g. tablet PC and PDA) are expensive to both maintain and buy and it is the opinion of many officers that technology is not mature enough to be as reliable as pen-and-paper. In addition, the way in which information flows from victims to officers is difficult to structure and systemize because of its highly idiosyncratic nature. Pen and paper offer the best flexibility for this task. Other forms were analyzed and a great deal of replication of the data was noted. The most common fields to be replicated are: Name, Address, Vehicle Details, Serial Number, and Type of Offence.

The main problem with the MDT as identified by officers was also the slow loading time of the system. In addition, most complaints concerned too much light during the night and too little during the day. On the information side, the officers complained about too much or too little information about incidents. For instance, most officers wanted only to visualize the active incidents rather than the whole list of closed and queued incidents on the MDT.

The main information RV officers need to perform the job is current incident list (AQ), fast access to PNC for positive ID purposes, and directions to reach the location of an incident. The various usage of mobile technologies varied depending on where the officer was and what he was doing. The difference in usage of mobile technologies performed in the various contexts can be loosely identified and divided as driving, waiting in or around the vehicle and

proceeding to the crime scene. Table 10 below shows the different types of technology suitable for application in the various tasks undertaken by RV officers.

	In or around vehicle	Driving	Entering crime scene
Type of Information Needed	AQ, Wanted people, Hot Spots	Destination, Hot Spots, Risk-assessment	Vicinity of other vehicles, positive ID of offender
Technologies Used	MDT, Mobile Phone, PR	Mobile Phone, MDT, PR	PR, Mobile Phone
Input/Output Technology	Touch Screen, Keyboard, Hands-free, Phone, Radio	Touch Screen, Hands-Free Phone, Radio	Hands-Free Phone, Radio
% Of time spent in activity	Approx. 30%	Approx. 40%	Approx. 30%
Challenges of Activity	Overload of information and Interaction	Diversion of attention from technology or environment	Diversion of attention from technology or environment
Mode of Interaction	Data, Voice	Voice, Little Data	Voice or None

Table 10 - RV and Information Needs

Most of the times, when traveling, officers spend their time figuring out the location of an incident. At this time, the GPS capabilities of the MDT are poor not allowing the officer to have a mapping system and a live automatic updated system.

5.3 Tales From the Field: Traffic Officers

In the following two subsections, 5.3.1 and 5.3.2, a tale about a high-speed chase with a traffic officer is narrated. Following, the context of work of Traffic officers in terms of typical activities and mobile technology use is presented.

5.3.1 A High Speed Car Chase with Traffic

It's 14:35, and I am trying to write an SMS to my PhD supervisor from a police Traffic car, a BMW. It finally occurred to me and I wanted to share it with him right away, but it was difficult. The speed was more than 100 miles per hour; the road was narrow and curvy and the adrenalin was pumping. Even in the passenger seat, it was difficult to write a simple SMS

with one thumb. At this speed, the road demands attention. Nevertheless, at the end I managed to write it:

Do you want to know what mobility is? It is going at 100 miles per hour and writing this SMS!

Constrained by the speed, adrenalin, and 165 characters of SMS, I did not manage to explain to him what I really meant. If I could have at the time, I would have taken a short clip showing the car, the road, the radio asking for updates and a computer with some data. Yes there it was, a mixture of moving objects, images and words traveling faster than that car. It reminded me of Foucault's pendulum. For the first time I had experienced mobility from a moving perspective. But let's go back to the beginning.



Traffic Vehicle

Figure 13 - A View of the Traffic Vehicle

It is 9am and Daniel, a traffic officer, is waiting in his BMW (Fig. 13). Daniel has been in the Traffic Division for about 5 years and he loves his job. He describes his job as exiting and varied. He has to talk to people most of the time. So it never gets boring since '*people always have new ways of committing crimes.*' We get into the car and start driving around. Daniel turns the MDT and KB Radio on (Fig. 14). There are not yet any reported traffic incidents.



Figure 14 - Inside Traffic Car - Speed Check/ Video Recorder/ KB Radio

The sun is shining and the MDT is difficult to read. Daniel tells me that when it is sunny there is always a reflection on the screen that makes it difficult to read. Daniel starts the car engine and drives to a roundabout. He then parks in a small street with good visibility of the main road. He keeps updating the MDT to see if anything comes in, but nothing so far. Daniel tells me that this is his favorite spot because many cars are stolen around there and if that doesn't happen there is always a misbehaving driver. Meanwhile, he keeps inputting license plates of suspicious vehicles in the MDT for PNC checks.

Sure enough a few entries later, we find a license plate that matches a stolen vehicle. It's a small red car containing two passengers. Daniel tells me to hang on tight. I can feel the engine getting louder. Daniel makes a quick U-turn. He turns on the sirens, and through the radio, he updates his position confirming that he is pursuing a stolen vehicle. He then accelerates so quickly I am pushed back into the seat. The road is straight and we reach high speed in the hope of finding the vehicle. Few seconds later, we are tailing the stolen vehicle. The driver pulls over to the left side of the road. Daniel again updates the control room with the details. He then steps out of the vehicle and walks towards the stolen car. I get out of the car as well and go closer to them just enough to hear the conversation and see the individuals. They are both very young, and look around sixteen of age.

Daniel asks the driver whose car that is, and the young driver answers that it is his mother's, Mrs. Jones. Daniel also asks the name of the driver. He goes back to the traffic vehicle, inputs driver's information in the MDT. The information matches with the one of the MDT. The driver is 18 of age, but he does not appear to have a full license to drive the vehicle. The MDT also shows that the driver has a tattoo of an English flag on his left arm – that tells Daniel that the driver has been already arrested for something. Daniel goes back to speak to the driver and asks him to show him his left arm. Sure enough there is an English flag. Daniel

comes back to the vehicle close to where I am standing and tells me that offenders tend to give other offender's name since they know each other – but that this one has been honest. His last name also matches the one of the registered owner Mrs. Jones.

Daniel calls the control room via the PR to check again if the vehicle is stolen. He finds out that Mrs. Jones has withdrawn the stolen-report earlier in the day as she found out that it was her son taking the vehicle without her permission. However, the driver is not entitled to drive, as Daniel does not find the record of him having a full driver's license. While Daniel further questions the driver, the driver keeps insisting that he has passed his practical test just a few days before. Even though Daniel does not believe him, he has to let him go. However, Daniel issues the driver with a warning and instructs the driver to bring his driver's license to a police station within seven days. He further reminds the driver that failure to do so will result in a one-year disqualification from driving.

As the vehicle drives off, Daniel looks at me and says:

I bet you he doesn't have a license and he won't show up at the police station...

Daniel starts the engine and we drive around another area. We pass a white car coming from the opposite direction. Daniel looks at the driver's face. After glancing at the driver's face for a few seconds, Daniel recognizes him. *He's Leem! He is disqualified and he won't stop since he knows he's going to go in for a while this time.* It seems that also Leem recognizes Daniel. The driver does not seem to want to stop. After various attempts to warn the driver, Daniel updates his position via the Radio again and informs the control room that the vehicle is not stopping and of the identity of the driver. We follow the vehicle at high speeds for about three miles and during the course of the chase we get some tips from bystanders of where the vehicle has turned.

The stolen vehicle takes a sharp turn and enters a driveway at high speeds. Suddenly the vehicle breaks vigorously to come to a stop. We park right behind it and Daniel steps out of the vehicle. The driver of the stolen vehicle is attempting to escape on foot. Daniel tells me to stay next to the police car and wait. The driver is running across the street in an attempt to hide. Daniel is behind him shouting to stop but with little success. Daniel, thanks to the help of various witnesses, then manages to catch up to the driver and handcuff him. The driver is

very agitated and attempts to escape even when brought all the way to the police vehicle. Daniel asks me to open the backdoor of the car. He drags the driver back to the car and via the radio informs the police station of an arrest. Daniel then steps out of the vehicle to secure some witnesses that we'll take statements from later during the day. After Leem is dropped at the police station, Daniel has a lot of paperwork to complete as well as escorting the prisoner to custody and conducting an interview.

Two hours later, we are back on the road. We receive a radio call for an accident that has happened on a road out of town. Daniel pulls over and asks for the incident to be sent to the MDT. The MDT reveals that there are two vehicles involved in the crash, a motorcycle and a small van. The log also tells us that an ambulance is on the way. Daniel puts the sirens on and we are on our way. Within 7 minutes, we are at the incident scene. The ambulance is already there. The driver of the van is uninjured while that of the motorcyclist is unconscious and is being taken inside the ambulance. Daniel starts talking to the driver of the van to reconstruct the incident. Daniel turns to me and tells me that we need to perform blood tests to see if any of the drivers was under the influence of substances. This is due to the fact that there are discrepancies in the reconstruction of the incident. Daniel then calls the control room to get a towing truck for the van.

5.3.2 Setting the Scene of Work of Traffic Officers

Traffic Officers attend fatal and serious accidents, In addition, they take statements from witnesses/victims/perpetrators of accidents, check for unlicensed, disqualified and/or intoxicated drivers, check for stolen vehicles (parked or driven), check for dangerous drivers, streamline traffic by making sure that the road is clear of accidents and animals and support the victims of traffic accidents. The table below outlines the main tasks of traffic officers, as observed and as described by the Traffic Officers themselves.

Described Tasks	Observed Incidents
Weighing vehicles	Waiting around in hot-spots to check for stolen vehicles or speeding vehicles
Attending fatal and serious accidents	Minor Injury – Lady in parking lot had accidentally broken a barrier
Taking statement from witnesses/victims/perpetrators of accidents	Car on fire in a Rural Area
Checking for unlicensed, disqualified and/or intoxicated drivers	Truck Driver suspected of being drunk, so is stopped
Checking for stolen vehicles (parked or driven)	PNC checks, and Stop and Check of various vehicles
Checking for dangerous drivers	Removing an animal from the middle of the road
Attending 'priority' scenes such as burglary, car crimes and violent behavior when not on the scene of traffic accidents	Checking for wanted people
Streamlining traffic by making sure that the road is clear of accidents and animals	Car Chase – disqualified driver arrested
Supporting the victims of traffic accidents	

Table 11 - Described Task and Observed Incidents

While the traffic officer faces a multitude of tasks, the majority fall into stopping unlicensed, disqualified, dangerous and intoxicated drivers, checking for stolen vehicles (PNC), and attending fatal and serious injury, and other accidents. Their context of work revolves around the vehicle (65%), the scene of crime (5%), the office (25%), hospitals (4%) and recovery garages (1%). The context of the work is showed in Figure 15.

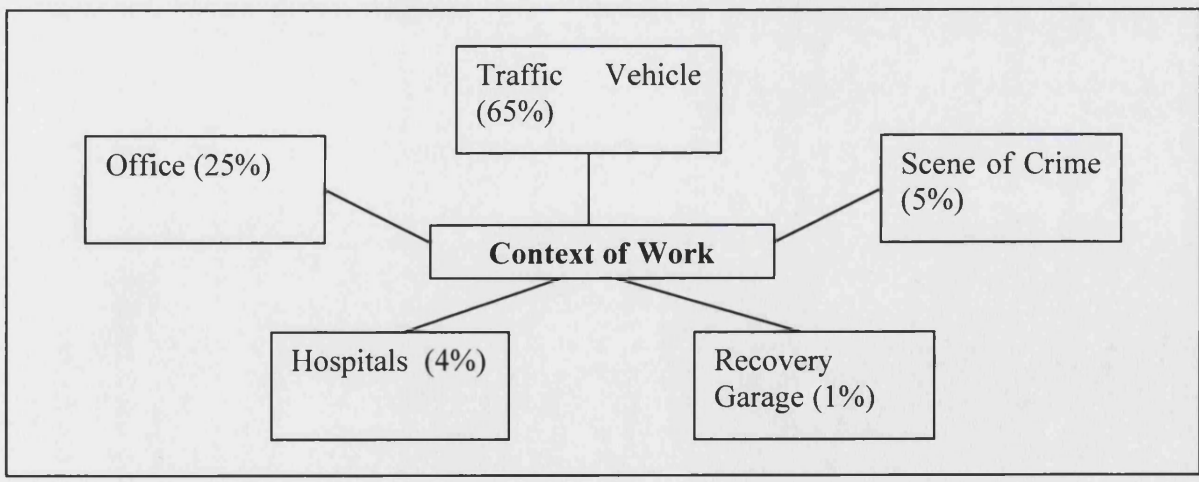


Figure 15 - Context of Work of Traffic Officers

During a typical day, traffic officers will attend from two to seven incidents. Their day starts in the office where information about the current state of affairs is exchanged with colleagues. After less than an hour a traffic officer is out and he will return to the office only

during lunchtime. There he might stay in to finish paperwork or go back out for the remainder of the day. Compared with RV, traffic officers spend more time in the vehicle and during stand-by times are constantly checking the MDT for incidents. Differently than RV, Traffic is a force-wide resource. Traffic officers travel great distances and serve an area of up to 200 square miles. Traffic officers are generally single crewed mostly because of human resource shortages. As one traffic officer described it, *'during the day we are often single-crewed while at night we are often double-crewed. It's a matter of safety...even though by the book we should always be double-crewed...'* The usage of mobile devices drops when the officer is single-crewed.

The key people, with whom traffic officers interact while on the move, is shown in Figure 16. As in the case of RV officers, the control room plays a vital part in the work of traffic and it can be seen as the closest *ally* to time-critical operational policing.

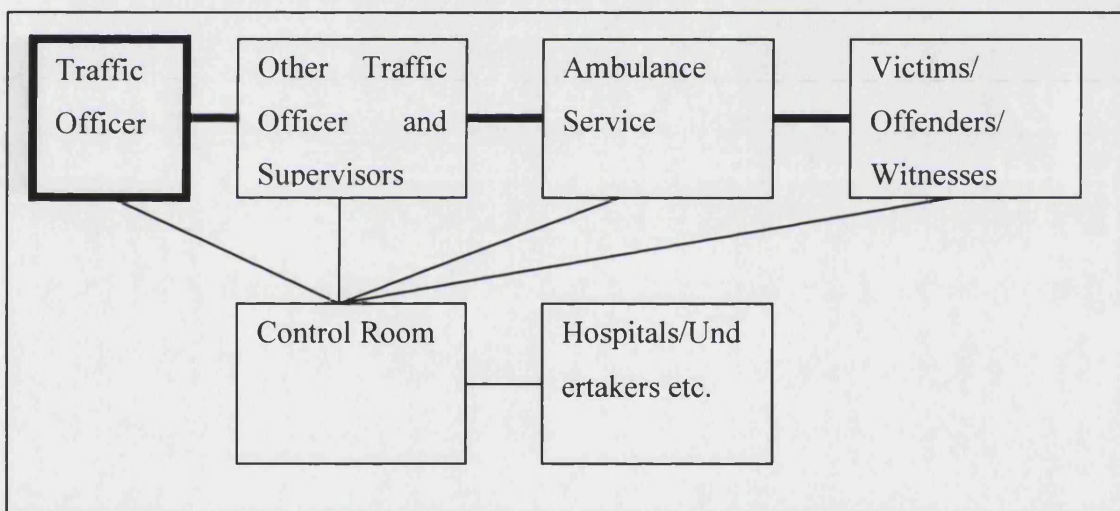


Figure 16 - Key People/Roles for Traffic Officers

The main technologies they use in order of frequency are: MDT, KB radio (a long distance force-wide radio system), mobile phone, PR radio (only in cities), video camera and photographic camera. The first issue discussed with the officers about problems with mobile technologies concerns the MDT. Firstly, the position of the MDT is not ideal since it is not adjustable. A more mobile MDT would increase the effectiveness of both single and double-crewed cars. For instance, the vision of the officer would be greatly improved if the docking station holding the MDT could be adjusted to suit particular driving conditions. Another potential suggestion from the officers was to make the MDT completely mobile. Then the car would serve only as a docking station where the MDT would be re-charged. This however

would have some negative implications. The MDT is clearly a delicate piece of machinery, and taking it out of the car would not only pose security risks but also physical risks to the device itself. As in the case of RV officers, most complaints also concerned too much light during the night and too little during the day. The main information traffic officers need to perform the job is current list of incidents marked as urgent (AQ), fast access to PNC for positive ID purposes, and directions to reach the location of an incident. As in the case of RV officers, the various usage of mobile technologies varied depending on where the officer was and what he was doing. The difference in usage of mobile technologies performed in the various contexts can be loosely identified and divided as driving, waiting in or around the vehicle and proceeding to the crime scene. Table 12 below shows the different types of technology suitable for application in the various tasks undertaken by RV officers.

	In or around vehicle	Driving	Entering crime scene
Type of Information Needed	AQ, Wanted people, Hot Spots, Disqualified Drivers	Destination, Hot Spots	Vicinity of other vehicles, positive ID of offender
Technologies Used	MDT, Mobile Phone, PR, KB	Mobile Phone, MDT, KB	PR, KB
Input/Output Technology	Touch Screen, Keyboard, Hands-free, Phone, Radio	Touch Screen, Hands-Free Phone	Hands-Free Phone, Radio
% Of time spent in activity	Approx. 35%	Approx. 45%	Approx. 20%
Challenges of Activity	Overload of information and Interaction	Diversion of attention from technology or environment	Diversion of attention from technology or environment
Mode of Interaction	Data, Voice	Voice, Little Data	Voice

Table 12 - Activities of Traffic and Information

5.4 Tales From the Field: Scene Of Crime Officers (SOCO)

In the following two subsections, 5.4.1 and 5.4.2, a tale about SOCO and the collection of evidence in a scene of burglary is narrated. Following, the context of work of SOCO officers in terms of typical activities and mobile technology use is presented.

5.4.1 Stolen Vehicles with SOCO

It's 8:15 am. Jan, a Scene of Crime Officer (SOCO), enters the Police Station and walks into his office (Fig. 17).



Figure 17 - SOCO's Desk

The first thing Jan does is to check his desk for updates on burglaries. Most vehicle crimes happen at night, the most convenient time for criminals, but they are dealt only in the morning by SOCO. Jan takes about a couple of minutes scanning each incident. He has printed out the incident from OIS. He then makes a few quick phone calls to colleagues just to touch base and see how they are going about on their jobs and to double-check on the possible overlapping of jobs. He also calls and receives calls from other parts of the organization that analyze forensic evidence, specifically the CID. Jan then calls the victims of the scene of crime that he wishes to visit in order to collect forensic evidence. On the phone he gathers more information on the crime scene, and evaluates whether is worthwhile to go the crime scene. It is, for example, useless to attempt collecting footprints outside of an estate if it has just rained. It is now 9:20 am, just an hour has passed and Jan is ready to visit the first scenes of crime.

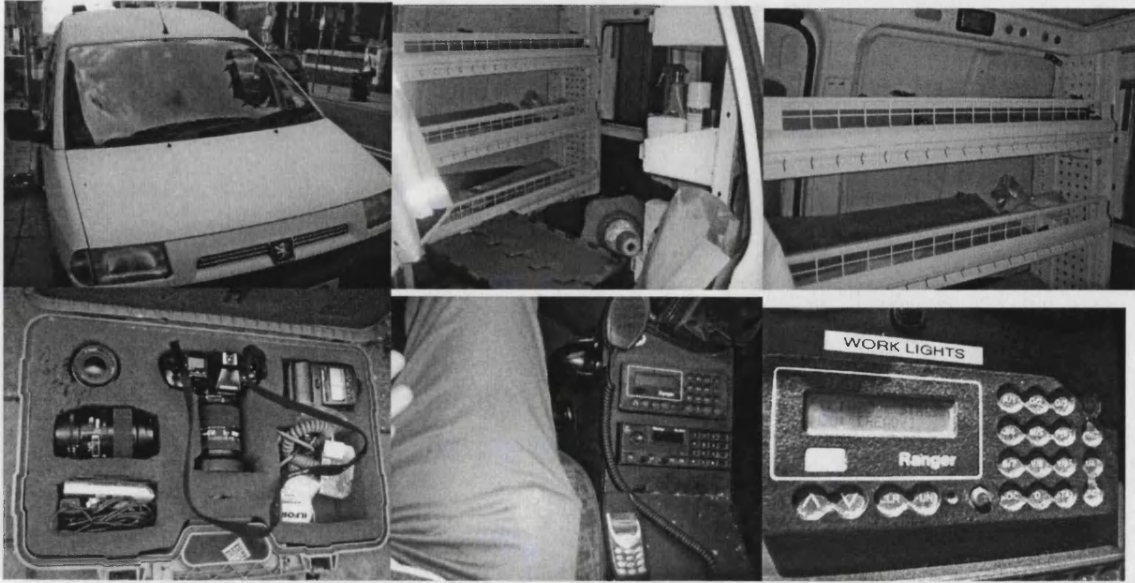


Figure 18 - From the upper left: SOCO Van/ Inside of Van/ Digital Camera/ Mobile Phone/ Roger Mobile Data System

He walks to the car in the parking lot behind the police station and shows me the various pieces of equipment he uses in the field (fig. 18). He then starts the vehicle and drives for 15-20 minutes to the first crime scene. He tells me that in the field SOCO collect additional information about the crime from the victims and try to reconstruct the dynamic of events. However, he is quick to point out that *We don't only collect evidence... we have to decide what to do with it... we are filters of information.* In this way Jan can determine the best places to gather forensic evidence. In addition, experience plays an important part in the retrieval of evidence. Aluminum powder, magnetic powder, fingerprint lifter, and analogue photo camera are part of the most used equipment. The Van contains all the equipment necessary for a SOCO to lift evidence from a scene of crime. Jan tells me that aluminum powder and chemicals can be damaging to a laptop and other pieces of digital electronics, and he has to keep those well away from each other. We finally arrive at the first crime scene. It is middle-class neighborhood.

Jan parks in front of the broken-into house and calls the victim via mobile phone. The victim comes out to the driveway. She is an elderly lady who looks both outraged and shocked by what has happened to her. She keeps asking Jan questions about how to secure the house and how to take deterrent measures to prevent further crime. Meanwhile, Jan takes a portable flashlight and a fingerprint detector kit (an aluminum flake kit and a small brush) out of the side of the vehicle. He then starts filling a standardized notebook form while speaking to the

victim to gain more information about the crime. The house has been broken into during the night. Jan enters the house and starts using the fingerprint detector kit in various parts of the house based upon his past experience and the alleged sequence of events, as narrated by the lady. Unfortunately, he fails to find anything important. He informs the victim about how to better secure the house in the future.

We go back into the vehicle and Jan takes out his mobile phone and calls the next victim. We drive for another 15 minutes to another house that has been burgled the night before, in the same area of town. A woman opens the door and invites us in. Jan asks her about the details of the crime: When she assumes it happened, how they got in, and what the burglars might have been looking for. After getting an idea of the dynamics of the crime, Jan takes out the aluminum powder and starts looking for fingerprints around the kitchen window. He collects two sets of fingerprints and advises the lady never to leave any window unlocked as she had done the previous night. He also advises her to get better lights around the house. Finally, Jan compiles the report on the crime scene in the car from the notebook notes taken in the scene of crime. While driving to the next incident through the city center, Jan, having been a police constable, turns on the PR for a few minutes. He explains to me that this is an unlikely occurrence but that it would be a good practice since you could go to a scene right after a crime has been committed. Sure enough we hear that there has been a robbery in a gambling establishment and the police are still there. We quickly proceed there. Jan takes out his fingerprint and footprint detectors and his photo camera. We are ready to lift up some fresh evidence...

5.4.2 Setting the Scene of SOCO's Work

SOCO attend and investigate most burglaries and actual and suspected scenes of crime to collect evidence in the form of CCTV videos, DNA, fiber, footprints, fingerprints and photograph of scenes of crime. In addition they inspect vehicles involved in crime, mark, tag and classify evidence, reassure victims and store evidence. The table below outlines the main tasks of SOCO, as observed and as described by the SOCO themselves.

Described Tasks	Observed Incidents
Attend and investigate most burglaries	A laptop computer stolen from a house
Go to actual and suspected scenes of crime	5 instances of giving suggestions to victims on how to protect from future crimes
Inspect vehicles involved in crimes	2 instances of robberies at local shops
Collect evidence from CCTVs, DNA, Fiber, Footprints, Fingerprints and photograph of scene of crime	8 burglaries in private houses
Mark, tag and classify evidence	Collect intelligence
Collaborate with CID	Take pictures of crime scene where windows were smashed
Reassure victims	
Properly store evidence (G83)	

Table 13 - Described Task and Observed Incidents

Theft crimes are about 85% of SOCO's work; 10% are minor theft and vandalism; and 5% are the major crimes (murder etc.). While SOCO face a multitude of tasks, the majority fall into attending and investigating burglaries as well as reassuring victims. Officers must have social skills in order to operate in this environment. As a SOCO put it *...most times we know that we won't find any significant evidence but we go because it is also about reassuring the victim and to give crime prevention advice...* Clearly the job of the SOCO is also that of public relations. Given the scarcity of resources, most small crimes will not be solved because of lack of evidence or because of low priority. Thus some intelligence is collected, and some crime scenes are attended only to reassure the victims that the police are there for them. This public relation exercise also serves the purpose of advising the victims on future lines of action. This entails that there is a lot of conversation going on with the victims that goes beyond proof gathering. The role of the SOCO, as observed by the researcher, was overlapping also with collecting intelligence (performed generally by a separate unit called CID). While nominally it is not the job of SOCO to collect intelligence, it does happen because evidence gathering requires an understanding of what has happened.

The typical day of a SOCO starts in the office where the officer gets a printout of the jobs for the day, carries out administrative work, reads e-mails, and transcribes statements in SOCKET. SOCKET is an evidence tracking system that richly describes the scene and the evidence. It is the most used technology in the office. Socket is an application running on the Windows platform on both stationary and mobile computers. It has recently been transferred to a web-based format and can thus be accessed through a virtual private network and a web

browser (SOCWEB is the web version of SOCKET). Their context of work revolves around the office (50%), the vehicle (25%), the scene of crime (20%) and the property storage room (5%). The context of work is shown in figure 19.

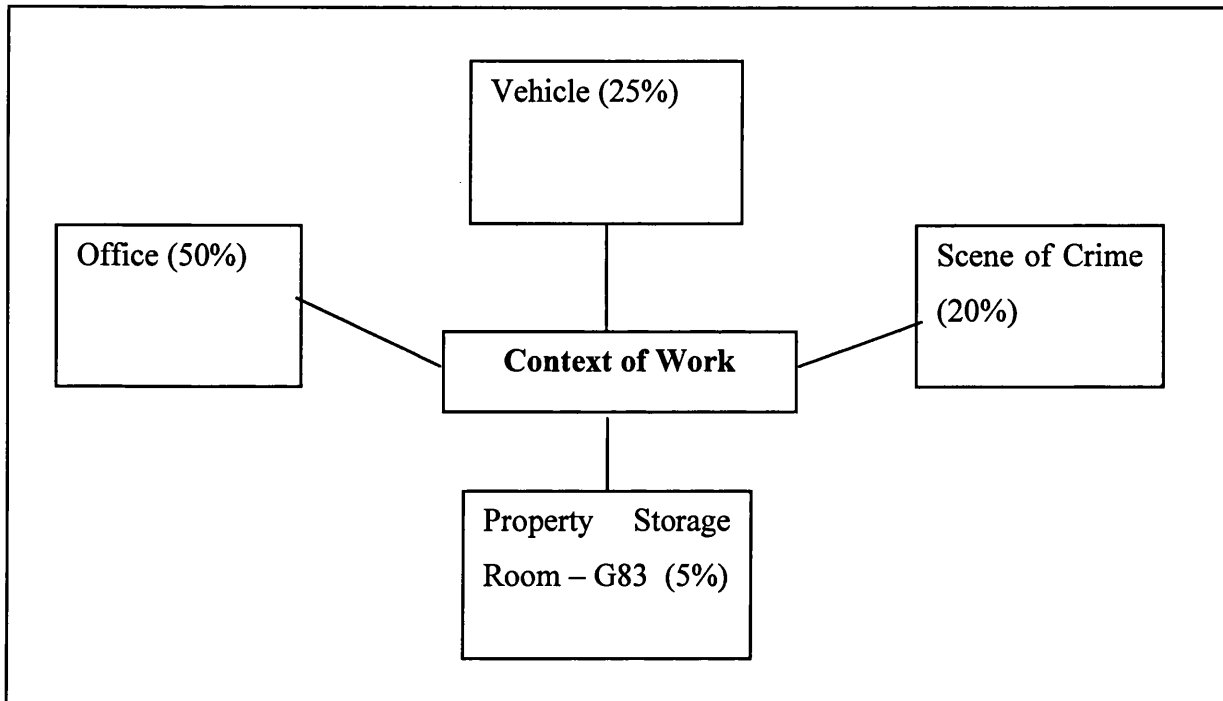


Figure 19 - Context of Work of SOCO

SOCO see their core job - and thus receive the most job satisfaction - in scene of crime. Because of the physical nature of some evidence and the limitations associated with working with a mobile system (connection, coverage and security issues), SOCO return frequently to the office.

SOCO are typically self-tasking. After getting the printout of the available jobs and dividing them, SOCO gets updated of new jobs only via the mobile phone or from the Crime Information System (CIS) and the Command and Control System (OIS) in the office. SOCO usually perform 3-5 jobs a day. Notes are generally completed in the car on a paper form that is after transcribed on their dedicated web based evidence and scene of crime intelligence software program (SOCKET). In the office, computerized resources are scarce. Most SOCO do not have a personal computer, and share a common computer room for entering data. A SOCO's desk typically has a phone, notes and files on active cases. The way in which SOCO get information about the crime scene relies on the reports generated by the police officer filing the crime and on the conversations with the victim(s) of a crime. There is a great

amount of codification going on in typical police work. After they check the system (CIS and OIS) and get the printouts of the jobs, they go in the field.

The people SOCO mostly interact with are police officers, investigators (CID) and scientists in forensics labs. SOCO expressed a need to strengthen their collaboration with CID. The key people, with whom SOCO interact while on the move, are shown in Figure 20.

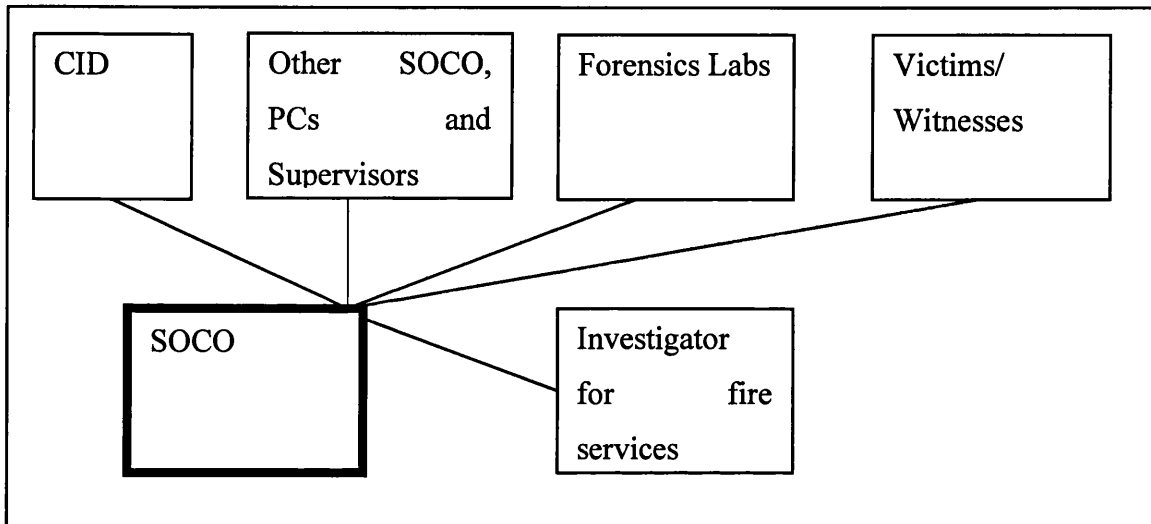


Figure 20 - Key People/Roles for SOCO

The SOCO organize work through a common mini-control center from 7am to 4pm. After 4pm, the organization of SOCO goes through the call center and one call dispatcher there becomes the SOCO coordinator. Most SOCO complained about the call center handling the calls in that *they don't really know what we do, what we need and what is important...* However, differently than RV and Traffic officers, the control room does not play such an important and critical role in the network of SOCO. Arguably, this is because the job of SOCO is not as emergent, uncertain and time-critical as the one of RV and Traffic.

Then they talk to the victim. Then they make notes while they examine the crime scene and collect the physical evidence that will be sent back to the labs for examination. On their report sheet they write down text, diagrams, sketches of shoe marks and pictures. The latter is seen as the richest kind of proof gathering. What they do with the evidence is to put it in a bag with a special ID (or an envelope for a fingerprint) and seal it. Then they sign a white label and each person that uses it signs it and dates it. There is a lot of documentation surrounding the exhibit. The documentation is kept in the office and the original receipt is kept with the SOCO.

The main technologies they use in decreasing order of frequency are; mobile phone, notebook, aluminum powder, photographic camera and PR (fig. 21). The performance of SOCO is based on the number of jobs they do (e.g. fingerprint evidence collected mainly). Picture evidence is less important for performance measures. According to SOCO this implies that less photographic evidence is collected. However, given the multimedia capabilities of new equipment there should be a drive toward richer proof gathering. As the saying goes 1 picture is worth 1000 words.

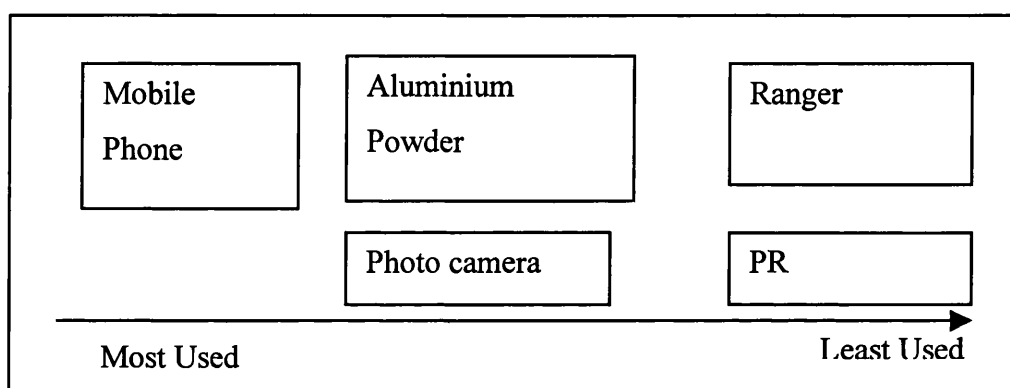


Figure 21 - Usage of Mobile Technologies by SOCO

The mobile phone can be considered as the most used technology by SOCO. The incoming calls are mostly queries from inside the organization (other SOCO or PCs). The outgoing calls are mostly with victims in order to organize visits to scenes of crime. The second most used technology is the notebook to take notes in the crime scene. The third most used technology is the street map since SOCO as a force-wide resource have to travel great distances. Because of that, SOCO prefer to organize ad-hoc. As one SOCO put it *...you don't know how long you are going to stay at a scene and what is required of you...it is better to call [the victim] just before going there...* The SOCO are given a police van containing an earlier version of the MDT (Ranger) and a KB, which are not used at all. In addition, the issued PR radio is used only in rare occasions (only one instance in which the SOCO was a trained police officer as opposed to a civilian). There was little or no usage of other technologies such as PR or Roger. The Scene of Crime Officers forms were analyzed. The most common fields replicated from the OIS printout are: Offence, Location, Crime Number, SOCO Reference, Name of victim, Address, Serial Number, and Type of Offence.

When asked about what mobile technology they would ideally want in the field, most SOCO hinted at the laptop. Would a laptop increase productivity and efficiency in the work of SOCO? Nominal evidence would suggest that a laptop would be an ideal solution. After all, SOCO compile their reports inside the car between jobs (thus on-the-move) and could potentially pack evidence in the van provided if they could access the evidence system (NB this is separate than SOCKET) and get an exhibit number. As one SOCO put it *...before SOCWEB we used to do 7-8 jobs a day...now with the increase amount of information that you have to transcribe on SOCKET you do only 3-5...* Thus, the increased computerization simply created additional work for SOCO. That is the transcription of their notes. This does not mean that it is not necessary to computerize – it is indeed a priority – but that applications of technologies have their costs. A laptop would thus mean less replication, more immediate contact with the scenes of crime and faster delivery of evidence. From a legal viewpoint, the notes would be considered as good as paper because they would be created and compiled at the scene. According to SOCO, OIS and SOCKET while on the move would be the ideal companions to the mobile phone. When asked what they would do with a laptop, the officers responded that they would do the reports directly on the computer so that they would not have to replicate information, and get more up to date information from OIS rather than working only from printouts.

However, this comes with its risks. The researcher has previously studied SOCO in another Police force where all SOCO are provided with a laptop. However, there are many issues associated with a laptop. Firstly, officers complained about the slowness in the booting of the system and in the transmission of data. In addition, officers acknowledge that a laptop must be industrial (resistant to water and other substances such as aluminum powder). Furthermore, the introduction of a laptop presents security issues. If the laptop is stolen a lot of confidential information could end up in the wrong hands. Finally, given the way in which the judicial system is set up, soft information is considered less valid than hard information. In other words, notes taken by hand at the scene are given more importance than a printout of them. This is in consideration of the fact that a laptop, as argued by most SOCO would be used mostly in the vehicle. To sum up, the job of SOCO entails 3 major elements: proof gathering, reassuring victims, and intelligence gathering.

5.5 Summary

This chapter has opened with a brief overview of the police force studied and of the various MICT encountered during the course of the empirical data collection. Following, a number of narratives are presented. The narratives presented try to capture the context and situations of work and the usage of mobile technologies by three distinct units in the police. The stories are purposefully written as narratives to transmit the feeling of being there. This is to give the reader an idea of what it is like to be there and how easy it is to make wrong judgments about mobile technologies without understanding the context and situations of work of police officers. These stories highlight the degree of improvisation, emergence, and uncertainty present in the field and how this hinders the usage of mobile technologies. However, no matter how rich in details these stories are, they are just one side of the coin. The police force is a large organization and it would be unthinkable to understand the dynamics of technological interaction without looking, if only briefly, at the institutions that influence the practice of officers and the use of mobile technologies. In the next chapter, these stories will be analyzed from the perspective of the *Framework of Virtuality*, as outlined in Chapter Three. The wider context is reconnected to the local one and an attempt at generalizing is made. A cross unit analysis is performed and common traits are presented to understand the state of affairs that make mobile interaction appear as it does.

CHAPTER SIX: ANALYSIS

The following analysis will follow the dictates of the *Framework of Virtuality* presented in Chapter Three. To recapitulate, the framework requires an a-priori appreciation of the intentionality of the actors at both a situated and institutional level, thus bridging the gap between micro and macro analysis. The emotional character of the context of police officers in the UK will surface as a consequence of such phenomenological analysis. In what follows, the use of MICT is explored in terms of the dichotomy between mediated and unmediated interaction. This dichotomy serves the purpose of mapping a number of *situations* of MICT use for police officers. The uncovering of these *situations* is then reconnected to intentionality to reveal the relational nature between police work and MICT use. This relational nature is key for venturing in an understanding of the effects of MICT in police work, which will be discussed in Chapter Seven.

In practical terms, this chapter will uncover some central issues concerning the act of policing. The first section is concerned with constructing an understanding of the reasons motivating the use of technology in police organizations, thus uncovering the mandate of police. Such reasons lie at the essence of police work, being the actual role police officers fulfill in society. It is important that the technology currently used by police be considered within the framework of a long-term technological development process, which accepts the pragmatics of police work and the ideal of its mandate. In the first section, this chapter will define the role of police in society so as to open the path to a contextualization of mobile technology use. The definition of the police mandate, although explored at the macro level, fits the ethnographic observations presented in Chapter Five. This will be the benchmark to understand the impacts of mobile technologies on police work. Then, the chapter will examine mobile technologies in the three units studied and map a number of *situations* in which MICT use changed in intensity. The chapter concludes with a characterization of MICT use connected to the nature of police work.

6.1 Understanding Police Work

In current research on police work the general outlook on MICT reflects a functionalistic view of police as an abstract entity. This section will first argue, drawing on prominent

researchers, that the role of police officers in British society, contrary to common assumptions in current research, is best understood as peace officers rather than as law enforcement officers. This paradigm shift in the understanding of police work permits a radically different analysis of the problem domain.

6.1.1 Transcending the Functional Law-Enforcement View of Police Work

It would be easier to assess the value of technology strategy [in police work] if we were able to define exactly to what end the technology would be applied and in what ways it could be expected to work (Manning 1997, p.207).

As they appear in popular TV shows, and as observed by citizens on the street on a daily basis, police are regarded with mixed feelings (Klockars 1985). Their mandate is confusing to say the least and considered by some prominent researcher as unattainable (Manning 1988). Furthermore, there is no consensus as to what constitutes the core of policing in terms of the activities officers perform (Newburn 2005). As Manning (1997) proposes, the public’s meaning of police action is rarely gathered from first-hand experience, but from the constructed imagery of the media- which rely upon official police sources for their presentation of the news (p. 205). As a consequence, the general understanding of police is confused. But where does the confusion arise? Although most people would argue to know, when confronted with the question of “What is policing?” they tend to stumble across many controversial and conflicting definitions (See Table 14).

They are the strong arm of the state	They are the enforcers of law
They maintain order	They arrest bad people

Table 14 - Responses to the question of defining police adopted from Klockars (1985)

As argued by Klockars (1985), multiple perspectives can be adopted, depending on the observer’s background and experiences. However, most perspectives offer normative definitions that attempt to define the police in terms of its *ends*, and not in terms of actual activities (Klockars 1985). According to Goldstein (1964), this gives rise to the *means over ends* syndrome whereby there is a strong belief that improvements in internal management of police resources will eventually increase the capacity to meet the objectives of police organizations. As Goldstein notices, *all bureaucracies risk becoming so preoccupied with running their organizations and getting so involved in their methods of operating that they*

lose sight of the primary purpose for which they were created. The police seem unusually susceptible to this phenomenon (Goldstein 1964, p.392).

This has led the police and the research community to be preoccupied with the maximization of the means of policing, especially these in the functionalist paradigm. However, through extensive survey of the literature since the beginning of the 1900s, Goldstein (1990) insists that the application of modern management techniques and technologies does not necessarily lead to better practical results.

This is, as Bittner (1990) argues, the common mistake of confusing police work with law enforcement. In fact, *the actual interests and practices of enforcement officials are rarely as specific or explicit as the verbal formulation of their respective mandate* (p.152). In his seminal work, Bittner (1970) shows the discrepancy between the representation of police work and its pragmatics. Using a phenomenological approach, he discerns appearances from the reality of police work. The appearance of police is that of a derivative of the provisions of the penal code. This appearance is due to the publicity of police as *crime fighters*, due to the organizational structure of the police in respect to specific crimes, and due to the active role of the police in the criminal process⁸. However, as Bittner (1970) shows criminal law enforcement is not characteristic of day-to-day work of the majority of police officers. This point is further reinforced by a number of ethnographic studies that document the fact that most patrol officers' contact with the public does not involve criminal matters. The formal charge in concordance with the dictates of criminal law justifies the arrest or the threat of it, when need arises, but is not the reason for it, as it is the need to handle the situation and invoke the law as an instrument to accomplish a task. Furthermore, Manning (1997) argues that police officers have to deal with crimes not only in light of the legal code but somewhere in the middle between the law and the moral order. Thus crime, as understood by police officers, is a product of the relationship between social structures and the law.

According to Klockars (1985), a definition must be based on the *means* used for policing and not what these tools are used to do. One of the *means* that are exclusive to police officers is the right to use coercive force. Thus, *police are institutions or individuals given the general*

⁸ It must be acknowledged that the work of certain special police units (e.g. Narcotics) is reliant in operational terms on the penal code. However, this is a small number of individuals and units within the police.

right to use coercive force by the state within the state's domestic territory (Klockars 1985, p.9). This definition does not, however, convey the act of policing, but only describe the extreme means that police could use. Furthermore, *the emphasis on law enforcement is nothing more than a continuing preoccupation with means* ((Goldstein 1964, p.396). Banton (1964) suggests that police are relatively unimportant in the enforcement of law. Accordingly, police officers obtain cooperation from the public because they enforce the standards agreed to by the community. Therefore, the core of police officers' authority stems from the responsibilities as a citizen and as a representative of citizens (Banton 1964). In turn, according to Banton (1964) a police officer is a *peace officer*⁹. Westley (1970) confirms Banton's thesis through his empirical study of the responsibilities of the police. Westley (1970) argues that the police function is that of enforcing the dominant political, social and economic interests of the citizens, and only incidentally to enforce the law. By studying official statements of police in regards to their daily activities he concludes that the listings reveal that *much of the policeman's job consists of dirty work. It consists of dealing with drunks, with the insane, with the dead, with the vice-ridden, with the ill...In an emergency of almost any type the police are among the first to be called in, and generally people expect them to do something about it. In one sense they can be said to fill the lacunae between the existent formal control embodied in the law and the agencies of the community and the rapidly breaking down formal controls related to change and transition in society* (p.19).

Bittner (1990, p.30) cleverly captures the essence of policing as *something-that-ought-not-to-be-happening-and-about-which-someone-had-better-do-something-now*. This definition of police work is calibrated carefully to capture the widest range of alternatives and is based on the assumption that police work is not law enforcement work in essence. In fact, police are not only concerned with illegal actions where coercive power is necessary, but also and foremost with other activities for the prevention of dangers, such as holding people back or resolving a dispute. Bittner's statement will now be deconstructed to understand in detail what he means and why this is so important for the analysis to follow. *Something-that-ought-not-to-be-happening* refers to any kind of activity a police officer has to engage in. These activities according to Bittner (1990) have seldom to do with the legal procedure of arrest and lots to do with *dealing with* people which are causing unrest in a community. Such unrest

⁹ Banton, M. (1964). The policeman in the community. New York, Basic Books. argues that this definition is particularly suitable for the regular patrol officer and less suitable for specialized units within the police.

can take many forms, from domestic disputes to small acts of vandalism, from street fighting to disturbances. What is most common about these actions is that their reasons rest in the moment in which they are committed, as does the reaction. This implies that the situation is emergent, uncertain and unplanned. *About-which-someone-had-better-do-something* refers to the urgency of the situation and the active and discretionary role of police officers in selecting which incidents require their attention due to the limited resources at hand. *Now* refers to the urgency of the situation at hand. A police officer is arguably given the right to use coercive force for this very reason.

6.1.2 Police Work as Peacekeeping Work

Until now, the dissertation has discussed the work of police in terms of somewhat an abstract task, which relies on the ability to act and react in a timely manner. As it was assessed, the work of police officers is not governed by criminal law and the commonly used definition of police work fails to capture the essence of their day-to-day encounter with the world. This encounter can be characterized as a situational intervention governed by a variety of considerations. But, what do police do? In a seminal study, Bayley (1994) uncovered the task of police officers. He states that *patrolling is by far the biggest assignment in policing*, accounting for more than 50% of the work of police in any given western democracy (p.29). He further states that patrol work is determined almost entirely by the public. In contrast he notes that self-initiated work by a patrol officer is a rare occurrence, and when it does occur it is in less developed and in rural areas. More importantly, Bayley notes that very little patrol work has to do with crime (he approximates less than 20% across modern democracies). So what is the majority of police work if not about crime fighting? Restating Bittner (1990) the work of police is about providing assistance and restoring order. Thus, although *police work is mostly trivial and non-criminal, it is nonetheless fought with uncertainty. Officers can never forget that any moment of boredom of a long shift can be shattered by a call that can be harrowing, traumatic, dangerous or life threatening. The dilemma for patrol officers is that they must prepare for war even though they are rarely called upon to fight. To relax invites risk; to be constantly on guard invites over-reaction* (Manning 2003).

Idiosyncratic as it can be characterized, the role of police officers is that of peace officers. Thus, police work can be understood as peacekeeping. To further illustrate this point the

police oath in England and Wales, from the Police Reform Act (2002) is reproduced in the following paragraph:

I (NAME) of (TOWN) do solemnly and sincerely declare and affirm that I will well, and truly serve the Queen in the office of Constable, with fairness, integrity, diligence and impartiality, upholding fundamental human rights and according equal respect to all people; and that I will, to the best of my power cause the peace to be kept and preserved and prevent all offences against people and property; and that while I continue to hold the said office I will to the best of my skill and knowledge discharge all the duties thereof faithfully according to law.

Wilson and Kelling (1982) define the difference between peacekeeping and law enforcement: *... is not simply the difference between little stuff and real crime... handling a disorderly situation requires the officer to make a judgment about what constitutes an appropriate standard of behavior; law enforcement requires him only to compare a person's behavior with a clear legal standard. Murder or theft is defined; unambiguously by statutes; public peace is not. Order maintenance rarely leads to an arrest; law enforcement typically does...* (p. 199) Thus peacekeeping relies on discretion and common sense. Discretion is the autonomy to decide which rules apply to a situation and whether or not to enforce them (Black 1971). *Every policeman has to exercise personal discretion in his duties – decisions about when and how to act, whom to suspect and whom to arrest. Such choices are the most important part of his work, distinguishing the policeman from the soldier who does not act without direct orders (Miller 1975, p.82).* In the UK, the role of discretion in police work came under scrutiny in the Blackburn cases of 1968 and 1973 (Ericson 1982). In these cases, the court of appeals pronounced that the courts would only interfere regarding an officer's discretion where there is an abdication of responsibility for law enforcement in a particular area of criminal law; however, in everyday work, it is up to the police themselves to decide what action to take. This is due to the fact, as Wilson and Kelling (1982, p.234) state, that the administrator *cannot in advance predict what the circumstances are likely to be or what course of action are most appropriate – because, in short, he cannot be there himself – he cannot in advance formulate a policy that will guide the patrolman's discretion by, in effect, eliminating it.*

According to Davis (1969), discretion implies making a choice among a number of alternative courses of action. But why do police need discretion in the performance of their activities? Firstly, *to win this cooperation, the police manipulated their power of discretion. They often chose not to take their authority to the letter of the law, preferring not to press their luck in return for tacit compliance from the community. In each neighborhood, and sometimes street by street, the police negotiated a complex, shifting, largely unspoken contract. They defined the activities they would turn a blind eye to, and those which they would suppress, harass or control (Ignatieff 1979, p.445).* Secondly, police work is peacekeeping; as such it requires common sense (or good judgment), as the law does not cover every situation that a police officer may encounter *on the beat*. Consequently, discretion is essential since the police is a symbolic bureaucracy (Manning 1997). Thirdly, discretion is the natural consequence of policing a community, as the wish of the citizens, as emerging patterns of a changing society, have to be taken into consideration in a democratic society (Giddens 1984; Siegle, Weinstein et al. 2004). Dworkin (1985) and Hart (1994) recognize discretion in the administration of order as *the hole in the doughnut* and *where the law runs out*. Both these theories of discretion recognize it as the natural consequence of the shortcoming of abstract policies and procedures.

It must be noted that in police work, discretion is not necessarily a good thing. In fact, there are many accounts of police abuse of power (e.g. Settle 1990; Eterno 2001). However, if put to good use, the future of police work in modern democratic societies depends on the role of discretion. Gaines and Kappeler (2002) outline the causes of discretion into three separate categories: offender related, situation related and system related. A police officer may sympathize with an offender; may consider an offender a non-threat in the future; may respond to previous court ruling which do not punish a certain behavior; may be influenced by the audience present at the incident (media, other civilians, other officers¹⁰ etc.). Both LeFave (1965) and Davis (1969) agree that alternative lines of actions (e.g. refrain from arrest for a crime) are taken if the police officer believes that the legislature did not desire full enforcement and/or the community demands leniency on certain crimes and/or, that given the scarcity of resources, other crimes are more important to tackle. In a number of studies of police action and the use of discretion (e.g. Sherman and Berk 1984; Hirschel, Hutchis et al.

¹⁰ It is noted that police work becomes more bureaucratic and mechanistic in the presence of these audiences Gaines, L. K. and V. E. Kappeler (2002). Policing in America. Cincinnati, OH, Anderson Pub.

1992) it was noted that police officer would use discretion in many cases of domestic violence, drunk driving, hate crimes and crimes involving mentally ill individuals; in such cases police would take action to protect the individuals from hurting themselves and other and arrest would be thought of as deleterious to the situation (e.g. children left alone by themselves).

To sum up, peacekeeping is performed by police officer in a variety of ways, which may include the use of coercive power. The exercise of peacekeeping is significant because it maintains order. Peacekeeping relies on the discretion of police officers and on their common sense. Thus the essence of police work is contained in common sense, discretion and a situated understanding which acknowledges the unwritten norms of a community. Furthermore, it is performed in potentially time and safety critical situations. Thus peacekeeping reflects both the mandate of police in maintaining order and the way in which this order is maintained. As such, it can be considered as the most fundamental way of being of police officers that reflects both a macro and micro perspective of their work. This definition well represents the specific units this dissertation has analyzed as they deal primarily with the public in time and safety critical situations.

In turn asking *how mobile technology participates in police action* means asking a very specific question on how technology affects the core of policing throughout the emergent act of resolving situations that require police attention – those being the ones that were extensively discussed earlier in the chapter. To sum up, the role of police officers in society is regarded as analogous to peace officers. With this in mind, the analysis of the role of technologies in operational policing has to take into consideration *how mobile technologies support the relation with the public during police operations*. For police operations the dissertation refers mainly to the act of maintaining peace in the wide variety of meanings that were outlined. By public the dissertation refers to both victims and perpetrators of *something-that-ought-to-be-done*. By support the dissertation refers to the extent to which the act of policing, *someone-had-better-do-something-now*, is facilitated in dealing with the public. In the following section, with these definitions in mind, the dissertation will analyze the observed usage of MICT.

6.2 Making Sense of Different Usage of Mobile Technologies by Police Units

Historically the police have relied heavily on mobile forms of communication to perform operations of all kinds. The possibility of wireless access to police information systems from anywhere and anytime, and the operational potential of instant data communication, are novelties that are not to be taken lightly for strategic decision-making about how to develop, resource and employ mobile information systems (Povey 2001). Despite a history rich with mobile technologies, from the telegraph to the first police radio, to today's Mobile Data Terminals, studying new data capable mobile technologies in a police setting requires a reappraisal of the problem domain. That is because the capabilities mobile technologies offer are radically different than those stationary technologies offered in the past (Woods 2002).

One of the main concerns of managing mobile devices is that of fulfilling the potential of mobile communication during operational policing. Thus, the way in which organizations manage and understand mobile communication is key to successful implementation. However, the management of mobile devices is extremely confusing across all industries (Lyytinen and Yoo 2002; Lyytinen, Yoo et al. 2004). This confusion leads to an increase in overall cost and poor usage of mobile devices (Woods 2002). Despite this, the perceived potential benefits outweigh perceived costs. For the police such benefits would translate into shorter time to respond to emergencies, less paperwork through electronic documentation, better informed officers, and more support for the officers in the field (Povey 2001). However, all of these potential benefits have to be analyzed with the intentionality of policing in the background. In the following sections, the chapter will first outline the observed functional benefits of using MICT. Subsequently, the hardships of logically connecting actual usage to the unfolding of police activities will be outlined.

6.2.1 The Benefits of MICT for Police Work

A number of benefits that mobile technologies afforded police officers were observed while in the field. In the following few paragraphs, these benefits will be outlined. It must be acknowledged though that the following observations are only the *tip of the iceberg*, a preliminary functional understanding of the logical reasons mobile technologies are employed – within these reasons there is no residual correlation of the reasons surrounding

the actual usage or non-usage of specific mobile technologies. Mobile information and communication technologies are used both for managing the complexity of coordinating distributed work activities (Schmidt and Simone 1996), and for managing the uncertainty of incidents being engaged through generating and disseminating information (Mathiassen and Sørensen 2002). Four particular and highly interrelated functions were observed: documenting, automating, coordinating, and controlling. Briefly each of these functions will be explored.

Documenting is an important and ongoing activity for every police officer. It must be noted that there is a clear demarcation between the documenting performed inside and outside the office. It can be easily argued that most documenting of incidents is associated with the office, while the resolution of incidents is associated with the field. Thus the documenting done outside of the office is of more ample magnitude than the one done in the office. Most studies (e.g. Povey 2001 and Woods 2002) argue that this is so because of the less comfortable physical environment in which it is performed. Therefore, the answer to poor documenting while using mobile devices resides in better filtering of information, easily manageable devices and users' training. However, as argued in Chapter Two, this means approaching the problem of mobile technology use from a level that takes the context of work as unproblematic and as compatible to the tasks of work. The observation of actual documenting in the field has generated the following consideration: whilst office documenting is mainly based on reflection in a stable environment, in the field, documenting relies on observational skills, social skills, and social engagement. Thus, the act of documenting outside of the office is reliant on the active engagement of the officer with the scene of incident, as opposed to the stable environment of the office, where officers can analyze past notes and reports, contact other officers for support, and recall through memory the events experienced. Hence, while outside documenting is characterized by gathering of information through the environment and people, office documenting is characterized by a systematic processing of that information.

In addition, operational policing is about coordinating and controlling resources. The way in which this is performed is difficult to generalize because operational policing is emergent and self-organizing, diverging from the view of the quasi-militaristic bureaucratic structure that most literature seems to assume about police organization. It can be a response to an emergency call, in which case the resourcing center controls and initiates the coordinating of

resources. It could also be initiated by an observation by a police officer, in which case the officer himself is the one initiating the coordination effort. Furthermore, because of the ability of global view afforded by mobile technologies such as the MDT, an officer can choose the particular incident he wants to attend; this adds more self-tasking to the role of police officers (this is so within some limits, for the resourcing center during shortage of resources can force a unit to attend an incident).

To summarize, a police officer can notice an incident and initiate the police coordination; a 999 call might come in and the controller might initiate the coordination effort; the officer can choose from a number of crimes from a list available through a mobile technology (MDT). In terms of movement, information travels both ways between controllers and officers triggering a series of events – this coordination of information can be synchronous or asynchronous. The information system, in order to allow for coordination, requires both officers and controller to share information actively on both the location of incidents and the status of police units. As Manning (1988) has argued this relationship is not on equal terms; when the information travels from the field to the system (in the form of a controller inputting information in the system), there are fewer problems associated with ambiguity and action. In fact, as Manning (1988) notes there are two stages of decontextualization of information when the information is given through a 999 number. Firstly, the information given by the caller might not be accurate, and second the systemic translation of the information by the controller might contain further elements of misinterpretation. Thus, the officer is faced with the problem of making sense of an abstract representation of the world of reference.

Thus, the officer relies heavily on mobile technologies to be provided with background information about the incident. This information helps the officer assess the risk of a situation and prepare a ground for a range of actions to be taken accordingly to the ethos and rules governing the organization. These ethos and rules are further enforced by the monitoring afforded by mobile technology in the form of the recording of the actions taken by the officers in a given incident. Within the range of actions, the mobile information system provides the officer with a coordinating power, through the creation of a fluid network of officers that can unite or disperse depending on the gravity of the situation. At the same time, the system relies heavily on the officers. It is vital to remember that the system is only as good as the information contained within it. In addition, MICT automate a number of more

trivial tasks. The most notable example is inputting vehicle license numbers in the MDT and the introduction of the Automatic Number Plate Recognition (ANPR) cameras on the front of police vehicles to automate this task.

Hence, the potential these technologies promise are key for the development of effective future operational police work. It is important to remember that operational policing has different technological concerns from policing in general. Since the dissertation is examining police in this light, it appears prudent to study operational policing on these terms rather than to study the police in general.

6.2.2 The Challenge of Understanding MICT Usage

There have been a number of research studies on operational police work. While these studies produced a great amount of detailed analysis together with highly specific recommendations, no clear attempt has been made to produce a more accurate understanding of the requirements of mobile technology for police officers with respect to their context of work.

The immediate problem of having amassed the data, which showed constant coupling and de-coupling from mobile technology, is in what way to differentiate the different usages of technology. A framework in which to place the results of this study in order to understand them needs to be provided. Previous studies are disappointing as guides as they tend to understand the coupling and de-coupling in a variety of ways, none of which are specific enough to cover the whole gamut of peacekeeping. Technology studies of the police in the past have been based on interviews about work settings (disassociated from the reality), second hand empirical data and descriptions provided by the police.

A variety of these studies (e.g. Ackroyd 1992; Ericson and Haggerty 1997; Povey 2001; Manning 2003) understand the data in terms of the information that the officer requires. From this particular framework, they assume a uniform relationship between the context of work and the usage of the mobile technology in the sense that if the officer is in any given situation then he will automatically need a set amount of information previously prescribed from some universal presumption of practice. It does not matter that the particular context of work might demand a different action or a need for different information, if the officer does not use the mobile technology in the way prescribed, it is automatically considered a failure of either the

police officer or the technology. Seen in this light, mobile technology usage takes precedence as a determinant over a situation rather than the determinant being the specific context of work. Intuitively and from the ethnographic research this approach seems to lack any correlation to the realistic requirements of operational policing.

Further studies, whilst they are built around a specific context of work (for example a particular crime) as opposed to a universal idea of the information required, are only specific to that particular context and hence they are guilty of the *means over ends* syndrome previously discussed. Through examining only one context, the studies lose sight of the purpose of the police and concentrate only on facilitating a particular objective. This approach, as well as being myopic, can conceivably harm the police officer in his ability to deal with a situation. This is because the primary underlying objective in police work is the practice of their purpose or end – peacekeeping and if the mobile technology has been designed with different objectives in mind then there is a false utility built into the system - theoretical possibilities imagined that are never actualized. There are studies (e.g. Klockars 1985; Manning 1997; Grange, Friday et al. 2002; Woods 2002) that have been collated using observational techniques similar to the one of this dissertation, however they have been written and collated from a political/social science standpoint. These studies are inadequate for use in understanding the technological needs of the police as they were written with different concerns and objectives in mind.

The following section characterizes the relation with mobile technologies in three operational policing roles on the basis of close observations of actual police work as well as in-situ interviews. Thus the *situations* of MICT use will be outlined. These *situations* are empirically derived and theoretically inspired. The units studied are Response Vehicle Officers (RV), Traffic Officers, and Scene of Crime Officers (SOCO). It is important to remember that all roles studied conducted work in a highly geographically distributed manner. SOCO were chosen as a counter-example since the time and safety criticality of their work is much reduced in comparison to the other two. Although the roles spend a significant part of their time in the office, this was excluded from the analysis as there they primarily conduct administrative and not operational police work (Ackroyd 1992; Manning 2003). In addition, all units studied engage in continuous documenting and coordinating of activities through similar mobile technologies. The subsections are divided into two groups made of Traffic and

RV officers on one side and SOCO on the other. These two groups are later compared and contrasted.

6.3 The *Situations* of Police Officers

The analysis of the interrelationships between mobile technologies and the context of operational policing must be based on an understanding of the specific elements shaping the officers daily work. It is this dissertation's contention that the context of work in which mobile technology is involved is of the utmost importance to understand its usage. The dissertation avoids the danger of previous studies through the use of direct observation as a means of collating the data and furthermore by going beyond the specific context and examining all the recorded contexts together. Having decided that the context of work is the determinant factor in the usage of technology, the dissertation differentiates among a number of situations. The police, when asked about their typical context of work, responded with a number of possible contexts. The police vehicle was the most common answer, followed by crime scenes such as domestics, burglaries, and public disturbances. The observed usage of mobile technology changed dramatically depending on the type of activity and the locale of the activity. For instance, when asked about problems they encounter on a daily basis, officers would discuss in-car usage of mobile technology and outside usage using different standards (e.g. arresting a person or waiting for a call). This is the primary guide to understanding activities. Furthermore in order to represent the whole act of peacekeeping and not only its constituent parts this framework was generalized into cyclical activities. Each activity mentioned by the police is only a facet of the whole act of peacekeeping. Thus if one desires to understand the usage of mobile technology in relation to peacekeeping then one needs to draw the facets together into a cyclical arrangement.

Kristoffersen and Ljungberg (2000) characterize activity in relation to mobile technology usage as traveling, visiting, and wandering. However, this distinction does not significantly enlighten the relationship between the specific nature of the work experienced and the viability of supporting it through different informational and interaction modalities. Besides being too vague, this distinction is not necessarily associated to a particular work condition or modality of interaction. However, Kristoffersen and Ljungberg's definitions point towards the identification of dispositions in the activity types in the sense that these more generalized activities can imply the feelings and moods of the police officer. This can lead to understand

the way a police officer feels using any given mobile technology. Thus, with the marriage of a phenomenology inspired definition of an activity, together with the more practical suggestions of the police officers organized in a cyclical format, a definition of the activity types and hence a framework comes into being. This distinction incorporates both the disposition of officers in terms of uncertainty (e.g. being in the police vehicle has little uncertainty as compared to being in an unresolved crime scene), and in terms of the geographical and operational character of the work involved (e.g. documenting a resolved incident implies being inoperative as opposed to chasing a criminal). Operational police work falls into five main activity types; Standing-by in car before incident, Driving to an incident, Taking action at the incident, Driving from the incident, and Standing-by in car after incident. These are based on a combination of careful codification of the field notes and theoretical reflections. In addition, this distinction was brought to the officers' attention and was accepted as valid by the officers involved in the study.

These five activity types are based on the fundamental distinction between waiting in the car, traveling and engaging with the scene of incident and thus can fall under a simpler tripartite structure. This leaves this dissertation with the generic cycle of operational policing where officers wait in the car before traveling to the incident. From this activity they then engage in resolving the situation after which they drive from the scene of incident and wait around in the car afterwards. The five activity types do not necessarily flow in the sequence prescribed and they can be recombined in a number of ways and the streamlined sequence presented is often broken up at various stages, for example when RV officers return to the station after an incident. Furthermore, incidents may be engaged in parallel with less urgent ones being placed in the background for later to re-emerge.

The core of operational policing is in the street and at the scenes of the incidents attended by the officers (Manning 2003). As previously stated, operational policing represents cycles of waiting, traveling and engaging. Within the activity types and in the rapid and subtle shifts between them, there are significant differences in the mobile technologies and interaction modalities chosen by officers. These rhythms of coupling and de-coupling are the situational coming together of the individual officers routines and their improvised use of familiar modes of virtual interaction with and through their range of mobile technologies. The three activity types exactly signify units where relative stability in the types of technologies used and the interaction modalities chosen was found. The shifts between coupling and de-

coupling create in-situ changes in the interaction with mobile technologies. Thus, changes from one activity type to another imply shifts in the usage of MICT since the physical conditions for interaction changes, as does the character of the work involved. This implies shifts from coordinating activities to documenting incidents, from relaxed scanning of the MDT to hectic negotiations on the radio and downloading of data to the MDT in order to manage the uncertainties about the incident approaching.

6.3.1 RV and Traffic Officers

In the case of RV officers, the primary mobile technology throughout the cycle of activities is the personal radio. This is due to the fact that engaging in incidents makes up for a third of the time RV spend in the field. During the engagement in incidents, the personal radio takes precedence over any other mobile technology. This implies that the modality of interaction with mobile technology becomes voice driven. However, it must be noted that compared to other activities, the use of radio is more discontinuous because the officer is busy dealing with people and solving problems. Only during stand-by time does the MDT take precedence over the radio, allegedly because it allows for a quicker and more complete overview of the incidents in progress.

In the case of Traffic officers, the use of the MDT is as intense as that of the radio. This is so because the time spent in the vehicle waiting and driving is significantly higher than that spent engaging in incidents. In both the RV and Traffic cases, however, data driven mobile technologies are seen as intrusive, for they require the attention of the officer to be distracted from the situation at hand. This seems not to be a problem when the officer has yet to choose which situation to tackle, but it becomes a problem when the officer engages in a situation. Thus, there is no easy juggling between virtual and situated interactions, as it appears that each of them is a detriment to the other.

Mobile Technology and Interaction Modality by Activity Type

Role	Technology ranking & Virtual modality	Standing-by in car before incident	Driving to an incident	Taking action at the incident	Driving from the incident	Standing-by in car after incident
<i>RV</i>	<i>Time %</i>	15%	25%	34%	13%	13%
	<i>Ranking</i>	1.MDT 2.Radio 3.Mobile phone	1.Radio 2.MDT 3.Mobile phone	1.Radio 2.Mobile phone	1.Radio	1.Radio 2.Mobile phone 3.MDT
	<i>Modality</i>	Data & voice	Voice or data	Voice or none	Voice	Voice or Data
	<i>Interaction Properties</i>	Virtual Interaction	Virtual and Situated Interaction	Situated Interaction	Situated Interaction	Virtual and Situated Interaction
<i>Traffic</i>	<i>Time %</i>	25%	34%	21%	9%	11%
	<i>Ranking</i>	1.MDT 2.Mobile phone 3.Radio	1.Radio 2.MDT	1.Radio	1.MDT 2.Radio	1.MDT 2.Radio
	<i>Modality</i>	Data & voice	Voice and little data	Voice or None	Data and voice	Data and Voice
	<i>Interaction Properties</i>	Virtual Interaction	Situated Interaction	Situated Interaction	Virtual and Situated Interaction	Virtual Interaction

Table 15 - The estimated distribution of work activities between the five main operational policing activity types and the ranking of mobile technologies in use according to importance in each activity type, and summary of preferred modality of interaction.

Through the cycle of activities, the MDT and the radio alternate as the primary mobile technology. However, in many cases, mostly those surrounding engagement, both of these mobile technologies disappear to allow for the officer to engage fully in a situation. Although in Table 15 a ranking of the most used mobile technologies is provided, this does not imply that a mobile technology will be used necessarily. In many cases depending on the officer's personal preferences, a mobile technology might or might not be used. It is difficult to speculate on these personal preferences, and so this analysis shall not do so. However, what is important to understand is that there is no uniformity of usage, nor is there any particular intensity of usage. What is interesting is that virtual interaction tended to disappear around

the engagement activity of police officers, and if it did not, it tended to take the form of voice interaction rather than data interaction.

The MDT, the radio and the mobile phone were generally used for different purposes, although some overlapping was present. The MDT was generally used to overview a list of active incidents (21)¹¹; get detailed logs on an incident (17); and PNC vehicle and people (16). The radio was generally used to update the geographical position of the officers (15); get further details on an incident log (11); update a crime log (10); PNC vehicle and people (9); and communicate with other officers (8). The mobile phone was used mainly to quickly and synthetically communicate with other officers (23).

There are a variety of reasons why these mobile technologies were used for such different purposes. The mobile phone was seen as an important means of horizontal communication, being the only technology that allowed flexible and direct communication with colleagues. Historically, the radio was the only way in which officers could communicate amongst each other. However, since the radio spectrum is a scarce force-wide resource such horizontal communication has to go through the control center and thus could be overheard by everybody. Although in critical situations horizontal communication through the radio is a common occurrence, during less critical situations (which are the majority police attend) it seems unreasonable for both officers and controllers to use up the radio spectrum.

The MDT was used mainly for over-viewing incidents as it allows officers to work independently of the control room in gathering information. In addition, the MDT was considered extremely useful and quick in checking registration plates and in identifying characteristics of wanted individuals. However, when it came to the actual involvement in an incident, the MDT was quickly replaced by the radio as a more interactive way of communicating. In fact, the radio served most of the needs of officers when engaging in an incident.

The *rhythms of interaction* can be observed in Table 15 as an occurrence where *situational discontinuities* arise. The pattern that seems to emerge is that when the police are engaging, they tend to de-couple from technology. As mentioned in Chapter Two this has previously

¹¹ Numbers in parenthesis represent the number of occurrences witnessed.

been seen as either a failure of the police officer or of the technology. However, this analysis hopes to look at the problem domain through a different lens. Using a hermeneutic phenomenological method, the dissertation strives to examine a way of *being* a police officer, or how a police officer feels with technology. In order to pursue this line of inquiry there is a need to understand what information the police officer actually requires during the activities (Table 16).

Operational Police Work Distribution by Activity Type					
Role	Standing-by in car before incident	Driving to an incident	Taking action at the incident	Driving from the incident	Standing-by in car after incident
RV	Active incidents queue. Wanted People	Destination, risk assessment, vicinity and status of other vehicles	Vicinity and status of other vehicles. Ongoing risk assessment. Positive ID of offender	Status of custody. Active incidents queue	Active incidents queue. Status of custody
Traffic	Active incidents queue, status of other units, wanted people, hot spots and disqualified drivers	Destination, risk assessment, vicinity and status of other vehicles	Vicinity and status of other vehicles, ongoing risk assessment, positive ID of offender	Hot spots, status of custody, active incidents queue	Active incidents queue, status of custody

Table 16 - Information types required by the two operational police roles across the activity types.

The use of mobile technologies throughout the cycle of activities can be explained by the information requirements of officers. As the activity changes so does the information that the officer considers important for the performance of the tasks at hand. In the stand-by activity, both roles are interested in a global view of the various incidents. Both RV and Traffic keep over-viewing long lists of incidents and logs of a particular incident to decide which one takes precedence and requires their immediate attention. Once an incident has been selected or assigned to RV or Traffic by the control room, information about how to get to a destination becomes of primary importance. However, this is not all that is required. RV and Traffic officers consider a preliminary risk assessment of paramount importance. While the MDT is good at giving an overview of incidents and important clues about how to get to a destination, it does not seem to support risk assessment, at least in the form that officers would like. The radio, again, becomes the central mobile technology. Voice communication

with the control room, other officers and at times victims becomes the central concern of police officers. This is due allegedly to the fact that knowing that backup can be available promptly creates a sense of security. When engaging in an incident, three things are important to RV and Traffic officers: firstly, the status and availability of other officers for backup purposes. Secondly, an ongoing risk assessment where the information provided by the control room through the radio and MDT is balanced against the situation the officer experiences – this implies the need for an open two-way communication channel between officers and control room, where the officer's impressions of the incident take primacy over the recorded information and are incorporated into the information system. Lastly, a positive identification of the offender, which provides officers information about the physical characteristics of the offender and crucially, the threat that the offender might cause to officers and other citizens.

Although the information system contains some of the information discussed, it is generally not enough for the officer to take effective action; the officer always resorts to situational clues contained in the environment of the incident. The environment of the incident is full of individuals, victims, offenders, witnesses and tensions. When the incident has been resolved (e.g. an arrest has been made, a person has been warned, a dispute has been resolved, etc.) the information requirements become similar to those of the stand-by activity. Again the officer looks at the active incident queue (note: if an arrest is made the most important information becomes the status of custody). However, the incidents are scanned through the radio. This is also the case for the activity of standing by after an incident. This is due to the fact that the officer is expected to update the log via the MDT or PR on how the incident has been resolved. In addition, the level of risk is unimportant as that incident has been resolved. Furthermore, both RV and Traffic officers often return to the police station to finish reporting on incident because of the large amount of information that is required for a case.

One of the most relevant details of the table is that the vicinity and status of other vehicles is of paramount importance to the officers. However, at this time there are no software programs to promote this function. Nevertheless, this requirement points towards the most important underlying feature of the operational police officers work, which is the disposition towards uncertainty. As previously stated, operational police work is both time critical and safety critical, and thus naturally there is a large amount of scope for a feeling of uncertainty before and during any engagement that the police officer takes part in. It is then natural to

assume that the danger that the police officer faces, which is manifested in the uncertainty of any possible outcome that he may find, affects the usage of any mobile technology that he employs. The analysis of Table 16 shows that police officers, when in an uncertain situation, attempt to convert any operational uncertainty into controlled risk. They manage the uncertainty through two main assets - the mobile technology that they have available, and the personal training and experience. In any given situation, it is natural that one asset should be given primacy over the other, and thus far the analysis has shown that amongst the activities preference is given to one asset or the other. This cycle of coupling and de-coupling - the transfer of reliance from the virtual (information provided by mobile technology) to the real (the police officers training and knowledge relating to the situated encounter they are in) is simply a natural process of modern operational policing. This finding can best be shown through a description of policing.

When the police are driving to an incident, the activity is characterized by a hectic mélange of virtualized communication and coordination. This is combined with the officers (if the car is double-crewed as they are in cases of domestic violence) engaging in focused discussions of the incident details (informed by the MDT and the radio) and simultaneously coordinating the rapid drive through the traffic. All of this is conducted at high speed, accompanied by the noise from the speeding car's engine, the loud siren and the distinct flickering of the blue lights. When waiting in the car and in particular when driving to an incident, the officers simultaneously coordinate, drive, read out information from MDT, and require information from the control room over the radio. The driver will continuously be kept updated with background information about the incident delivered directly to the MDT or negotiated with the control room over the PR. The other officer will also support the driver in navigating intersections. Here, the virtual represented by the PR and MDT, and the physical in terms of the elegant dance between slightly confused cars, buses and pedestrians melt into one. Here the prominent feature that is the delicate balance between two worlds –the virtual, where all the necessary information is being received and the real world where paramount are the safety concerns of driving at high speeds through the streets. When the officers arrive at the scene and engage at a intensive incident such as a domestic they will immediately attempt to split up and thus control the two separate parties involved. Clearly, the MDT does not get used from this point onwards, which is shown by the *situational discontinuity* evident in table 15. The MDT, so important when traveling and waiting for an incident, is ignored when the officers need to engage. At the engagement, there will be a flurry of activity, tempers will be

raging and the situation will be particularly volatile. As well as keeping the conflicting parties apart, the officers need to be able to make sure that none of the aggravated parties present any danger to the officers themselves. In this particular situated encounter the most important assets the officer has are his senses, training and understanding of the situation. Mobile technology must take a lesser role as it only serves to disassociate the officer from the situation. Table 15 reflects this reality, with the radio being the only connection with the virtual and even then the police officer will only use the PR sporadically in order to update his position and possibly call for back up. The incident being resolved the police officers return to the car where they update their logs, report to the control room and actively search for further incidents on the MDT.

From this description, it can be determined that the de-coupling from mobile technology can be seen as a consequence of the uncertainty that the police officer faces. The *rhythms of interaction* form as the police officers move from one activity (driving to an incident) to another (engaging) and then to the final one (standing by after the incident). In the first activity the police officer is coupled with the mobile technology but then, when the engagement takes place the police officer de-couples from the technology to become actively involved at the scene of the incident. After the incident the police officer again couples with the mobile technology, creating a pattern of usage. It is these patterns of usage that represent the *rhythms of interaction*. When they are married to an understanding of the different police activities they allow for the *situational discontinuities* (de-coupling) in context to be appreciated.

The *rhythms of interaction* provide a guide, which can be used to find out what relationship with mobile technology one can expect from the police officers at any given time. This is because the patterns that have formed of coupling and de-coupling reveal a natural process rather than a faulty one. For example, uncertainty is a factor that leads to an alteration of the need for information, as each police officer will prioritize his needs determined by his sense of his own safety to fit the specific context of the situation. Thus, when they drive to the incident, it is in the officers' best interests to use the MDT to gain as much knowledge of the coming engagement as he can. They prioritize their information needs and concentrate on a balance between arriving at the engagement safely and assimilating all they can from the mobile technology before they get there. This balance is altered at the engagement, as the police officers have to gather information not provided by mobile technology and more

importantly they have to act. This obligation to act or engage at an incident necessitates the de-coupling from mobile technology. Thus when this necessity is appreciated as the legitimacy of the police officer to de-couple from the mobile technology, the emerging patterns of *situational discontinuities* caused by the de-coupling can be tracked through understanding the factors that prohibit the police officer from virtual interaction and necessitate interaction in the real world. Furthermore, if these patterns are understood then the most sensible expectations for the mobile devices provided can be advised.

6.3.2 Scene of Crime Officers (SOCO)

Uncertainty was mentioned as a factor that alters the police officers perception of his requirements for information. To illustrate the potency of this particular factor a comparison between RV and Traffic officers on the one hand and SOCO on the other is pertinent. In sharp contrast to the previous roles described, for SOCO, the time criticality and safety criticality of their work is almost non-existent. This section will analyze SOCO in the same way using the same scheme activities. In addition, SOCO represent an effective counter-example to the other two roles as they also reinforce the belief that the disposition of uncertainty plays a key role in determining the *rhythms of interaction*.

Role		Standing-by in car before incident	Driving to an incident	Taking action at the incident	Driving from the incident	Standing-by in car after incident
SOCO	Ranking	1. Mobile Phone	1.Mobile Phone 2.Radio (Seldom)	1.Mobile Phone	1.Mobile Phone 2.Radio (Seldom)	1.Mobile Phone
	Modality	Voice	Voice or None	Voice or None	Voice or None	Voice
SOCO	Information Required	Active incidents queue	Destination, Active incidents queue	Dynamics of the crime committed. Investigating agent contact	Active incidents queue	Active incidents queue

Table 17 - SOCOS and their use of MICT and the Information Required.

Both the information requirements and use of mobile technologies throughout the cyclical activities of police work by the SOCO is very different than in the case of RV or Traffic officers. The most notable difference in terms of information requirements is the risk

assessment, which does not exist since SOCO enter a scene that has already been resolved by a police officer. In addition, the time criticality that is inherent to RV and Traffic officers' work does not concern SOCO (although being in a crime scene as soon as possible is desirable because of the nature of some evidence). Therefore they experience a less visually and physically involving environment contrary to the other two units. As a consequence of this, their potential and actual use of mobile data is higher as was the case in other constabularies (Pica and Sørensen 2004). SOCO mostly rely on second hand information that is information generated by the officers attending and investigating the crime.

The most used technology by SOCO is the mobile phone with which they generally contact colleagues, victims, and investigating officers. Although SOCO are equipped with a stripped down version of the MDT (known as Roger) and a radio, they seldom use these as they consider them of little use for their job. SOCO equipped with a laptop tended to use the laptop waiting before, and after having left an incident. However, they still did not use it at the victim's site and in the vehicle because of the slow loading time of the system and the poor comfort of typing in a small space. Nevertheless, this additional usage of mobile technology can be attributed to the lack of time and safety restraints at the scene of activity, which in turn allows SOCO to have a much fuller relationship with the mobile technology. Even though they interact with the public, as much as Traffic or RV, their job is confined to speaking to victims and reconstructing the crime to look for evidence. This is a job that despite requiring tact and sensitivity contains virtually no uncertainty. Although not mentioned in the above table SOCO have a number of more traditional mobile technologies that they use at the scene of crime when they engage with victims. These are digital cameras, aluminum powder, and a number of evidence collection materials. Furthermore, in an earlier study of SOCO equipped with a laptop computer (Pica and Sørensen 2004), it was noted that the technology was not used at the crime scene but was instead substituted for more traditional note taking technique.

Thus, the SOCO needs be considered separately given a comparably less risky and more expected environment. However they do add considerably to the understanding of the activity types of the other roles studied. Since the SOCO have a more complete risk assessment of the situation due to police officers having already been to the scene of crime, the amount of information needed whilst on the move in preparation to take actions is minimal. In contrast, when at the scene of crime, the virtual information needed is much greater as the need for

instinctual information regarding safety is not necessary. In addition, whereas the job of RV and Traffic rely on quick communication across actors in order to assess risk properly, the job of the SOCO does not. In fact, SOCO, as shown in other constabularies, can make greater use of mobile data whilst taking action, as well as between jobs (Pica and Sørensen 2004). However, this is not to say that SOCO should not have an immediate way to communicate during emergencies that could always occur, but points to the concept of risk – and its time-critical nature – as a relevant detail to match mobile technology to operational police work. This appears to corroborate the finding that uncertainty influences mobile technology usage. The data collated indicates that the patterns of usage for SOCO at the engagement activity are the inverse of those for Traffic and RV. It can be safely assumed that this inversion is directly correlated to the lack of time and safety constraints placed on SOCO at the engagement.

6.3.3 Comparing the Units

The example of SOCO has emphasized the two variables of time criticality and safety criticality and their subsequent effect on operational police work. The disposition of uncertainty has also been mentioned as a factor and it is the dissertation's contention that these two variables and the aforementioned disposition are inextricably linked. Operational policing is for the most part time and safety critical work, and managing uncertainty through gathering information prior to engaging in the incident denotes a careful balancing between the need for rapid but at the same time informed, coordinated and sensible response. This often resulted in a particular *rhythm of interaction* where the officers, even when at the scene of incident would purposefully hesitate and gather further information before decoupling from all mobile technologies with the possible exception of the PR and engage in the incident. RV and Traffic officers routinely engage in situations of extensive operational uncertainty, e.g., is the perpetrator still in the house? One of the primary purposes of the mobile technologies is to support the conversion of this operational uncertainty into an estimate of the risk involved for the officers and others. This, for example, often results in officers waiting to engage until they have a reasonable idea of the nature of the situation they are about to engage in. If, for example, there is a risk of firearms involved, a separate Armed Response Unit will be called in, as no other officers carry firearms. In the RV example, the intense provision of information via the MDT serves the primary purpose of providing the best possible means for the officers to assess the situation and thus managing the uncertainty and converting it into a perceived risk, which can be acted according to. This analysis leads

to the belief that the two variables of time criticality and safety criticality create the disposition of uncertainty in the police officer. Furthermore, mobile technologies (MDT, PR, mobile phone) are the tangible tools provided for the police officers to manage this uncertainty. Thus the usage of mobile technology is tied to uncertainty.

The specific feelings of the police officer towards particular mobile devices are illuminating not only for understanding the role of mobile technology during an activity but also how that particular mobile technology manages the uncertainty that the police officer is faced with. During time-critical actions, the officers want to use the PR and the control center assumes a central position. This is partly because the PR links the officer with his local organization providing him with reassurance and information, which in theory assists the officer in overcoming a situation. There is also the symbolic power of the PR, which represents to the people he is dealing with the entire police organization and lends him a form of omnipotence as the potential power of the police can conceivably be called upon. Hence, mobile information systems in time-critical situations are to be seen as tools to transform quickly the uncertainty of the situation into a credible risk assessment to allow for effective deployment of resources. Mobile devices are the channel of information, and information is what is needed to get an idea of any given situation in a somewhat expected manner. When there are time-critical incidents, potentially dangerous situations, and synchronously interdependent tasks among geographically dispersed individuals the usage of mobile data is hindered. This is due to the intense physical and visual involvement of the officers in the context. Voice point-to-point communication, via PR or mobile phone, is the favored way of using mobile devices in these situations. When used in these emergency situations, information transfers through mobile terminals are quick, relevant and critically compensated by voice communication. In fact, the radio is generally used in these situations to update the crime and get more information about victims, criminals and police officers. The mobile phone was used to communicate with all officers and for all kinds of information when two or more officers were operating in the same place. If the officer was alone only the PR was used for all information exchanged. According to most officers interviewed, it is the immediacy of communication with colleagues to be the factors favoring the PR. Furthermore, during standing-by and engaging the PR served as an incident retrieval system because of the continuous broadcast and the one-to-many mode of information exchange (as opposed to the one-to-one of the mobile phone).

It must be noted that the mobile phones used to initiate communication among colleagues were not always the ones provided by the police, but they still created an efficient and informal means of communication. The PR is the most used for more immediate actions and to update position. Most officers consider the mobile phone to be the least formal mean of communication that cuts out some obligatory passage points such as the control center. The MDT was seldom used to communicate with other officers. However, it was the most used to get an overview and details of incidents. This could be due to officers not trained to send inter-car messages and to the fact that it can be done only in a double-crewed vehicles or whilst standing-by. Most officers do not get much information about where they need to go until they are on their way. Police work is about both formal and informal communication and it should support both. The functions that mobile technologies provide are both of documenting and organizational nature. While some forms of mobile technologies are preferred for certain activities other are not. Most instructions for particular crimes are also handled by mobile phone because “it is a better 2-way communication device than the radio where everybody hears you.” In addition, most times the victims must be contacted multiple times and the mobile phone is an ideal way to do so.

6.4 The Rhythms of Interaction and Intentionality

From these results what can be understood of the relationship between mobile technology and operational police work? The results have shown that *situational discontinuities* have occurred and that they appear to form a pattern, or *rhythms of interaction*. The de-coupling from mobile technology is a valid response to the uncertainty or practicality of the situation that the police officer is involved in. Another description of operational police work will help to shed light on this relationship. Through an example, in the following paragraph *situational discontinuities* are further discussed.

When the police are called to a domestic they may already be aware of several things. They may recognize the parties involved as a small, chronic portion of violent couples who are responsible for the majority of calls (Sherman & Berk 1984). They may also take into account what kind of area they are traveling to – how violent and how unpredictable it may be. When they arrive at the domestic they will automatically split up to separate the parties involved. As mentioned earlier, the primary resources the police officer has at this juncture are his senses and experience. At this tense stage of the engagement the police officer will de-

couple from technology for a variety of reasons. There will be some mobile technology that he simply cannot use – for example his MDT as all his attention will be focused on the situated interaction in front of him and he cannot leave the parties and return to his car. This idea of focusing on the parties he is involved with is reinforced by one police officer's reaction to using a hand-held PDA during an engagement; "*When faced with a person, who potentially can hurt you badly, you want to look that person in the eyes and not stand there and stare into a screen*". The mobile technologies that remain used are the PR and the mobile phone. A clear picture of the role that uncertainty plays in the relationship between the police officer and mobile technology can be noticed. As Manning (1988, p.263) states *The violence and risk taking of policing is both sought and avoided; but the underlying question is always how to confront the unknown and the unseen. Like the combat soldier, the officer varies between a sense of fatalism and a sense of self-control and fate control. The grounding of the police officer's social world is uncertainty, and responses to it is a mode of coping.*

At any safety critical, uncertain juncture the necessity to de-couple from mobile technology is prevalent. The police officers' five senses and his experience are his prime assets in dealing with the situation at the engagement. This is because, as far as managing uncertainty at the engaging situation, the human attributes of the police officer are more effective in resolving the situation than the technological tools that the officer has at his disposal. This is not to say that the de-coupling from mobile technology is complete. The guiding principle is one of balance, and the *situational discontinuity* might only affect one or two of the mobile devices. There is a balance between the services that mobile technology provides in facilitating the management of uncertainty and the reliance of the police officers on themselves and their training. The observed usage of the PR is instructive in explaining this balance.

This balance can best be illustrated by looking at the cycle of activities more closely. When the police drive to the incident they need to assimilate as much information as they can from various mobile devices (MDT, Mobile Phone & PR). There will always be potential uncertainty contained within the driving to any incident due to its unpredictability. In this activity, uncertainty necessitates the need for coupling with mobile technology and it is here that mobile technology helps to manage uncertainty. However the officers cannot be too intensely coupled as the practicality of the situation demands that they place some of their attention on negotiating their way to the incident safely. Thus, there is a balance, weighted more in favor of the coupling with technology, when the police drive to the incident. At the

engagement level, uncertainty manifests itself in a physical form and hence the officers de-couple from the mobile technology in order to engage. However it is important to understand that the de-coupling is not complete as sporadic use of the PR and mobile phone is often observed due to the uncertainty that the officers may feel. Again it can be seen that mobile technology is helping to manage uncertainty, however the emphasis for this management of uncertainty is placed on the officers real interaction with the environment. Thus, *situational discontinuities* are rarely in absolute terms – whereby either the officer uses intensely the technology or does not use it at all; instead they reflect the actions of the police officer in terms of prioritization. The officer will prioritize one form of information (his own experience, training and impressions) over another (mobile technology). This prioritization is the fruit of the officers training and as such needs to be respected and seen as a conscious and informed choice. In this light a *situational discontinuity* is part of a process of a systematic, rising and falling of intensity in usage of mobile technology. When the police officers are standing by there is little or no uncertainty and this is reflected by the normally intense coupling with technology as they log the details of the incident and perform administrative tasks.

There are two particularly significant values that the PR has for the officer in the engagement activity. Firstly, it provides a sense of security to the police officer in the way that he has immediate communication to the control room and hence his organization. This enormous support mechanism largely falls under the coordinating function of mobile technology and provides the police officer with the ability to manage uncertainty. Secondly, there is the symbolic value of the PR as it adds authority and power to the police officer through the connection that it provides to the organization, which in turn belies the fact that any antagonist is only dealing with one or two officers. However, this value is a double-edged sword, as in a situation the police officer will often try and talk to the parties involved on their level, attempting to placate not through the threat of the larger organization but as a fellow citizen. Thus the police officer may only use his PR sporadically as not only does it disassociate the officer from the parties involved, it further reminds them of an ‘us and them’ interaction. In this case, uncertainty is not the prime cause of the de-coupling, but rather a community inspired approach, which lies at the heart of peacekeeping. This is not to say that uncertainty does not play a role as the police officer may be reticent, in lieu of his own safety to take his eyes off the party that he is involved with in order to communicate via the PR. If this line of thinking is followed, one can clearly see that the use of a mobile phone could be

hazardous as well. Thus, two concurrent themes are emerging, which govern the use of mobile technology in the activity of engaging, which are the disposition of uncertainty and the role of peacekeeping. To regard uncertainty as the sole cause of the *situational discontinuities* would be to take a one-dimensional view. As argued in the previous sections the role of police as peacekeepers is of paramount importance in understanding their usage of mobile devices. It is to the mandate of the police and the consequent role of peacekeeping that this dissertation now turns to.

When the mandate of the police is taken into consideration, *the rhythms of interaction* can be understood in a different way. Of all the five activities, it is only when the police engage that they actively fulfill their mandate of peacekeeping in the eyes of the community. As previously argued, the two most important assets that the police officer has to fulfill his mandate are common sense and discretion, both of which are imbued in the officer from training and experience. Furthermore, the practice of common sense and discretion requires the officer to understand the *transcendental horizon of experience* – the ability to interact in the present with an understanding of how it relates to the past and how it might relate in the future. Thus for peacekeeping to be effective, any information needs to be understood not only in the situated interaction but contextualized in a larger sphere of knowledge and experience. It seems that mobile technology is unable to contextualize information in this way and hence, may forcefully move the practice of peacekeeping in a different direction. The police will respond, within reason, to the demands of a community and concentrate on one crime rather than another. The documenting function of mobile technology at present does not recognize any particular use of discretion. Thus if the police officers want to respond pro-actively to demands within this community and retain their capability as peacekeepers, then they will feel inclined to de-couple from mobile technology. Until mobile technology allows for an understanding of any particular contextualized situation then it can serve as a hindrance to the practice of peacekeeping. When the police officer does de-couple this is because of the conflict between discretion and over-documenting.

This argument relates directly to recent research on the effects of MICT enabled interaction on traders in the Middle East. Al-Taitoon (2005) explores the shifts from sensemaking, routines, and norms that govern interaction in local settings, towards sensemaking that accommodates remoteness and mobility. Al-Taitoon (2005) concludes that the optimal

compromise for MICT use entails adopting a loosely-coupled system that allows discretion to reflect the autonomy characterizing the nature of speculative work.

In a similar way, during the engagement, the police officer will at some point have to act according to the requirements of the situation. He can make an arrest or give a warning – the police, as argued before, have a right to use their discretionary power as long as it is not systematic. Discretion is at the heart of community policing and does not imply doing as one pleases but is bound by norms – professional, community, legal and moral. However it is here, in the realm of discretion, where any relationship between mobile technology and the police becomes controversial. Suffice it to say that discretion is a much disputed and much debated issue in the police. As stated earlier it is not within the remit of this PhD to debate this, but what this dissertation accepts is that peacekeeping would not exist without discretion and that peacekeeping is the mandate of the UK police. How then, in the final stages of engagement, where the police officers decide what course of action to take and where discretion comes into play, does mobile technology alter the process? For the answer, the documenting function of mobile technology must be looked at. Excessive documentation generally limits discretion (Ackroyd 1992; Manning 2003), sometimes so much that documenting processes are willfully ignored. For example, when the police arrive at an incident, they are supposed to log this information into the system via the MDT and likewise when they leave the engagement they are supposed to also log this into their MDT as well. However, from interviews gathered, it was discerned that the reason the police officers virtually never did this was because they disliked the idea that they were being ‘supervised’ from above. There have even been incidents observed of police officers turning off their MDT after an engagement to discuss the action taken. This subsidiary role of accountability that mobile technology plays in operational police work can be seen as a grey area. There is evidently a tension and some *situational discontinuities* may be a result of this.

6.5 Summary

The consequences of this analysis have ramifications for the understanding of mobile technologies in policing. The first is the consideration that mobile technology use is characterized by discontinuities in all police units surveyed. With the *Framework of Virtuality*, it is argued that those discontinuities are a consequence of modularization and de-contextualization. By creating potential ambiguity, the interaction with mobile technologies

tends to decrease as uncertainty increases in relation to the activity and locale of work. In fact, for instance, in RV and Traffic units there is more uncertainty in the *Engaging* activity than in SOCO. Given the same mobile technologies, SOCO are more intensely coupled with technologies because of the more certain environment in which they operate. Furthermore, to fulfill the role of peacekeeping the best practice for the police is to de-couple from the technology. From the examples it emerges that this is because the technology itself is not neutral and thus when there is excessive documentation it can force the police to change their actions and as a result not fulfill their mandate. Secondly, peacekeeping requires the full, situated attention of the police officer in the real world and anything less is not only a danger to the police officers but moves them further away from their community.

What is the relationship between the police officer and mobile technology? Mobile technology facilitates police work but there are certain caveats to this statement. Thus far, the role of uncertainty as a factor in the relationship between mobile technology and operational police work was analyzed and the role of peacekeeping with its correlated themes of discretion and accountability was introduced. The two factors that account for the *rhythms of interaction* – peacekeeping and uncertainty – have been identified. It is these factors that determine with what intensity the mobile technology is used; hence any discussion of the usage of mobile technology in operational police work must be based around an understanding of the effects of these two factors on any context of operational work. The salient feature of all this discussion, if the idea of the police proposed earlier in this chapter is accepted is that peacekeeping must be at the forefront of all operational policing concerns as the police are primarily peacekeepers. Therefore, when a police officer engages his attention and his resources, they must be as un-modularized and as contextualized as possible. This is a fundamental requirement of the act of peacekeeping.

If the activities of policing are looked at under this light, waiting entails little uncertainty on the part of the officers. Traveling contains low uncertainty as officers are in the preparatory stage of engagement. In engaging, there is a deep uncertainty that surrounds police work and the information system becomes the environment (the people and the settings). From these patterns *situational discontinuities* can be understood as a reflection of the process of policing as peacekeeping – that decoupling from mobile technologies is as much integral to the performance of police work as coupling with mobile technologies. Here there is a radical departure from traditional ways of thinking of technology as the *holy grail* of policing

practices. This is not to argue against mobile technologies, as they are inevitably tied to modern police work, and enable its functioning as citizens know it and expect it, but to establish a pragmatic understanding of the problem domain through the acknowledgments of the limits/problems of being-with-mobile-technologies during the performance of police work.

Now that the relational nature between MICT use and police work has been explored in terms of a number of situations, the potential effects of MICT use on the intentionality of policing can be discussed. In the following chapter, the problems inherent to MICT use in police settings will be addressed. In addition, the following chapter will attempt to conceptualize, in more details, the relation between mobile technology use and the use context.

CHAPTER SEVEN: DISCUSSION

Up to now, the aim of this dissertation has been to provide a detailed analysis of the role of mobile technologies for operational policing. To accomplish this three examples of operational policing in the UK were explored; the roles of Response Vehicle officer, Traffic officers and Scene of Crime Officers. The way in which operational police work was conducted with a number of MICT in the physical contexts of the police cars and the incidents was explored in depth. The analysis highlighted five general activity types particularly pertinent for the coupling and decoupling of mobile technologies. The concept of *rhythms of interaction*, characterizing the alternations in intensity of communication with mobile technologies as typified by the five general activity types in operational police work, was put forward. By uncovering the grounds of this relational nature, the dissertation can now proceed to tackle the central question concerning the effects of MICT on the intentionality of police work.

Throughout this chapter, first the issue of uncertainty is explored and reconnected to issues of centralization and decentralization of decision-making and information requirements with the aim of constructing a framework for understanding mobile technology use in relation to particular situations of work of the police in the UK. Then, the possible effects on police intentionality caused by MICT use are determined by exploring the issue of peacekeeping. Lastly, an overall view of the effects of MICT will be put forward in a way as to balance both the positive and negative sides of these technologies. The section concludes with an understanding of MICT in police settings that moves beyond the unilateral views of current paradigms. By doing so the dissertation attempts to move beyond the current understanding of the role of mobile technologies in police organizations and advance a more practice-oriented understanding of the use of MICT in modern organizations.

7.1 Discussing the Uncertainty of Policing in Relation to MICT Use

Chapter Six has analyzed how the three roles of RV officers, Traffic officers and SOCO have different modalities of interaction with mobile technologies depending on a number of

different factors, of which uncertainty and peacekeeping are argued to be the most important ones. This section will discuss uncertainty in more detail by relating it to existing Information Systems theories. First the technological potentials of MICT in police settings will be explored. Secondly, the difference between data and voice communication in MICT will be investigated. Lastly, on the basis of these two discussions, a framework for understanding MICT use in relation to particular situations of work of the police in the UK will be constructed.

7.1.1 The Technological Potential of MICT in Police Settings

MICT have enabled new ways of working and of interacting with physical environments in police settings. These new ways of working can be seen as a revolution (Sørensen and Pica 2003). This revolution of mobilization of interaction as defined by Kakiyama and Sørensen (2002a) offers notionally infinitely unexplored technical possibilities of friction-free access across boundaries to any person and any service at anytime from wherever, through whatever medium may be desired. In fact, mobility has become the new buzzword in both academia and industry, and not without a valid cause.

For instance, the redefinition of many cultural rituals of interaction are apparent, especially in younger generations of mobile technology users in urban areas (Fortunati 2000; Kopomaa 2000; Geser 2002; Palen 2002). For them the city has regained meaning and the way in which they contact their friends and arrange to meet have changed. There are many contentions in regards to this type of on spur-of the-moment, instantly organizing culture. The most dramatic conceptualization of this is probably the idea of fluid organizations whereby the need for planning is superfluous as it can be done when the need arises (Kakiyama 2003).

The same is true for the new mobile post-modern workforce, so well discussed by Kakiyama and Sørensen (2004). The new workers, defined by the mobile technologies they use to produce and support encounters, are ones that seem independent of space and time. At the same time these same individuals have *everywhere to go but nowhere to hide* (Sørensen 2004). These tools allow for a worker to contact and be contacted by customers, superiors and co-workers at any time and anywhere. In addition, MICT are the channel to access corporate information systems, and thus allow for the consultation and update of a number of databases relevant to the work. The logic of such a scenario is straightforward: the worker is

now more independent, more efficient and better prepared to face customers' demands. The trend suggests that notebook computers will represent a larger and larger proportion of personal computers sold. The desktop computer has broken loose and is turning into a wirelessly connected notebook, palmtop and smartphone — the hub of modern professionals' work (Kakihara 2003), and in turn that of modern police officers.

As argued in Chapter Two, the characterizations of the mobile revolution tend to focus on physical human movement in some form or other supported by an MICT that may or may not be networked to a telecommunications or Internet infrastructure. However, there are many additional facets of mobility related to the way workers, and consequently police officers, access and use information. Technological possibilities are more radical than merely in terms of people moving around carrying technology (Urry 2000a; Kallinikos 2002). There is also a radical *mobilization of objects*, for example parcels and containers criss-crossing the Earth whilst tracked by advanced GPS technology, as well as a *mobilization of signs and symbols*, exemplified by the rapid change from viewing CNN news page to the BBC news page on the World Wide Web (Urry 2000a; Kakihara 2003). In particular there is an experience of a rapid increase in the *mobilization of interaction* between people as well as between people and information services (Kakihara 2003). This last aspect can be used as a way of explaining the essential core in the technological potential of the mobile revolution. In fact the mobile revolution is primarily one of mobilizing human interaction as well as interaction with information services. In this respect it began with the Victorians' widespread diffusion of the telegraph infrastructure around 1900. Standage (1998) argues that Queen Victoria would be less impressed by the Internet than by the global system of human air transport since many of the challenges the Victorians' were faced with when introducing the telegraph were similar to the ones faced when the Internet or other information infrastructures were introduced. However, the commercial development of MICT began when the police force in Chicago began using radio technology (Agar 2003).

According to Kakihara and Sørensen (2002a) there are three distinct technological potentials. Firstly, the *spatial* aspect implies that individuals can engage in interaction while being on the move. In situations where individuals do not have access to mediated interaction, the participants will generally be rigidly confined to interact when located in the same place. Mobilizing interaction allows participants to move more freely while remaining in touch with each other. While mirroring the surface of this revolution, the spatial aspect of mobile

technology – in terms of the virtualization of interaction of geographically distributed networks of people and objects – does not necessarily replace co-located interaction, as this dissertation has argued with the case of police officers.

Secondly, the mobilization of interaction alters the *temporal* aspects of individuals' lives — the role time plays (Lee and Sawyer 2002). Traditionally time is thought of as the linear ticking of the clock, but in a world of highly mobilized interaction, the perception of time plays an important role. In theory, linear clock time has been shrinking as people have a faster point-to-point exchange of information and services. As exemplified by the police, there are tensions between extemporarily of situated action and the linear temporality of MICT use.

Thirdly, and perhaps most importantly, the mobilization of interaction introduces a radical change in the *context* for interacting with others. When only face-to-face interaction is available, interaction is locally conditioned. People employ routines to support their own definition of the context of interaction. For example, they close their office doors or leave them half-open to signify that they are busy or semi-busy. In social gatherings, people display a range of sophisticated ways of arranging who is speaking, and what they speak about. This in part reflects the deep need to elicit what others think and say about oneself (Goffman 1959). The mobile revolution therefore signifies flexible coordination of contexts. MICT allow individuals to cut through others' contexts (e.g. people and institutions). Because the receiver does not automatically expect the initiator to know where they are, what they are doing, and more importantly, if they are in the mood to talk, they can without hesitation be contacted. In synchronous interaction such as phone conversations, the initial discussions are often arrangements of where people are, what they are doing, whether or not the discussion is appropriate and for how long the interaction will last (Weilenmann 2003). For asynchronous interaction such as email, the context is abstracted and at the discretion of the receiver — individuals can choose where and when they check email messages. Instant messaging applications such as ICQ or MSN Messenger offer simple means of indicating the context and the preferences to interact.

This discussion highlighted the fact that voice and data modalities of interaction appear different in many aspects. In the next sub-section the difference between voice and data services will be discussed in more details.

7.1.2 The Difference Between Data and Voice Modalities

Interaction with and through mobile technologies can take place in different modes. Drawing on media richness theory (Daft and Lengel 1984; Trevino, Lengel et al. 1990) and literature on interaction overload (Ljungberg and Sorensen 2000; Mackay 2000), these modes can be more or less intrusive and can involve different inputting mechanisms. Simplistically, according to media richness theory, voice, text and face-to-face are all modes of communication that hold some specific values for the actors involved. When delicate issues are discussed, face-to-face communication is the most appropriate mean of communication since it minimizes the number of ambiguities. For instance for Daft and Lengel (1984) *organizational success is based on the organization's ability to process information of appropriate richness to reduce uncertainty and clarify ambiguity* (p.194).

This is in strict accordance with the framework of Virtuality and the concepts of modularization and de-contextualization associated with virtual forms of communication. Drawing on Ljungberg and Sorensen (2000), interaction overload is based on the interaction context and the interaction modality. Communication can be obtrusive, when it imposes an obligation to notice or react, unobtrusive, ephemeral, when it exists only in the activities performed and leaves no trace, and persistent, when it leaves an external trace. Thus various modalities of interaction can be characterized in terms of intrusiveness, de-contextualization, modularization and persistency. Table 18 encompasses the use of voice and data through mobile technologies in terms of a number of discussed variables.

INTERACTION MODALITY	Voice	Data
CHARACTER		
Intrusiveness	High	Low
Persistency	Low	High
De-contextualization	Low	High
Modularization	Low	High
Function	Coordinating	Documenting
Time Orientation	Polychronic	Monochronic

Table 18 - The Differences Between Data and Voice Services

In addition, the police roles studied implied shifts between monochronic and polychronic working patterns (Lee and Sawyer 2002). When waiting in the car and in particular when driving to and incident, the officers simultaneously coordinate, drive, read out information from MDT, and require information from the control room over the radio. The driver will continuously be kept updated with background information about the incident delivered

directly to the MDT or negotiated with the control room over the PR. The other officer will also support the driver in navigating intersections. This polychronicity radically changed when officers engaged in the incident where the temporal behavior of events and tasks demanded monochronic temporal behavior of the officers. Indeed, the main reason for RV cars being double crewed when attending domestic incidents is for each officer to engage in one of the parts of the incident and in this way defuse the situation. The rhythms of polychronic and monochronic temporalities also imply coupling and decoupling of various mobile technologies. Whereas there is relative flexibility in interaction modalities whilst officers are waiting around in the car, this is rapidly transformed into a highly technologically hostile environment where even the unobtrusive PR may not be allowed to disturb the attention of the officer. Paradoxically, voice interaction is generally considered obtrusive (Ljungberg and Sorensen 2000), but in these situations, the personal or car-mounted radio offers the only possible *modularization* that will not act as an even more obtrusive virtual filter between the officer and the incident. This can be explained as the radio offering unobtrusive awareness of the situation as well as a lifeline to colleagues (Schmidt and Simone 1996; Heath, Knoblauch et al. 2000). As illustrated by the various ethnographic tales on policing, the phenomenon of interaction with mobile technologies manifests itself in different forms depending on the nature of the locale of interaction and the nature of the task. In the next sub-section, these issues will be explored and related to the dichotomy of voice and data interaction.

7.1.3 Uncertainty, Information and Implications for Police Work

Uncertainty is the first factor that will be discussed in relation to MICT use in the three different police roles. This will be done in terms of the information requirement and generation of the units studied, and it will be done in terms of comparing and contrasting RV and Traffic officers to SOCO.

SOCO require an intense data communication throughout their visit at the crime scene, and are required by law to document every action they take. The Traffic and RV officers' job is more abstract. It is about community peacekeeping and does not require a continuous engagement with mobile technologies for information. RV and Traffic generally need information to be delivered immediately but only when the environment demands it. The SOCO, on the contrary, is tasked by the information already contained in the system.

Drawing on decision-making theories as documented by Ciborra (1993), the idea can be advanced that while RV and Traffic officers mostly make non-routine decisions based on approximate information, SOCO make routine decision based on precise information. Therefore, the two types of decision-making differ fundamentally both in the collection of information and in the use of information. While the SOCO is guided and supported by the information in decision-making, RV and Traffic are guided largely by the environment and supported by some subsidiary relevant information.

Furthermore, under the assumption of police as peacekeepers, police officers are more like professional social workers than the contrary narrow view of blue-collar crime-fighters. This distinction is important for understanding both the organization of police and the outcomes of current technological initiatives. The crime-fighter view believes that the primary purpose and action of police is to apprehend offenders, where offenders are the product of their own rational choice of becoming criminals. The social worker view suggests that crime results from a variety of social, economical and political reasons, and the role of the police officer is that of building communities and teaching crime-prevention strategies to citizens (Goldstein 1990). The emphasis on crime fighting suggests a legalistic and mechanistic understanding of the organization and role of policing, where there is a bureaucratic and military-like decision-making structure. Alternatively, the emphasis on social work recognizes the uniqueness of incidents, where there is a high degree of discretion in decision-making and a high reliance on contextual information – in collaboration with citizens and as perceived by the officers in the environment of the interaction. Whilst the emphasis on the activities of police is largely that of a social work, it must be accepted that the crime-fighter view has validity up to a point. What is needed is a balance between the two where the social worker ethos has primacy. However, at present technology is skewed more towards the crime-fighter view of the police. In practical terms, this means that the services that are being designed for MICT do not support the actual actions of police officers. New technological initiatives must take into account the social work aspect of police work to be effective.

The discussion now turns on how uncertainty can be understood in regards to the development of mobile technology for the police. The first problem encountered is how to conceptualize uncertainty in a framework from which one can develop technological solutions. One way would be to schematize the relationship between work activities, mobile

technology use and the environment of work. Uncertainty is caused by the nature of work and the nature of information in respect to the specific activities of a particular environment.

Work can be generally divided into two distinct categories: structured – one which requires a high degree of routinized steps and a low degree of complexity – and unstructured – one which requires a high degree of improvisation (Ciborra 2002) and has a high degree of complexity (Mathiassen and Stage 1990)¹². Thus, a structured work task can be defined as one that has a repetitive character in its information access for problem resolution. An unstructured task is one that has to be supported by a dynamic access to information through multiple channels. For instance, a directory assistance operator performs mostly structured information gathering while a market analyst relies on multiple channels of information that are dynamically changing.

The dissertation's contention is that the nature of work, due to its complexity or lack thereof, in part determines the successful or unsuccessful usage of mobile devices. As well as work being defined as structured or unstructured, it can also be described in terms of environmental characteristics, essentially how dynamic the environment of work is. This can be active or passive. An active relation can be characterized as one that requires constant attention to the physical space of interaction. The physical space is the one dictating the line of action to be followed by the worker and is full of emergent details. An example of such work can be one that involves either physical attention (e.g. a telephone engineer), visual attention (e.g. a policemen walking across a high crime area) or a mixture of both. The success of mobile devices in active work environments is dependant on the vagaries of the situated interaction. For instance, in a highly active environment, where there is significant uncertainty, it can be argued that only voice-supported services should be adopted.

In Table 19 below the roles analyzed in the case study can be envisioned. The SOCO would be located in the Passive/Structured cell. SOCO visit the crime scene after it has been resolved and thus their environment can be described as passive. Furthermore, when they are at the crime scene their gathering of evidence follows a routine pattern. Their relation with mobile technologies is structured. The usage of mobile applications in this cell is very high

¹² This distinction can be considered too simplistic, as there can be routine complex tasks. However for the sake of the argument this bipolar distinction allows for a rudimentary but useful initial step for understanding work in relation to MICT use.

because it allows for Virtuality to enter the work environment in multiple modalities and undisturbed by environmental limitation both physical and informational. RV and Traffic, during the engagement activity, would be located in the Active/Unstructured cell. When RV and Traffic arrive at the scene of incident they immediately embark on gathering situational cues, evaluating the safety of the situation, assessing the reliability of the information gathered from different mobile devices, and most importantly reacting to the emergent characteristics of the situated interaction. The adoption of mobile applications in this cell is generally not high and the mobile devices used are normally voice enabled. This reflects the uncertainty of the situation due to the fact that it is an active environment of work. As far as police work is concerned, when police officers are in an active environment they are also in an uncertain one.

ENVIRONMENT TASKING	MOBILE DEVICE INTERACTION	
	STRUCTURED (Routine Access to Information)	UNSTRUCTURED (Ad-hoc Access to Information)
ACTIVE (Environment Tasking)	High Usage of Voice Services on the go Low Data Usage on the go Concentrate on exchange rather than processing of information	Limited Usage of Mobile Services while on the go Mostly Voice Services Concentrate on routing and filtering of information
PASSIVE (Technology Tasking)	High usage of both voice and data services while on the go Need for added intermediaries	High usage of both voice and data services while on the go Pressing need for information and interaction filtering Need to integrate stationary and mobile equipment

Table 19 - Mobile Technology Use in Relation to Work Environment

Table 19 shows that the more intense the relationship with the environment becomes in terms of the emergent character of the situation, the more visual and hence “non-virtual” attention is required (e.g. the RV and Traffic officers). The only modality of mobile interaction that gains in importance in active situations is voice services. In active situations, coordinating activities are important. For instance, when RV or Traffic officers notice a situation that requires police attention, they will call via the PR for help. This points to the fact that the best way to communicate in time critical situations is by voice because it is more contextualized and a more immediate information modality.

From the matrix it can be seen that there is a different relationship to mobile technologies when RV and Traffic officers are in an unstructured but passive environment. This reflects the activity of driving to an incident where the police officer will be coupled with both voice and data services on the go. This analysis is concurrent with the descriptions of the rhythms of interaction and the discussion of uncertainty. The matrix reflects the necessity of decoupling from mobile technologies in time and safety critical and thus uncertain situations. This matrix further shows that mobile technology does not always decrease uncertainty as posited by previous studies and the current consensus of thinking on technological initiatives in the police. In fact, the matrix shows that the right way to deal with an unstructured and active environment, in other words a highly uncertain one, is to contextualize the modalities of interaction through decoupling from all but the most necessary and contextualized mobile technologies. If this matrix is accepted as an accurate reflection of police work, then the conclusion must be that the decoupling caused by uncertainty is the appropriate way of acting with the usage of mobile technology.

In the case of SOCO, where the usage of data is high and thus the de-contextualization modality is also high, there is a need for added intermediaries that will solve contextual problems that cannot be handled by the computerized system. For instance, the short-term improvement of SOCO work, as demanded by SOCO themselves, would be to employ an expert administrator that could assist in doing the work of documenting the findings into the mobile devices and then into the system (Pica and Sørensen 2004). This would enable SOCO to concentrate on the core tasks of finding and collating evidence as well as reassuring and advising victims, rather than being distracted by excessive data inputting activities. It is worth mentioning that contrary to the perceived benefits of more advance mobile technologies

where it is claimed that intermediaries are removed, this dissertation sees the need for the provision of at least one extra employee in the process.

Although uncertainty is much reduced in the work environment of SOCO, there are still problems associated with the use of MICT. These problems find their root in the framework of Virtuality, where the increase in de-contextualization suggests a re-intermediation process. In the long term there is a need for the introduction of mobile technology that will minimize the replication of information. As an example the Tablet PC was mentioned as a means for supporting the recording of information, with the additional requirement of a more rugged version since fingerprints primarily are lifted using aluminum powder, which is highly destructive to computer technology. Due to the de-contextualized nature in which the SOCO work, another possible development would be encouraging the ability to communicate with police officers who originally resolved the situation at the scene of the incident. This would enable the SOCO to have a more contextualized impression of the scene of crime.

RV and Traffic officers demand a more efficient filtering of information, as they have very little time to react when engaged at an incident. This means that any modus operandi for voice-to-voice communication should be based around an unstructured model. If mobile devices were used for a support function (communicating versus documenting work) as in the case of RV and Traffic, it would permit a higher flexibility during the resolution of incidents. RV and Traffic officers would benefit from greater accessibility to horizontal awareness systems. However, this accessibility whilst it could be accessed in a passive/unstructured environment would not be much use in an active one. The main recommendations from when the police engage in an active environment are twofold: firstly, to make voice communication as flexible and as unobtrusive as possible; this could partly be done by the encouragement of the use of mobile phones. Secondly, there is a need simply for a change in attitude regarding the usage of mobile technologies in active environments. In effect, this means an acceptance on the part of the organization that mobile technology will take second place in an engagement in deference to the police officers' contextualized understanding of the situation. As yet, there are no mobile technologies in place to replace this asset.

Thus SOCO need more of a synchronization function that structures their work, Finally, RV and Traffic need real time access to information and to communicate with different parts of the organization. Across the roles studied, the critical success factors of mobile devices, in

terms of perceived value by the officers, are 1) immediacy of communication with colleagues, 2) awareness in terms of geographical information on incidents and proximity to other officers and 3) support for both formal and informal communication. The recommendations stemming from this discussion can be divided into technical, informational and organizational issues. Within the technical domain, many studies are required to understand how particular roles work when outside of the organization. Most complaints were regarding poor adjustability and poor readability of mobile data technologies at different stages of the day. These problems are probably the most trivial but the ones that can hinder mobile police work most significantly. Understanding the easiest mode of interaction, given activity type and nature of context of work can be of great help. For instance use sounds and voice activation for people driving, and integrate the GPS into information systems. On the informational side, problems with too much or too little relevant information at hand seems to be common. Filtering is still key to mobile work. Understanding what is needed, when and which form is critical especially for immediate responses. On an organizational level, work is increasingly geographically distributed and well connected. Reliance on mobile devices is rising and is set to steadily increase for years to come. The choice of appropriate technologies must reflect the current practices in the actual context as well as the capacity of technology to create new efficient form of working. More awareness among the role's functions can only ameliorate the fluidity of mobile work. Awareness though should not be confused with active surveillance.

7.2 Discussing the Peacekeeping of Policing in Relation to MICT Use

This section will discuss peacekeeping in more detail and will form an opinion about how MICT use influence and has the potential to influence the *intentionality* of policing. Peacekeeping takes center stage and is explored in terms of public policy and political science views ranging from Roman Law to Liberal Democracy theories. Such connections are useful in reassessing the implications of MICT use in police settings and venturing to answer the research questions of what the effects of MICT are on the intentionality of policing.

7.2.1 Peacekeeping and the Implications of MICT use

There is no doubt that the police associations now support new mobile technologies. It is part of the idea that more information in reach of the police on the streets will result in better policing. According to ACPO (2005) *We have long argued for greater investment in technology and the case and custody system being developed to allow the police, courts and the CPS to communicate electronically will have a major impact on efficiency and saving the time of front line police officers. It will also fundamentally improve the quality of service to the public.*

In fact, as DeLint (2000, p.71) argues *the quest for the unification of police through communication technology has constantly rekindled the modernist dream of matching an accurate representation of the social world with a legitimate means of intervening in it.* However, there is a false presumption that more technology, and more spending on it, means better police performance. Indeed, technology may transform policing. According to research however, generally the increase in technology budgets tends to result in a waste of funds, as the technologies are not even used. On occasion, the results are even hazardous to policing culture (Ackroyd 1992; Manning 2003).

As a consequence, there is a lack of consensus on how effective mobile technologies are. However, technology is commonly seen as the holy grail of policing and as such the drive of current mainstream research and policy is to see how to pump more technology into police work (e.g. Chu 2001). Numerous studies exist arguing that the increased use of technology leads naturally to better efficiency, faster response times, and better resourcing and organizing of policing, and improved community safety. Such studies lead one to believe that the way forward is to increase the number of technologies and improve their speed and power. Such a view ignores the complexity of the police intentionality. Further studies on the use of technology by police point to the alienation of police offers, the invasion of privacy, excessive social control, and excessive mechanization of the process of policing (e.g. Manwaring-White 1983; Marx 1988). The fact is the use of technology can and does alter the interaction with people and environments. This leads to technology affecting the police and their intentionality. Thus, serious questions need to be asked about whether an uncontrolled

change of intentionality would be dangerous in its implications for society as a whole, as it would distort the commonly agreed balance between freedom and social control¹³.

These two concepts are reflected since ancient times, as their root can be found in Roman times. The Republic of Rome invented individuals' public and private rights within a non-hedonistic view of society (Ruiz and Guarino 1998). The freedom of citizens is not unlimited and as the Romans argued *usque ad sidera, usque ad infernos* (All the way up to the stars and all the way down in hell). Thus, an individual's freedom ends when it invades that of another citizen. The role of policing since ancient times has been threefold: 1) to operate *pro bono pacis* (for the sake of peace), *ne cives ad arma veniant* (to prevent that citizens would come to arms), and to preclude *juris diczio* from the part of the officers (the police could not judge who was right or wrong in a dispute, but only refer this behavior to a court that then had the power to make a judgment) (Ruiz and Guarino 1998). Seen in this light, one can argue that the transformation of police practices through a change in their intentionality could in turn transform British society. To understand the delicate nature of the intentionality and the implication of adopting new mobile technologies one needs to understand policing in Britain.

The primary intentionality of the police in Britain is to uphold order in society. Therefore, any discussion of the application of advanced technologies must be seen in the light of how they might unbalance the role police have in upholding this order. The United Kingdom is unique in seeing the intentionality of police in this way. Generally the intentionality of police is primarily seen as the enforcement of order, where *order* refers to standardized law enforcement. Law enforcement, however, is closer to a Hobbes' *homo homini lupus* (men is similar to a wolf) definition of human beings, where the State tends to be repressive and sees the citizen as an antagonist (Hobbes 1651). However, this definition is not appropriate for the intentionality of the police in the United Kingdom. The intentionality of UK police is instead the implementation of order through the act of peacekeeping, where peacekeeping is the maintaining of order within agreed social principles. Social peace is then a sort of harmony reached through the social projection of concord.

Social peace is not reached through a continuous repression of behaviors, but through an understanding of human action and its motivation, whereby the role of police is also that of

¹³ To understand Political Science theories in more depth turn to Appendix B.

reminding and explaining proper behaviors to citizens. As Baruch Spinoza (1993), the illustrious philosopher of tolerance argues *humanas neque contemnerere neque lugere sed intelligere* (Human actions shouldn't be deplored nor derided, but understood). Thus, peacekeeping relies on the discretion of police officers and on their common sense, much like the work of social workers. For example, the current problem of anti-social behavior by teenagers cannot only be repressed, but need to be understood, and the root problem of poor parenthood solved through a number of social services and not repression alone.

In fact, according to rich field studies documenting police activities, including this dissertation, police officers exercise their intentionality through talking to individuals (both giving suggestions to victims, and threatening arrest for an inappropriate behavior), finding solutions or mediations amongst parties, withholding people with dangerous behaviors, and giving a sense of presence, but not draconically enforcing the law (Miller 1975; Klockars 1985; Goldstein 1990; Manning 2003). This does not mean having an overly liberal attitude towards law breaking, but to have a more effective approach to its resolution that still conforms to democratic ideals. Thus the essence of police work is contained in common sense, discretion and a situated understanding that acknowledges the unwritten norms of a community.

In the UK, the agreed social principles of the society are reflected in common and statutory law. More significantly, they are reflected in a non-codified, relatively fast changing system of localized socially accepted norms of behavior (Manwaring-White 1983). These socially acceptable norms of behavior influence police work as much as common and statutory law. That is, as something becomes more socially acceptable it might be against the law, but nevertheless tolerated because of socially accepted norms of behavior within the community. Thus, what makes peacekeeping different from law enforcement is the flexibility provided by the extra consensus reached between the community and the police. Seen in this light, the police are not anti-crime machines but priority seekers. Therefore, the accepted norms of the community are the benchmark from which they deal with a community. Already one can begin to understand that due to the complexities of peacekeeping, special attention must be paid to the introduction of potentially process altering technologies. As yet, system designers have not been able to take account of these factors in the production of technology (DeLint 2000; Bovens and Zouridis 2002). Thus, how can current and future technology co-exist beneficially with police intentionality?

A nebulous understanding of the ultimate strategy of the implementation of MICT in the police leads to a general mistrust at the most basic level. For example, Manning (1997) argues that *it would be easier to assess the value of technology strategy [in police work] if we were able to define exactly to what end the technology would be applied and in what ways it could be expected to work*. One of the principal benefits of the intentionality of peacekeeping is that it is inherently flexible. Therefore, it cannot be wise to have this flexibility subordinated by the characteristics of any particular mobile technology that the police might at any time employ. Technology may provide a subtle shift in the intentionality of the British police that could in turn transform the actual role of the police as peacekeepers into law enforcing machine. This would create a significant change in the practice of policing of Britain (again here the example of speed cameras could be employed).

The promise of technology to improve the effectiveness of controlling crime, as well as enhancing professional status and organizational legitimacy, has resulted in a long-lasting close affinity between technology and police work (Ericson and Haggerty 1997; Manning 1997, 2003) to the extent that the image and practice of police is shaped in part by information technologies. This has been exacerbated by the fact that Britain is now at the forefront of the use of information technology to support all aspects of their service delivery in operational terms (Povey 2001). This development has been labeled e-policing and is strongly supported by the government. E-policing provides information to officers through mobile computing. In police terms this means immediate access to police databases through multiple technologies and arguably a better use of resources. On the surface this appears to be a commendable improvement in police. However, to understand better the implications of technology upon British policing it is useful to refer again to a key study by Ericson and Haggerty (1997) in Canada.

In police settings, the information technology supports auditing, monitoring, and managing risk (Ericson and Haggerty 1997). However, the reporting system curbed individual officers' discretion and the supervision of activities was intensified. The study concludes that the use of information and communication technologies changed the structural aspects of policing through limiting individual discretion, leveling hierarchies, and questioning traditional divisions of labor. Traditional police command and control structures were replaced by mechanisms regulating police conduct through surveillance. If the same information

technology that was implemented in Canada were implemented in the United Kingdom then the results in the long term would be unfortunate for the role of police as peacekeepers.

Apart from transforming police culture and operations, the fact that technologies may fail has to be taken into account. When this happens in the policing environment, the consequences are hazardous and expensive. Another study of the use of technology in the 1970s and 1980s finds disappointing results of various technological innovations such as computer-aided dispatch systems, attempts to reduce response time, car locator and tracking systems, crime mapping techniques, and management information systems, all of which failed to reach expectations and in some ways exacerbated original problems. The study goes on to conclude that new technologies have less positive effects on police practices than their proponents predict or prefer (Manning 1997).

It is fair to say that information technologies are not only employed because of their functions, but also because of the image of police that the police themselves seek to transmit. Such an approach can result in costly endeavors with unlikely recuperation of these costs, let alone achieving the stated objectives. In a number of cases around the world, new technologies employed to enhance policing have been abandoned. Although they were adopted sometimes because the police asked for them, they are also adopted in response to public opinion, or political pressure. Face-recognition CCTV cameras in Tampa Bay, for instance, created much controversy when introduced, yet city officials promised greater abilities to combat crime. It was eventually used for the Super Bowl, the largest sporting event in the United States, and the police claimed that nineteen individuals were caught from amongst the crowd. The nineteen were eventually released, as the technology failed to properly identify any individuals. While the political controversy continued for months, few had realized that shortly after its implementation the police actually stopped using the technology because of the number of false-alarms. The project eventually became an embarrassment and was abandoned quietly (Stanley and Steinhardt 2002).

Technology may be a waste of police resources and time. Technology may also cause greater tensions with minority communities as many profiling algorithms contain racial variables. All those issues aside, however, if the technology could be made to work perfectly, would this mean that mobile technologies will have a positive role in policing? Even still the research is inconclusive. Technology, and particularly mobile technology, can facilitate police work, but

there are certain caveats to this statement. One such caveat is the practicality of the situation. Police work is both time-critical and potentially dangerous. During an engagement the police officer might be fearful for himself or those around him, and this feeling leads to uncertainty. This feeling of uncertainty is the most significant variable in any action that the police officer undertakes. For example, during an engagement where physical harm is threatened, the most important assets the police officer has are his physical senses and his intuitive grasp of the situation. His use of technology is dictated by an evident uncertainty; perhaps the use of his radio to call for back up will antagonize the people he is dealing with. In a subtler example, if the police officer is attempting to placate or move a crowd of people, he must act with a flexibility that does not countenance constant reporting of the situation – thereby disassociating himself from the people he is dealing with – and again there is no time to consult the technology. Thus uncertainty and practicality are the factors dictating the relationship between the police officer and mobile technologies.

Manwaring-White (1983) affirms that there is a lack of sufficient political discussion on these matters. Far too little discussion has taken place, both in parliament and in the public regarding whether the use of new technology by the police transforms the order in society. The new technology appears only to enhance information gathering, daily on the increase, while doing little to prevent crime. But Manwaring-White (1983) argues that it does attack the liberty of the individual to hold certain political beliefs or to support certain political causes, because the knowledge that files are kept on such beliefs intimidates, chilling action. She concludes with the bald statement that no amount of technology can replace the need to face up to the fundamental problems of society that reside outside of the competencies of technology (e.g. alienation, unemployment and feeling of oppression).

This section has dealt with how mobile technology might affect the police intentionality. However, this section has also diverged from this to discuss other factors concerning unfeasibility of mobile technologies as a facilitator of operational police work. In the next section there is a return to the concept of MICT and the impact on discretion. To understand the danger of this transformation it is important to understand that the strength of the police intentionality is contingent upon the relationship officers have with a community. Technology can become a burden that endangers the essence of policing by *enframing* a one-dimensional view of the world (Marcuse 1964) when it must be acknowledged that the world

can be both complex and subtle. In this light, police work does not have such close affinity with technology as previously thought.

7.2.2 Towards the End of Discretion? The Rhetoric of MICT

To summarize, firstly the British police have a legacy of restraint in the act of administering order - a fundamental characteristic that even the first police commissioner explicitly articulated in concomitance to the issue of authority. Secondly, the British police are based upon flexibility - or discretion - in the execution of the law, giving primacy to common rather than statutory law. This is represented by the fact that the British police are highly professional thus giving a degree of competency in the interpretation of the law to street-level worker - the constable (Newburn 2005). Furthermore, discretion and common sense open up an horizon of possibilities for the administration of order (Davis 1969).

As Heidegger (1977) has argued the horizon of possibilities are dwarfed by the usage of technologies. However, this dwarfing does not necessarily need to be of a negative nature, nor is it related strictly to the technical characteristics of mobile technologies. It is rather a mindset that equates the application of technology to a blind efficiency that forgets the subtleties of life and of the flexibility of a democracy. This is reflected also in the various eras of policing technologies in UK where the stress has been fluctuating between centralization and decentralization of the policing function, with this new century witnessing a double stress on local problem-solving on the one hand (e.g. the introduction of Community Support Officers), and on centralization and bureaucratization on the other (e.g. the introduction of common databases, inter-organizational information systems and surveillance systems).

Given this context, although mobile technologies on the surface give officers exceptional coordinating and documenting powers whilst promoting an internal accountability through the surveillance of police action, in practice they displace or suggest a displacement of the rules of engagement with the society by promoting mechanistic law enforcement and administration oriented action. This overshadows the more needed and elusive peacekeeping function that communities long for (Goldstein 1964; Goldstein 1990).

The use of technology may lead to a more authoritative police figure, leading the dissertation to question whether this is truly reflective of what the British public want. If the history and development of police in England is consulted, it is hardly improbable that such increase in the authority of individual police officers would be univocally welcomed (Manning 1997). This serves to pronounce the primacy of the non-technological activities of police work, namely the practice of discretion and the ability to understand a specific situation, and most importantly fruitful interaction with the community.

The American (USA) system, from which most technological innovation in policing are borrowed, has always been action oriented, involving weaponry, and has views of the public as a dangerous adversary (Manning 1997). It is not a leap of imagination to assume that by slowly adopting American techniques and technologies, there are a number of subtle transformation of societal relations. The introduction of most technologies in the practice of policing is driven by the specter of fear through the narrative of exceptionally dangerous stories (Glassner 1999). This narrative of fear is constructed by a number of agents, which directly or indirectly benefit from a more controlled and draconian society where the *status quo* is preserved and the real problems are overlooked in favor of more lucrative and easier to solve problems. In the case of the introduction of police technologies, it is not difficult to imagine a number of agents that can benefit from this culture of fear; technology manufacturers, service providers, conservative politicians, conservative religious groups, scandalist media groups, consulting companies etc.

This is also reflected by the fact that it is now common to think of police work in terms of the most extreme incident they attend. However, these represent a small part of the work of a police officer, and when designing technologies such scenarios should not be the base upon which technologies are built. The most evident example that is currently being covered by newspapers worldwide is that of brutality of the Los Angeles Police Department (LAPD) (Glassner 1999). Here, the argument that policing is reflected in the tools used to perform the job resonates true. The LAPD is given a large range of technologies when on the beat (e.g. guns, radio terminals, computer terminals, non-lethal weapons, fortified vehicles, in-vehicle cameras etc.) and through those means it transmits authority and builds a relationship with the citizens (Manning 2003). The availability of these technologies renders certain scenarios possible - such as the ones of gunfights and real time checking of citizens' information - and essentially suggests a particular role for the police officer. In the case of the LAPD this

would be an adversary to citizens as suggested by the rhetoric of the war on drugs and gangs. This is an acknowledged argument upon which the decision not to give guns to British police officers was based (Sullivan 1998).

Although it might be argued that mobile technologies have not changed discretion entirely, it is exactly for the symbolic value of these technologies, and for the rhetoric that surround these, that discretion might be at risk. As argued by Manning (2003), police officers tend to act differently when they feel they are being watched - be it from other fellow officers, other citizens, or the media. Usually their behavior, when under surveillance, becomes that of the standardized imposition of order. This may lead to mechanistically stopping and demanding fingerprints or iris scans merely because the technology is available and the law enables such conduct. Here the excessive documenting function of mobile technologies can remove the police from a community inspired approach. This coupled with the fact that they are unable to practice discretion comfortably due to constant surveillance, cannot mean anything else but the displacement from their original intentionality.

The current vision of mobile technology is pushing the UK police in the direction of the US, attempting to dwarf the discretion of the street-level officers and transforming them into system-level bureaucrats (Bovens and Zouridis 2002). This is not to suggest that police should do away with mobile technologies because they do facilitate the act of peacekeeping. However, it is within the use, and the vision of use, where the problems of these particular technologies lie. It is the contention of this dissertation that there are some essential parts of operational police work where the usage of mobile technology should be left to the police officer's discretion. This is most evident in the engaging activity, where the police officer both prudently and justifiably decouples from the mobile technology to perform satisfactorily the more important task of keeping the peace.

There is a technological attitude gaining momentum. This direction of thought threatens the current functioning of the operational side of police. Such a technological attitude on an abstract level makes perfect sense in a police bureaucracy. The perception that all use of technology is good tends to obscure the uncertain and contradictory role of police officers in a democratic society, and portray their work as a standardized task that relies on documentation and coordination. This is a means over ends syndrome where one loses sight of the *raison d'être* of a particular institution and concentrates instead on its mechanic

functioning (Goldstein 1964). It is easy to see how it may become customary to concentrate on documenting activities and inelastic enforcement of the law. In addition, this custom can in time lead to an unwritten policy.

There are inherent problems in the application of information technology in police organizations, and these problems may not reside in technology itself, but rather emerge in its use (Chan 2001). Information technologies, and the consequential new management culture of police can restrict the discretion and autonomy of the street-level police officer (Ackroyd 1992). It is now useful to briefly relate the changes in management culture of police to wider changes in public management. During the beginning of the 1980s a new management philosophy called New Public Management (NPM) was introduced by government around the western hemisphere to modernize services to citizens (Gruening 2001). The main tenet of NPM was that the more market oriented government services were to become (based on competition and on the view of citizens as costumers as in the private sector) the more this would lead to greater cost efficiency for government, without sacrificing the quality and the core aim of the service (Behn 1998). NPM, however, led to endless discussion about the compatibility between a democratic form of government and the way services were envisioned for citizen, as in the case of accountability (Hood 1995). Thus much like NPM, the new police management culture carried out through new ICT and MICT could have consequences for the way police action is carried out.

But what are the consequences of these restrictions on discretion and autonomy? As already mentioned, thanks to information technologies there is a transformation of police officers from street-level decision-makers to system-level bureaucrats, whereby discretionary powers are removed in favor of an unattainable utopia of perfect law administration where information technologies instead of being supportive are decisive to action (Bovens and Zouridis 2002). The most notable risk of this transformation is the standardization of the imposition of order, whereby no account is taken of the circumstances of individual cases and the administration of justice becomes rigid. The nature of human life is undermined by the logic of standardization of order – every single incident has a different background and demands social skills to be understood and solved (Barth and Arnold 1999). It is appropriate at this point to cite the great Cicero (1913): *Summum jus, summa injuria* (Extreme justice is extreme injustice).

There is also the risk of leaving decisions about the practical administration of justice to system designers, who know little about the realities of the street level. The best exposition of such claim, in a police setting, given by Hough (1980) states that there are four modes of policing conduct implicit in the design of technology that do not reflect the practice of policing: *the primary objective of the police is crime control, police activity is one of the primary determinants of crime levels, the police are organized and operate as a rational bureaucracy and police strategies are primarily those of deterrence* (pg. 351-52). Accordingly if technologies are not properly viewed, managed and used they can shift police attention to inappropriate measures, raise misleading public expectations, and impose restrictions to police operations (Sparrow 1991).

In addition, the culture of fear is leading many parties, such as the Home Officer, to force the police to adopt technologies that they believe they do not need. But by doing so there is a potential transformation of police intentionality through dwarfing discretion, a key component of British policing culture. According to Wilson (1989), *the good cops were street-corner politicians who controlled their beats in the common interest by selectively enforcing the rules, sometimes letting off people for behavior for which others were arrested. The not-so-good cops were those who either retreated from the confusion and dangers of the street altogether or mechanically applied every rule as the law required* (p.334).

Although one might not agree with the definition of the good cop, the definition of the not-so-good cop resonates well in light of the previous discussion. It further suggests that the current drive towards optimization, standardization, and surveillance might not produce the most attractive situation in terms of citizens-police relations. This further resonates in the most notable difference between continental police systems where there is a stress on the surveillance of the civilian population and British police systems where there is a concern with preserving the liberties of the population, not only in actual terms but also symbolic terms (Chapman 1970).

In turn the way in which MICT influence the structuring of work activities is complex and it requires a number of different angles to be holistically explored. In the next section the dissertation tries to wrap up this discussion by building an overall understanding of MICT in

police work and a number of suggestions on how to approach the possible drawbacks of the applications of these technologies.

7.3 Balancing the views of MICT use in Policing: Asymmetry and Trust

It is now useful to recapitulate the issues examined in this discussion, in order to form an overall view of the role of MICT in police organizations that balances the considerations made.

On one side, it is clear that MICT fulfill and enhance both the need of instant communication, the need for coordination, and the need for command and control. These are essential aspects for the functioning of police work from an organizational viewpoint. In addition, MICT fulfill the need of information that benefits police organizations both internally and externally – for inter and intra agency cooperation – and furthermore benefit the actual activities of individual police officers by transforming uncertainty into risk assessments. Overall these benefits can be grouped together to form the idea of the fluidity of work activities. This sorts of considerations are the ones most talked about in current literature on MICT in police settings, and represent what can come to be defined as a technologically oriented view of police, which is not inaccurate, but it is incomplete.

Despite the perceived benefits of MICT's induced efficiency, the discussion of the *rhythms of interaction* and the *Framework of Virtuality* for the police leads this discussion to make a few critical observations. Firstly, mobility, as it is envisioned in current research concentrates on the capabilities of the technical device, that being contained mostly in the practice of constant contact and monitoring, and the suppression of dead time. This idea proves myopic for many failures occur when nearly technically perfect technologies are introduced into any given organization. A sort of subtle resistance comes to the surface in the under-usage of the technical capabilities of the devices. This is most evident in the police context whereby officers purposefully detach from the technology in order to act in the environment. Even more so, the symbolic creation of surveillance in the form of the possibility of continuous documenting dwarfs many applications of mobile technologies. This sort of consideration is not surprising, especially when compared to ones in key literature in information systems; the

most obvious and powerful example is contained in Orlikowski's (1993) study of Lotus Notes, and how the further structuring and surveillance nature of the software created resistance from the users.

Furthermore, the quality of the service is not necessarily better as technology improves because it is not directly linked to the speed at which information can be accessed. For instance, the resolution of certain circumstances in a police setting does not rest solely on the availability of information or on the speed at which it can be accessed, but it requires a cautious understanding and interpretation of the social environment in which it unfolds. Hence no matter how fluid a mobile technology becomes it can nevertheless fail to provide the specific support that the police officer needs to resolve any given situation.

Drawing from the study of police and the concept of *rhythms of interaction* it is clear that ubiquitous usage of mobile technologies is not always a welcomed addition for it can endanger the intentionality of police action. In fact this discussion has shown that without considerable pressure from the organization it would be hardly possible to enforce the ubiquitous usage of mobile technology. If these considerable pressures could even be applied it would fundamentally alter the subtle practice of peacekeeping and place primacy on the technology rather than the individual.

In turn, from a more contextual or situated perspective, which emerges throughout the analysis and discussion of this dissertation, it is clear that other considerations are to be made. First, police officers need to decouple from MICT to concentrate all of their attention on the emergent environment in which they find themselves. This implies that MICT have to seamlessly disappear from the context of action to allow officers to make emergent decisions based on a contextual understanding. More importantly, what appears as a productivity enhancement, the all-the-time access to data and the possibility to document constantly, or rather what the literature defines as the end of *dead time*, is not a positive improvement in policing. On the contrary, police officers need to be inoperative, because being inactive and still gives a sense of presence in communities.

In addition, while MICT, by bringing the institutional context closer the situated context, promote a more standardized imposition of order – or what can be considered a more efficient and just law enforcement – these technologies also endanger the act of

peacekeeping, which relies on situated understanding. Thus, counter-intuitively there is a need for inefficiency in the imposition of order. Finally, although there is a stress on protocol, which can be easily inscribed and enforced through MICT, in order for police officers to develop effective peacekeeping techniques, there is a need for experience – which relies more heavily on trial and error and on a constantly evolving relational nature with an environment. MICT, thus far seem to promote an encounter-based nature with context rather than a relational nature. This can be reflected in adaptive and evolving mobile services.

In turn, the importance of fluidity suggested by the technical capabilities of mobile technologies is dwarfed by two interrelated phenomena that arise when mobile technologies are used. The first is the utopia of considering virtual and co-located interaction on equal grounds. As the degree of mobility increases so does the level of de-contextualization. De-contextualization produces a climate of uncertainty, especially when a situation does not go according to plan, which are the vast majority of situations – this is despite the fact that mobile technology might work perfectly during routine activities. The reality of operational police work is that almost all the context of work is unique and thus each situation requires a specific situated understanding which mobile technology at present and for the foreseeable future cannot provide. Secondly, the multiple channels of communication produce a climate of information overload that again produces uncertainty in situated action. Information overload is not confined to the retrieval of information but also to the inputting. For instance, as police are given more information technologies in the field, their documenting activities increase, as does the amount of paperwork in the office. Thirdly, mobile technologies, following the utopia of perpetual contact, create a climate of control maximization in order to promote efficiency and due process. The analysis discovered that more often than not police officers reject these attempts at maximization and the technology is simply decoupled. However, despite the failure of the previous attempts, this temptation of control maximization is hard to escape, especially in bureaucratic organizations that seek to streamline decision-making processes.

In terms of the actual application of mobile technologies, this discussion leads to an alternative paradigm for understanding mobility. The current dominant paradigm of perpetual contact is not suited for operational police work. The supposed paradigm of perpetual contact is in fact skewed by the fact that it appears only to consider the technical possibilities of the

device rather than the interaction with the human factor in a particular context. This leads to the consideration that perpetual contact might not be a paradigm at all. Perpetual contact and its derivative ubiquitous computing should not be regarded as a principle for the deployment of mobile technology for the police. One reason is that perpetual contact can lead to uncertainty. Uncertainty can be caused from de-contextualization that is a direct result of over-virtualization and/or information overload, which themselves are caused by perpetual contact. Whilst it was argued that the police must move away from perpetual contact on a vertical level between the various levels of command, paradoxically it is wise to promote more contact on a horizontal level between equal ranking police officers.

A more balanced paradigm that concentrates on the quality rather than the quantity of the encounter should be encouraged. Quality in mobile service delivery, however, is difficult to assess and varies within organizations and roles, as it does in the specific police organization studied. In the police context, quality refers to a balanced juggling between virtual and situated encounters. In addition, the *rhythms of interaction* in police work make an important contribution when seen in light of current research on ubiquitous computing. The research can contribute to the understanding of highly distributed work and use of MICT within the police, and peripherally to the use of mobile technologies in organizations. The ubiquitous computing environment is not uniformly ubiquitous, and as it will be explored in more details in the following sections, this has implications for understanding MICT for work in general.

Thus MICT should be seen at the cross road of both the technological and contextual potentials. This balanced view of MICT use leads this dissertation to notice a dichotomy in terms of angles of view, concurrently in agreement with the *Framework of Virtuality*, which points to a tension between the context of technological action and the context of situated action. In addition the idea that the ubiquitous computing environment is not uniformly ubiquitous suggest a reappraisal of the problem domain of the role of MICT in organizations. Such tension can be explored in terms of an asymmetry of assumptions between these two domains.

The *Framework of Virtuality* has allowed this dissertation to notice the tensions between situated action and virtual interaction. In addition, it has allowed for the identification of the

problem of encounter driven interaction with the communities because of the intense use of all sorts of technologies that stress the mechanic resolution of incidents.

It can be argued that these problems are brought about by the *technological attitude*, afforded by new technologies. However, what is peculiar to MICT, as was argued in Chapter Three, is the intrusion into situated action. There is an asymmetry between the context of situated action and the context of Virtuality. These asymmetries lie at the essence of the nature and purpose of these interactions. While situated action is emergent and extemporaneous, technological interaction is planned and tied to a strict temporality.

In addition, situated action is relational in nature, while virtual action is encounter based. The difference between encounters and relationships is tackled in the literature concerning computer services (Gutek 1995; Mathiassen and Nielsen 2000; Mathiassen and Sørensen Forthcoming). Wegner (1997) elucidates the concept by equating encounters – on which traditional ICT is logically based upon – to sales contracts, and relationships to marriage contracts. How can police organizations mitigate the effect of these asymmetries? Sørensen and Pica (2003) and Pica and Sørensen (2004) offer an answer contained in the way in which workers are envisioned in organizations where an emphasis is placed on the workers, and not only the supporting technologies. Thus mobility is more than the characteristics of the devices but also an attitude of more trust towards the employees.

In the police context excessive demand for logging activities and excessive monitoring of communication between officers are examples of a lack of trust between the police officers on the street and the organization exacerbated by particular mobile technologies. This directly accords with a socio-technical understanding of the introduction of technologies in police organizations (Tapia and Sawyer 2005). This trust, as envisioned by Pica and Sørensen (2004), can be gained through Customer Managed Relationship (CMR) systems, which are flourishing at the moment in B2B models such as Vodafone Corporate. Then contrary to what Ericson and Haggerty (1997) describe as systems to monitor the workers in police organization, whereby protocol is strictly maintained, this dissertation proposes a system to emancipate the workers, whereby monitoring is a post-facto rather than an a priori activity of the organization. This would be the way forward to avoid excessive accountability in operational police work. Trust also entails a less monitored use of MICT.

Mobility is then seen not only in terms of the fluidity that it enables, but also in the stability of interaction with physical environments (Pica and Kakihara 2003). A revealing example is represented by the wishes of police officers in regards to the services that they would like to see from mobile technologies. More *bricolage* is required when technologies are introduced in organizations. Thus rather than setting strict parameters for the usage of mobile technologies, a mediated environment where the officers are allowed to experiment with the applications of the technologies should be actively encouraged. This means also bringing system designers in the field of operations to understand the context of usage. This is not an isolated call; Ciborra (2002, 2004) has already shown the need for such rethinking of technology in organizations. Furthermore, as Nulden (2002) has stated, horizontal awareness systems (i.e. the position of other officers, who they are, where they are, what incidents they are involved in are) are of paramount importance to police officers. These awareness systems are a mechanism of trust.

However, at present, awareness information is received only from the control room via the PR. Devolving this information from the control room to the officers' MDT or other MICT not only allows for greater peripheral awareness of a situation, but also reduces uncertainty and leads to a faster local response (Nulden 2002). Devolving information from the control room to a more self-service system, such as the MDT, enriches the formal channel by encouraging the police officers to experiment and innovate and therefore bring greater value out of MICT. As well as this benefit, by removing this additional responsibility from the control room, it gives the control room more time to concentrate on its core activities. The paradigmatic example of how an informal means of communication both freeing the control room of unnecessary responsibility, and for encouraging innovation and experimentation, is the usage of mobile phones. On a practical level the mobile telephone should be encouraged as the vast majority of police officers are familiar with it, it has low cost, it is reliable, and it is a widespread resource. The functional benefits that it provides are in short a means of horizontal communication between police officers.

This is important because whilst there is an excessive amount of vertical/hierarchical fluidity of communication in the organization of the police, there is a conspicuous lack of horizontal fluidity amongst police officers. The benefits of an increase of horizontal fluidity between police officers, and thus a higher level of trust in the organization, would provide the facility for the frank transfer of information at the bottom level enabling the police to have a greater

understanding of any situated interaction. Furthermore, monitoring needs to be reduced if workers ought to be emancipated from excessive accountability, and the mobile phone by its nature allows for this to happen. From a symbolic viewpoint, the mobile phone can reduce antagonism between the police officer and the person that he is dealing with due to the informal character of the device, compared with the more *intimidating* formal technology. Currently, however, the police view these informal means of communication as antagonists to the traditional means of communication. Alas, the idea that greater informality would facilitate police work is still far from the current system design that stresses in large part the mechanic and legalistic aspect of police action.

7.4 Concluding Remarks

Under the lens of the *Framework of Virtuality*, a *technological attitude* gaining momentum is evident; this is a direction of thought that threatens the current functioning of the operational side of police officers in the UK. The projections of the current application of MICT displace the intentionality of operational policing closer to the law enforcement paradigm. However, in a *free society* an overemphasis on the application of law enforcement suggests a sort of despotism and inflexibility that defies the role of police as peacekeeper.

It is clear from criminological studies that the mandate of police is unattainable, yet their presence in society is indispensable (Manning 2003). Perhaps a propensity of view of *pure* peacekeeping is idealistic in nature. Yet, researchers have to hold on to some ideals when assessing the value of public services that suffer from the endemic contradictions of human beings.

Additionally, this *technological attitude* is a consequence of *enframing* (Heidegger 1977), and on a superficial level it makes perfect sense in a police bureaucracy. The various functional accounts of mobile technologies presented in Chapter Two disregard such attitude surrounding the discourse of introducing technologies and instead concentrate on the technical possibilities of MICT. In addition, these texts tend to obscure the uncertain and contradictory role of police officers in a democratic society, and portray their work as a standardized task that relies on documentation and coordination. This is what Goldstein (1964) calls the means over ends syndrome, where one loses sight of the *raison d'être* of a particular institution and concentrates instead on its mechanic functioning. On the other hand,

it is also clear that the supporting role of MICT is important for the functioning of police as citizens know it and expect it. However, again, one has to be cautious in mistaking the means of police with its ends.

The functional view of mobile technologies tends to represent the use of these technologies in the most extreme of cases and creates a rhetoric of *omnipotence* based on a rhetoric of fear as described by Glassner (1999). For instance, most MICT providers will advertise their technology in a setting of police attending a dangerous incident, where the suspects are armed and special tactics must be deployed. Although, this sort of police action does exist, it cannot be more unlikely. The day-to-day encounter with MICT is unfolded in a much less information and coordination intense environment. It would be more sensible to advertise these technologies in an environment where the officer is trying to divide two or more fighting parties, or to reason with a half-insane person, for those and not the armed criminals, are the individuals with whom an officer will have most of his interaction.

In turn, the role of mobile technologies in police work is less straightforward and more problematic than current literature tends to suggest. It cannot be argued either way that mobile technologies are critically supporting the act of peacekeeping or that they are dwarfing citizens' liberties. In contrast MICT sit rather uncomfortably in a police environment that promotes restraint and authority. It is hard to predict whether MICT will satisfy the promises. However, it is clear that these technologies do present a challenge to the current arrangement and execution of work, for they transmit either functionally or symbolically an image of the ever-present organization. In addition, MICT tend to transfer more documenting work to the officers in the field rather than streamlining their work.

It is clear then that the functional view of mobile technology tends to ignore the extent to which technologies are implicated in the qualitative transformation of the services provided by public administration, and instead focus on the quantitative changes in terms of reducing costs and increasing efficiency. Although quantitative measures are useful, for the police have a limited amount of resources and a limited budget, these are not enough to inspire decisions about technologies. The qualitative side of the implications of technology use is of paramount importance when considered within the actual *raison d'être* of the administration of order. The role of MICT is certainly not that of a panacea, which can cover any possible situation of interaction and aid it.

The symbolic studies of mobile technologies have illuminated these issues pinpointing situations of ambiguity, contradiction and frustration generated when information technologies were operated. MICT are constantly implicated in transforming the uncertainty of police officer into a risk assessment. Such transformation, as Manning (1988) has pointed out in his semiotic analysis, is problematic in itself for technology mediated interaction increases the ambiguities and uncertainties of police work. This as discussed creates operational uncertainty. Furthermore, as Manning (1997) argues, the police are a symbolic bureaucracy rather than a functional one in that there is a high degree of discretion at both the bottom and top of the organization because of the nature of symbolic communication and of police work itself.

The critical view of mobile technology, the one most concerned with issues of privacy, is perhaps the one that finds most affinity in terms of concepts with this current discussion. Although the critical view of mobile technologies primarily looks at the employment of MICT by the police from a citizen's viewpoint, it is interesting to note the parallelism in the findings. This dissertation would most likely agree with the statement that mobile technologies have gained momentum in current organizations for the possibilities of total control and maximum surveillance of the workers (Norris and Armstrong 1999) masquerading behind the rhetoric of fluidity of work and post-modern claims of emancipation (Kakihara 2003). However, the critical researcher focuses with more enthusiasm on the inevitability of such movement, without questioning the possible adversity that human agency might pose on such structural direction.

Differently, this dissertation sees *situational discontinuities*, or what technical experts would call under-usage or mis-usage of technology, as the triumph of human agency over the structures created by technology. The discontinuities of use by police officers represent the primacy of situated action, where the core of peacekeeping, as a discretionary activity and not as a standardized imposition of order, reveals itself. In addition, the dissertation does not take a luddist view towards MICT by suggesting a retreat from further adding technologies to police practices, but rather suggest a sensible use of these technologies.

In conclusion, this dissertation has proposed an alternative way of looking at the role of mobile technologies in the police. This view tends to transcend the previous functional,

symbolic and critical views of MICT in police organizations by incorporating many of the concepts from previous theories and constructing a coherent discourse around the phenomenon of mobile technology use within the intentionality of policing in the United Kingdom. The phenomenological view of MICT, as represented by the *Framework of Virtuality*, shows the tension between virtual and situated encounters. From this tension, the dissertation advances the idea that failure to use MICT can be explained by the nature of the work of police and not by technical or organizational hypothesis.

In general terms, this dissertation proposes the idea that ubiquitous computing is not uniformly ubiquitous. This is so because of the endemic asymmetries between situated action and virtual interaction. Such asymmetries are explained by the *Framework of Virtuality* and are further supported by research on computer services and information overload. In addition, the dissertation suggests that non-usage – or in the language of the dissertation *situational discontinuities* – of MICT is not a technological or organizational failure but rather a natural occurrence of these asymmetries. In order to counter these asymmetries the dissertation proposes the idea of trust as a key mechanism to support geographically distributed work – as opposed to the *technological attitude* that proposes a constant monitoring of activities and a strict enforcement of work protocols.

The next chapter concludes this dissertation by giving an overview of the main arguments of this dissertation, by summarizing the contributions to current research, by addressing the deficiencies of this current study, and finally by opening the path to further research in the area of MICT use in police organizations and in organizations in general.

CHAPTER EIGHT: CONCLUSION

This final and closing chapter is divided into four main sections. The first section presents an overview of the dissertation. Following, the contribution of this research in terms of the theoretical, the methodological and the practical character are addressed. The third section examines the implications of the research approach in terms of the research design limitations and the adequacy of the research framework. The final section presents the potential and scope of future research in this area of study.

8.1 Overview of the Dissertation

The dissertation has begun by exploring the motivation and scope of the study. It has argued that MICT have gained increased importance in organizations, especially in geographically distributed organizations such as the police. Yet, the understanding of these particular technologies is still fuzzy and contradicting. This is allegedly due to the newness of the field of study and to the new problematic that these technologies pose. The dissertation schematizes the various analytical lenses that study MICT in police settings. The writings that address directly MICT in police work fall into one of three groups. First, there are the texts that assess how MICT change or can change work contexts in terms of the technical possibilities of the artifacts. These writings primarily address the issues of user interface and technical design. Second, there are writings that address the symbolic value of MICT. Rather than looking at the technology as self-contained these writings uncover the possible social effect of MICT use, thus moving towards a socio-technical understanding of the context of work. Third, there are writings that analyze MICT critically, concentrating particularly on issues of privacy, politics and control.

After a scrutiny of the existing literature, the chapter moves into the problematic of the existing literature, namely the understanding of *context*. This problematic is connected to both the pervasive character of MICT and to the strong coupling that MICT suggest between geographically distributed individuals and institutions. To resolve this problematic the dissertation draws on phenomenological approaches to technology. After, presenting the central tenets of phenomenology in terms of questioning, intentionality, lived experience and the particular view of technology, the dissertation builds a framework, named the

Framework of Virtuality. Central to this approach is the aim of uncovering the context of interaction in terms of situation through looking at intentionality at both a macro and micro level.

Following, the methodology of research is unfolded. It draws on the ethnographic tradition and in particular on observation-based ethnographic techniques of data gathering and a narrative style of data presentation. A brief overview of the particular police force is studied and the various MICT are exposed, before a series of three tales of operational police work is presented. The narratives focus on the usage of MICT by three operational units in a UK police force. Following each of the three narratives, some background material pertaining to the unit studied is presented to give an idea of typical MICT usage scenarios.

In the next section of the dissertation, the *Framework of Virtuality* is applied to the tales. First, an understanding of the intentionality of police work as a whole, congruent with the tales, is presented. Then, the dissertation examines the extent to which the concepts of the framework can enrich the understanding of MICT in the context of the police in the UK by making sense of the different usages of these technologies across the units. The chapter concludes by linking intentionality to the observed usage of MICT and presents the concept of the *rhythms of interaction* to characterize the alternations of intensity in MICT uses by the various police roles. The main concepts emerging from the analysis are uncertainty and peacekeeping. The issues of uncertainty and peacekeeping are addressed in the next chapter of the dissertation. The chapter argues for an understanding of MICT beyond the functional domain. It does so by proposing the incorporation of intentionality of work context and of technology into the analysis of MICT. The last chapter proposes a scenario of MICT uses in the police in the UK, looking at the themes of discretion and control. The chapter concludes by presenting a balanced view of MICT in police settings, which seeks to reunite the discrepancies of previous paradigms in terms of the effects of MICT on policing.

8.2 Contributions

This dissertation makes a number of contributions in the area of MICT studies and in the area of police studies. These can be divided into the triad of theoretical, methodological and practical contributions. Many of the contributions arising from this study can be attributed to the theoretical framework adopted, namely to the *Framework of Virtuality*. In addition, a

contribution to methodology in terms of the approach to the particular case and the presentation of the data is also offered. Concluding the section, a summary of all findings and contributions is presented in subsection 8.2.4.

8.2.1 Theoretical Contributions

This dissertation can be envisaged as a response to the a-theoretical and diverse field of MICT studies, as well as a response to the call made by Ciborra to understand context in terms of situation. Within the narrow domain of police work and technology studies, the *Framework of Virtuality* represents a valid contribution in terms of new insights into the dynamics between police work and technologies. Although phenomenology has been used for studying ICT and MICT (e.g. Dourish 2001, 2005 and Suchman 1987), or to study police work (e.g. Manning 2003 and Bittner 1990), such approach has not been taken comprehensively on both domains. The position taken in this study is that insight into the action of mobile workers (in this case police officers) can be afforded through the application of a phenomenological theory into the MICT domain. From the framework employed a variety of concepts emerge that can enrich the literature.

This dissertation has explored the work of police officers and their use of MICT from multiple angles, both from the micro or situated level, and from the macro or institutional level through the phenomenological concept of intentionality. Reconciling these viewpoints is not an easy task as the elements of analysis of these two levels are different and contradictory. The use of a phenomenological understanding of police work and MICT has eased the task by providing a bridge through which reconciliation is possible. The idea of context as situation (Ciborra 2004) has provided a vehicle to reconcile the intentionality of the police force with that of the individual officers. This sort of inquiry can benefit other studies of MICT especially for organizations that have a well-defined service delivery statement. In addition, the integration of the concept of intentionality in the analysis of technological use marks a novel approach to MICT.

Furthermore, the questioning of the police and technologies is itself original. Shifting a research question from ontic – concerned with entities – to ontological – concerned with being – can enrich the field of information system and provide novel account of well established *truths*.

In addition, concentrating on the lived experience of using technologies provides a relevant rich picture of the modern organization of police. The main methodological proposition of phenomenology is exploring a context in its richness of details and letting the facts speak for themselves. In a way, it allows a first-person perspective on the experience of the subjects of study. In order to do so, the dissertation follows the method of ethnography as a technique to reveal the everydayness of police work and mobile technology use, and narrative as the method of exposition.

Finally, The *rhythms of interaction* are a contribution to the understanding of MICT use as not uniformly ubiquitous. The *Rhythms of Interaction*, which the dissertation discusses at the situated level of encounter between police work and MICT use, can transpose to the institutional understanding of police organizations in terms of the inherent tension between control and standardization as sought by the institution and drift and discretion as sought by the individual officer. This exploration of the dynamics of such tensions can benefit the study of other organizations as well.

8.2.2 Methodological Contributions

This dissertation holds the assumption that in order to understand MICT use, a holistic view of the problem domain must be acquired. Using ethnographic techniques in the interpretive qualitative tradition does this. Ethnography affords an insight into human, social, and organizational aspects of ICT use (Harvey and Myers 1995), in the real world setting in which these unfold. As a consequence, ethnographic studies can question the *status quo*, the assumptions that govern inquiries into particular settings. But even more importantly, ethnography uncovers *the distinct qualities of their [users of technology] experience* (Zuboff 1987, p.13).

In turn, the use of observational techniques allowed the researcher to gain deep insights into the daily life of police officers and their usage of MICT. Furthermore, they allowed the researcher to acquire an understanding of the intentionality of individuals through the observation of activities and through constant questioning. Especially in the study of this type of organization, within the IS field, this dissertation marks a departure point from the usual

top-down accounts of technological use by penetrating the context of the actors. This is due mostly to the accessibility problem of police organizations.

Furthermore, the dissertation by using narrative as an exposition method provides new insights into technological use that highlight the more mundane and taken for granted assumption about police work. In addition, narratives provide a rich ground of material for debate and allow readers to gain a thicker understanding of the emotions and uncertainty of the work of police. Therefore, the narrative-based ethnographic study can be seen as a positive scholarly contribution to the field of IS.

8.2.3 Practical Contributions

The practical contributions of this dissertation are primarily a consequence of the theoretical framework employed to explore MICT use in police settings. In the field of police studies this framework has reinforced the understanding of police officers as peace officers. Although such distinction seems trivial it holds important implication for the analysis, design, and management of ICT and MICT in police forces.

One such implication is that MICT have to disappear seamlessly from the context of action to allow officers to make emergent decisions based on a contextual understanding. More importantly, what appears as a productivity enhancement, the all-the-time access to data and the possibility to document constantly, or rather what the literature defines as the end of *dead time*, is not a positive improvement in policing. On the contrary, police officers need to be idle, because being idle gives a sense of presence in communities. Such contribution goes against the current practices in police.

Furthermore, contrary to conventional wisdom, excessive demand for logging activities and excessive monitoring of communication between officers can hinder the functioning of police. Thus rather than setting strict parameters for the usage of mobile technologies, a mediated environment where the officers are allowed to experiment with the applications of the technologies should be actively encouraged. First, this means that MICT are transforming the police force into a highly professional organization that need to use MICT to foster trust and not actively monitor its workers. Second, this means also bringing system designers in the field of operations to understand the context of usage.

Consequential to the issue of increasing trust, there is the issue of reinforcing horizontal communication. Horizontal awareness systems (i.e. the position of other officers, who they are, where they are, what incidents they are involved in) are of paramount importance to police officers. These awareness systems are a mechanism of trust and this dissertation suggests a force-wide implementation of such systems.

8.2.4 Summary of Findings and Contributions

This dissertation has made a number of findings and contributions. What follows is a concise summary of all findings and contributions. In theoretical terms the dissertation has developed the framework of virtuality, which delivered a stress on understanding individual and organizational internationalities as well as a technological drive in the functioning of the police organizations. Looking for intentionality at both macro and micro levels has allowed the dissertation to form an alternative view of police work as peacekeeping and has further celebrated a lens that considers with equal attention the micro and the macro. Furthermore, the dissertation has introduced the concept of *rhythms of interaction* to describe the alternation in intensity of the use of MICT and of information in general. Through the concept of rhythms the dissertation has uncovered the issue of limited attention from individuals and how they shift it from technology to situations and vice versa. This has contributed to the view of MICT not as an anytime-anywhere technology but as a sometimes-somewhere one. This last consideration sheds new light on the idea of failure in MICT use: that being that if the intentionality of an organization is at odds with the intentionality of technology little use will surface. In addition, non constant use of MICT is not a failure.

In methodological terms, the dissertation is a celebration of the ethnographic and narrative methods. It delivers narrative as a vehicle of describing MICT, police work, and their relationship. The research benefits from an hands-on data gathering technique (in the form of observations and interviews) in an organization that generally shields itself from such approaches for security and privacy concerns.

In practical terms, the dissertation contributes to a number of areas, the most important of which being policy through the introduction of the concept of discretion in the administration of order in society and the view of police officers as peace officers. The dissertation suggests

bringing MICT designers into the field to understand the practicalities of police work. In addition, it suggests that there is a need for more intermediaries as well as more trust and autonomy for police officers, which could be foster through the improvement of informal horizontal channels of communication.

8.3 Implications of Research Approach

This section presents the limitations concerning the design of the research and the limitations pertaining to the *Framework of Virtuality*.

8.3.1 Research Design Limitations

The reasons for adopting an observation-based collection technique were led primarily by pragmatic criteria. Achieving access to police organizations is difficult enough for researchers, especially at an operational level. Police organizations deal with sensitive situations and with classified information. Furthermore, there is a strong sense of accountability and due process in the police, and the riding along of a civilian presents risks to the police force itself. In turn, one of the main limitations of the approach of this dissertation is the lack of rich data gathering mechanisms such as video-camera and voice-recorder.

In addition, ethnography tends to give primacy to local knowledge and by doing so it creates great difficulty in the act of generalizing findings (Walsham 1993). This has resulted in ethnography being attacked over its failure to address social and historical contexts in which IS development takes place. Tinker (1998), for instance, criticizes ethnography on three levels. First he argues that ethnography has a myopic perception of the conflictual nature of technology – a view that Marxists would not take lightly. Second, he argues that by letting only the actors speak, the expert voice of the observer tends to be silenced. Finally, it is worth reapepting Tinker (1998, pp.24-25) and his criticism that there is an a-historical view of IS whereby *the larger picture is, in part, a historical one that recognizes that the current innovation in IS are not virgin experience but belong to a long lineage of events...Capitalism is the unfinished revolution that continues today with upheavals in the work practices of printers, airline employees, managers etc...If ethnographers are to be more than technology's cheerleaders (humanistic or otherwise) they need to give more balanced*

consideration to the impact of their discipline. In a final note, ethnography suffers from a pragmatic limitation of being contained in the long time it requires for the researcher to gather the data.

8.3.2 Adequacy of Research Framework

Despite the theoretical contribution offered by the *Framework of Virtuality*, there are three areas of this framework that are open to criticisms. First, the framework is not sophisticated enough on a micro level. Second, the framework over-stresses a duality and an inherent tension between situated action and virtual interaction. Third, the framework lacks considerations of the full number of actors involved in the unfolding of technological interaction, thus making it incomplete.

The sophistication of the framework on a micro level is debatable. In fact, by grouping and studying MICT as a whole it does miss the specificity of certain functions contained in the technology. In addition, the framework offers a somewhat arbitrary and oversimplified distinction between the activity types. Further time should be invested in assessing the validity of such distinction.

The *Framework of Virtuality* stresses the issue of conflict between technological interaction and situated action. Such duality is at times naïve when looking at technological practices that are constantly evolving and being re-negotiated.

Finally, the *Framework of Virtuality* does not consider a number of actors that have an influence on technological use in the organization of police. A number of groups and their activities are omitted in the analysis of the intentionality of policing. Such omission could be critical especially when dealing with particular situations.

8.3.3 Summary of Weaknesses

This dissertation suffers from a number of weaknesses, some of which endemic to the research framework adopted and the limited time and resources of the researcher. To sum up, the dissertation, by trying to balance macro and micro considerations does not produce and present enough details to satisfy each angle. In a way, by trying to incorporate an holistic understanding, the dissertation fails to address the periphery of either the micro or macro, and

concentrates instead on the intersection between them. However, this incomplete way of looking at the phenomenon of MICT use in the UK police has produced an alternative way of understanding MICT (as was discussed in the section 8.2.4).

In addition, the *framework of virtuality* tends to produce a critical spin towards the application and use of technology in organization by contrasting strongly the situated and the mediated encounter with the world. Although this tendency is in favor of situated interactions, the findings of the dissertation sound true in light of the current debates concerning technology. In addition, a critical view of technology, in a world that seems not to question its application, can benefit the field by producing a more balanced and careful understanding of MICT in organizations. Finally, the framework itself can be used as a sensitizing device.

The *framework of virtuality* is also an experimental model, which can benefit from a number of future enhancements. Through its application to the case study, the *framework of virtuality* has been successful in mapping the micro situation of police work through the delivery of the idea of *rhythms of interaction*. It has also been effective in sketching a macro picture of the environment of policing. However, the way in which micro and macro interact is still unclear and the framework does not provide many insights. In addition, the tentative relations between the various elements in the framework have not been fully proven. These weaknesses have to be addressed in future research.

In terms of method, the research does not benefit from the richer gathering techniques suggested by ethnographic approaches. Again this is to be attributed by the restrictive environment in which the research was conducted. A less restrictive organization in terms of security and privacy could be a more solid benchmark on which to practice ethnographic techniques to study MICT.

8.4 Areas of Further Research

The dynamics of MICT use and a context of work are important to understand because the resolution of problems both present and potential cannot find an answer in technological fixes alone, especially when those are strictly seen from a situated perspective. Instead these require an appreciation of the macro dynamics of the interplay between many institutions that

seek to govern the rhetoric of technological penetration into work practices. And this discussion does not cease at the level described by Heidegger in the *Question Concerning Technology*, as a mere disposition towards the world, but extends to the culture of modern democratic societies. Therefore there are a number of institutions that seek to advance their own agenda and that collude with each other. Future research could explore in more depth the dynamics of institutions and how technology advances in a specific area of work.

In addition, this dissertation has hinted towards a positive correlation between technological penetrations, especially represented by MICT, in police practices and draconian control of social practices. In its present rhetoric there is indeed a positive answer to this burning and controversial question. However, rather than adopting a Luddite view of technology, the dissertation tries to transcend such highly critical understanding by looking at both side of the debate. Future research could address this correlation and understand what technological practices advance what state of being.

In addition, the view of MICT as an institutional extension that seeks to control situated action by imposing the context of the institution can be explored in other domain, where such dynamic this can be just the opposite. To this end the concept of discretion, uncertainty, and technological penetration can be anchored to such a discussion. Related to this last point, future research could address the asymmetries between technological and situated interaction. To this end the dissertation has pointed towards the phenomenological concept of *horizon of possibilities* afforded by technologies and afforded by an unmediated encounter with the world.

Also, given the discussion presented in Chapter Seven, the *Framework of Virtuality* can be of use in policymaking, especially within policies concerned with proper usage of technologies by the administrators of order in society. This is particularly so in the police context where technology is following a development of penetration into the organization and functioning of police activities that cannot be ignored for doing so would undermine the evolving and self-reproducing nature of social practices (Giddens 1984).

Lastly, although this dissertation has concentrated on the police, the *Framework of Virtuality* is not confined to this type of organization. Further research should attempt to contribute to a more general discussion of the role of MICT based on the *Framework of Virtuality*, and of

the concept of *rhythms of interaction*. In addition, future research should concentrate on the study of information flows and discontinuities to understand workflows and improve MICT use. This implies addressing some of the shortcomings of the framework. The aim should be to extend the police-centric analysis of MICT to other types of organizations and to contrast such view to current theories and debates on mobility.

APPENDIX A

In the following two subsections, A.1 and A.2, a narrative of controllers organizing mobile resources during an assault will be presented. Following, the context of work of controllers in terms of typical activities and technologies to support mobile work will be described.

A.1 Tales from the Field: Controllers

It's 8:00 am. I have to admit that I expected a boring day. Sitting in a control room, or as some officers have hinted a call center, was not a good prospect especially for a researcher concerned with mobile technologies. All these desktops, telephones, and seats reminded me of the traditional office environment (fig. 22).



Figure 22 – An Overview of the Control Room

Tom, a quite enthusiastic controller, was my contact for the day. He has been a controller for two years and he thinks that it is a very exiting job. He knows a lot about operational policing since he used to be an RV officer for nearly ten years. According to him, *supporting mobile work is not an easy task and as a controller, you have to have a contextual understanding of a remote situation in order to make appropriate judgments [on deploying resources]*. In other words, it can be easily argued that most benefits of mobile technologies can be traced back to the control room.

What exactly does it take to be a good controller? I ask.

Well, you have to be able to perform many things at once. For example, you have to take a 999 call and take notes for it on the computer system and at the same time check on another screen what units are available...it is common sense most of the times. Whenever someone calls in [999] it is customary to check for a history of the caller. A lot of 999 calls are false alarms or pranks...so we always check the history of the caller or of the phone number. Prank callers are always repeated callers. Also you can hear it from the tone of voice...generally people with real problems are in distress...

Tom invites me to sit down at a controller position and put on a pair of headphones to listen to the radio and 999 calls. It's 8:27 am and Tom receives a 999 call.

An elderly person calls 999 from his mobile phone to report he was just assaulted by two young criminals in the street.

Caller...Hello...*There are some violent people... (Caller is clearly in a state of distress)*

Tom: *Sir calm down...Please tell me your name and where you are calling from*

Caller: *John X... I am between X and Y street...they are still around...one has a knife...*

While the 999 call-taker gets the details of the offender and location of incidents and updates the log, the radio controller is dispatching units to the incident area. Meanwhile, given the presence of CCTV cameras around the incident area, the CCTV controllers are transmitting the images of the incident on the CCTV monitors of the involved controller positions. The controller is logging in the crime in the OIS as an immediate response. While writing down some notes in the free text space, he puts the caller on hold for a few seconds. He turns to radio dispatch mode. He broadcasts, the name of the caller, the place and nature of incident. Then he comes back to the caller.

Controller: *We are sending a unit right away Sir. Meanwhile could you give me some more details?*

Caller: *I am calling from my mobile phone, there are 2 of them, one has a knife...my god*

Controller: *Are they still around there?*

Caller: *I don't know*

Controller: *What are they wearing?*

Caller: *I think blue jeans and one has a red jumper*

Controller: *How old would you say they were? Any particular signs?*

Caller: *Mid 20's, they are white, I don't remember more...one has a baseball cap*

(Sound of sirens in the background)

Controller: *Mr. X, the police are almost there, could you hold on the phone for a second please...*

The controller turns his attention to the OIS and Radio. Then he contacts the CCTV room to have a broadcast around street X and Y. When the situation has calmed down, and an ambulance has arrived; the control room with the help of SerWorld directs the officer to where the weapon used by the criminals might be. The 999 call taker keeps talking to the victim and is updating the log on OIS together with the radio controllers, who are organizing the units and doing PNC on a captured suspect as well as on the victim. Throughout this process, even though the officers in the field are supplied with an MDT, they still mainly rely on controllers and their speed in putting useful information together...

A.2 Setting the Scene for Controllers' Work

The job of controllers can be divided into two main tasks that can be performed synchronously or separately depending on the number of staff: 999 call taking and radio control of officers in the field. The controllers work in an open space and their desks are divided by geographical area so that controllers from the same area can interact with each other (e.g. radio and 999). Table 20 shows the most recurring incidents for controllers.

Described Tasks	Observed Incidents
<p>Receive and Grade 999 calls Call-backs (small part) Produce tapes for court Interact with Ambulance Service, Fire, Telecom Companies, Council and Social Services Connect people. General Troubleshooting for officers (general assistance for making contact within the police with a particular officer or expert) Give priority to the following incidents: Violence, Domestic, Car Related Crimes and Burglaries Do PNCs (decreased since the introduction of MDT) Assign officers to jobs on the AQ Managing crime logs in OIS – look for duplicate incidents as well In case of shortage of resources select the most important incidents (AQ) - they can change the grade or wait to assign jobs Use CIS to look at informal intelligence on cases and to check on vehicles Check with Supervisor on procedure for handling complex incidents</p>	<p>999 Call: Man with mental illness, repeated caller, claims again someone stole his money. Call is dismissed because of his mental state. 999 Call: Small car incident in which a person was feeling faint. 999 Call: Silent Call. Number identified and called back. An elderly person is lying on the floor and needs ambulance attention. Ambulance is called right away. 999 Call: Parking attendant reports that a known 14 years old has just dumped a stolen car in the parking lot. PNC carried out on vehicle and attached to crime number. PNC records on vehicle not matching in database. Call made to recovery garage and information passed to PNC office to correct records. 999 Call: A man calls with a bomb treat. Meanwhile the location of the caller is identified and a unit arrives within minutes. The call is classified as hoax and the caller arrested. 999 Call: 17 year old ran away from a mental institute. Controller calls the clinic to assess the risk and to get more information. Individual found after 8 minutes of initial call. 999 Call: 6 children are jumping off the pier. Same call was made the day before. CCTV employed to look at the incident area and help officers on the move. 999 Call: Lady claims ex-husband assaulted her in front of her house. A controller finds history at address and sends an immediate response. 999 Call: Silent call from public phone. The number is called back and a very young kid answers. It was a hoax. 999 Call: Ex-husband on restraining order has attacked ex-wife and son. 999 Call: Fight in the street reported 999 Call: Domestic in front of an house 3 Outgoing Calls: Organize recovery of vehicle 8 Outgoing Calls: Get an ambulance 1 Outgoing Call: Rail and Transport Police 999 calls: 2 Hoax Calls Radio Communication: Ongoing interaction for assigning jobs, doing PNCs, Updating incidents</p>

Table 20 - Described Task and Observed Incidents – 999 and Radio Communication

Controllers are generally multitasking. In fact, the tasks of controllers are usually synchronous and the layout of the work environment reflects this. Controllers usually use 2 OIS screens, GPS System, various web applications, a CCTV Screen and an ICCS (computerized integrated telephone and radio system). They use all these together to follow, create and modify an incident (Figure 23).

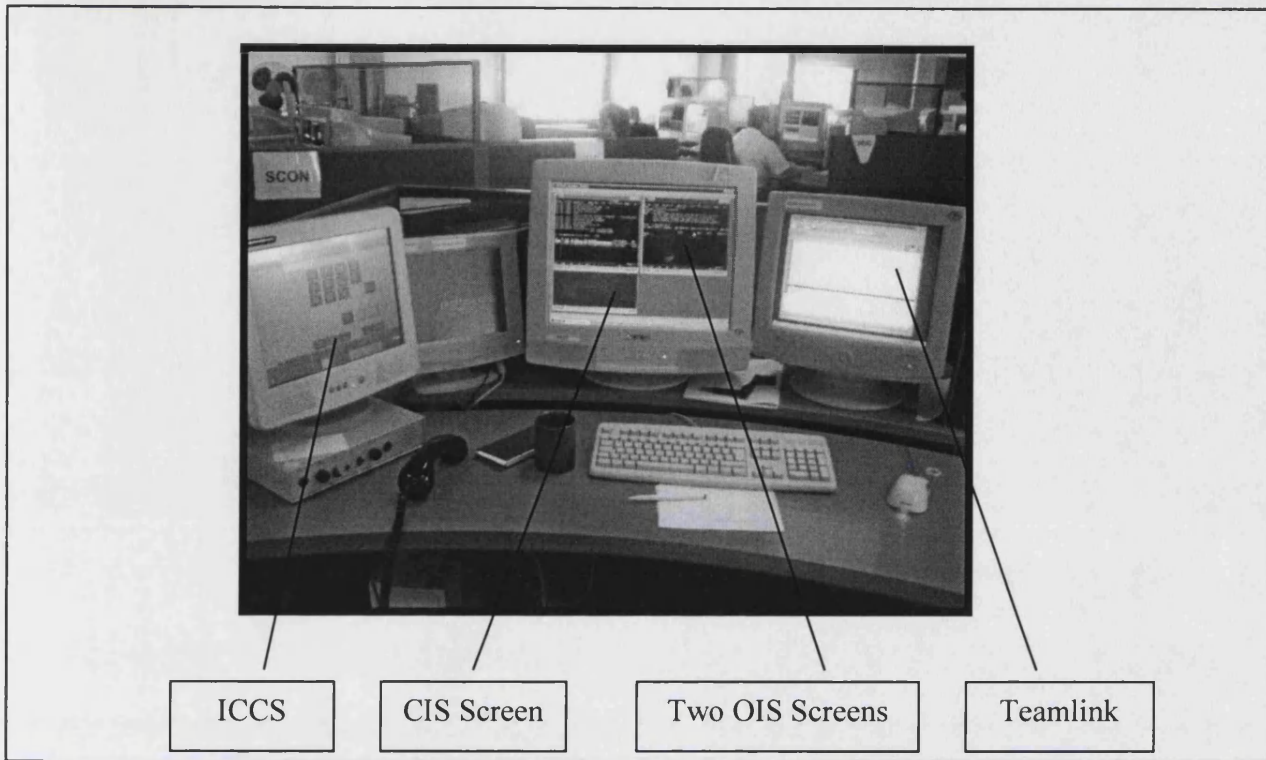


Figure 23 - Environment of Work and Technologies Used

The main technologies used by controllers are shown in figure 24.

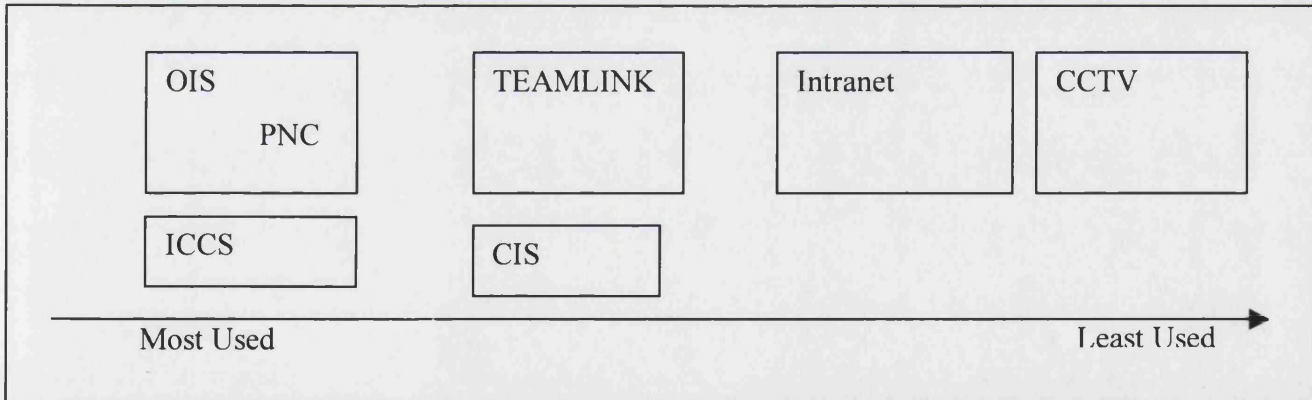


Figure 24 - Main Technologies Used by Controllers

The Command and Control System (OIS) and ICCS are in constant use as opposed to scattered use of the other technologies. The OIS is used primarily to coordinate mobile work and exchange messages among controllers. SerWorld, the live GPS system, is used both to direct officers to the incident scene and to look up for addresses. TeamLink, the e-mail system, is mainly used to look at statistics and check email for important operational updates. The Intranet is used for various tasks including looking up at new laws and changes to old

regulations, looking at current high profile cases and finding contact numbers within and outside the police force.

Figure 25 shows the key people and establishments controllers interact with through the ICCS.

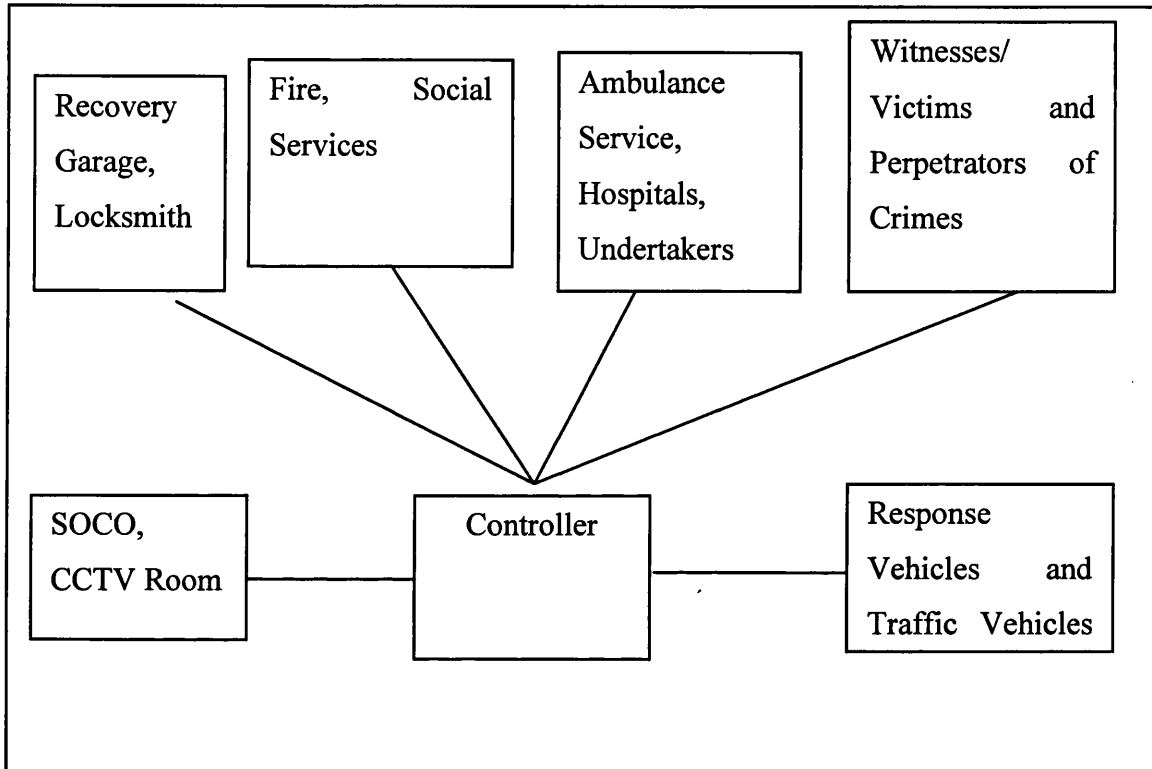


Figure 25 – People and Establishment Controllers Interact with regularly (ICCS).

Controllers usually use radio, phone and OIS at the same time. These can create a problem of overload of interaction and information. Filtering becomes of paramount importance. In fact, between two and three radio communications are kept open simultaneously. Given the shortage of human resources and the long hours of work of controllers, it is reasonable to expect that they won't use the system to its full capacity as in the case of SerWorld. According to most controllers, such functionality, in order to be fully exploited, should be better integrated into OIS (e.g. becoming fully automated).

SerWorld, the live mapping system, although being potentially useful in increasing the effectiveness of police response, is not used to assign jobs because there is little time to do so, especially in busy periods. As reported by the controllers there is still a lot of information replication that negatively impacts on the time of response to crimes. Building a common

gateway rather than integrating the systems can avoid this replication since these technologies use different operating systems and it would be extremely costly to integrate them. For instance when information is displayed on the ICCS about number of caller and location, a functionality that would transfer such information directly on OIS would save the controller a considerable amount of time considering the he/she has to do so for every 999 call. Another example would be transferring details to CIS from OIS. In short, the main problem at the moment lies in the poor integration among the systems and the difficulty in contacting and connecting officers.

The various incidents observed have been used to categorize the various jobs performed by controllers and then to identify information needs (see Table 21). The activities performed in such context can be divided into 999-call handling and radio resourcing. Table 21 shows the different types of technology suitable for application in the various tasks undertaken by controllers and it also shows that the two activities present the same kinds of challenges.

	999	Radio
Type of Information Needed	Description of people, registration number of cars, direction taken, weapons used, location, name of caller, ID of perpetrator, History of caller and phone number	Destination, crime number, response vehicle state (busy or available) and location
Technologies Used	ICCS, OIS	ICCS, OIS, SerWorld
Input/Output Technology	Touch Screen, Keyboard, Hands-free Phone	Touch Screen, Hands-free radio, Keyboard
Challenges of Activity	Overload of information and interaction	Overload of information and interaction
Perceived Problems	Problems locating caller, not sufficient filtering mechanisms for incident priority	Problems with quality of communication, problems locating units, not sufficient filtering mechanisms
Mode of Interaction	Voice, Data	Voice, Data

Table 21 - Activities of Controller and Information Needs.

Like with other parts of the Police Force, the Resourcing Center suffers from understaffing. There are 400-500 emergency calls per day and at times there are very few people on duty (e.g. only 3 emergency call takers). According to controllers, only 25% of the calls are really in need of immediate response. In addition, as a recent article from *The Economist*¹⁴ points out with the diffusion of mobile phones, 999 calls (real and otherwise) are increasing dramatically. However, currently controllers do have neither a tracking system nor a caller identification system for mobile phone callers. It must be also noticed, that most 999 calls are

¹⁴ *The Economist* (2003) *Panic Attacks: The Emergency Services Struggle with Success*. Aug 28, London

non-emergency calls. As one controller put it *I miss the old system [before ICCS] when we collaborated with BT. The BT operator would introduce us the caller. You knew what to expect. Now, in the name of progress, we have to have both our eyes and ears open...it was more contextualized and we would know what to expect...*

APPENDIX B

The issue of the administration of order is already controversial in itself as there are many theories surrounding it – it is related, for the most parts, to the understanding of the government in relation to its citizens. The most relevant theory is Social Contract Theory (SCT). SCT explains both why we have the police institution and introduces their functional role in society. SCT delineates an agreement between the state and the citizens whereby the members of society agree to the terms of the social contract by choosing to stay within society. In political theory, SCT explains the origins and purpose of the state and the rights of individual citizens.

As Hobbes (1651) explains, because of the State of Nature, whereby human beings are self-interested and brutal, the social contract is formed whereby the state guarantees peace upon agreed principles (spoken and unspoken). However, while Hobbes' idea of social contract is based on a somewhat fixed entity, Locke (1689) believed in a more fluid social contract because he had a less gloomy vision of the State of Nature (e.g. as not necessarily in a state of constant war). As he states, “the justification of the authority of the executive component of government is the protection of the people's property and well-being, so when such protection is no longer present, or when the king becomes a tyrant and acts against the interests of the people, they have a right, if not an outright obligation, to resist his authority.”

In addition, Rousseau (1762) understands the dynamics of the social contract as a balance between rights and responsibilities – whereby we give up certain freedoms endemic to the State of Nature and give the responsibilities for the enforcement of the contract to the state. According to Rousseau (1762), the social contract itself is not fixed but evolves through time as it is renegotiated and reappraised by the members of society. In addition Rousseau (1762) believed that there was a direct relationship between rights and responsibilities, whereby fewer of the former meant fewer of the latter and vice-versa.

Under the lens of SCT, it is clear that the administration of justice – dispensed by police organization in democratic societies – and the means of the administration (e.g. the various technologies, the symbols and the protocols) are integral part of how the contract is carried

out in society. Further taking in consideration the dynamism endemic to social contracts in democratic societies it is clear that its execution cannot be based entirely on legal mechanisms but also relies on the flexible adaptation of the administration of justice based on citizens' interests, which vary from community to community. As we have taken an explicit look at police work, we have come to understand the administration of order as an act of peacekeeping – reliant mainly on discretion and common sense. Discretion and common sense open up and horizon of possibilities for the administration of order (Davis 1969). This specific understanding of police work is reflected in the political theory of liberal consent policing. Liberal consent policing can be viewed as a sensitive balancing between respectful protection and intrusive penetration, authority and restraint, whereby the act of policing is subject to severe scrutiny by judicial and organizational supervision, and the rule of law (DeLint 2000). Is there a threat to the social contract posed by mobile technologies? It is difficult to answer this question and the finding of this dissertation can hardly answer such question. What is evident though is that the possibilities afforded by mobile technologies, if understood as Virtuality, pose a challenge to the core of the police function. We define this core as peacekeeping. While mobile technology on the one hand suggests a bureaucratization of police practices through a closer integration of codes of behaviors and documentation, coordination and control mechanism in the field of operations, the concept of peacekeeping and the observed act of policing suggest an opposite attitude based on discretion and common sense. It is clear that discretion is by no means always a positive occurrence in police work, for it can lead to discrimination and excessive use of force. However, on the other hand, discretion is what constitute policing in a democratic society, which is open to change through time, and which respects the extent to which the citizens are concerned with the enforcement of particular pieces of legislation. However, looking at the law enforcement function of police officer is rather misleading. Law enforcement is not endemic to the operational police function, but is somewhat a derivative.

APPENDIX C

There are a number of methodological and case background considerations and information that were omitted from the main arguments of the dissertation. This section is intended to provide this additional information and is divided into two distinct sections. The first describes the small case study conducted with a Community Security Officer in the form of a two-hour interview. It must be noted that when the interview was conducted the CSO was still in state of experimentation. The second presents the development of the ideas about police by the researcher as well as a breakdown of the hours and personnel encountered in each police unit.

C.1 The Community Security Officer (CSO)

The CSO is a very localized police officer – with much less training and powers – whose interests lie in the tranquillity of the community. He can be seen as a bridge between the police and the community. A CSO generally patrols the community by walking or cycling and has a very personal relation with most members of the community. The CSO sees the car as alienating; he wants to be in the field and have extensive local mobility. The officer is sentimental about his area and keeps referring to the people as my people and my kids. The CSO job is more old fashion way because is remains quite personal. Differently than other parts of the organization that just want to get the job over with, the CSO sees his practice as a continuous process. A formalized system in a way makes the information lose the local flavour. The way in which they put info in the system is seen as crucial for the following investigations by other police roles. In a way, the information by being so localized is not adept for a big-shared system. As one CSO put it the information is good for an insurance claim but not for community building, the main job of a CSO.

The CSO has extensive and continuous contact with many community institution and generally also volunteers at local schools. They build their own information gateways for the communities through e-mail and web pages. The information CSO look at and share within the organization are with: colleagues over a cup of coffee in the same office (in order to share information about an area; LIO (Local Intelligence Office – which according to the CSO are the most likely to get a positive ID on a criminal); TPT; BURROS; Domestic violence team;

dog team ID2 (Intelligence Surveillance Team in Plain Clothes who use the information from CSO to watch people and make arrests) and the press office which helps community awareness and good publicity. In addition the CSO has an extensive network outside the organization such as council, housing associations, schools and social services. Some of the members of the public have the CSO mobile phone number. These are the ones that have most tips and have most trouble. When the officer is at home he decides whether to get it based on the caller ID.

A CSO usually does 30 minutes computer work every morning and then carries the paperwork to the field. The process of the day to gather information is the following: log to the computer (here ICAD, CIS and E-mail are the main application in order of importance), make and receive phone calls on the mobile (there are certain people that have the mobile phone number and usually are only the important informants –one source of info – another is the voice mail, not a high priority because only 5% of the calls are relevant). A lot of coordination and information is passed through the mobile phone and sometimes it is ‘unofficial.’ There are a lot of informal information channels for police to get information. The CIS is the most commonly used information system. It has both a standalone and an HTML interface. Usually the last 24 hours are looked up. The CSO keeps also in contact by e-mail with a lot of students at the University and families in the community. He sends bulletin e-mails to students and receives anonymous information about drugs and fights. Everything is referred to as my patch and my people. The mobile phone keeps ringing from both civilians and other police people. The time at which the accident occurs can indicate the gravity of the incident. The local intelligence officers are the most important contact for the CSO. There is a lot of community work involved (serving food in school).

After checking the computer system it is time to go out in the field. The CSO are self-tasking, and they decide what to do depending on the perceived urgency of the situation. Being a CSO is a vocation; it requires a certain mental attitude. There isn’t too much supervision. CSO seldom see any supervisors. For instance from the CSO interviewed, the sergeant and chief superintendent were seen only once in a year. According to the CSO interviewed the job performance is not very well measured. The arrest rate measure is not an appropriate measure. The CSO wants peace in the community; they only want to get the ‘big fishes.’ The CSO wants to be seen, be in the field.

Interaction ranges across many departments and civilians (e.g. OIO, Traffic, CID, Schools, Council, Patrol Officers, TPT). The crimes are imputed within 24 hours. Usually a CSO would know about a new crime only if he gets in the system. Info is mostly collected also by going around and chatting to people. The system is scanned through to check crimes and relations among them. When CSO report a crime they usually do it through the phone or the airwaves. It is claimed that the process of translation, again, makes the information lose the local flavour. However, the CSO does not usually make the arrests himself. In fact, usually CSO don't go on their own warrants because it is too confrontational. The police officer also doesn't want to be seen as bad guy. As stated, the CSO is more concerned about the safety of the community. So, for instance, the CSO is not too concerned about vehicle tax but rather on drug dealing in the community.

Even though having a lot of interaction with the local people, CSO are not allowed to handle informants just 'people that give information.' The civilian people who give information to the CSO are mostly kept informal because once registered (in the system) the CSO has to lose contact with him/her for safety reason. The local information gained by the CSO is put into the local system. However, some of it is only used personally and kept in a non-networked file. This means that other officers don't have the benefit to access it. One of the concerns of CSO is that through the increased computerization and formalization of information system their job will shift to being mostly clerical as opposed to centered in the field.

The plan is not followed as planned from the morning (CID). It changes in the field, depending on what happens. It is in a sense 'tasked by the public.' The radio is used to get updated during the day and also to check on people. But CSO don't want to lock all the airwaves for this, plus people hear what one says and something that might be important to the individual in context might seem stupid to the others.

There are 17 different ways in which a CSO can gain information for his tasking. Thus for each of them it is important to use the right information channel in the right place. 'Leave the office in the office.' There is zero training in tasking; they are totally independent.

C.2 The Idea of Police, the Time with the Various Units, and Miscellaneous Background Information

The researcher has entered various stages of developments in the idea of police and police work. When in 2001, the researcher first contacted the police to negotiate access the main concerns were those of providing a more efficient way of employing MICT. In fact the first meetings centered on new organizational methods as afforded by new technologies. Various organizational visions were discussed, and the one that most interested the researcher and the audience at the time was the concept of Network-Centric Warfare (NCW), an idea developed by the US Department of Defence to deploy and organize armies in foreign countries. The concept of NCW is based on the decentralization of resources and the quick reassembly of them through fast information channels. It also entails the creation of more independent individuals with full access to information anytime-anywhere. The researcher put forward the idea that such concept could be applied to fighting crime through having extremely independent but well connected police units.

This idea was formed before the researcher embarked in the actual empirical research. Things quickly changed with every hour spent in the field. Not only did the researcher find it difficult to see the police as crime fighters – which undermine the idea of NCW – but also the way in which MICT participated in police activities raised serious questions about the efficiency of the idea of anytime-anywhere technologies. This changed the focus of research towards understanding the actual usage and deriving a definition of police work from it. However, later in the research, such practice-based definition needed more explanation relating mainly to the societal factors influencing the role of police in society. A careful reading of the literature concerning police work in the UK complemented such definition and the idea of police work as peacekeeping was formed. This represented a radical departure from the original design of the research as well as of the research question.

It must be also noted that the researcher spent very little time with upper management as the focus of research was in the operational field. Therefore, the tensions as documented in the research came either from comments made by the participants in the study or from secondary sources such as newspapers and internal police documents, which reported little usage of MICT or MICT failures. The comments relating to the tensions with upper management and the Home Office are not included, as the comments have been made off the record.

The researcher tried to form friendly bonds with the officers who participated in the study. This happened by spending a lot of time in the tearoom as well as a lot of time smoking cigarettes outside. Furthermore, the researcher has tried to replicate the slang and technical words used by police officers. It is also worth noting that because of the Italian accent of the researcher and the affiliation to a notable research institution known for being partial, the researcher was seen as a non-threat.

The researcher spent a total of approximately 300 hours studying four units in the police for a total of 36 shifts of 8 hour each. The unit to which most time was dedicated is the RV with a total of 14 shifts, followed by Control Room with 8 shifts, Traffic with 7 shifts and SOCO with 7 shifts. In addition, the researcher has interacted and engaged in discussions as well as observations with a number of people – either operational or managerial: 20 RV, 10 Control Room, 8 Traffic, and 7 SOCO. Finally, it must be noted that although the tales describe mostly situations outside of the office environment, the researcher has spent a considerable time observing work in the office.

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