POLICE OFFICERS’ ADOPTION OF INFORMATION TECHNOLOGY: A CASE STUDY OF

THE TURKISH POLNET SYSTEM

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One of the important branches of government and vital to the community, police agencies are organizations that have high usage rates of information technology systems since they are in the intelligence sector and thus have information incentives. Not only can information technologies develop intra- and inter-relationships of law enforcement agencies, but they also improve the efficiency and effectiveness of the police officers and agencies without adding additional costs. Thus, identifying the factors that influence the police officers’ adoption of information technology can help predict and determine how information technology will contribute to the social organization of policing in terms of effectiveness and efficiency gains.

A research framework was developed by integrating three different models, theory of planned behavior (TPB), technology acceptance theory (TAM), and diffusion of innovation theory (DOI) while adding two other factors, facility and voluntariness, to better determine the factors affecting the implementation and adoption of the POLNET software system used by the Turkish National Police (TNP). The integrated model used in this study covers not only basic technology acceptance factors, but also the factors related to policing. It also attempts to account for the factors of cultural differences by considering the important aspects of Turkish culture. A cross sectional survey was conducted among TNP officers using the POLNET system. The LISREL 8.5© analysis for the hypothesized model resulted in a good model fit; 13 of the 15 hypotheses were supported.
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CHAPTER 1

INTRODUCTION TO STUDY

Introduction

Today, the world is experiencing significant technological revaluation at the main part of which is the information technology. There is a general belief that information technology eases and contributes to many aspects of our life (Nunn & Quinet, 2002). New technologies have changed drastically our ways of thinking, our perceptions, our attitudes, our symbols, and even our community. In particular, information technology has transformed our big world into a small village by creating communication channels all around the globe (Chan, 2001). Unlike traditional means of communication/information sharing, information technology transfers more information more quickly at a lower cost in addition to adding more flexibility of data management. In this new age of information, many people and organizations utilize information technologies and track new developments in this sector. The increasing investment in the information technology by many organizations as well as its widespread usage even in households show what an important element in our lifestyle it has become (Flanagin, 2002).

In this information age, whose parameters can be identified by technologies processing information to increase the efficiency and performance of not only individuals, but also of large organizations, people are bombarded with the promise of technological success (Nunn & Quinet, 2002). This idea of technological success stems from the promises of more power, authority, control, and the remarkable potential of
the systems designed with technology (Manning, 2003). Flanagin (2002) claimed that these technological developments have improved the capabilities of contemporary organizations and have made significant changes within and among these organizations. In the law enforcement setting, the belief in technological success has even been depicted in the entertainment media such as with the imagery of Robocop and high tech crime scene investigation series, like CSI.

Among large organizations using information technology systems, police agencies can be mentioned as such groups that have high usage rates of information technology systems (Nunn & Quinet, 2002). Moreover, this use is extremely crucial for these agencies in terms of the negative consequences from wrong or inappropriate implementations. Thus, most police agencies offer information technology as support for their police officers (Gottschalk, 2006). In fact, Maltz, Freidman, and Gordon (1991) maintain that “information is the lifeblood of the police” (p.12). The amount of information that the police receive during enforcing the law is overwhelming (Gottschalk, 2006). Police use information technology tools at almost every stage, including allocation of sources, patrolling, crime prevention, crime tracking, hot pursuits, and crime solving. Colvin and Goh (2005) assert that information technology has substantial impact on police practices. In addition, any increased acceptance of information technology by police officers improves the quality of policing and performance of law enforcement agencies (Gottschalk & Holgersson, 2006). Therefore, it is important to know how well information technology is working for a police force.
Problem Statement

In this fast-paced era of rapid technological advances, people spend considerable amounts of money on technology to increase productivity in almost all organizational structures across the globe. However, whether this investment really results in efficient output is a big concern for not only policymakers but also investors (Malhotra & Galletta, 1999).

Law enforcement is highly information intensive, and technology and training require significant resources, so the effective use of technology requires acceptance by those involved. Therefore, studies focusing on understanding user technology acceptance in law enforcement settings may contribute to the use of information technology more effectively by law enforcement personnel (Lin, Hu, & Chen, 2004). Similarly, Colvina and Goh (2005) assert that knowing the factors that influence the police officer’s adoption of information technology identifies and predicts how information technology contributes to police organizations or the social organization of policing in terms of effectiveness and efficiency gain. Moreover, allocating any new information technology and embedding it to the present structure may have also some unintended consequences unpredicted by policy makers as a result of the resistance of users (Manning, 2003).

If both the number of police officers using information technology in police organizations and the amount of investment for the establishment and development of this technology are taken into account, it becomes clear that police executives and
policy makers should pay special attention to identifying the optimum usage of these systems (Gottschalk & Holgersson, 2006).

When evaluating the impact of information technology on police practices, a comparative analysis is required to see how much the predictions and expectation fully become true in terms of users’ perspective in that particular police departments. Generally, information technology tools are purchased without considering user demands, systematic cost benefit analysis or not acquired by police budgetary officers. Moreover, lacking sufficient information technology knowledge and not tracking newest innovations the police are more vulnerable to the vendors of information technology. The reasons for this are that police administrators often readily accept the offers of new information technology tools from the vendors because they can not stand up to external political and social pressures. Although this purchase seems rational from their management perspective, it ignores the users’ opinions and users’ participation, which results in resistance and inefficient performance. Thus, information technology can not change the structure of the traditional process of policing as much as it can effect change in the business sector (Manning, 2003).

Several paradigms have been developed and used to explain the acceptance of information technology by users. Researchers have tested user technology acceptance in various occupations by using different instruments stemming from those theories. However, few studies have been conducted in law enforcement setting to examine usability features of police officers. Since the police organizations tend not to disclose
their activities publicly, the police officer’s adoptions of information technology are not well identified and studied by researchers (Manning, 2003).

Other aspects need to be considered. For example, each profession has different structures, cultures, and usability features. In addition, police agencies in each country have unique characteristics and different features in terms of organizational structure; therefore, it is really difficult to make generalizations about them (Sheptycki, 2004). Thus, for accurate understanding of a user’s acceptance in each occupation, different instruments need to be developed. Cork, Detmer, and Friedman (1998) argued that similar structures of attitudes and beliefs can not be known for different professions. They also claimed that each member of a different occupation has different attitudes regarding information technology usage. A unique design for just one type of profession can address the acceptance and use of information technology to obtain accurate measurements (Colvina & Goh, 2005). Clearly, there is a need to develop an instrument designed for information technology acceptance for law enforcement settings.

Additionally, the variety of work in policing, including personnel management and fighting different kinds of crimes, affects the usability of information technology and requires comprehensive information technology tools. If the usability of information technology is not seriously taken into account, all efforts made in this area and purchases of new technology may turn into a critical mass in which information is being collected without systematic organization and specific purpose (Manning, 2003). In this context, there is a need to understand these issues: whether law enforcement
personnel accept technological advances, what the primary elements of successful adoption of information technology are, what the primary blocks to acceptance are, and what the aspects of law enforcement culture that are significantly different from the private sector corporate environment are.

Veiga, Floyd and Dechant, (2001) argue that the additional pressure of globalization make these aspects more challenging and complex. Especially in the last two decades, considering the enormous and continuous investments being made in business and organizational resources, a main concern within the information technology community has been to understand and create conditions in which the technology will be accepted and used. Manning (2003) asserted that today, technological innovations occur as a result of demands and needs based on measured results, systematic feedbacks, and rational evaluations, but there is also a need to understand usability of these innovations systematically. Therefore, understanding the reasons why individuals accept or reject the information technology systems appears to be one of the most demanding issues currently facing researchers of information systems (Premkumar & Bhattacherjee, in press; Yi, Jacson, Park, & Probst, 2006).

As international and domestic competition among organizations has become more dependent on information and thus information technology, organizations try to produce new policies and transform their structures and perceptions to survive in this information-dependent environment. This transformation severely affects organizations which can not adapt to these rapid changes in terms of economic conditions and compels them to reconsider their traditional approaches. From the individual's
perspective, information technology is viewed as knowledge and skills that a person has to know to get a good job (Chu, 2001).

Therefore, especially for the last two decades, the research on information technology based on user needs and usability has grown and continues to interest researchers (Hu, Lin, & Chen, 2005; Premkumar & Bhattacherjeeb, in press). Adoption is not instantly embraced and comprehended; rather, it is a complex and continuing process of which every part needs to be clear. For this reason, researchers have developed many theories, conducted numerous studies, and tested these theories in different environments. In business settings, researchers have concentrated on identifying the factors of usage because they have found that information technology has been used by enterprises to reduce costs, increase production, and raise the quality of service (Legris, Ingham, & Collerette, 2003). However, most previous research has concentrated on user acceptance in business settings but few research studies have been conducted in non business settings, such as law enforcement environments.

Among the instruments developed, Davis’ (1986) Technology Acceptance Model (TAM) has been used and tested in the past two decades in various professions to explain user acceptance of information technology as a theoretical foundation of policy (Veiga et al., 2001). However, according to McCoy (2002), the majority of these studies have been conducted in North America and relatively few of them have focused on information technology acceptance outside of this continent. Thus, there is a need to determine if cultural differences influence technology acceptance.
Research Questions

In this study, an integrated technology acceptance model is designed to understand user features of information technology adoption in a law enforcement setting in Turkey. Using a survey instrument adapted from the relevant literature, the following questions related to information technology usability were tested:

1. Does the integrated technology acceptance model, designed for this study, confirm the information technology adoption of police officers using the POLNET system in Turkey?

2. To what extent do the characteristics of police officers as end users of information technology affect their acceptance of technology?

3. Do information technology users having different cultural values in the law enforcement environment in Turkey exhibit different technology adoption characteristics?

Purpose of the Study

The primary objective of this study is to respond to the research questions by providing a research model, an integrated framework of three different theoretical models which were developed to estimate and measure information technology innovation success. The research model used in this study covers not only basic technology acceptance factors, but also the factors related to policing. Moreover, it also attempts to account for the factors of cultural differences by considering the important aspects of Turkish culture. In doing so, this study aims to assess individual characteristics, technology characteristics, task characteristics, and national culture
characteristics. Thus, the main aim of the study was to provide evidence of the research model's predictive relevance.

To address research questions, this study implemented a data gathering method, a quantitative survey. Based on this quantitative research methodology, the outcomes of the research questions mentioned above are expected:

To contribute to information technology management practices of the Turkish National Police (TNP),

To add to technology acceptance literature,

To test technology acceptance models in a non business setting,

To fill the gap in the area of testing technology acceptance models in different cultures.

Conceptual Framework

The conceptual framework of this study is related to the information technology adoption theories. Thus, a research model was developed by integrating three different models, the Theory of Planned Behavior (TPB), Technology Acceptance Theory (TAM), and Diffusion of Innovation Theory (DOI), while adding two other factors, facility and voluntariness, to better determine the factors affecting the implementation and adoption of the POLNET (Police Network System) software system used by the TNP. These kinds of unified and integrated technology acceptance models have been used by many different studies in different settings. Realizing the importance of information technology for police agencies, this model attempts to explain the concepts where policing and information technology meet.
Significance of the Study

This study provides useful insights in different areas. This study attempts to explain the Turkish police officers’ behaviors and beliefs with the POLNET system from both theoretical and practical perspectives. Theoretical frameworks maintain the foundation of the subject which allows us to analyze it in greater detail and depth than just anecdotal case study alone. A combination of both theoretical frameworks and practical case study examination provide for gaining robust understanding of this phenomenon.

From the theoretical perspective, this study can shed light on better understanding the factors affecting the Turkish police officers’ successful adoption and implementation of POLNET system. It also provides empirical support for the integrated technology acceptance models developed from the three different theories. This study adds to the technology acceptance literature by testing this integrated technology acceptance model in a different culture and in a rarely studied organizational setting, law enforcement.

From the practical standpoint, if the usability of technology adoption factors is taken into account by the TNP, this study will be helpful in providing recommendations for each step of the process. The subjects, as users of the POLNET system, can get a better system based on the suggestions highlighted in this study.

This study also overcomes some of the common limitations of many of the technology acceptance studies. In their meta-analysis of TAMs, Legris et al., (2003), addressed three distinct and apparent limitations. First, they claimed that most of the
studies are conducted in universities or academic settings due to economic availability instead of in business or government settings. However, in this study, a Turkish law enforcement setting was used to measure the adoption of information technology.

Second, Legris et al., (2003) found that most of the research application tools described in the literature are office automation software or system development applications, which again do not reflect real life environments. They suggested that business process applications would be better for analyzing technology acceptance. In this study, the POLNET software system, which can be attributed to a process application, was used as a research application tool.

Third, most of the studies measuring technology acceptance do not test system usage; instead relying on self reports of individuals. Legris et al., (2003) claimed that this kind of measurement may not reflect an actual measure of acceptance. In this study, system usage was not tested; instead intention to use was selected as a dependent variable because the official report systems that measure personnel use of the system are restricted and inaccessible due to security concerns in the TNP.

Organization of Following Chapters

Chapter 2 reviews the background of this research including practical observations about and explanations for information technology and the law enforcement and theoretical backgrounds of information technology acceptance. After explaining five different models, the research model and hypotheses are presented. Chapter 3 describes the methodology of this study. Since this study is quantitative research, the research design, survey participants, instrumentation, procedure,
instrument validation, and data analyses are explained in this chapter. Chapter 4 presents the results and explains the statistical analyses of the cross-sectional survey conducted in Turkey. Chapter 5 consists of a summary of findings, limitations of this study, recommendations for the practitioners including Turkish National Police, policy implications, the directions for future research, and conclusion.
CHAPTER 2

LITERATURE REVIEW

Introduction

The relevant literature guides to comprehend the basic concepts of information technology, policing and culture and the relationships among them to understand the notion of research model of this study. Thus, this chapter first introduces the importance of information technology in law enforcement settings. Basically, information technology helps police agencies to collect, organize, store, and replicate information to enable crime analysis, crime mapping, and other activities aimed at crime prevention. In addition, not only can information technology disseminate information to the public at large, but it can also create a network of communication within agencies. This network has been extended parallel to the development of internet in the world. Today, the police can inform citizens by showing maps, diagrams, statistics, and pictures in their own websites (Manning, 2003).

Second, knowledge management in law enforcement is introduced because one of the main purposes of this study is to contribute to the knowledge management practices in the TNP.

Third, information technology and usability are introduced because this high utilization of technology also requires acceptance; just allocating the systems does not return always efficient results. Information technology systems significantly depend on the individual users’ capacities for usage. Usability of information technology affects
directly the knowledge management of the police agencies. Thus, later, task characteristics of law enforcement and user characteristics of police officers are presented to understand what factors affect usability of police officers employing information technology.

Fourth, based on the idea that culture is a discerning variable of information technology, the cultural dynamics of technology acceptance are handled since the participants of this study are from a culture different from those in the relevant literature. Fifth, to structure the theoretical background of this study, the summary of five accepted information technology models, Theory of Reasoned Action (TRA), TBA, DOI, Task Technology Fit (TTF), and TAM are introduced and discussed.

Fifth, in light of all these factors and theoretical facts, the research model used in this study is developed and presented.

The Importance of Information Technology in Law Enforcement

Not only can information technologies develop and facilitate the intra- and inter-relationships in law enforcement agencies, but they also have the potential to improve the efficiency and effectiveness of the police officers and agencies without adding additional costs (Nunn & Quinet, 2002; Premkumar & Bhattacherjee, in press). Chan (2001) claimed that information technology has contributed to policing by enabling the sharing of more information among officers, creating officer accountability, improving communication, providing cooperation, and creating positive work environments. She also asserted that there have been three types of essential impulses for technological changes in law enforcement; enhancing effectiveness and efficiency, responding to the
demands of other agencies, and providing for the necessities of new methods in police management and accountability.

In fact, information technology, historically, has always reformed police practices and opened new horizons in policing (Chan, 2001). For instance, Manning (1992) said that in the USA, the first use of information technology in policing dated back to the 1877 when the telegraph was employed to provide communication between law enforcement agencies (as cited in Flanagin, 2002). Information technology has also helped law enforcement agencies control crime and improve their professional status and organizational authority (Chan, 2001).

As an important branch of government and a vital part of the community, the law enforcement agencies need information technology to communicate effectively with other agencies. Today, information exchange between agencies is an unavoidable necessity for modern governments (Chan, 2001). The tragic events of the 9/11 terrorist attacks in America showed how important information sharing between and within national and international organizations is. Also, the example of the Oklahoma courthouse bombing indicates how significant data exchange among different federal, state, and local police agencies is. Timothy McVeigh, who killed 168 people and injured hundreds more, was arrested for driving without a license plate in a routine traffic stop in Perry, Oklahoma, while the FBI was looking for him in the US criminal database for being a suspect in the bombing of the Murrah Federal Building, in Oklahoma City. If the FBI had not got the arrestee information from the Perry Police Department on April 21, 1995, two days after bombing, he would have not been captured (Chu, 2001).
Due to new aspects of human rights and new management approaches in policing, the concept of public accountability has gained enormous attention among researchers in criminal justice and police executives dealing with criminals. In addition, police executives and policy makers also consider cost-effectiveness, integrity, ethics, and procedural standardization for better management in policing. All of these issues relate to the necessity of information technology usage and hence a large scale acceptance of information technology promises a positive difference in policing (Chan, 2001).

Flanagin (2002) said that information technology changes the dynamics of organizations by creating effective communication tools which allow more interpersonal relationships. He noted that Hinds and Kiesler (1995) claimed that information technology also provides an environment in which a variety of people can join the organizational decision-making process (as cited in Flanagin, 2002). Similarly, Flanagin pointed out that Pinsonneault and Kaemer (1990) found that information technology has an impact on reaching group consensus and increasing the confidence and satisfaction of its members. They believed that information technology has enhanced vertical and horizontal relationships within organizations by removing physical interaction problems (as cited in Flanagin, 2002). Information technology also contributes to improving inter-organizational relationships by providing competitive advantages and experience, reducing costs, and increasing profits. Information technology helps change the communication structure of organizations from hierarchical to horizontal. Moreover, studies that showed that information technology tools used
intra-organizationally, such as electronic mail, videoconferencing, group communication systems, and corporate interests, have a profound positive impact on success in the organizations (Flanagin, 2002).

For law enforcement agencies, information technology offers timely, reliable, and intact data, in addition to cost effective and flexible solutions for data communications which are crucial for most kinds of policing (Nunn & Quinet, 2002). For these reasons, law enforcement agencies have invested in information technology to improve their storage capacity and process and to effectively access these huge volumes of data for better intelligence and investigation (Chan, 2001).

A positive image of law enforcement is crucial for effective policing and generally, the police rely on citizen cooperation by providing information. This affiliation brings about crime prevention, which is called proactive policing (Cao & Burton, 2006). Moore (1997) claimed that by using the tools of information technology, not only can complex relationships of social structure and uncertainty between police and community be overcome, but also effective and improved public service can be managed. To implement this proactive policing, described as preventing crimes beforehand, communication channels need to be established for information exchanges between the community and police by using information technology.

Community policing can be defined as a proactive and organizational strategy which is designed to reduce fear of crime, crime, and disorder, and is aimed to increase citizen satisfaction with police services through collaboration with the community (Chu, 2001). This policing recognizes the community as a stakeholder in providing safety and
encourages the community to join in activities with the police to prevent crimes in their neighborhoods. Community policing includes the full partnership between police and community to set up order in the community and identify the problems to address reducing crime. Crime and disorder problems are the common concerns of the community and the police (Hinnat & Welch, 2002). Therefore, the community members need to participate in determining public policy based on an interactive and cooperative relationship with police. By collaborating with each other, the police and community can do many useful things, such as repair property damage immediately before allowing it to be destroyed by vagrants. This community involvement can be obtained through different means; one of these is “Community Crime Watch” which focuses on gathering information from citizens and giving it to the police.

As an example of this policy related to information technology in the United States, Williams and Aasheim (2005) outlined the Knowledge-Based Community Oriented Policing System (KBCOPS) which was implemented by the Charlotte-Mecklenburg Police Department (CMPD) in North Carolina. They said that the CMPD has recognized that information technology is one of the most important crime fighting and community policing tools in the 21st century in the practice of law enforcement, especially for crime analysis and computerized mapping. They also stressed how crucial it is to make information a part of problem-solving policing. In this department’s operational plan, information technology played an essential role to make Charlotte a safe city. Although Williams and Aasheim (2005) did not address a specific casual
relationship, they indicated that crime rates decreased after 1996 when this system was first implemented.

Similarly, Chu (2001) indicated that police are more likely considered successful by citizens due to professionalism, rapid response time, high arrest rate, and technology usage. He also added that information technology can contribute in many ways to community policing. Many police agencies use internet-based web pages to implement community policing strategies by getting feedback through emails and message boards, such as Automated Regional Justice Information System (ARJIS) providing crime statistics and mapping for San Diego Police Department, Canadian Police Information Center (CPIC) allowing citizens to search some areas of law enforcement records, and crime prevention website of Albuquerque Police Department based on crime-free multi-housing program. However, Nunn & Quinet (2002) claimed that these benefits of information technology may not be so effective in every type of community policing due to different types of activities.

Law enforcement agencies are hierarchical and masculine in form (Ozdemir, 2004). Thus, lower ranking or female officers may avoid face to face communication, which in turn affects decision making processes and successful management in that department. Online telecommunication using information technology may resolve this problem and increase the communication within the law enforcement organization (Flanagin, 2002). In another perspective, information technologies can also increase the capacity of organizational supervision, command control, and authority. For instance, increasing technology seen at cellular phones, car locators, video cameras on the cars,
and audio devices improve capacity of managers to observe their workers. Police organizations having paramilitary bureaucracy always need these kinds of supervision means (Manning, 2003).

Law enforcement agencies are in the intelligence sector and their crime fighting and prevention capabilities depend on individual officers’ timely access to relevant and accurate information (Hu et al., 2005). Collier (2006, p.110) defined intelligence as “actionable knowledge” and indicated that intelligence is very critical for policing. Mueller (2006) asserted that the value of information has increased due to threats against national security. Intelligence analysis used for allocation, decision making, and tactical planning has emerged as a significant component of contemporary policing strategies (Hauck & Weisband, 2002).

In Europe, intelligence-led policing based on information and communication technology has emerged after organized crime groups have increased during 1990s. According to Action Plan to Combat Organized Crime deployed by European Council in 1997, this policing requires an establishment of a data collection system for better analysis the situations of organized crime groups. Police agencies across the Europe have recognized the importance of information technology when they have disseminated and analyzed the criminal intelligence during the combat against organized crime groups. Thus, they have begun to implement new policies to utilize more of information technology, such as National Intelligence Model (NIM) in England (Sheptycki, 2004).
Particularly after September 11, it is clear that domestic intelligence is also important for counterintelligence and observing terrorist movements within the borders of homelands (Martin, 2004). There is general consensus that better information and intelligence analyses are needed to combat terrorism threats. Thus, after September 11, The Patriot Act of 2001 has changed the process of collection, dissemination, and evaluation of information, which affects significantly to public managers in terms of their decision making practices in the USA (Haque, 2005).

Mueller (2006) pointed out that technology is an important factor when analyzing information. It organizes the information to determine patterns and connections. Mueller (2006) claimed that every pieces of information needs to be converted into readily accessible intelligence to protect countries from threats. Thus, this intelligence task can be implemented successfully by information technology systems (Lin et al., 2004).

Increasing digital government applications requires law enforcement officers to use more information technology (Galindo, 2006; Hu et al., 2005). Computer technology used by governments to present information and services to citizens or other stakeholders has become so prevalent that it has recently been named e-government (Hinnat & Welch, 2002). Galindo (2006) suggested that government agencies using e-government services should promote innovative uses of information technology among their agencies. He also argued for a need for standardization of information technology including interconnectivity and interoperability among agencies for security. By the same token, the citizens’ use of e-government systems has also
increased in direct proportions. However, creating technology applications readily accepted by citizens is also critical and significant to the ultimate success of digital e-government systems (Lin et al, 2004). Manning (2003) stated that police need to serve public by giving requesting information. For instance, in the USA, in accordance with the Freedom of Information Act, search engines for information about arrestees have been created several police departments. Similarly, FBI posted 16,000 case files on the internet in 1997. Therefore, there is a growing effort among law enforcement departments to institutionalize the process of ‘learning the technology’ so that they can better serve and respond to demands from citizens (Redmond & Baveja, 2002). In addition, security challenges that may be a threat to the e-government systems and security informatics require an effective usage of information technology by law enforcement agencies (Hu et al., 2005).

Hu et al. (2005) claimed that the progressive usage of information technology has a positive impact on crime fighting and prevention. Crime fighting and prevention are not only core tasks of policing but also fundamental requirements of justice, which is one of basic dynamics of society. In addition to protecting and serving, the basics of policing require the prevention of future crimes or the catching of criminals after a crime has occurred (Redmond & Baveja, 2002).

While enforcing the law, police officers have to decide whether or not a crime has been committed, to investigate the case to gain information and evidence to identify the suspects, to recover the stolen property, to arrest the suspects, and to bring them to justice by presenting the evidence to the prosecutor (Chen, Schroder,
Hauck, Ridgeway, Atabaksh, Gupta, Boarman, & Rausmussen, 2002; Gottschalk, 2006). Thus, law enforcement agencies make tremendous efforts to perform these tasks, which can be very expensive. While implementing these basic and frequent tasks, police regularly retrieve and use information about crime scenes, crime patterns, locations of vehicles, responses to calls for service, personnel, finances, and various other aspects of departmental performance (Redmond & Baveja, 2002).

Couret (1999) added that information technology also helps police officers to gain information before they have physical and verbal contact with criminals, which improves the quality of response. He asserted that information technology yields a more timely response, more arrests, and thus a safer community. Therefore, the police need effective information technology tools to perform these critical and costly tasks. Moreover, successful monitoring and efficient investigation necessitate advanced collaboration and communication, which can be accomplished by information technology (Hu et al., 2005).

Time is also a critical concept for law enforcement officers (Hu et al., 2005). The police have limited time to clarify a case due to the difficulty of retaining evidence, suspects, criminals, and witnesses indefinitely (Hauck & Weisband, 2002). This issue is so important that a new technological device, a mobile display terminal (MDT) that facilitates computerized dispatch; access to state, local, and federal crime information databases; report writing; and electronic submission of reports from the field to the station has been designed (Chen et al, 2002). Clearly, the police need to access correct, relevant, and accurate information as much and as efficiently as possible.
With new technology benefits come possible drawbacks. Cyber crime and cyber terrorism are growing problems for law enforcement agencies, and are a new focus in crime literature. Shelley (1998) claimed that the developments in information and communication technologies create the situation in which crime has no geographic boundaries—it is now global. The developments have also affected the forms of criminality and criminal behaviors. He also asserted that though there have been many technological innovations in 21st century, law enforcement agencies have not prepared themselves adequately against cyber crime and criminals. According to police evidence, organized crime groups use computers for their daily transactions and communication networks. They also benefit from encryption techniques to hide from criminal justice. Shelley suggested that the police need to adapt information technologies to serve them and combat criminals in this era of globalization where transnational crime and corruption can be seen frequently.

The growing number of criminal groups and crime networks operating over the internet require effective tools for fighting against them and the implementation of new technological developments in this area. Organized crime and even some terrorist organizations use network systems by utilizing the latest information technology tools. Thus, the police need to embrace information technology to fight these kinds of crimes and criminals (Mueller, 2006).

In the United States, 940,000 police officers who spread out around the country domestically protect the homeland; in Turkey, 170,200 police officers perform the same role (Colvin & Goh, 2005; Ozmen, 2006). These huge organizations need effective
network systems that provide communication within and between organizations. The reality is that this can be provided by information technology systems. In today’s crime environment where organized crime and terrorist organizations have established perfect communication networks, it is a clear necessity for law enforcement to acquire information technology systems to establish communication channels and network systems (Xuan & Chen, 2005).

When police officers perform their jobs, they have a high level of autonomy and discretion in pursuing criminals. Although there are many variables including offenders, victims, witnesses, crime tools, and evidence and many changeable aspects that affect officer decisions at the crime scenes, police officers have to be able to make correct judgments to provide justice. They exercise their individual judgment in conjunction with regulations and formal rules while making decisions. In fact, no specific and unique list of policies and procedures can potentially guide police officers at every crime scene where police officers must take into account even small pieces of information that may affect their decisions. Therefore, the police need an effective and comprehensive information system to make good choices (Lin at al., 2004).

Knowledge Management in Law Enforcement

Gottschalk (2006) explored knowledge management in law enforcement in terms of usage of information technology. Knowledge management embraces a broad range of complex organizational, social, and behavioral factors. It can be defined as the sharing, disseminating, and comprehension of information within an organization; clearly, it is directly related to policing because of the knowledge intensive and time
critical structure of policing (Collier, 2006; Gottschalk, 2006). Chu (2001) stated that
information technology tools, such as computers or network devices support knowledge
management by their effects on decision making and problem solving. In his knowledge
evolution model regarding information technology and knowledge management,
Gottschalk (2006) identified four stages and concluded that it is in the later stages that
information technology is more beneficial to the organizations.

In the first stage, officer-to-technology, general information technologies, such as email, spreadsheets, and word processing are used by knowledgeable workers. Officers have information technology tools to share documents within an organization. The second stage, officer-to-officer, contains knowledge sources where users can access which officer has what information, such as an intranet in the organization to find, and communicate and coordination with other knowledgeable workers.

In the third stage, officer-to-information, officers can access the stored information by means of information technology. A database that stores information can be an example of this stage. Officers can search the information by data mining techniques. In the fourth stage, officer-to-application, the officer using the information system can assess the situation to solve missing knowledge problems by using a particular information technology system. An expert system can be an example of this stage. The POLNET system used by the TNP is an intranet system that has a database where users can access stored documents. In this context, as with the COPLINK system, “An advanced intelligence and security informatics (ISI) technology” (Hu
&Chen, 2005, p. 236) used in Tucson Police Department in America, POLNET can be defined as a third level knowledge management system using information technology.

Gottschalk (2006) indicated that database technology is a critical factor for information management. If the users find them unusable and difficult, the system cannot manage the information effectively within that particular organization (Collier, 2006).

Information Technology and Usability

Collier (2006) defined information as organized data without any assessment. Broadly, information technology consists of three important structures: hardware, software, and systems. Based on existing technological development, any software, hardware, or combination of systems that allow users to access or process the information constitute information technology. It can be utilized by organizations for different purposes, such as data handling, cataloging, communications, quality enhancement, cost reduction, providing statistical data, and finding strategic innovations (Chu, 2001).

As with any other technology implementation, information technology systems depend significantly on the individual’s capacity for usage, i.e., how individuals use the functions of the system (Money, 2004). Lewis (1995) stressed that a usable system can be delineated by the competence of users ease in handling the system and quickly recovering from errors. Nielsen (1993) stated that individual characteristics and task differences are the two main determining factors for usability of technology (as cited in Hauck & Weisband, 2002).
The characteristics of users and features of tasks affect the process of technology acceptance and effective usage of that particular technology. By the same token, Egan (1988) stated that in a system design, individual differences play an important role because they influence whether or not people can use the system to perform their tasks well (as cited in Hauck & Weisband, 2002). Al-Gahtani and King (1999) acknowledged that a lack of information technology acceptance by its end users is an important obstacle for organizations and requires investigation. They asserted that resistance to usage of information technology is a common problem for organizations but found that the acceptance of information technology can bring success to organizations at managerial, professional, and operational levels.

Williams and Aasheim (2005) pointed out that if the user needs can not be understood properly and user resistance occurs, this situation may undermine the system usage. They said that some users may perceive information technology as creating a greater workload and heavy burden for them. Some users question the value of the system when they encounter some deficiencies and limitations of the information technology systems. However, adoption of technology may create opportunities and convenience, and also it may generate some difficulties and strain for some people because of adoption problems.

Familiarization is another concept that affects usage of information technology. The more they familiar the system, the more elaborately they use it (Williams & Aasheim, 2005). Dennis and Wixom (2002) indicated that training is the critical factor for implementation of systems and system management. Barney (1991) remarked that
training improves user satisfaction, organization effectiveness, and user morale (as cited in Williams & Aasheim, 2005).

Characteristics of Law Enforcement Information Technology Tasks

Overall, the usage of information technology is affected by the characteristics of police work and organization, types of information, the form of police intelligence and various operational strategies (Flanagin, 2002). Although new information technologies promoting better performance are implemented often in law enforcement agencies, the expected improvements may not be observed every time (Nunn & Quinet, 2002). Generally, in law enforcement agencies with paramilitary organizations, deploying new information technology may not stem from the needs of that particular police agency; rather, it may be a general implementation of new policy decided earlier by the police executives or policy makers (Nunn & Quinet, 2002).

There is no difference between policing and business either commercial or non profit in terms of usage of information technology. Organizational response of police organizations to the information technology consists of several stages including familiarity, adoption, resistance, and reformation. These stages include several dynamics similar to the ones observed in organizational change process in business setting. Technological capacities, such as memory capacity, software capabilities, and fittingness for demanding job also play critical role in these stages (Manning, 2003). However, comparing to business sector, law enforcement agencies have fallen behind the business sector in utilizing new information technologies. Although there seems to
be significant improvements in using computers, commitment to paper based traditional policing needs to be replaced totally in this pre-digital era (Chu, 2001).

Flanagin (2002) claimed that law enforcement agencies have some obstacles when compared to other agencies in terms of obtaining benefits from information technology. The structure of police organizations, the characteristics of policing, and the demand of maintaining efficient information processing are some of these obstacles that prevent police officers from using information technology as effectively as users in other settings, such as business. Generally, law enforcement agencies have a traditional hierarchical bureaucracy in which the orders are assigned and dictated. As Manning (1992) mentioned, the information flow in the law enforcement agencies is asymmetrical as there is always an authoritative figure who designs the communication system (as cited in Flanagin, 2002).

Collier (2006) indicated that in the policing, the main problem is not if the information is available, but rather to access the information when it is necessary. Police officers spend a considerable amount of time and energy to collect and store the data, but if the information technology tools are not used properly in law enforcement, then information retrieval and optimum usage of stored information can not be obtained (Gottschalk, 2006).

Police agencies are, traditionally, reactive in nature rather than proactive in controlling crime within their jurisdictions. Police officers usually go to crime scenes after the crime is committed. Because of the uncertain and unpredictable environment at the crime scene, the officers attempt to take into account even very small amounts
of data before they go to the crime scene, because unprepared action may cause fatal results (Flanagin, 2002).

The communications within and between organizations rely on two kinds of information: explicit and tacit information. Explicit information is strict, formal, and systematic, while tacit information can not be formulated in a systematic way, and is highly dependent on an individual’s ability to express it. Thus, personal experience and comprehension ability regarding a particular situation are critical factors for tacit information. Explicit information can be gathered by books and other learning materials, but tacit information is obtained from shared experience. Generally, due to the changeable and unstable environments at the crime scenes and to the nature of policing, the information the police handle is tacit. Therefore, an officer’s ability to evaluate tacit information in uncertain conditions and the shared experience of this tacit information may affect the performance of policing (Flanagin, 2002). However, newly developed information technology offers a way to formulate this kind of tacit information, such as crime mapping, police network systems, and crime scene simulations so that police can share information among organizations. These technologies translate this information to be more accurate and accessible for everyone, although the officers’ ability to use these technologies affects the accuracy and comprehensiveness of information and performance of policing.

Sheptycki (2004) identified the organizational problems of European police agencies regarding intelligence and information sharing technologies. He stated that there are many digital data storage systems within and between police agencies, which
make analysis of information really difficult. Without coordination of information and communication technology systems, it is difficult to mention a well built information flow and intelligence system among police agencies. Lack of data linkages between police agencies may also cause serious problems for crime series analysis.

Sheptycki (2004) also mentioned that there is a lack of analytical capacity and administrative support in police agencies to analyze intelligence gathered from the fields. In this context, he addressed the importance of information technology systems to handle intelligence overload which damages the quality of data analysis.

Flanagan (2002) said that information technology processes the information by decreasing the amount of raw information and increasing the analyzed information. Thus, data reduction is an essential part of information processing. Although explicit information can be easily processed, data reduction for tacit information, which the police mostly deal with, is difficult, so there is a need to use and follow the new information technology in policing.

Nonetheless, despite the increased availability and utility, not everyone is positively inclined towards the technology. The resistance stems from how the organizational culture discloses the effects of users’ cognitive understanding in the course of organizational learning. Inadequate technological systems can cause cultural barriers in the organizations (Collier, 2006).

Positive public image is very important for law enforcement agencies due to its effect on public confidence (Collier, 2006). This is because public confidence is related directly to the cooperation and the community’s willingness for reporting any
information, such as crimes and suspects (Cao & Burton, 2006). Thus, any failure of information technology systems may damage public confidence in the police, which the police do not want (Collier, 2006).

Police organizations are generally quasi-military in nature, so the morale and the encouragement of supervisors influence a police officer’s behaviors (Ozdemir, 2004). When police officers perform their jobs, they use high level of autonomy and discretion. Although there are many variables including offenders, victims, witnesses, crime tools, and evidence and many changeable factors that affect officers’ decisions at the crime scenes, police officers have to make correct judgments to provide justice (Ozdemir, 2004). They exercise their individual judgments in addition to formal rules while making decisions. Moreover, there is no specific and unique list of policies and procedures that can potentially guide police officers at the crime scenes where police officers crucially need even small piece of information that may affect their decisions. Therefore, police needs correct information systems to make good choices (Lin at al., 2004). In addition, police officers should consider public accountability and responsibility while using their discretionary powers (Ozdemir, 2004).

Manning (1992) delineated information handled by the police in three different types: Primary, Secondary, and Tertiary Information. Primary information is raw data that need to be processed by police after being obtained. Secondary information is the data adjusted by a member of the police organization. Tertiary information is a kind of managerial information that is processed by more than one agency. He also commented that most of the information that the police have is primary information and not shared
among police officers due to different storage practices. Therefore, this primary information gathered by the police needs to be analyzed and classified systematically by information technology tools (Flanagin, 2002).

Generally, the intranet, a network system restricted to limited users, is used in law enforcement agencies to provide communication and data transfer within an organization. For example, intranet-based calendars and member directories help the law enforcement officer keep all the events and schedules effectively (Dees, 2001). However, Lutz (2003) claimed that most law enforcement agencies do not share information routinely. It is very difficult to make a form of information retrieval that can gather information covering all institutions in law enforcement. Therefore, this lack of demonstrability affects the usability of information technology systems in law enforcement settings. There is a need for a comprehensive information technology system to organize the information flow among these organizations (Chen et al, 2002).

Colvin and Goh (2005) insisted that the two factors of information quality and timeliness for law enforcement agencies are important in terms of the general acceptance of information technology. They defined information quality as being accurate, relevant, specific, and recent information. The construct of timeliness they described as gathering information and responding to calls for services in the most convenient time.

User Characteristics of Police Officers

Although there are clear and certain rules for police behavior, the events that the police encounter are mostly irregular, uncertain, and unstable in nature. Thus, police
officers use their discretionary power based on the situational rationality in light of the information they get beforehand and at the crime scene. The information that the police deal with is very contextual and related to the officer’s ability and evaluation (Flanagin, 2002).

Manning (1992) claimed that traditional policing and the traditional role of the police can contradict information technology usage (as cited in Colvin and Goh, 2005). Officers may resist using information technology if they believe that this method changes or disturbs their accustomed social structure, such as preventing them from engaging in social relationships with other colleagues (Colvin and Goh, 2005).

Resistance is the main problem of usability. Saade and Kira (in press) stated that the user resistance of information technology may stem from computer-phobia which is rooted on computer anxiety. This physiological condition becomes more critical in non-voluntary environments in law enforcement. Manning (2003) asserted that as an indicator of resistance, officers may re-designate the information technology by re-describing the situations where information technology does not exist. For instance, they may claim that the reports are better gathered by using paperwork. In Michigan City, senior police officers complain about the young officers for not interacting with the citizens, but relying on computers, which cause them to lose some policing skills. They may also perceive that information technology can be used as a big brother tool by their supervisor, such as Automatic Vehicle Locators (AVL) developed for better direction and supervisions of police cars. In addition, police officers may adjust or manipulate the conditions by using information technology. For instance, officers may
close their AVL devices in their cars in certain places where the signal may go off when they need to leave their jurisdictions. They may also give misleading information through information technology to cover up their failure or deficiencies. The worst way of resistance is sabotage to the information technology tools where the maintenance takes too much time. After sabotaging the information technology tool, they may report it as a regular break down for not to use that particular technology.

Collier (2006) indicated that one of the reasons for the failure of intelligence systems is that the systems are not user friendly. In addition, Che (2001) stated that some police officers may not want to disseminate of information gathered and locked to other people due to security concerns. The cases of hackers in digital world and the secretive nature of policing stimulate these concerns.

Typically, police officers have strong psychological attachments to their peers and supervisors and personal commitments to the public service. Such psychological attachment and personal bonds might be partially attributed to several factors that include the nonprofit nature of organization, the relatively less straightforward peer competition for resources or promotion, the greater trust of peers for assigned tasks, the personal commitment to public service, the comparatively long-term career pursuit, and the closed nature of the community. These characteristics are determining factors for usability and acceptance of technology, because subjective norms which can be defined as influence of important others, affect acceptance of technology (Lin et al., 2004).
Police officers have a very pragmatic, tangible, and anti-theoretical perspective to their job due to focusing on daily work with minimum paperwork. As a result, this situation causes police officers to find research and experimentation objectionable. Chen et al, (2002) claimed that police, particularly, are more pragmatic than those in business settings. The fact that testability and performance are determining factors for acceptance of technology makes this characteristic of police affect officers’ acceptance of information technology and they are liable to concentrate more on the usefulness of a technology than on its ease of use.

Perception is an important determinant for usage of information technology. Although information is perceived by many police officers as power, control, and influence and later, a valuable personal asset and a gain, the impact of information technology on this process is not the same as the one in business settings because of the nature of police work (Manning, 2003). Rochelelo (1993) stated that unlike most private sector organizations, law enforcement agencies have not typically viewed information system as a strategic and a valuable asset. In the private sector, information technology contributes a highly competitive advantage. There are some reasons of this perception. Generally, in policing, usability is ignored where users and tools confront each other and when allocating and purchasing the systems. This confrontation begins with the process of gathering raw data by patrol officers when they decide that it is necessary to use these technologies pragmatically. Then, they format and formulate these raw data and changed into official information. Because of these reasons, police officers alter and reshape the information technology systems
based on their needs and purposes while obtaining information from crime scenes (Manning, 2003). However, in the public sector, in an organization such as law enforcement, there is a misperception of utility due to inadequate evaluation of information technology and being seen as unnecessary for beneficially serving the public. (as cited in Hauck & Weisband, 2002).

Information Technology Developments in Law Enforcements

Manning (2003) categorized information technology developments accrued in law enforcement in the USA in five stages: pre World War II, post World War II, the Law Enforcement Assistance Administration (LAEE) stage, the National Institute of Justice (NIJ) policy, and the Crime Control Bills (COPS) period. His categorization stems from the significant impacts of information technology on police practices. For instance, pre WW II, police had used the telegraph, the call box, the telephone, and the two way radios which changed the structure of policing in those times by providing coordination within agencies. Unified Crime Reports under the FBI was developed during this stage. Policy makers were trying to depict crime fighting, scientific, and professional image during these time period. Especially, after the 1930s, two way radios met the need for responding citizen’s calls.

After World War II and till 1967, the telephone was used widely to decrease police response time to citizen’s calls. After the 1960s, computers were used to collect and organize citizen’s calls (Byrne & Buzawa, 2005). Between 1968 and 1980, the Law Enforcement Assistance Administration (LEAA), an agency giving grants to the states to support researchers and studies in law enforcement, had significant impact on
information technology usage in police. LEAA sponsored Computer Assisted Dispatching (CAD) systems for police agencies. The CAD could organize and store by means of computers. 911, emergency call number, was introduced by the President Crime Commission and accepted during this time period. However, the adoption of this system took many years by police agencies, such as the usage rate was 17% in the mid 1980s and reached 85% in the late 1990s. After 1974, the National Institute of Law Enforcement and Criminal Justice (NILECJ) and later National Institute of Justice (NIJ) had significant impact on information technology process in the USA’s law enforcement system. They conducted several experiments and implemented several policies, such as reducing random patrol, simplifying detective work, advocating crime analysis unit, rationalizing drug law enforcement by using information technologies funded by mentioned agencies. In 1994, Crime Control Bill was enacted to support community policing. In accordance with this law, new information systems, including intelligence gathering and integrated databases were funded. Today, information technology systems are still being adopted by the local police agencies. Considering all information technology developments in law enforcement in the USA, Manning (2003) claimed that these developments were unplanned and generally politically driven.

In Turkey, the Turkish Police Organization was established in 1845 although there were similar organizations in Ottoman Empire before that time. As a modern organization, Directorate General of Turkish National Police was established in 1909. Deployed by Technical Department which, now, has been called the Communication Department since 1984, different communication devices, including telegraph, radio,
and telephone had been used by Turkish Police Officers since then. The Computer Department was established in 1981 as a section under the Department of Research Planning and Coordination to handle computer related jobs of the TNP. In 1984, this section was transformed as an independent unit called Computer Department to provide information technology to the Police for better, faster, secure, effective and reliable services. Pekgozlu (2003) categorized the information technology developments in the TNP in three phases: establishment of data processing, police computer network project, reorganization and the POLNET. During that time, several projects, including wide area police network, were started to create a database system covering many information necessary for Turkish National Police.

One of main purposes of Police Network Project was to establish computer infrastructures both in central unit and 81 city police agencies. To do so, the TRANSPOL system, a physical telecommunication infrastructure of Police services was established to combine different transmission systems, including Automatic Fingerprint System, digital imaging, data transmission, LAN & WAN computer communication, and voice transmission, into one unique platform. Computer Department also focused on computer training for police officers and initiated many course activities. Today, several projects, including mobile information system which is an implementation of digital map supported by global positioning system (GPS), digital signature, and document management system are on the agenda (Askan, 2006).
Data Integration Programs in Law Enforcement

Several different information management systems used by law enforcement organizations exist. As mentioned earlier, Knowledge-Based Community Oriented Policing System (KBCOPS) has implemented in Charlotte-Mecklenburg Police Department (CMPD) in the USA. This system is based on a mobile information system using wireless data sharing and transfer. The main aims of this system are to reduce the amount of paperwork, increase data integrity, promote information sharing within this police department and between other police departments, and support problem solving. This system is designed to support information sources encountered by police officers including incident reports, crime management, arrests of criminals, crime investigation, and crime analysis. In doing so, the processes of reporting and investigating incidents are linked by information technology. This linkage created a precise, timely, and complete information system for police officers in Charlotte (Williams & Aasheim, 2005).

The KBCOPS also has search capabilities that allow users to search any type of crime, date ranges, patrol divisions, operation methods, suspect features, type of weapons used in the crime, or any other variables that officers want to identify. The KBCOPS database includes information that can be used to determine and arrest criminals and to find track and plot criminal behavior patterns and trends (Williams & Aasheim 2005). A study interviewed the law enforcement users of KBCOPS systems to determine their perceptions about this system by utilizing questions from the TAM (Davis, 1989) and the information systems implementation literature (Burns, Turnipseed...
& Riggs, 1991). The researchers found that the overall perceptions of the officers were positive although some older officers had resisted the system initially. They claimed that the resistance stemmed from involuntary changes in the daily routine activities of officers.

The National Incident-Based Reporting System or NIBRS (NIBRS Implementation Program, 2002), is a national crime tracking system which was established to solve crimes that happen in jurisdictions of individual police departments and across state lines (Williams & Aasheim, 2005). The INFOTECH International was developed in Tampa, FL. This program focuses on developing public safety to enhance information sharing between law enforcement agencies. The objective of this is to utilize information and security technology to enable secure data transmission between agencies (Chen et al, 2002).

The COPLINK project (Chen, et al. 2002) was initiated and processed by the Artificial Intelligence Lab at the University of Arizona. The objectives of COPLINK are to increase the crime-fighting and prevention capabilities of law enforcement officers. The COPLINK project offered two modules; COPLINK Connect and COPLINK Detect. COPLINK Connect allows law enforcement officers to access other data located in other jurisdictions or government agencies, beyond the initial restrictions of the systems. COPLINK Detect supports individual officers’ analyses of complex criminal connections by providing effective data integration and knowledge discovery. Typically, this module also supports knowledge sharing by identifying and connecting individual officers working on the related cases. One of the objectives of COPLINK is to develop an
integrated system to allow the Tuscon Police Department’s officers easy access to all the information contained in all three systems, the Record Management System, Mug Shots, and the Criminal Information Computer. The database technology plays an important role in the management of information technology for a police department. For instance, in one interview a patrol officer recounted that if he had had COPLINK Connect, either in the patrol car or at one of the local substations, then he could quickly and easily have verified the person’s identity (Chen et al, 2002).

Law Enforcement Online (LEO) is a secure intranet system that facilitates the communication between law enforcement agencies. This system, operated by the FBI, has online educational programs in addition to sensitive information for national security. The Knowledge Management Centre (KMC) at The Hague in the Netherlands is a knowledge management center administrated by Europol, the European Police Organization. Europol regularly updates KMC’s databases and tracks new developments in information technology to provide accurate and current information to member law enforcement agencies (Gottschalk, 2006).

Case Study: Research Application Tool, POLNET, Turkey

Case studies help to comprehend whether the information technology tools fit to the group norms, cultures, and practices since the traditional usability of technology assessments just focus on the single users (Sonnenwald, Maglaughlin, & Whitton, 2001). In this study, the POLNET system was selected to understand usability features of Turkish police officers.
The modern Turkish Police were established in 1845 (Cao & Burton, 2006). Today, the TNP, which is the largest law enforcement agency in Turkey and is administered by the Minister of Interior, has more than 174,000 employees. The TNP is a highly centralized organization based on the structure of integrated policing which can be defined as a structure where all the functions of police are encompassed in one organization (Ozmen, 2006).

For the TNP, the POLNET is an information technology system that provides a secure, reliable, and fast online aid to police officers dealing with criminal investigations (Askan, 2006). POLNET was established for knowledge management, with the main purpose of increasing performance in the TNP. Providing a secure network system, POLNET enables Turkish police officers to access a national database that combines different kinds of information storage, such as a criminal record database, a vehicle database, and the data for terrorist or organized crime groups. In fact it was designed to cover all the needs of Turkish police officers, including communication between different agencies. (Yazici, n.d).

There are several reasons for establishing POLNET system in Turkey. First, due to the rapid changes in social, economic, political, cultural, and industrial structures of Turkey, and the growing population, new types of crime and methods have appeared in the last decades. These conditions compel the TNP to have strong communication systems between its agencies. Second, because of the requirements of e-government applications and citizen satisfaction, the TNP has needed to respond to the demands of online inquires of services such as passport and driving license issues, so an e-
government system like POLNET has been a necessity for the Turkish police. Third, the TNP has to respond to other security organizations in Turkey in terms of information sharing. POLNET has the capability to do this. Fourth, international police organizations, such as Interpol and Europol, requires effective information sharing within member countries’ police organizations due to increasing international organized crime organizations around the world. Turkey, as a member of Interpol and Europol, has to respond to these demands by using an effective information management system. Fifth, establishing timely and effective information and communication system within the TNP in terms of improving decision making process has been a requirement of contemporary policing. Sixth, the TNP has needed an efficient and cost effective communication system in terms of economical considerations by omitting duplications and errors in the system (Pekgozlu, 2003).

Surveillance, smuggling, gun license, passport and visa control, criminal background checks, fingerprint compression, traffic investigation, and decision support systems are some of the areas that can be handled more quickly and effectively by POLNET. Wireless connection through GPRS can be made for officers working in the field. This system is also designed to provide a communication tool with international organization networks and information databases as well as national organizations under the protocol of e-government projects. Along with the project of TRANSPOL, the POLNET system causes an establishment of electronic infrastructure with new hardware and software programs which enable past and high quality data transfer for many police agencies in Turkey. After deploying the POLNET system, more than 30,000 police
officers who will use this system have been trained regarding usage of POLNET system and other computer applications, such as office programs until 2005. Based on these training results and establishing the POLNET system, new personnel deployment system has been applied to officers using POLNET system, which increase efficiency in the TNP (Pekgozlu, 2003). Figure 1 indicates an interface of POLNET system (Public Security Project of POLNET) (Askan, 2006).

Within the POLNET system, many different programs have been developed by different areas of policing as of June, 2005. To increase search capability, 31 main applications, 51 search programs, 26 local programs, and many statistical programs have been installed in the POLNET system. The POLNET system is being used by 33,000 users with 13,567 workstations. The number of processes performed daily on POLNET system is around 2.5 million.

Figure 1. An interface of the POLNET system (Askan, 2006).
In 2003, POLNET was also awarded a prize by the Turkish Informatics Foundation and Turkish Industrialists’ and Businessmen’s Association (TUSIAD) in the competition of e-government projects that support the transformation of information technology in the applications of e-services in Turkey (Sozen, n.d).

The Effect of Natural Culture

The studies conducted on information technology adoption and usage outside of the North America offered different results not only compared to the results in the United States, but also one from another. Some of them found that national culture is a discerning variable for technology acceptance and different factors of national culture influence the core variables of TAM (Koeszegi, Vetschera, & Kersen, 2004; Malhotra & Galletta, 1999; Mao, Strite, Thacher, & Yaprak, 2005; McCoy, 2002; Straub, Keil, & Brenner, 1997; Veiga et al., 2001). Predominantly, they used and measured Hofstede’s National Culture Model which was designed in 1980 (Hofstede, 1991; McCoy, 2002).

Hofstede’s National Culture Model is based on research which Hofstede conducted at the IBM Corporation between 1967 and 1970. There were 116,000 respondents from 66 countries for the survey. Basically, he classified the countries based on significant value differences (Veiga et al., 2001). Hofstede’s model consists of five different variables that were the main classification dimensions of his study. These variables are:

1. Power Distance: defined as the “the extent to which the less powerful members expect and accept that power is distributed unequally” (Hofstede, 1991, p.28)
(2) Uncertainty Avoidance: Hofstede’s explanation for this variable is the “the extent to which the members of a culture feel threatened by certain or unknown situations” (Hofstede, 1991, p.113)

(3) Masculinity / Femininity: Hofstede said that the “degree to which ‘masculine’ values like assertiveness, performance, success and competition prevail over ‘feminine’ values like the quality of life, maintaining warm personal relationships, service, caring, and solidarity: from tender to tough” (Hofstede, 1991, p.163)

(4) Individualism/ Collectivism: Hofstede delineated individualism as “societies in which the interest of individual prevail over the interests of a group” and collectivism as “societies in which the interest of the group prevail over the interest of the individual” (Hofstede, 1991, p.50)

(5) Long Term Orientation: According to Hofstede, “to the extent which people in a country have a long term versus a short term outlook on life, the values of perseverance and thrift are future oriented and more dynamic while the short-term values are more static, being past and present oriented” (Hofstede, 1991, p.164-166; Srite & Karahanna, 2006).

Studies exploring various cultures in terms of information technology found significant differences in attitudes toward technology. Therefore, the researchers’ findings were different from the results of North America, so many hypothesized that these differences stemmed from the effects of national culture on people. However, some of them took a different position and claimed that the effect of national culture was not a determinant variable for information technology acceptance (McCoy, Eyerard,
& Jones, 2005; McCoy, Galletta, & King, 2005). National culture also consists of
different interrelated concepts which are legitimacy, acceptance of authorities, dispute
solution means, perceptions, and authorities’ discretionary powers.

According to Hofstede’s National Cultural Model, the score of cultural variables
for Turkey:

- Power Distance: 66
- Individualism: 37
- Uncertainty Avoidance: 85
- Masculinity: 45

(Where 100= Highest, 50= Individualism, 0= Lowest value. Adapted from
Hofstede, 1991; Mao et al, 2005)

Based on these scores, it can be asserted that the people in Turkey have
relatively high power distance, are group oriented, avoid taking risks and are
moderately masculine in nature. Turkey is a nation with an obvious authoritarian legal
culture although western cultural influences have been observed recently. Collectivist
orientation, referring to the prevalence of group interest over individual interest is
another common feature of the Turkish nation. Individuals are affected by societal
power and legal control. However, modernization has begun to change the political,
social, and economic realities of this country (Cao & Burton, 2006).

Theoretical Backgrounds of Technology Acceptance

Many theories of technological acceptance have been proposed and expanded
for the past decades in contemporary information system research literature. In this
context, most of the studies inspiring these theories have generated adoption metrics that can be used to determine the likelihood of information technology usage and they all attempt to explain what factors influence the acceptance or rejection of technology by its potential users. The relevant paradigms will be presented in a chronological discussion.

Theory of Reasoned Action (TRA)

The Theory of Reasoned Action (TRA), a widely studied model in social psychology, was established on several dynamics including relations between beliefs, attitudes, intentions, and behaviors (Fishbein & Ajzen, 1975). The basic goal was to understand what and how motives that change people’s beliefs and attitude affect behavior in general. While proposing this theory, Fishbein and Ajzen (1975) assumed that human beings make rational choices and also make systematic use of the information that they have in their decision making process. Thus, individuals consider the consequences of their actions whether or not they implement that particular behavior.

Instead of attitude, behavioral intention is selected as a main predictor of behavior by this theory. In fact, behavioral intention, the core determinant of user acceptance for this theory, is classified by the person’s attitude toward behavior and subjective norms (Malhotra & Galletta, 1999). An individual’s attitude toward behavior consists of behavioral beliefs and evaluations of behavioral outcomes. In this context, behavioral beliefs refer to an individual’s positive or negative feelings about performing the intended behavior. Later, these beliefs are defined as silent or available beliefs that
a person holds (Azjen & Fishbein, 1980). By presenting this behavioral intention model, Fishbein and Ajzen (1975) propose that researchers should be able to predict the performance of any behavior unless individuals make deliberate changes between evaluation and carrying out that behavior.

In this theory, evaluation of outcomes refers to individuals’ engagement in activities when they perceive adequate benefits (Hinnat & Welch, 2002). Overall, attitude can be evaluated as the consequences of individual behavioral beliefs and expected consequences of that behavior. As for the subjective norm, it is formed by normative beliefs and motivation to comply with that particular task. Subjective norm refers to an individual’s perception of his or her significant referents' opinions. TRA hypothesizes that people’s beliefs influence their attitude, which joins with subjective norms in shaping the behavioral intention that eventually guides or dictates the actual behavior (Lin et al., 2004). Figure 2 shows the schematic design of TRA:

**Figure 2.** Graphical view of Theory of Reasoned Action (Adapted from: Fishbein & Ajzen, 1975; Legris et al., 2003).
However, according to Vankatesh, Morris, Davis, G, and Davis F. (2003), there are some limitations in the theory. First, in TRA, there is no clear distinction made between attitude and norms, which may cause confusion and misusage when determining the concepts. Second, this theory does not take into account variables other than attitude and subjective norm that may affect the behavior, such as ability, time, cultural factors, and unconscious habits. Therefore, some behaviors may not be explained by this theory. Third, Fishbein and Ajzen (1975) pointed out that their observation was based on self reports of individuals and not an actual and direct observation. Fourth, in this theory, there is also a limitation for individuals who perceive that they have little power over their behaviors, so this theory does not clearly explain these kinds of individuals’ behaviors. Thus, to overcome these problems, Ajzen developed and presented the Theory of Planned Behavior (TPB) (Schiffter & Ajzen, 1985).

**Theory of Planned Behavior (TPB)**

The Theory of Planned Behavior (TPB) extends the TRA by adding perceived behavioral controls to the model, including attitude, subjective norms, behavioral intention, and actual behavior (Madden, Ellen, & Ajzen, 1992; Yi et al., 2005). The main reason behind this addition was the recognition that behavior is not always controlled voluntarily. Ajzen (1991) claimed that behavior is deliberative and planned and behavior is a determination of behavioral intention (Huang & Chuang, 2007). This theory posits that there are three beliefs that affect behavioral intention. The first one is behavioral
beliefs which lead to attitude. Attitude is defined in this theory as positive or negative feelings about that behavior or its outcomes (McCoy, 2002).

Second, normative beliefs which lead to subjective norms consist of the referent’s opinion and motivation to comply, motivation to what each referent thinks. Third, control beliefs that lead to perceived behavioral control refer to people's perceptions of their ability to perform a given behavior. This perception consists of two dimensions, internal and external, which are affected by the individual’s knowledge capacity. Internal perceptions refer to past experience and channels where information is received and external perception refers to social influence and resource limitations including technical and managerial support (Lee, Kim, Rhee, & Trimi, in press; Veiga, et al, 2001). Figure 3 depicts the schematic view of TPB:

Figure 3. Graphical view of Theory of Planned Behavior (Adapted from: Ajzen’s personal website: http://www.people.umass.edu/aizen/tpb.diag.html).
TPB also hypothesizes that knowledge affects not only attitudes but also perceived behavioral control and that there is a strong correlation between intention and behavior. In this theory, behavioral intention can be defined as the perceived likelihood of performing the behavior (Lin et. al, 2004). In sum, people are more likely to perform the behavior and intention if they have a more favorable attitude and subjective norm in addition to considerable perceived behavioral control to that targeted behavior (Ajzen, 2002).

Taylor and Todd (1995) presented different version of the TPB and called Decomposed Theory of Planned Behavior (DTPB). They found that attitude, subjective norm, and perceived behavioral control contributed equally to the behavioral intention. Moreover, they claimed that both the TPB and DTPB have more explanatory power over behavioral intention than TAM has alone (Brown, Massey, Montoya-Weiss, & Burkman, 2002).

The Diffusion of Innovations Theory (DOI)

The Diffusion of Innovation (DOI) theory hypothesizes that information flows by means of communication networks and channels in the society and the diffusion of an innovation is formed in this society by being affected by these channels (Russell & Hoag, 2004). This theory also posits that the level of adoption of new technology is determined by the perceived attributes of innovation and the process of communication (Premkumar & Bhattacherjee, in press). In addition, Mao, et al., (2005) claimed that this theory assumes there are differences in adapting innovations across cultures.
Rogers, the creator of DOI, (1995) identified the innovation as individuals’ perceptions of new about an idea, practice, or object. He defined how innovation, particularly technological innovation, has critical importance for our society in every aspect of our daily life and civilization. He also mentioned that individuals’ reactions to these innovations determine their effects to society.

The important concepts of DOI can be described in their special meanings for this theory. Rogers (1995) defined key factors of this theory. First, innovation is any thought or process observed as new by people. Second, communication is the process of the new idea transferring from one person to another- mass media play an important role in this stage. Third, a social system is the group of individuals that have a complete and specific goal. Fourth, time is how long it takes the rate of adoption for individuals or the group to adapt an innovation (as cited in Yi, et al., 2006).

Based on his five years of investigation on diffusion of innovation, Rogers (1995) determined that five basic factors occur in social systems and change over the course of time. These are knowledge, persuasion, decision, implementation, and confirmation. Knowledge is shaped by two determining variables: Receiver variables including personality characteristics, social characteristics, and perceived need for innovation, and social system variables including social system norms, tolerance of deviancy, and communication integration (Russell & Hoag, 2004).

Persuasion is formed by perceived characteristics of innovation attributes. According to the Rogers, (1995), these key innovation attributes are:
• Relative advantage is a degree of persuasion for being better than what it supersedes. It can be measured by several variables, such as usefulness, credibility, quality of results, or prestige.

• Compatibility can be described as consistency with existing values, including past experiences and needs. Compatibility is also related to norms, cultural values, and objectives of people who try the innovation in terms of differences between traditional work patterns and new innovation approach.

• Complexity is the difficulty of understanding and use of technology. When the system is found difficult, Rogers claimed that people do not adopt that particular innovation. Because of this reason, usability engineering and user friendly interface designs have been become appealing subjects among designers and computer programmers.

• Trialibility is the degree of experimentation for that particular innovation. It includes perception of ease of try and risks for possible unintended consequences. If the systems allows you to make redo, people more likely adopt the innovation. Exploring the system effortlessly gives people more information and confident about usage of the system.

• Observability is the visibility of its results. It is the degree to whether the results of innovation can be understood easily. Rogers (1995) asserted that users need to know the consequences of usage before they try that particular innovation.
Figure 4 shows the schematic view of DOI:

Yi, et al, (2006) noted that in this theory, the decision stage includes two options. First, rejection of innovation results in either later adoption or continuation of rejection. Second, adoption of innovation results in either continued adoption or replacement. In the implementation stage, innovation is put into use by end users. Finally, a confirmation of innovation happens in which individual users can evaluate the results of that innovation. Moreover, in this theory, result demonstrability, a tangible product as a result of innovation, and image, a belief that innovation increase one’s
image or status, are important characteristics that affect user intention (Lundblad, 2003).

Rogers (1995) also categorized adapters in this process based on their reaction time to new innovations. He classified these groups by using a normal distribution curve, and called them innovators, early adaptors, early majority, late majority, and laggards as seen in Figure 5. The innovators are well educated, venturesome, and have multiple information sources. Early adaptors are also educated, popular, and respectable. Early majorities are deliberate and have many informal social contacts. Late majorities are skeptical and have lower socio-economic status. Laggards are very traditional and have very few information sources (Starkweather & Wallin, 1999).

Figure 5. Adopter Categorization on the Basis of Innovativeness (Adapted from Rogers, 1995).

Rogers (1995) asserted that the process of diffusion is also influenced by reduction of uncertainty. Individuals, at first, are uncertain about that particular
innovation, and then they cope with this uncertainty by learning form different sources, including consulting others about this new innovation. He claimed that early adopters more likely to ask to authoritative sources about their opinions since they have limited education background and skills. He pointed out that this situation approves how the process of innovation develops in a given society. However, his theory has been criticized for not focusing individual perspective of technology adoption rather addressing innovation occurs in society (Dillion & Morris, 1996).

Task-Technology Fit Model (TTF)

TTF focuses on the match between user task needs and the available functionality of the information technology (Goodhue & Thompson, 1995). The core structure of a TTF model is the matching of the capabilities of the technology with the demands of the task (Ioimo & Aronson, 2004). Goodhue & Thompson (1995) developed a measurement that shows important factors for utilization of technology. These are quality, ability of locate, authorization, compatibility, ease of use, training, production timeliness, systems reliability, and relationship with users.

Dishaw and Strong (1999) indicated that users utilize information technology provided that their needs fit the capabilities of the technology. Information technology is more likely to have a positive impact on individual performance. They suggested that an integration model of TTF and TAM would better explain technology acceptance.
Figure 6 shows a schematic view of TTF:

![Schematic view of TTF](image)

**Figure 6.** Graphical view of Task Technology Fit Model (Adapted from: Goodhue & Thompson, 1995).

The degree of individual abilities also affects the utilization of technology. This concept can be defined in this model as computer efficacy and classified as cognitive abilities, experience, and frequency of use (Dishaw & Strong, 1999). TTF theory has four basic factors that affect the performance of individuals. These are first, task characteristics and second, technology characteristics, which together affect the third factor Task-Technology Fit, which in turn affects the outcome factors, either performance or utilization. The model hypothesizes that individual abilities also affect the process of TTF. For instance, experienced users will benefit from technological tools and methods more than new users will (Ioimo & Aronson, 2004).
The Technology Acceptance Model (TAM) developed by Fred Davis in 1986 is an information system that illustrates how users come to acknowledge and adapt the technology. The TAM addressed why users accepted or rejected information technology. As was the Theory of Planned Behavior (TPB), this model was also an adapted version of the TRA (Colvin & Goh, 2005). TAM is such a widely accepted and tested model that, according to Money (2004), 355 journal citations have been made, indicating a strong acceptance among researchers due to its understandability and simplicity. Moreover, there were approximately, 200 studies, published in journals, proceedings, or technical reports, related to the TAM between 1989 and 2001 (Ma & Liu, 2004). This paradigm contends that when users are introduced to a new technology, some factors impact their intention to use the system. The TAM holds that users’ behavioral intention to use technology is affected by the perceived usefulness and perceived ease of use of the technology (Vankatesh & Davis, 2000).

Davis (1989) claimed that perceived usefulness, “a belief that using the new system will increase the performance”, and perceived ease of use or “the degree to which a person believes that using a particular system would be effortless” (p.320) are the main two parameters that impact the usage of these systems. Both perceived usefulness and perceived ease of use predict attitude, the user’s interest or desire to use the system. Attitude and perceived usefulness, together, are then predictive of an individual’s behavioral intention to use the system. In addition, perceived usefulness is
also affected by perceived ease of use which escalates the usefulness (as cited in Vankatesh & Davis 2000).

Davis, Bagozzi, and Warshaw, (1989) stated that TAM’s capability to explain individuals’ attitudes and behaviors toward information technology system depends on the external variables. These external factors both affect perceived ease of use and perceived usefulness simultaneously. Specifically, what these external variables constitute depends on the environments that the research is conducted. Thus, many researchers have used different variables for these external factors.

Figure 7 shows a schematic view of the original TAM:

![Figure 7. Graphical view of Original TAM (Adapted from: Davis, et al., 1989; Legris et al., 2003).](image)

In this model, there is a direct causal link between the behavioral intentions and actual behavior and this mentality is theoretically explained by many researchers in a variety of studies (Lin et al., 2004; Money, 2004; Ma & Liu, 2004; Malhotra & Galletta, 1999).
TAM provides an important theoretical contribution to our understanding of user acceptance of information technology (Robey, 1996). Szajna (1994) examined the reliability and validity of perceived usefulness and perceived ease of use and found significant reliability and good predictive validity. In 1995, Chin and Todd tested TAM in their cross validation study. They used a structural equation model by applying a one factor usefulness construct and two-factor explanatory interactions and found that the one factor model fit their sample.

TAM can be classified as a leading model for explaining or predicting individual technology acceptance and presents a framework from which extended models can be developed for examining individuals having different characteristics (Lin et al, 2004). Among these extended models, several of them, classified as milestones of this theory, are mentioned chronologically.

Taylor and Todd (1995) modified TAM by explaining the evaluation of the effectiveness and the understanding of the behavior of experienced or inexperienced users. The results of their study showed that there were significant differences in the relative influence of the determinants of usage regarding users’ experience.

Chau (1996) modified the TAM model and distinguished between perceived near-term usefulness and long-term-usefulness. He also found that contrary to perceived ease of use, a person’s usage of a new technology relies on perceived usefulness of that technology and that perceived ease of use has a relative impact on intention to use. Similarly, Sun (2003) claimed that the most important factor among all the variables determining the user acceptance of a new technology is perceived usefulness.
Gefen and Straub (1997) investigated whether gender affects technology acceptance. They found that women were more cooperative in terms of social conversion than men who were more competitive than women. Later, Venkatesh and Morris (2000) also investigated the effect of gender on technology acceptance. They found that perceived usefulness is a strong predictor of technology acceptance for men. On the other hand, women are affected by systems’ ease of use and subjective norms.

The TAM2 model proposed by Venkatesh and Davis (2000) extends the original TAM by incorporating subjective norms and cognitive instrumental processes in the model (Lin et al, 2004). Social influence processes, subjective norms, voluntariness, image, cognitive instrumental process, job relevance, output quality, result demonstrability, and perceived ease of use are all included. According to Vankatesh and Davis (2000), the social influence processes affect the social dynamics and forces on users in terms of whether they use the new systems or not. In this context, a subjective norm can be defined as a perception of being influenced by the referent(s) who is/are the authority in that particular organization. Similarly, an image is a level of perception that innovation is beneficial.

Venkatesh and Davis (2000) tested the TAM2 model and discovered a correlation between these social factors and perceived usefulness of technology. Voluntariness was chosen as a moderating variable in two sample groups and defined as being non mandatory for the decision to adapt and use the technology. As a result of testing these assumptions and hypotheses, Vankatesh and Davis found that subjective norms have a significant effect on usage intentions over perceived usefulness in both voluntary and
non voluntary conditions. However, there is only a slight effect on ease of use in non voluntary conditions and when people get experience in their jobs, the effect of social influence process decreases. In cognitive instrumental processes, all four conditions have a significant effect on perceived usefulness and ease of use. Another interesting finding from the Venkatesh and Davis study was that job relevance and output quality shared a mutual effect. They also questioned the effectiveness of attitude in mediating the effect of perceived usefulness and perceived ease of use on behavioral intention, thus they argued for its removal from TAM and its extensions.

Van der Heijden (2004) examined the individual acceptance of technology and a related subject, usage of a website, adding two new constructs, perceived entertainment value and perceived presentation attractiveness (Gardner & Amoroso, 2004). This study offers several interesting findings; first, that the relationships among perceived usefulness, perceived entertainment value and website revisits were significant. Second, in determining website usage, perceived usefulness and perceived entertainment value were both significant factors. Third, perceived entertainment value increased to the length of visits to websites more than perceived usefulness. And finally, fourth, ease of use only indirectly influenced website usage (Van der Heijden, 2004).

Similarly, Yi, Jacson, Park, and Probst’s (2006) study produced an integrated model which was a combination of TAM, TPB, and IDT and tested it on individual professions (Yi et al, 2005). This model provides a cognitive understanding of the mechanisms underlying technology acceptance through the combination of these three
models. They assert that this new model can better explain information technology acceptance and usage. They also found that individuals are more likely to accept technology if the tangible results are visible or technology improves their stature at work.

Premkumar and Bhattacherjee (in press) developed an integration model which is a combination of TAM and the Expectation-Disconfirmation Theory (EDT). EDT is a longitudinal process model and hypothesizes that user intention and behavior depend on a satisfaction process which is formed by a user’s previous expectations and initial experiences. The integration of TAM and EDT provided a more comprehensive understanding of processes related to information technology usage. According to this model, users have pre-usage expectations for the particular product. In addition to gaining experience by using it, they compare this perceived performance and initial experience and arrive at a disconfirmation. As a result, this disconfirmation level determines usage satisfaction which directs and affects user intentions about whether they will use it or not (Premkumar & Bhattacherjee, in press).

In addition to individual studies, some researchers conduct meta-analyses by reviewing various technology acceptance models. Legris et al., (2003) stated that although TAM is a very useful model for determining technology acceptance, the variables used to explain TAM in previous studies are inconsistent and unclear, so there is a need to add some other variables including human and change processes and adoption of innovations. They claimed that original Tam models explain just 40% of system usage.
Similarly, Sun and Zhang (2004) stressed that TAM can explain 40% of variance in technology acceptance and stated that studies usually explaining technology acceptance by using TAM have used technology imperatives and micro level analysis when considering individual perceptions. They suggested that a mixed level focus, including both macro and micro analyses should be used to solve the inconsistent results of previous research. They asserted that technology acceptance is a dynamic process involving technological and organizational structures.

Sun and Zhang (2005) also examined the moderating factors that influence TAM. These factors were categorized into three groups, individual, technological, and organizational. They concluded that most of the technology acceptance models need improvement although they found some statistically significant results. In addition, they pointed out the importance of moderating factors explaining technology adoption. They also stressed that cultural values have not been examined adequately by researchers in this field and suggested that researchers focus on cultural dimensions of technology acceptance.

King and He (2006) reviewed 88 published articles and found that TAM is a robust model to explain technology acceptance. They organized the concept and variables of TAM into four categories: (1) external factors, such as experience and self efficacy, (2) other factors suggested by other theories, such as subjective norms, risk, and trust, (3) contextual factors, such as culture and technology characteristics, and (4) measures, such as actual usage or perception of usage. They found that perceived usefulness and behavioral intention are significantly reliable.
Usability and Information Technology Acceptance Research

Conducted in Law Enforcement Settings

Lin et al. 2004 examined the perceived ease of use and perceived usefulness for the COPLINK. This framework, basically, is a combination of the TAM and the TPB. They measured perceived usefulness and perceived ease of use in terms of subjective norms, availability, job relevance, output quality, result demonstrability, external data exchange, efficiency gains, and self-efficacy. Results from preliminary evaluations of COPLINK showed that individual officers placed great importance on task performance efficiency resulting from their use of a technology. (Lin et al, 2004). This study found that perceived usefulness may be the single most important factor in individual officers’ technology acceptance decision making. Perceived usefulness appears to be the only construct that has a significant direct effect on behavioral intention.

In their study validating the use of TAM on police officers, Colvin and Goh (2005) determined that TAM findings were supported empirically in law enforcement settings. A patrol officer who accepted new technology would be facilitated by increasing the ease of use and perceived usefulness. Their findings suggested that the new factors of information quality and timeliness were the most important components of technology acceptance by patrol officers (Colvin & Goh, 2005).

Timeliness elements were defined as timely access to information and timely response to calls for service. Given the potentially dangerous situations in which law enforcement officers performed their jobs, placing importance on the quality and timeliness of information might prevent fatal outcomes. The findings also implied that
administrators should be clear about the purpose of new technology. For this reason, for example, they might emphasize the usefulness of the technology in the form of report writing functions that would permit patrol officers to remain in the field while they completed incident reports (Colvina & Goh, 2005). Patrol officers rely on technology to ensure the safety of the communities they serve. Officers who readily accept new technology would improve both efficiency and resources that facilitate their efforts to serve community members effectively.

Zaworski (2005) examined the impact of the Automated Regional Justice Information System (ARJIS) on police officers to find out whether an information sharing system has any effect on policing performance. He focused on individual effectiveness, job performance, productivity, investigative support, arrests, and clearances in terms of technology effectiveness. In his experimental study, one of the two groups was assigned to use the ARJIS system. He found significant results for these variables, except for the arrest factor, between his subject groups.

Pekgozlu (2003) conducted a study for end-users of POLNET in 2003. He stated that there is a high correlation between end-users’ participation and the success of the project based on information technology. Usability features of end-users may influence the system’s performance positively or negatively in accordance with their participation to the system. He added that end users may resist the system because of the inappropriate system design, their confusion or distrust to the system, and their negative attitudes about the system. This resistance may go further and even leads to
the sabotage. In addition, he also mentioned that end-users’ too high expectations about the system may result in disappointment and distrust of the system.

In his study, Pekgozlu (2003) found that even when the end-users’ knowledge about computers is only at an average level, they are liable to trust the computers’ technology and the POLNET system. End-users think that computers and the POLNET system contribute a lot to their work, but they also are concerned that some projects in the POLNET system do not completely meet the needs of their work. They also think that using the POLNET system is relatively easy and it is not perceived as an obstacle to their decision making process. In addition, 61.5% of the end-users think that the POLNET system increases the Turkish police’s prestige and status and thus they have a positive attitude to the POLNET system (Pekgozlu, 2003).

In his master’s thesis, Tosun (2006) conducted a study to test the attitude and perception of Turkish police officers, working in Istanbul, toward the Mobile Information System (MOBESE) system terminals mounted in police cars by utilizing TAM. As external factors, he chose police officers’ tenure of job, their user experience with computer, and user satisfaction of MOBESE system. He found that perceived usefulness, perceived ease of use, and attitude toward MOBESE usage are positively related to system usage.

Usability and Information Technology Acceptance Research Conducted in Different Cultures

There are many studies focusing on the acceptance and diffusion of information technology systems in North America (Premkumar & Bhattacherjee, in press; Vankatesh...
& Davis, 2000; Yi, et al., 2006). Compared to the number of American studies, there are relatively few studies conducted outside of North America (McCoy, 2002). The most seminal of these studies of the past decade are presented in chronological order:

First, in 1994, Phillips, Calantone, and Lee conducted research in China. They measured cultural affinity and TAM in the setting of Chinese firms adopting technology for transactions. They investigated employees of those firms to determine whether adoption of information technology differs across countries and found that culture had a significant effect on international information technology adoption.

In 1997, Straub, et al. compared the level of e-mail adoption in three different countries, the United States, Japan, and Switzerland. They found that email was adopted highly in the USA, moderately in Switzerland, and rarely in Japan. They attributed these differences to culture. However, McCoy (2002) and McCoy, et al. (2005) pointed out that though the researchers claimed that culture had a moderate effect on information technology acceptance, they did not collect data related to culture and they could not empirically prove that the variance in the results stemmed from culture.

Evers and Day's 1997 Australian study hypothesized that in order to gain economic success in the software business; web-interfaces should be designed in accordance with cultural differences. To test this, they investigated native Australian and international students’ design preferences in their survey. They found that design preferences influenced interface acceptance. As with the previous study, they attributed this variance to culture without actually measuring it (McCoy, et al., 2005).
Veiga et al. designed a qualitative study in 2001 to investigate whether cultural variables defined by Hofstede could have an impact on key components of TAM. They proposed 16 different hypotheses to explain the gap or lack of functional relationships between culture and TAM.

Then, Koeszegi, et al. conducted research in 2004 using an extended TAM to find out whether national culture influences a user’s perception and use of Internet-based negotiation support systems (NSS). However, they used a different comparison scale based on Hall’s (1976) contextual distinctions between cultures (as cited in Koeszegi et al., 2004). Low-context or high-context cultures constituted the unit of measurement to identify cultural differences. In low-context cultures, like the United States or Northern European countries, a small amount of information is shared and encoded completely in a given context of an event. However, in high-context cultures, like in Latin-American or Eastern (Asian) countries, most information is either included in the physical background of that event or personalized by them. Koeszegi, et al found that during negotiations, users from high-context cultures exchange significantly more messages and offers than users from low-context cultures.

Most recently, Mao et al (2005) conducted a comparative study examining user behaviors related to cell-phones in Turkey and the United States. They focused on how the adoption of cell phones changes across two cultures. As hypothesized, their results differed in terms of technology acceptance and adoption of innovations. For instance, they found that perceived ease of use to intention to use was significant for the Turkish sample, but not significant for the Americans. They attributed these differences to
cultural and economic structural differences. However, they did not measure the culture. They just found different results for technology acceptance and concluded that these differences stem from cultural differences because their argument was consistent with the Hofstede’s model of culture. The researchers also compared these two cultures based on Hofstede’s model, and found consistent results with their study.

However, some recent researchers have criticized these aforementioned studies in terms of either not using Hofstede’s model or not measuring cultural factors with technology acceptance models. These researchers claim that previous studies were conducted in student settings, not in “real” environment settings. Moreover, their international variance was even lower than variance in Hofstede’s model (McCoy, 2002). The following are three of the major studies that critique the earlier research.

First, McCoy tested the factors of TAM and culture dimensions in university settings across the world in 2002. He claimed that there is a strong correlation between patterns of TAM and whether or not a person has low or high cultural dimensions. The result of this study indicated empirically that the cultural orientation of people can make a difference in decisions of technology adoption. He examined the results individually and also attempted to measure cultural factors themselves.

Second, McCoy, et al. examined TAM in Uruguay and the USA in 2005. Their assumption was that no significant differences exist across cultures in terms of technology acceptance, which stem from Straup et al’s., (1997) critiques regarding the relationship between culture and technology acceptance. They conducted a survey by using the TAM to test email usage by American and Uruguayan university students. An
important finding was that it was appropriate to apply TAM to explain significant differences in intention to use technology in a non-American nation. The variables of TAM showed consistency within both countries although they had been found to be different in Hofstede’s Model.

Third, McCoy, Galletta, and King (2005) also criticized previous studies. They attributed these inconsistent results to some flaws of the previous research, pointing out that Hofstede’s Model was more than 30 years old. They claimed that the world has changed significantly and more importantly, habits of technology usage also have changed drastically in the last two decades. Another criticism was that the country scores in Hofstede’s model may not reflect every individual in a given country. Obviously, there can be variability across individuals in every country. They advised a trait-based approach that evaluates each individual’s score to test cultural differences in terms of technology acceptance. They also stressed how important it is to collect contemporary data of cultural variables.

Research Model

The research model used in this study is based on the integration of three different technology acceptance models: TAM, TPB, and DOI, while including modifications not originally in those models and including two additional variables (facility and voluntariness). The model is designed to best fit police officers using the POLNET system in Turkey, considering three main dynamics including national and organizational culture, characteristics of police officers toward technology, and distinctive features of policing and technology acceptance. In addition, the previous
studies conducted in law enforcement settings and the studies whose samples were drawn from Turkey were considered while structuring this model. Figure 8 shows the conceptual diagram of the research model:

![Conceptual Diagram of the Research Model](image)

*Figure 8. Conceptual Diagram of the Research Model.*

This particular design was selected because different professions may show different paths in terms of attitude about and intention of using information technology (Colvin & Goh, 2005). Thus, the police officers’ adaptation of information technology can be jointly explained by these different factors, so this integration of three technology acceptance models, having more explanatory power than each theory alone,
was chosen. Other than two variables of Voluntariness and Facility, the design of the model was tested by Yi et al. in 2006 in the health professions and they found significant results although some paths of variables that are slightly different than this research model proposed. By integrating these theories, it is assumed that this model provides an improved and more comprehensive understanding of the cognitive processes and behaviors regarding information technology usage of Turkish police officers, than each theory alone can.

The reason for integration stems from findings of recent studies. Wu and Wang (2005) suggested that the TAM model needs to be strengthened by including additional variables in its structures. In fact, there are some common constructs in these three theories. They all include system usage and behavioral intention. Legris, et al., (2003) recommended that TAM needs to be integrated with other variables including adoption of innovation and social control factors. The constructs of perceived usefulness and perceived ease of use, the core variables of TAM; the subjective norm and perceived behavioral control from TPB; and prestige, result demonstrability, and personal innovativeness from DOI were all adapted and integrated for this study.

The concepts of facility and voluntariness were also selected as factors involved in the acceptance of information technology because of the specific nature of law enforcement settings. TAM focuses on perceived gains and benefits because it assumes that people make rational decisions by weighing risks and benefits, but in TPB, positive or negative beliefs play important roles for technology adoption (Horst, Kuttschreuter, & Gutteling, in press).
This model not only embraces these general rules but also includes some variables from DOI. Indeed, in TAM 2, Vankatesh and Davis (2000) used the concept of image (called prestige in this study as Rogers defined originally) and result demonstrability, but they did not evaluate personal innovativeness in their model. Legris, et al., (2003) suggested that new variables need to be added, including innovativeness, to better explain technology acceptance. Vankatesh and Davis (2000) included perceived voluntariness in their model as a mediating variable of the social influence process and reported significant findings. Lin, et al (2004) included availability (it is rephrased as facility in this model) in their case study of COPLINK. As a result, I assume that the intention to adopt the POLNET system is related to the concepts mentioned above: perceived usefulness, perceived ease of use, subjective norms, behavioral control, facility, prestige, result demonstrability, and personal innovation.

Summary

The importance of information technology for police agencies reveals that policy makers and administrators continue to invest in this sector by considering usability factors which directly influence the effectiveness of the information technology. To examine usability characteristics of police officers, technology acceptance theories offering different models can be employed by considering task characteristics of policing and police officers’ usability features. Recent studies indicate that researchers also ought to take into account national cultural factors when examining user attitudes and perceptions toward technology adoption.
Thus, a research model was presented based on three different technology acceptance models, TAM, DOI, and TPB, to test the Turkish police officers’ adoption of information technology to contribute to Turkish information management practices. Police agencies in many countries have developed many projects for better information management systems in their organizations, one of which is POLNET developed by the TNP and selected as a research tool for this study.
CHAPTER 3

METHODOLOGY

Introduction

This chapter reviews the research design and methodology used to conduct this study to answer the research questions. First, it presents the variables for testing the research questions and states the main hypotheses. Next, the research methodology is described in detail, including sampling, instruments, data collection, and the data analysis method.

Research Design

The methodological plan of this cross-sectional study is a self administrated survey design. The survey was given to the participants, was completed by them, and then collected. For researchers in social sciences, such as in criminal justice, the main motivation of choosing a survey design is its one high predictive value of assessing the efficiency of an organization or a group in a society when the aspects being studied are related to human opinions, perceptions, and beliefs. In addition, survey research is preferred when researchers can not manipulate the conditions that the subjects will experience. In this study, the attitude, intentions, and beliefs of Turkish police officers were sought and evaluated. In fact, their individual cognitive perceptions were tested, so a survey that collects perceptual data from individual respondents was conducted in a Turkish law enforcement setting.
To determine and evaluate the perceptions of subjects via a research survey, in turn, creates prerequisites for rectifying policies consistent with the changes in perceptions. In this study, the researcher assumes that using effective and valid survey research will have helped to determine the factors that affect the usability of the information technology on which the TNP has spent considerable money in order to improve the performance of policing in Turkey. As a result, this study was performed based on survey research rather than an experimental or quasi-experimental design.

Operational Definition of Variables and Hypotheses

Dependent Variable-Intention to Use

The dependent variable is “Intention to Use” the POLNET system, a subjective probability of using the POLNET system. This variable is justifiable and empirically supported by previous studies (see Hu et al., 2005; Premkumar & Bhattacherjee, in press; Saade & Kira, in press; Vankatesh & Davis, 2000, Wu & Wang, 2005). According to Ajzen and Fishbein (1975), intention has significant effects on behavior. Similarly, TPB postulates that behavior is a result of behavioral intention (Ajzen, 1991).

In this cross sectional study, selecting intention instead of system usage prevents the potential problem of retrospective analysis. In fact, in their meta-analysis, Sun and Zhang (2005) said that behavioral intention is a better indicator of system usage than expectation, motivation, value, and user satisfaction. In this study, intention to use was selected as a dependent variable instead of system usage because in involuntary settings, usage may not accurately reflect the real opinions of users. Choosing intention
could also be beneficial for managers and policy makers involved in the development and deployment of new systems.

**Attitude**

Attitude refers to the police officers’ positive or negative attitudinal beliefs about the use of POLNET technology (Hu et al., 2005; Huang & Chuang, 2007). According to the TAM model, attitude is a determinant of perceived usefulness and perceived ease of use (Zain, Rose, Abdullah, & Masrom, 2005). However, in technology acceptance literature, attitude has always been discussed relevant to its effect on intention or technology usage. In the original TAM model, attitude was a strong determinant of behavioral intention to use the target technology. However, in TAM2 and later studies, Taylor and Todd (1995) and Vankatesh and Davis (1996, 2000) excluded attitude, claiming it has only a partially mediating effect on behavioral intention when considering the effects of perceived usefulness on behavioral intention.

In contrast, Yanga and Yoo (2004) claimed, from the perspective of social psychology, that attitude deserves more attention. They stated that attitude has two components: affective attitude and cognitive attitude. Affective attitude can be related to whether a person likes or dislikes the object, but cognitive attitude refers to that person’s specific beliefs about that particular object. In their study they found that cognitive attitude mediated the effects of technology usage, but the affective component did not mediate the influence of technology usage. They suggested that attitude should be linked in a cognitive understanding of information technology usage though attitude can be changed immediately. Wu and Wang (2005) pointed out that
attitude toward usage directly predicts intention, which also predicts system usage. Similarly, Brown et al., (2002) stated that in mandatory environments, attitude should not be excluded: as TAM can not explain actual phenomenon where usage is not voluntary, they concluded that attitude is critical for technology acceptance. Most specifically, Hu et al. (2005) stated that attitude is an important factor for indicating a police officer’s intention to use information technology since police officers have high levels of autonomy and discretionary power while they perform their job. Thus, I hypothesized:

\[ H_1: \text{A police officer’s Attitude towards the POLNET system has a positive effect on Intention to Use this system.} \]

**Perceived Ease of Use**

Davis (1989), the creator of TAM, defined the variable, Ease of Use, as “the degree to which an individual believes that using a particular system is free of effort” (p.320). This easiness includes mental and physical effort, especially in the learning phase (Yanga & Yoo, 2004). In this study, this variable can be defined as police officers’ perceptions that their usage of the POLNET system is effort-free. Consistent with TAM and later TAM2, perceived ease of use has an effect on both intention to use and perceived usefulness, though some studies found that perceived ease of use has no influence on intention to use, since they omitted the attitude factor in their models (Davis, 1989; Vankatesh & Davis, 2000).

However, some studies did find that perceived ease of use has significant effect on intention to use through attitude (Lin et al., 2004). In this study, it is assumed that
police officers using the POLNET system consider that the POLNET system is useful when they perceive it is easy to use and their attitudes are affected if they perceive the POLNET system is effortless. Similarly, I hypothesized:

\[ H_2: \text{Perceived Ease of Use has a positive effect on Attitude of police officers using the POLNET system.} \]

\[ H_3: \text{Perceived Ease of Use has a positive effect on perceived Usefulness of police officers using the POLNET system.} \]

\textbf{Perceived Usefulness}

Davis (1989) defined perceived usefulness as “a belief that using a new system increases the performance” (p.320). It is related to effectiveness on the job, to more productivity at work, such as consuming less time or money, and to relative motivation for usage of that particular technology (Yanga & Yoo, 2004). In this study, perceived usefulness refers to the concept that police officers perceive POLNET as useful. Usefulness has been tested relative to the system’s ability to increase performance, productivity, and effectiveness. Many empirical studies have found that perceived usefulness is an important determinant of intention to use and also of attitude (Colvin & Goh, 2005; Hong, Thong, & Tam, 2006; Hu et al., 2005; Lee, Kang, & Kim, 2007; Premkumar & Bhattacherjee, in press; Srite, Thatcher, & Yaprak, 2005; Vankatesh & Davis, 2000). For this reason, this variable was added into this study, so I hypothesized:

\[ H_4: \text{Perceived Usefulness has a positive effect on Attitude of police officers using the POLNET system.} \]
Subjective Norm

In many studies, the Subjective Norm has been found to be an important factor for intention to use information technology (Chau & Hu, 2002; Hu et al, 2005; Huang & Chuang, 2007; Lee et al., in press; Yi et al. 2006). It refers to individuals’ perceptions affected by important others’ opinions about information technology adoption. Lee et al. (in press) categorize the subjective norm in two parts: peer pressure and effects of supervisors. When considering the organizational culture and subculture of police officers working in a hierarchical environment, social norms and interpersonal communications between police officers and with their supervisors have significant effects on intention behavior. In addition, as a sub-cultural value, the police officers’ commitment and attachments to their jobs and peers also show the influence of opinions of significant others on police officers. Unlike in a business setting where competition between workers can be observed, police officers bond to their agency and peers easily because of the nonprofit nature of policing (Hu et al., 2005).

Moreover, in terms of the national culture, people in Turkey are collectivist in their behaviors and there is a notable power distance between supervisors and employees in work settings. This indicates that people in Turkey are affected by the opinions of significant others (Srite et al., 2005). In addition to these factors, the subjective norm has considerable background depicted on TPB and DOI (Ajzen, 1991; Goodhue and Thompson, 1995). Yi et al. (2006) asserted that observed behaviors from social groups are an effective instructional tool for people learning technological issues. Furthermore, users may perceive the particular technology to be more useful if their
supervisors or peers say so. Thus, subjective norm is included in this model as a
determinant on intention to use and perceived usefulness, so the hypothesis is:

\[ H_5: \text{Subjective Norm has a positive effect on Intention to Use the POLNET system.} \]

\textit{Prestige}

Prestige can be attributed as individuals’ high standing among others in the society. Gaining a positive image and increasing prestige in a social group are important factors for some people who value success, assertiveness, challenge, and competition (Srite & Karahanna, 2006; Yi et al., 2006). McCoy (2002) pointed out that for people in male-dominated cultures, such as in Turkey, success and status are essential and venerated concepts in social groups. In addition, police officers who enjoy a high level of autonomy and discretionary powers dignify the public image and gain prestige within the organization and from society. An authoritative image and prestige help officers to enforce the law more easily. Moreover, prestige is also related to the others and their opinions in the work environment where the system is used. Supervisors’ and peers’ opinions can be affected by the users’ prestige after using the system in terms of increasing performance for supervisors or competition among peers.

Especially in masculine cultures, colleagues may or may not encourage the police officer to use the system if they perceive that use of system increases the prestige of that particular police officer. It is assumed that if police officers use the POLNET system, they will gain prestige, so they will find POLNET more useful. In addition, the
prestige obtained by police officers affects important others’ opinions in the work environment. Thus, I hypothesized:

\[
H_6: \text{Prestige has a positive effect on perceived Usefulness of police officers using the POLNET system.}
\]

\[
H_7: \text{Prestige has a positive effect on the Subjective Norm of police officers using the POLNET system.}
\]

**Behavioral Control**

Behavioral Control refers to a belief about an individual’s control over technology in terms of resources and opportunities (Ajzen, 1991; Yi et al, 2006). It includes accessibility of skills, controls, resources, and necessary allocations (Huang & Chuang, 2007). Recent studies indicate that external and internal behavioral control has a positive effect on perceived ease of use (Venkatesh & Davis, 2000). This variable has similarities with the concept of self-efficacy (Horst et al., in press). The police officers’ ability to control their use of the POLNET system and their resources to handle it are important determinants of their perceived ease of use of the system. Thus, I hypothesized:

\[
H_8: \text{Behavioral Control has a positive effect on perceived Ease of Use of police officers using the POLNET system.}
\]

\[
H_9: \text{Behavioral Control has a positive effect on Intention to Use the POLNET system.}
\]
Result Demonstrability

Result Demonstrability can be attributed as the system’s capability of presenting the results easily after system usage. Apparent and tangible results of information technology contribute to people’s willingness to adapt more easily to using it and to gain confidence of use (Yi et al, 2006). Positive outcomes also help those who hesitate to take the risk of accepting new technology. In terms of risk avoidance, people who prefer structured situations and avoid uncertainty are more likely to accept new technology when there is a positive outcome. Police officers, being practical in nature, should recognize the apparent and tangible results of information technology for dealing with crime.

System capability of presenting results is also related to the perceived easiness of the system. If the system has the capability to show tangible results, police officers may perceive the system is easy to use when they see outcomes of their use straightforwardly. Thus, police officers will find it useful and will be willing to use the POLNET system when they see positive outcomes and also police officers will find it easy to use when they see the results of their usage clearly, so I hypothesized:

H10: Result Demonstrability has a positive effect on perceived Usefulness of police officers using the POLNET system.

H11: Result Demonstrability has a positive effect on perceived Ease of Use of police officers using the POLNET system.
**Personal Innovativeness**

Personal Innovativeness refers to "the willingness of an individual to try out any new information technology" (Agarwal & Prasad, 1998, p. 206). Individual reactions to new technological innovations differ from people to people based on their approach to risk taking, according to DOI theory. The DOI hypothesis is that adopters can be grouped into five categories: innovators, early adopters, early majority, late majority, and laggards (Rogers, 1995). Thus, personal reaction to innovations is a strong predictor of information technology usage (Lee et al., in press). Examining the personal innovativeness of individuals enables us to learn how different users control systems. Taylor and Todd (1995) stated that self efficacy has an effect on behavioral control, so innovators and early adopters are more likely to take risks and control over that particular technology.

In terms of national cultural values, for people who tend toward uncertainty avoidance, such as the Turkish people, the degree of innovation may affect their willingness to adopt and accept new technology. In addition, the technical skills of adopters as defined in the five categories change, based on their reactions. For instance, early adopters have more technical ability than late majority or laggards, according to DOI (Yi et al, 2006). Thus, it is obvious that adopters with more technical skills will find it easier to use the target technology than others, so it can be argued that the degree of innovation affects the perceived ease of use. Therefore, I hypothesized:

*H 12: Personal Innovativeness has a positive effect on Behavioral Control of police officers using the POLNET system.*
H 13: Personal Innovativeness has a positive effect on Perceived Ease of Use of police officers using the POLNET system.

Facility

Facility refers to the perception that police officers using the POLNET system can easily access necessary computers and resources while performing jobs on this system. TPB posits that external factors, including availability of a system (It is rephrased as facility in this study), influence behavioral control (Ajzen, 1991). Similarly, Venkatesh and Davis (2000) showed system availability to be a determiner of technology acceptance. If the users believe that enough resources and computers are available when they need them, they are more likely to use that particular technology; otherwise, they may try to find other solutions to handle their jobs.

Hu et al. (2005) found a somewhat significant relationship between availability and intention to use, so this study tested the direct effect of facility of the POLNET system on the behavioral control of the police officers. It is obvious that providing and maintaining computers in working condition is not easy for a central government which has many branches. In this study, I assume that if the police officers perceive that computers are readily available when they need them, they will have more control over the POLNET system. Thus I hypothesized:

H 14: Facility of the POLNET system has a positive effect on Behavioral Control of the police officers using the POLNET system.
Voluntariness

Most of the user acceptance research on information technology has been tested in volitional environments (see Al-Gahtani & King, 1999; Chau, 2001; Horst et al., in press; Li et al., 2004; Lin & Wu, 2004, Premkumar & Bhattacharjeeb, in press; Saade & Bahli, 2005; Wu & Wang, 2005). However, little focus has been given to study voluntariness in the area of technology acceptance (Braun et al., 2002; Venkatesh & Davis, 2000). Braun et al., (2002) defined the voluntary usage as a choice opportunity for users in terms of performing that specific technology or not. They claimed that if the technology use was not voluntary, then the relationships of variables offered by traditional technology acceptance models would be different. In this context, they found that unlike voluntary settings, perceived ease of use was the key antecedent of intention to use technology instead of perceived usefulness. They added that users, in order to keep working in their jobs, accept using technology as dictated by their supervisors.

Similarly, in their model, TAM2, Venkatesh and Davis (2000) defined voluntariness as the perception that a decision adoption is non mandatory; they found that in mandatory settings, individuals are affected by opinions of their significant others, but not in voluntary settings. Since the usage of POLNET is mandatory for certain assignments, voluntariness was chosen as an important factor for subjective norm. Thus, I hypothesized:

H 14: Voluntariness has a significant effect on Subjective Norm for police officers using the POLNET system
The proposed research model with its hypotheses is depicted in Figure 9 below:

![Research Model with hypotheses](image)

*Figure 9. Research Model with hypotheses.*

**Participants and Sampling Plan**

The sample was drawn from the police officers of the TNP who are currently using the POLNET software system. It is critical to draw a sample that can represent the population correctly to reduce the bias. Therefore, this study used the "Purposive Sampling" method where the researcher is responsible for the representativeness of the
samples to the population based on some criteria to determine the sample frame. Later, simple random sampling was used to select samples from this sample frame.

Purposive sampling allows researchers to use judgments to select samples having specific features and conditions (Kerlinger, 1986). Researchers’ beliefs, judgments, or their prior experiences about the representativeness of sample to the population play an important role for selecting purposive sampling. In this study, the main logic behind selecting purposive sampling is that the sample should include a collection of respondents with an understanding of and familiarity with the POLNET system, since its establishment, to adequately measure the effects described in the hypotheses.

The personnel in the TNP Computer Department have worked on this project both in the infrastructural phase and the software phase. The personnel in the TNP Communication Department jointly participated on this work. Knowing this information and having this experience, I chose purposive sampling because I assumed that the police officers selected from these departments had more conceptual and broader knowledge about the POLNET system than other TNP departments, which may directly influence the results of this survey. In addition, it is assumed that they can give more accurate responses than other police officers because of their cognitive understanding of the POLNET system. Other police officers focus more on their jobs instead of on handling the POLNET system. Just knowing a part of the system may not be sufficient enough to answer the survey questions. This condition could have affected the validity of this study, so I preferred to draw sample by utilizing purposive sampling techniques,
which can be specified as an expert sampling. I also assumed that this sample can be referred to as a subset of this study population and generalizations about the results of this study can be made by using this purposive sampling.

The TNP has 170,000 members consisting of almost 156,000 police non-ranked officers and 14,000 ranked personnel; they constitute the theoretical population of this study. However, the study population includes the 33,000 police officers who have the authorization to use the POLNET system in all departments of the TNP. The sample frame constituted the police officers who work under the Directorate of the Computer Center and the Communication Department in both the TNP General Directorate located in Ankara, Turkey, and in the other 81 city police agencies. This sample frame uses the POLNET system regularly and actively by dealing with most parts of POLNET. The study frame of included 2627 police officers--1360 police officers who work under the Directorate of the Computer Center and 1267 police officers who work under the Communication Department.

Among these police officers who were selected based on the purposive sampling method, 500 police officers were chosen as a sample by using simple random sampling where each police officer has an equal chance of being selected within this group. A computerized random number generator to frame the units and elements was used in this phase of sampling. Although a sample size of 200 was enough to administer a reliable analysis in structural equation modeling (Harris & Schaubroeck, 1990), I started with a large sample size to offset a potentially high non-response rate.
Instrument Development

The constructs in this study were operationalized through items validated in prior research studies. Data were collected from participants through these previously validated questionnaires (Appendix A) to understand the technology acceptance of Turkish police officers using the POLNET system.

First, the instrument was comprised of items from previous relevant studies having confirmed reliability and validity of the instruments. Excluding the demographic questions which were asked at the end of questionnaire, all of the items were measured by a 5 point Likert-type scale (ranging from 5 indicating strongly agree to 1 indicating strongly disagree).

Table 1 presents the survey constructs related to each variable used in this study.

Table 1

*Survey Construct and Measurement Items*

<table>
<thead>
<tr>
<th></th>
<th>Intention to Use was measured by a three item scale developed by Venkatesh and Davis (2000):</th>
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<tr>
<td>1</td>
<td>IUSE1 Assuming I have access to the POLNET system, I intend to use it.</td>
</tr>
<tr>
<td></td>
<td>IUSE2 Given that I have access to the POLNET system, I predict that I would use it.</td>
</tr>
<tr>
<td></td>
<td>IUSE3 If I access the POLNET system, I want to use it as much as possible</td>
</tr>
</tbody>
</table>
Perceived Usefulness was measured by three scale items developed by Venkatesh and Davis (2000):

| 2 | PU1 | Using the POLNET system improves my performance in my job. |
|   | PU2 | Using the POLNET system in my job increases my productivity. |
|   | PU3 | Using the POLNET system enhances my effectiveness in my job. |

Perceived Ease of Use was measured by three scale items developed by Venkatesh and Davis (2000):

| 3 | PEU1 | My interaction with the POLNET system is clear and understandable. |
|   | PEU2 | Interacting with the POLNET system does not require a lot of my mental effort. |
|   | PEU3 | I find the POLNET system to be easy to use. |

Subjective Norm was measured by two scale items developed by Venkatesh and Davis (2000):

| 4 | SN1 | In my work, people who influence my behavior, such as my supervisors, think that I should use the POLNET system. |
|   | SN2 | In my work, people who are important to me, such as my colleagues, think that I should use the POLNET system. |

Prestige was measured by two scale items developed by Venkatesh and
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<tbody>
<tr>
<td>96</td>
<td>Davis (2000):</td>
<td></td>
</tr>
<tr>
<td>PRES1</td>
<td>Having the POLNET system is a status symbol in my work</td>
<td></td>
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<tr>
<td>PRES2</td>
<td>Using the POLNET system provides a high profile.</td>
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<tr>
<td></td>
<td>Result Demonstrability was measured by two scale items developed by Venkatesh and Davis (2000):</td>
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<tr>
<td>RD1</td>
<td>I have no difficulty telling others about the results of using the POLNET system.</td>
<td></td>
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<tr>
<td>RD2</td>
<td>The results of using the POLNET system are apparent to me.</td>
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<tr>
<td></td>
<td>Attitude was measured by two scale items developed by Bhattacherjee (2000):</td>
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<tr>
<td>ATTI1</td>
<td>Using the POLNET in policing would be a wise idea.</td>
<td></td>
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<tr>
<td>ATTI2</td>
<td>I like the idea of the POLNET system in policing.</td>
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<td></td>
<td>Behavioral Control was measured by three scale items developed by Taylor and Todd (1995) and Bhattacherjee (2000):</td>
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<tr>
<td>BC1</td>
<td>I would be able to use the POLNET system in my work.</td>
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<tr>
<td>BC2</td>
<td>Using the POLNET system gives me greater control over my work in policing.</td>
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<tr>
<td>BC3</td>
<td>I have enough resources and necessary documents.</td>
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<td></td>
<td>Personal Innovativeness was measured by two scale items developed by Yi, et al (2006):</td>
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<tr>
<td>PINNOV1</td>
<td>If I heard about a new information technology, I would look for ways to experiment with it.</td>
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<tr>
<td>PINNOV2</td>
<td>I like to experiment with new information technologies.</td>
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<tr>
<td>Facility was measured by two scale items developed by Taylor and Todd (1995):</td>
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<tr>
<td>FACIL1</td>
<td>There are enough computers for everyone to use the POLNET system.</td>
<td></td>
</tr>
<tr>
<td>FACIL2</td>
<td>Facility of computers for accessing the POLNET system is not going to be a problem.</td>
<td></td>
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<tr>
<td>Voluntariness was measured by two scale items developed by Venkatesh and Davis (2000):</td>
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<td></td>
</tr>
<tr>
<td>VOLUN1</td>
<td>My supervisor does not require me to use the POLNET system.</td>
<td></td>
</tr>
<tr>
<td>VOLUN2</td>
<td>Although it might be helpful, using the POLNET system is certainly not compulsory in my job.</td>
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</table>

Second, the application wordings of the questionnaire were rephrased to relate to the research tool, the POLNET system. Third, the questionnaire was translated into Turkish to obtain accurate responses from the participants, who were non-English speaking police officers. To ensure reliability of the instrument, the Turkish version of the questionnaire was reviewed by three independent researchers from different universities in the United States, Mr. Aziz Ozmen from Sam Houston University, Mr. Ilker Pekgozlu from the University of Texas at Dallas, and Mr. Ilkay Akyay from Virginia.
Commonwealth University. They verified that the translation was accurate and the meanings of items in the questionnaire were consistence in English and Turkish.

Fourth, in order to mitigate the bias problem, which is a tendency to select the same response choice for each question, 5 negative statements were used in the questionnaire out of 47 survey questions. Thus, the responses of five respondents, who had entered “strongly agree or strongly disagree” for each item were dropped from the analysis since this would cause conflicting scores because the positive and negative items were scattered. Sixth, the instructions for the administration of the survey and the consent form for participants were designed and added to the questionnaire.

Expert Validation

In order to ensure that the respondents in this study would properly interpret the items, the survey questions were reviewed by Ilker Pekgozlu, who has done a master’s thesis regarding the POLNET system in Turkey and the two POLNET users who are currently working at the TNP Directorate of the Computer Center and are active POLNET users. Based on their interviews, revisions and additions were made to the instrument. I assumed that if the purposive sample is designed carefully, results similar to the ones designed by probability sampling can be obtained. Thus, in terms of content validity, the questionnaire was submitted to these experts in the relevant field to determine if the items are appropriate for the subject in question.
Survey Administration and Data Collection

Before the data gathering process, I met the requirements set forth by the University of North Texas Institutional Review Board (Appendix B). In addition, I also received the approval from the TNP General Directorate to conduct research among the police officers working in the TNP Computer and Communication Departments (Appendix D). The survey instrument, a self administrative form, was then given.

After determining the sample, the survey was distributed to the sample with the consent form. Participants were asked to indicate the degree to which they agreed with a series of statements. A descriptive note, including the design of questions, how they can respond to the questions, and how much time they may spend for this survey, was provided prior to the survey questions to decrease any missing data and increase the response rate. In addition, the respondents were notified and informed about the survey and how it may contribute to the TNP. Clear survey question statements and appropriate check boxes were attached to each set of the survey.

The questionnaire survey was delivered to the sample in two ways: a paper survey and a web-based online survey via email. A hard copy of the questionnaire is presented in Appendix A. The paper survey was delivered to the police officers working in the Computer and Communication Departments under the TNP General Directorate in Ankara, Turkey because of the geographic feasibility. For other respondents, randomly selected police officers working in the other 81 cities, but under the auspices of the Computer and Communication Department branches, a web-based online survey was provided by sending the questionnaire to the samples’ email addresses. The email
containing the link to the online questionnaire was provided to these participants. A website, Surveymonkey.com™ was used for online survey administration since this website is very user friendly and provides many options including graphical demonstration and raw data storage in appropriate formats. In addition, follow-up and thank you emails were also sent as a reminder to those who had not already completed the survey.

In the data gathering process, I took into consideration ethical issues, such as assuring the confidentiality of subjects, maintaining the privacy of respondents, and verifying the consent form (Appendix C) provided to meet the Institutional Research Board requirements. In the presentation of the results, I reported aggregate rather than individual data to ensure protection of the participants. The questionnaires were filled out by subjects anonymously, and the subjects were assured that their responses would not be disseminated to the police administrators or other authorities in any personally identifiable way. After the data gathering processes, data obtained from the two survey formats was inserted into SPSS 12™ and LISREL 8.5® programs to conduct the necessary analyses.

Data Analysis Method: Structural Equation Model

Structural Equation Modeling (SEM), a multivariate statistical technique, was used in this study. Currently, SEM is frequently used in behavioral and social science research areas, such as organizational behavior, management, business, and applied psychology (MacCallum & Austin, 2000; Millsap, 2002; Streiner, 2006). SEM can test a variety of theoretical models and provides a practical tool for researchers exploring the
relationships in those areas (Schumacker & Lomax, 2004). Technically, SEM combines confirmatory factor analysis used in apparent factor structures and path analysis generally used to explore causal relationships among sets of variables (Kelloway, 1998). In fact, SEM expands path analysis by constructing paths between latent (theoretical) variables that can not be directly measured, and variables that are observed (manifest) (Streiner, 2006).

Basically, SEM has five stages (Schumacker & Lomax, 2004):

1. Model Specification:

   In this phase, based on all relevant literature and theories, a theoretical model is developed. The variables which are used in the theory are specified and necessary relationships between these variables are created. This phase is so important that including or omitting a variable may cause a misspecification, which may yield a situation in which the model may not fit the data.

2. Model Identification:

   This stage concerns whether or not a unique set of parameter estimates can be found in the data. It depends on the designation of fixed, free, and constrained parameters. In order to identify the entire model, all parameters need to be identified. There are three levels for model identification: under-identified, just-identified, and over-identified. Just-identified and over-identified are necessary for model identification and estimation because the number of observed variables is more than the number of variances in the model. In addition, there are different rules to overcome identification problems for both the measurement model and
structural model. In this phase, the path diagram of causal association is depicted and constructed.

3. Model Estimation:

The parameters of the proposed model are estimated and the sample covariance matrix type is chosen. Different types of estimation methods including ordinary list square (OLS), generalized list square (GLS), and maximum likelihood (ML) can be used depending on the nature of the data and the sample size. Specified SEM software, i.e., LISREL, can be used for estimation. The estimated standard error of the parameters, which determines whether the estimates statistically differ from zero, is used in most cases.

4. Model Testing:

After the parameter estimates are obtained from the model, the next step is to evaluate how well the data fit the proposed model. The estimates of Goodness-of-Fit express whether the model fit the data or rejected them. The fit refers to whether the model can reproduce the data. If the value of the fitting function is close to 0, then it can be evaluated as a good model fit.

5. Model Modification:

If the model’s estimation of the covariance/variance matrix does not reproduce one of the samples of data, then the model can be modified and adjusted. If necessary, the path diagram might be reconstructed and parameters can be changed or fixed (Schumacker & Lomax, 2004).
There are several reasons why SEM is used in this study. First, SEM allows researchers to examine linear relationships between multiple observed variables and unobserved variables simultaneously, so complex variables of theories can be analyzed by this model (Williams, Edwards, & Vandenberg, 2003). Second, SEM is considered a confirmatory method rather than an explanatory approach. In this study, a model based on different theories of technology acceptance and adoption was tested and confirmed by data obtained from a Turkish law enforcement setting. Thus, the validity of this model was established rather than a new model being created. Third, SEM has several advantages over traditional models testing theories (Yang & Yoo, 2004): SEM considers measurement error during data analysis and does not require perfect measurement error, unlike path analysis, in terms of reliability and validity of measurement instruments (Williams, et al., 2003). Fourth, SEM has various, windows based, and user friendly software programs including AMOS® and LISREL® which was used in this study as well (Schumacker & Lomax, 2004).

Data Analysis Tool

LISREL®

A program of Linear Structural Relationships (LISREL 8.5®) was used to analyze the data. It is frequently used in research to analyze linear structural relationships and factor analysis of models in SEM. LISREL® is a useful tool for this study because it is robust for the sample size of this study. LISREL® has several advantages over other techniques. LISREL® analyzes all of the covariance in the data and when estimating the 190.__________________________

1 LISREL®: www.www.ssicentral.com
significance level and coefficient of the paths, it enables researchers to examine all of the correlations, shared variances, and paths in the model (Bollen, 1989). Bollen (1989) asserted that LISREL® gives more accurate and original results than other methods. It aims to measure the structure of latent variables measured by indicators. A causal structure between latent variables and underlying causes of observed variables is a first assumption for LISREL®. Then, two sets of equation models are created in LISREL®: a validating measurement model and a fitting structural model (Al-Gahtani & King, 1999).

**Measurement Model**

In the measurement model, hypothesized latent variables are measured by observed variables. Factor loadings indicate the relationship between observed and latent variables. Confirmatory factor analysis is used in this model. This model requires selecting a number of common factors and of measured variables which are related to those common factors. In addition, the reliability and validity of observed variables are described by using latent variables (Schumacker & Lomax, 2004).

**Structural Model**

In the structural model, the causal relationships and their effects between latent variables are described. This model identifies the directional relation among variables. Path analysis is used in this stage. The exogenous variables, independent variables, endogenous variables, moderators, and their causal relationships are depicted (Schumacker & Lomax, 2004).
Summary

By conducting a cross sectional survey, 15 hypotheses were developed to test the Turkish police officers’ information technology adoption. The sample was drawn from police officers working in the TNP Computer and Communication Department in accordance with non probability sampling design, purposive sampling. Data were collected in two ways: on paper and online, both accompanied by the appropriate consent form for the respondents. The dependent variable of this study is intention to use POLNET system. Ten other independent variables were selected based on three aspects: general technology acceptance factors, policing related factors, and national cultural factors. To analyze the statistical results, the SEM was selected by using LISREL 8.5® program.
CHAPTER 4

FINDINGS and DATA ANALYSIS

Introduction

This chapter presents the findings based on the data analyses. To respond to the research questions, this study aimed to prove 15 hypotheses. First, the primary analysis is provided to get information about the response rate and response distribution. Second, descriptive statistics are presented for demographic information. Third, psychometric analysis is described to give information about reliability and validity of this study. Fourth, the measurement model and structural model are analyzed based on the techniques of the structural equation model.

Primary Data Analysis

The response rate and descriptive statistics were examined for the primary analysis. A total of 500 surveys were distributed and 407 usable responses were received. This response rate is very high (81.4%) compared to the relevant literature. For analysis purposes, the response scale was assigned Likert-scale like numerical values for each item response on the instruments:

- Strongly Agree = 5;
- Agree = 4;
- Neutral = 3;
- Disagree = 2;
- Strongly Disagree = 1.
The “neutral” category option was provided to not force the respondents to select a choice when they were not clear. Thus, the analysis used in this study was measured using this 5 point scale. Due to the fact that the structural equation model tool, LISREL is sensitive to missing data, missing values were replaced by using the ‘series mean’ method in the SPSS™ (12) program. This replacement was just made for 53 cases. However, it was not necessary to transform the data related to the demographic information. Numeric values were reversed for the negative statements by using SPPS™ (12) program.

Table 2

*Descriptive statistics of items*

<table>
<thead>
<tr>
<th>Items</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>PU1</td>
<td>407</td>
<td>4.33</td>
<td>.03</td>
<td>.680</td>
</tr>
<tr>
<td>PU2</td>
<td>407</td>
<td>4.44</td>
<td>.03</td>
<td>.677</td>
</tr>
<tr>
<td>PU3</td>
<td>407</td>
<td>4.41</td>
<td>.04</td>
<td>.726</td>
</tr>
<tr>
<td>PEU1</td>
<td>407</td>
<td>4.38</td>
<td>.04</td>
<td>.813</td>
</tr>
<tr>
<td>PEU2</td>
<td>407</td>
<td>4.30</td>
<td>.04</td>
<td>.849</td>
</tr>
<tr>
<td>PEU3</td>
<td>407</td>
<td>4.24</td>
<td>.04</td>
<td>.797</td>
</tr>
<tr>
<td>SN1</td>
<td>407</td>
<td>4.24</td>
<td>.04</td>
<td>.718</td>
</tr>
<tr>
<td>SN2</td>
<td>407</td>
<td>4.25</td>
<td>.03</td>
<td>.674</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>--------</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>PRES1</td>
<td>407</td>
<td>3.97</td>
<td>.04</td>
<td>.845</td>
</tr>
<tr>
<td>PRES2</td>
<td>407</td>
<td>3.97</td>
<td>.05</td>
<td>.959</td>
</tr>
<tr>
<td>RD1</td>
<td>407</td>
<td>3.95</td>
<td>.05</td>
<td>.985</td>
</tr>
<tr>
<td>RD2</td>
<td>407</td>
<td>4.17</td>
<td>.04</td>
<td>.874</td>
</tr>
<tr>
<td>ATTI1</td>
<td>407</td>
<td>4.09</td>
<td>.04</td>
<td>.800</td>
</tr>
<tr>
<td>ATTI2</td>
<td>407</td>
<td>4.00</td>
<td>.04</td>
<td>.824</td>
</tr>
<tr>
<td>BC1</td>
<td>407</td>
<td>3.97</td>
<td>.04</td>
<td>.784</td>
</tr>
<tr>
<td>BC2</td>
<td>407</td>
<td>4.41</td>
<td>.03</td>
<td>.694</td>
</tr>
<tr>
<td>BC3</td>
<td>407</td>
<td>4.31</td>
<td>.04</td>
<td>.744</td>
</tr>
<tr>
<td>PINNOV1</td>
<td>407</td>
<td>3.81</td>
<td>.05</td>
<td>1.000</td>
</tr>
<tr>
<td>PINNOV2</td>
<td>407</td>
<td>3.99</td>
<td>.05</td>
<td>.914</td>
</tr>
<tr>
<td>FACIL1</td>
<td>407</td>
<td>3.99</td>
<td>.04</td>
<td>.901</td>
</tr>
<tr>
<td>FACIL2</td>
<td>407</td>
<td>4.27</td>
<td>.03</td>
<td>.672</td>
</tr>
<tr>
<td>VOLUN1</td>
<td>407</td>
<td>4.29</td>
<td>.03</td>
<td>.661</td>
</tr>
<tr>
<td>VOLUN2</td>
<td>407</td>
<td>3.85</td>
<td>.06</td>
<td>1.135</td>
</tr>
<tr>
<td>PU1</td>
<td>407</td>
<td>3.88</td>
<td>.05</td>
<td>.927</td>
</tr>
<tr>
<td>PU2</td>
<td>407</td>
<td>2.84</td>
<td>.06</td>
<td>1.283</td>
</tr>
<tr>
<td>PU3</td>
<td>407</td>
<td>2.66</td>
<td>.07</td>
<td>1.325</td>
</tr>
</tbody>
</table>
Descriptive Statistics of Respondents

Consistent with prior research practices, the respondents were asked to provide demographic information, age, gender, education level, and job experience.

Table 3 indicates that the respondents are fairly young. Almost one-third of the respondents are in the age group of 21-30; almost half of them (201) are between 31 and 40 years old. Approximately 15% the respondents are in the age group of 41-50, but just 5% them are between 51 and 60 years old.

Table 3

*Frequency Distribution of Respondents by Age (N=407)*

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>21-30</td>
<td>118</td>
<td>29.0</td>
<td>31.1</td>
<td>31.1</td>
</tr>
<tr>
<td>31-40</td>
<td>201</td>
<td>49.4</td>
<td>52.9</td>
<td>83.9</td>
</tr>
<tr>
<td>41-50</td>
<td>59</td>
<td>14.5</td>
<td>15.5</td>
<td>99.5</td>
</tr>
<tr>
<td>51-60</td>
<td>2</td>
<td>.5</td>
<td>.5</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>380</td>
<td>93.4</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

According Table 4, of the respondents, 79 were female police officers (19.4%) and 299 were male police officers (73.5%). The female response rate in this survey is
almost four times greater than the general rate of women police officers in the TNP (5.5%). The reason for the high response rate may stem from the fact that most of the female personnel work in office environments such as these departments.

Table 4

*Frequency Distribution of Respondents by Gender (N=407)*

<table>
<thead>
<tr>
<th>Gender</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>299</td>
<td>73.5</td>
<td>79.1</td>
<td>79.1</td>
</tr>
<tr>
<td>Women</td>
<td>79</td>
<td>19.4</td>
<td>20.9</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>378</td>
<td>92.9</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td>29</td>
<td>7.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>407</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5 indicates the education level of respondents, which in general is high. The largest groups of respondents have a two-year college degree (35.9%). However, approximately 30% have a four-year Police Academy or university degree or higher. The remaining one-fourth has a high school degree, in addition to police school; high school is a requirement for Turkish police applicants.
Table 5

Frequency Distribution of Respondents by Education Level (N=407)

<table>
<thead>
<tr>
<th>Education Level</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>High School</td>
<td>106</td>
<td>26.0</td>
<td>28.3</td>
<td>28.3</td>
</tr>
<tr>
<td>2 year College</td>
<td>146</td>
<td>35.9</td>
<td>38.9</td>
<td>67.2</td>
</tr>
<tr>
<td>University</td>
<td>94</td>
<td>23.1</td>
<td>25.1</td>
<td>92.3</td>
</tr>
<tr>
<td>Master</td>
<td>25</td>
<td>6.1</td>
<td>6.7</td>
<td>98.9</td>
</tr>
<tr>
<td>PhD</td>
<td>4</td>
<td>1.0</td>
<td>1.1</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>375</td>
<td>92.1</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td>32</td>
<td>7.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>407</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 6 shows the job experience of respondents. Among these respondents, the largest group (32.9%) had between 11 and 15 years of on the job experience; these results correspond with the age groups of respondents. Of the others, the smallest group (3.7%) to respond was the least experienced officers (0-2 years).
Table 6

*Frequency Distribution of Respondents by Job experience (N=407)*

<table>
<thead>
<tr>
<th>Job Experience</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-2 year</td>
<td>15</td>
<td>3.7</td>
<td>4.0</td>
<td>4.0</td>
</tr>
<tr>
<td>3-6 year</td>
<td>70</td>
<td>17.2</td>
<td>18.5</td>
<td>22.4</td>
</tr>
<tr>
<td>7-10 year</td>
<td>95</td>
<td>23.3</td>
<td>25.1</td>
<td>47.5</td>
</tr>
<tr>
<td>11-15 year</td>
<td>134</td>
<td>32.9</td>
<td>35.4</td>
<td>82.8</td>
</tr>
<tr>
<td>More than 15 years</td>
<td>65</td>
<td>16.0</td>
<td>17.2</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>379</td>
<td>93.1</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td>28</td>
<td>6.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>407</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Psychometric Properties

After gathering the data, the reliability and the construct validity including the convergent and discriminant validity were examined, although the purpose of this study was theory testing and pre-validated scales were employed (Premkumar & Bhattacherjee, in press). To examine whether the variables were measured with correct items, convergent and discriminant validities were checked through exploratory and confirmatory factor analysis, which is discussed in the measurement model section.
Reliability

Reliability is the degree to which a measurement instrument gives consistent, steady, and uniform results even after repeating the measurements of the same item each time. For the reliability testing in this study, Cronbach’s alpha coefficient was chosen as it is a commonly accepted measurement among researchers. In the composite reliability test, also called internal consistency reliability, all items were above the .70 reliability threshold; the negative statements in the questionnaire (6, 12, 25, 30) were recoded by reversing their scores in the SPSS (11)™ program. The Cronbach's alpha values are shown in the Table 7 below:

Table 7

Reliability Analysis

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Cronbach’s α</th>
<th>Number of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intention to Use</td>
<td>0.84</td>
<td>407</td>
</tr>
<tr>
<td>Perceived Usefulness</td>
<td>0.87</td>
<td>407</td>
</tr>
<tr>
<td>Perceived Ease of Use</td>
<td>0.79</td>
<td>407</td>
</tr>
<tr>
<td>Subjective Norm</td>
<td>0.84</td>
<td>407</td>
</tr>
<tr>
<td>Prestige</td>
<td>0.78</td>
<td>407</td>
</tr>
<tr>
<td>Results Demonstrability</td>
<td>0.78</td>
<td>407</td>
</tr>
<tr>
<td>Attitude</td>
<td>0.88</td>
<td>407</td>
</tr>
<tr>
<td>Behavioral Control</td>
<td>0.82</td>
<td>407</td>
</tr>
<tr>
<td>Personal Innovativeness</td>
<td>0.73</td>
<td>407</td>
</tr>
</tbody>
</table>
Validity

Validity, basically, can be determined in accordance with whether the instrument measures what it is intended to measure. Mentzer and Flint (1997) asserted that validity is a measurement that ensures the researchers can share their findings with confidence. Many types of validity measurements have been used in the research, including external related, content related, construct related, and criterion related validities. In this study, due to the response rate (81.4%) and sample size (407), it is assumed that there is enough evidence to believe this study has external validity. Content validity should be suitable because the various parts of the questionnaire were all adapted from the literature and have been reviewed carefully by the researcher.

As for the construct validity, it is related to whether a scale measures what it is meant to measure (Garver & Mentzer, 1999). There are several sub-forms of construct validity, some of which are discriminant and convergent validity. In the explanatory factor analysis, the construct validity was assessed by using principal components analysis with varimax rotation in this study. Convergent validity addresses the measures of constructs that are theoretically related. The latent variable should correlate the items which are assigned for that particular variable (Garver & Mentzer, 1999).

<table>
<thead>
<tr>
<th>Facility</th>
<th>0.82</th>
<th>407</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voluntariness</td>
<td>0.84</td>
<td>407</td>
</tr>
<tr>
<td>All items</td>
<td>0.89</td>
<td>407</td>
</tr>
<tr>
<td>Standardized Items</td>
<td>0.91</td>
<td>407</td>
</tr>
</tbody>
</table>
Discriminant validity addresses the measures of constructs that are not theoretically related. The variables should not correlate the items which are not assigned for that particular variable. The requirements for discriminant and convergent validity are satisfied when measurement items load high (0.70 or more) on their corresponding constructs and low (0.40 or less) on other constructs (Straub, 1989). Table 8 indicates the factor loadings of this study’s items. Although some factors, PEU3 and RD1, RD2, BC2, BC3, have lower factor loadings than other items and fall slightly below the 0.70 threshold, they were kept in the measurement due to the content validity.

Table 8

*Factor Loadings*

<table>
<thead>
<tr>
<th>ITEMS</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>PU1</td>
<td>0.7687</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>PU2</td>
<td>0.7877</td>
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<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>PU3</td>
<td>0.8046</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PEU1</td>
<td></td>
<td>0.7343</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>PEU2</td>
<td></td>
<td></td>
<td>0.854</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PEU3</td>
<td></td>
<td></td>
<td></td>
<td>0.6303</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>SN1</td>
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<td>0.8369</td>
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</tr>
<tr>
<td>SN2</td>
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<td>0.7922</td>
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<tr>
<td>PRES1</td>
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<td>0.7044</td>
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<tr>
<td>RD1</td>
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<td>0.5769</td>
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<td>RD2</td>
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<td>0.6737</td>
<td></td>
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<tr>
<td>ATTI1</td>
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<td>0.7665</td>
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<td>ATTI2</td>
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<td>0.714</td>
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<td>BC1</td>
<td>0.7675</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BC2</td>
<td>0.694</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BC3</td>
<td>0.6365</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
Data Analysis

The data analysis was handled in two separate stages by using the measurement model and the structural model, as recommended by Gerbing and Anderson (1988):

Measurement Model

The measurement model was used to estimate the factor loadings between manifest and latent variables. The main idea of measurement model is to describe how well the manifest variables explain the latent variables (Garver & Mentzer, 1999), that is, in order to evaluate a latent construct, a measurement model needs to be performed to make the construct observable by using indicators. In this stage, confirmatory factor analysis (CFA) was employed to supplement the construct validity and confirm the relationships between the manifest variables and their corresponding factors. CFA uses maximum likelihood estimation (MLE) as a primary form of estimation (Netemeyer, Bearden, & Sharma, 2003). To be theoretically valid, each manifest variable should be represented by only one latent variable (Garver & Mentzer, 1999).
Convergent validity can be verified by measuring whether the indicators load together on their corresponding latent variable. Garver and Mentzer (1999) assert that convergent validity exists when the loadings are significant, in addition to good fit results after CFA. These factor loadings should exceed the 0.7 threshold level to ensure each measurement explains 50% or more of the corresponding latent variable variance (Chin, 1998).

In this study, an 11-factors model was used to describe the relationship between the factors and 26 indicators while performing CFA. Based on the theoretical foundation, the factors were classified into the following 11 groups: Intention to Use, Perceived Usefulness, Perceived Ease of Use, Subjective Norm, Attitude, Prestige, Results Demonstrability, Behavioral Control, Personal Innovation, Facility, and Voluntariness. Each indicator was assigned to its corresponding factors, for example, with Intention to Use, the indicators were IUSE1, IUSE2, and IUSE3.

All factor loadings, latent variables, and error variances of manifest variables were significant (p <0.01, two tailed test). With respect to the factor loadings, it appears that most of the manifest variables loaded well on related latent variables (p<0.001, λ>0.70) evidencing the unidimensionality of each construct, except for the loadings PEU2-PEU3 to Perceived Usefulness (λ =68, 69), PRES2 to Prestige (λ =68), and BC1 to Behavioral Control (λ =69). However, since these items were validated before, the scores were found close to the threshold, and the reliabilities of these items were high, they were retained, so their loadings were considered acceptable (Yi et al, 2006). In terms of factor loadings, for every standard unit increase in the Intention to
Use variable, it is expected that IUSE1 manifest variable will increase by 0.84 standard units.

Table 9 shows other relationships between manifest and latent variables including variance and average variance extracted value. The percent of variance in IUSE1 manifest variable that is not explained by "Intention to Use" is 29%, which indicates a 71% explanation from manifest variable, IUSE1 to the latent variable, Intention to Use. In addition, the correlation matrix presented in APPENDIX (E) also shows a higher correlation among items which are assigned to the same construct than with those measuring other constructs. Most of the error variances of manifest variables are significant and lower than 0.50. That is, the percent of variance in most manifest variables not explained by related latent variable is less than 50%. PU2 (θ=0.53), PU3 (θ=0.52), PRES2 (θ=0.53), and BC1 (θ=0.52) are exemptions due to their slightly lower loadings to their factors. Thus, for instance, the percent of variance not explained by Perceived Ease of Use is 53%.

Table 9

Confirmatory Factor Analysis- Factor Loadings

<table>
<thead>
<tr>
<th>Construct</th>
<th>Items</th>
<th>Factor Loadings</th>
<th>Variance</th>
<th>Average Variance Extracted (AVE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTENTION TO USE</td>
<td>IUSE1</td>
<td>0.84</td>
<td>0.29</td>
<td>0.63</td>
</tr>
<tr>
<td></td>
<td>IUSE2</td>
<td>0.81</td>
<td>0.34</td>
<td></td>
</tr>
<tr>
<td>Category</td>
<td>Variable 1</td>
<td>Variable 2</td>
<td>Value 1</td>
<td>Value 2</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>------------</td>
<td>------------</td>
<td>---------</td>
<td>---------</td>
</tr>
<tr>
<td>PERCEIVED USEFULNESS</td>
<td>IUSE3</td>
<td>0.75</td>
<td>0.43</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PU1</td>
<td>0.85</td>
<td>0.28</td>
<td>0.70</td>
</tr>
<tr>
<td></td>
<td>PU2</td>
<td>0.80</td>
<td>0.37</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PU3</td>
<td>0.87</td>
<td>0.25</td>
<td></td>
</tr>
<tr>
<td>PERCEIVED EASE OF USE</td>
<td>PEU1</td>
<td>0.75</td>
<td>0.44</td>
<td>0.50</td>
</tr>
<tr>
<td></td>
<td>PEU2</td>
<td>0.68</td>
<td>0.53</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PEU3</td>
<td>0.69</td>
<td>0.52</td>
<td></td>
</tr>
<tr>
<td>SUBJECTIVE NORM</td>
<td>SN1</td>
<td>0.80</td>
<td>0.36</td>
<td>0.70</td>
</tr>
<tr>
<td></td>
<td>SN2</td>
<td>0.88</td>
<td>0.23</td>
<td></td>
</tr>
<tr>
<td>PRESTIGE</td>
<td>PRES1</td>
<td>0.74</td>
<td>0.48</td>
<td>0.50</td>
</tr>
<tr>
<td></td>
<td>PRES2</td>
<td>0.68</td>
<td>0.53</td>
<td></td>
</tr>
<tr>
<td>RESULTS DEMOSTRABILITY</td>
<td>RD1</td>
<td>0.86</td>
<td>0.26</td>
<td>0.76</td>
</tr>
<tr>
<td></td>
<td>RD2</td>
<td>0.89</td>
<td>0.21</td>
<td></td>
</tr>
<tr>
<td>ATTITUDE</td>
<td>ATTI1</td>
<td>0.84</td>
<td>0.30</td>
<td>0.72</td>
</tr>
<tr>
<td></td>
<td>ATTI2</td>
<td>0.86</td>
<td>0.25</td>
<td></td>
</tr>
<tr>
<td>BEHAVIORAL CONTROL</td>
<td>BC1</td>
<td>0.69</td>
<td>0.52</td>
<td></td>
</tr>
<tr>
<td></td>
<td>BC2</td>
<td>0.73</td>
<td>0.46</td>
<td>0.50</td>
</tr>
<tr>
<td></td>
<td>BC3</td>
<td>0.71</td>
<td>0.50</td>
<td></td>
</tr>
<tr>
<td>PERSONAL INNOVATIVENESS</td>
<td>PINNOV1</td>
<td>0.91</td>
<td>0.17</td>
<td>0.65</td>
</tr>
<tr>
<td></td>
<td>PINNOV2</td>
<td>0.70</td>
<td>0.50</td>
<td></td>
</tr>
<tr>
<td>FACILITY</td>
<td>FACIL1</td>
<td>0.72</td>
<td>0.49</td>
<td>0.57</td>
</tr>
</tbody>
</table>
“Average Variance Extracted (AVE) assesses the amount of variance captured by a set of items in a scale relative to measurement error” (Netemeyer, et al., 2003, p: 153). The threshold of 0.5 is used for convergent validity where the AVE from each construct is greater than this recommended threshold (Fornell & Larcker, 1981). Table 10 shows that the AVE’s of all the constructs exceeded the 0.5 threshold, which indicates that the measurement model exhibited satisfactory convergent validity.

<table>
<thead>
<tr>
<th>VOLUNTARINESS</th>
<th>FACIL2</th>
<th>0.80</th>
<th>0.36</th>
</tr>
</thead>
<tbody>
<tr>
<td>VOUN1</td>
<td>0.71</td>
<td>0.50</td>
<td></td>
</tr>
<tr>
<td>VOUN2</td>
<td>1.03</td>
<td>-0.06</td>
<td>0.78</td>
</tr>
</tbody>
</table>
Figure 10. Diagram of Confirmatory Factor Analysis
A measurement model should also be assessed with the criteria of goodness-of-fit values. The CFA conducted in this study showed good model fit. First, for a good model fit, chi-square ($\chi^2$)/degrees of freedom (df) should be less than 3. The $\chi^2$ of 392.17 with 239 df showed an $\chi^2$ to df ratio of less than the recommended 1:3 ratio. Additionally, the value of Goodness of Fit (GFI) is 0.93 with 0.04 Root Mean Square Error of Approximation (RMSEA), evidencing the good fit of the model to data. The model fit index is indicated below in Table 10:

**Table 10**

*Model Fit Index*

<table>
<thead>
<tr>
<th>Fit index</th>
<th>Recommended criteria</th>
<th>Results in this study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi Square ($\chi^2$)/Degrees of Freedom</td>
<td>1:3</td>
<td>1.640</td>
</tr>
<tr>
<td>Goodness of Fit (GFI)</td>
<td>&gt;0.90</td>
<td>0.93</td>
</tr>
<tr>
<td>Adjusted GFI</td>
<td>&gt;0.80</td>
<td>0.90</td>
</tr>
<tr>
<td>Non-Normed Fit Index (NNFI)</td>
<td>&gt;0.90</td>
<td>0.96</td>
</tr>
<tr>
<td>Comparative Fit Index (CFI)</td>
<td>&gt;0.90</td>
<td>0.97</td>
</tr>
<tr>
<td>Root Mean Square Residual (RMR)</td>
<td>&lt; 0.10</td>
<td>0.029</td>
</tr>
<tr>
<td>Root Mean Square Error of Approximation (RMSEA)</td>
<td>&lt;0.06</td>
<td>0.04</td>
</tr>
<tr>
<td><strong>P &lt; 0.001</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Thus, based on the observed values gathered in this study, it can be said that the model fit the data well.

The results of discriminate validity were verified by a guideline suggested by Segars (1997). All the modifications indices were below the critical level of 5.0. This means that adding a path from the manifest variables to the latent variable does not cause any significant change in the $\chi^2$ statistic. If the constructs are correlated more strongly with their indicators than with any other construct, the discriminant validity of research study is acceptable (Fornell, Tellis, & Zinkhan, 1982).

Soundness of discriminate validity can also be assessed by seeing whether the $\chi^2$ value of the unconstrained model is lower than the $\chi^2$ value of constrained model in which the variance between the two constructs is constrained to 1.0 (Netemeyer, et al., 2003). Table 11 indicates the $\chi^2$ differences between the dependent variable “Intention to Use” and other constructs and thus demonstrates that discriminant validity exists.

Table 11

<table>
<thead>
<tr>
<th>Construct</th>
<th>Constrained</th>
<th>Unconstrained</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived Usefulness</td>
<td>583.06</td>
<td></td>
</tr>
<tr>
<td>Perceived Ease of Use</td>
<td>470.92</td>
<td></td>
</tr>
<tr>
<td>Subjective Norm</td>
<td>491.04</td>
<td></td>
</tr>
<tr>
<td>Prestige</td>
<td>570.05</td>
<td></td>
</tr>
<tr>
<td>Results Demonstrability</td>
<td>470.23</td>
<td>392.17</td>
</tr>
</tbody>
</table>

**Comparison of Chi-squared values**
<table>
<thead>
<tr>
<th>Intention to Use</th>
<th>Attitude</th>
<th>596.74</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Behavioral Control</td>
<td>478.92</td>
</tr>
<tr>
<td></td>
<td>Personal Innovativeness</td>
<td>483.14</td>
</tr>
<tr>
<td></td>
<td>Facility</td>
<td>584.04</td>
</tr>
<tr>
<td></td>
<td>Voluntariness</td>
<td>738.02</td>
</tr>
</tbody>
</table>

**Structural Model**

In the structural model stage, model fit, hypotheses testing and the paths between latent variables were analyzed. The structural model was used to estimate the relationships between the hypothesized latent variables. This model also gives path coefficients and the variance proportions in the endogenous variables explained by the exogenous variables.

Exogenous variables are the traditional independent variables. Exogenous variables are those for which the model makes no attempt to explain. In other words, they are not supposed to be placed between another independent variable and latent variable in SEM. This means that they are not supposed to be correlated with other exogenous variables. However, endogenous variables are called mediating variables in SEM language and the model attempts to explain them. They are placed between two exogenous variables or between one exogenous and one dependent variable. Exogenous variables are independent variables in all equations, but endogenous
variables are dependent variables in at least one equation, though they may be independent variables in other equations in the system (Schumaker & Lomax, 2004).

In this study, the exogenous variables are Prestige, Results Demonstrability, Personal Innovation, Facility, and Voluntariness. The endogenous variables are Behavioral Control, Perceived Usefulness, Perceived Ease of Use, Subjective Norm, Attitude, and Intention to Use. The research model of this study postulates that the endogenous variables indicate the internal process of technology acceptance, but the exogenous variables are external factors that are assumed to affect the internal rational process of technology acceptance.

In the structural model, the first step is to examine the model fit results of hypothesized research model. Like the measurement model, the structural model presented here shows an adequate fit with the data when compared with the suggested fit criteria as discussed in the measurement model. In this model, as with the RMSEA, (0.051), and the GFI, (0.91), all results are above the recommended threshold, which indicates the good fit of the research model. Table 12 indicates the recommended criteria and results in this study.

Table 12

*Goodness of Fit in Structural Model*

<table>
<thead>
<tr>
<th>Fit index</th>
<th>Recommended criteria</th>
<th>Results in this study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi Square ($\chi^2$)/Degrees of Freedom</td>
<td>1:3</td>
<td>2.09</td>
</tr>
<tr>
<td>Goodness of Fit (GFI)</td>
<td>&gt; 0.90</td>
<td>0.91</td>
</tr>
</tbody>
</table>
The second step in this structural model is to examine the path of the coefficients between the latent variables in addition to variance explained. The results shown in Table 13 indicate that all factor path coefficients between exogenous variables and endogenous variables are significant except for the paths between Personal Innovativeness and Perceived Ease of Use (p=0.0, \( \gamma =-0.06 \), T-value=1.19) and Personal Innovativeness and Behavioral Control (p =0.0, \( \gamma =0.03 \), T-value= 0.39). However, all other coefficients’ significances indicate that the data support all proposed hypotheses, except for the two mentioned above.
Table 13

Path Coefficients

<table>
<thead>
<tr>
<th>Structural Path</th>
<th>Standardized Coefficients</th>
<th>T- Value</th>
<th>Hypothesis Direction</th>
<th>Hypothesis Testing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude – Intention to Use</td>
<td>0.67***</td>
<td>9.90</td>
<td>+</td>
<td>H1 Supported</td>
</tr>
<tr>
<td>Perceived Ease of Use - Attitude</td>
<td>0.41***</td>
<td>6.37</td>
<td>+</td>
<td>H2 Supported</td>
</tr>
<tr>
<td>Perceived Ease of Use – Perceived Usefulness</td>
<td>0.54*</td>
<td>3.01</td>
<td>+</td>
<td>H3 Supported</td>
</tr>
<tr>
<td>Perceived Usefulness - Attitude</td>
<td>0.49***</td>
<td>7.76</td>
<td>+</td>
<td>H4 Supported</td>
</tr>
<tr>
<td>Subjective Norm – Intention to Use</td>
<td>0.15*</td>
<td>3.13</td>
<td>+</td>
<td>H5 Supported</td>
</tr>
<tr>
<td>Prestige – Perceived Usefulness</td>
<td>0.79***</td>
<td>6.39</td>
<td>+</td>
<td>H6 Supported</td>
</tr>
<tr>
<td>Prestige – Subjective Norm</td>
<td>0.65***</td>
<td>10.03</td>
<td>+</td>
<td>H7 Supported</td>
</tr>
<tr>
<td>Behavioral Control - Perceived Ease of Use</td>
<td>0.34***</td>
<td>5.17</td>
<td>+</td>
<td>H8 Supported</td>
</tr>
<tr>
<td>Behavioral Control – Intention to Use</td>
<td>0.16*</td>
<td>2.76</td>
<td>+</td>
<td>H9 Supported</td>
</tr>
<tr>
<td>Results</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demonstrability – Perceived Usefulness</td>
<td>-0.61**</td>
<td>-3.32</td>
<td>-</td>
<td>H10 Supported</td>
</tr>
<tr>
<td>Results</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Demonstrability – Perceived Ease of Use</td>
<td>0.67***</td>
<td>10.03</td>
<td>+</td>
<td>H11</td>
</tr>
<tr>
<td>Personal Innovativeness - Behavioral Control</td>
<td>0.03</td>
<td>0.39</td>
<td>+</td>
<td>H12</td>
</tr>
<tr>
<td>Personal Innovativeness - Perceived Ease of Use</td>
<td>0.06</td>
<td>1.19</td>
<td>+</td>
<td>H13</td>
</tr>
<tr>
<td>Facility - Behavioral Control</td>
<td>0.85***</td>
<td>8.19</td>
<td>+</td>
<td>H14</td>
</tr>
<tr>
<td>Voluntariness – Subjective Norm</td>
<td>-0.24***</td>
<td>-5.31</td>
<td>-</td>
<td>H15</td>
</tr>
</tbody>
</table>

* P<0.05, ** P<0.01, *** P<0.001

As Figure 11 indicates, 13 of the 15 causal paths designed in accordance with the research model in this study were supported with the statistically significant value (P-value), of 0.01 or less than 0.001.
The explanatory power of the model was also evaluated by squared multiple correlations for structural equations. This process enables the researcher to assess the percent of variance in the latent dependent variable explained by the latent independent variable. In this context, the research model could explain 75% variance.
for the model’s dependent variable, Intention to Use. Similarly, the research model was able to account for 67% of the variances for Attitude, 87% of the variance for the Perceived Ease of Use, 73% of the variance for the Perceived Usefulness, 73% of the variance for the behavioral control, and 55% of the variance for the subjective norm. As an gauge of the explanatory power, all these variances indicate an acceptable explanation of information technology adoption for police officers using the POLNET system.

**Evaluation of Hypotheses Testing**

1. **H 1**: The police officer’s attitude toward the POLNET system has a positive effect on intention to use this system.

   As predicted, attitude has significant effect on behavioral intention ($\gamma = 0.67$, $p<0.001$). For every one standard unit increase in the latent endogenous variable Attitude, it is expected that the latent endogenous variable, Intention to Use, to increase by 0.67 standard points ($\gamma = 0.67$, $p<0.001$). This suggests that attitude is a significant information technology driver for the officer’s intention to use the POLNET system. Consistent with Yanga and Yoo (2004), this study found that attitude is strong predictor of behavioral intention to use information technology. Similarly, as Brown et al., (2002) stated, in a mandatory use environment, the factor of attitude is significant on intention, so the intention toward using POLNET system can be predicted by individual police officers’ attitudes.
2. *H 2: Perceived ease of use has a positive effect on attitude of police officers using the POLNET system.*

Police officers’ perceptions of easiness of the system predict significantly their attitudes and intentions. For every one standard unit increase in the latent endogenous variable, Perceived Ease of Use, it is expected that the latent endogenous variable Attitude will increase by 0.41 standard points ($\gamma = 0.41$, $P<0.001$). Although a few studies have found insignificant results for perceived ease use to intention toward attitude (Yi et al., 2006; Venkatesh & Davis, 2000), this study found that easiness of the system is a strong predictor for attitude toward intention to use information technology, which is consistent with other studies that found perceived ease of use to have a significant effect on intention to use toward attitude (Lin et al., 2004).

The studies conducted in policing, such as that of Hu, et al. (2005) found that perceived ease of use has significant effect on attitude although they found insignificant results from attitude to intention. Similarly, Colvin and Goh (2005) determined that ease of use was a predictor of technology usage of police officers. Tosun (2006) asserted that perceived ease of use is strongly correlated with the system usage in his study conducted in Istanbul, Turkey. In terms of studies conducted in different cultures, Mao et al. (2005) had significant results between perceived ease of and behavioral intention for the Turkish sample of their study. Thus, this study’s finding is consistent with the previous, relevant research.
3. *H 3: Perceived ease of use has a positive effect on perceived usefulness of police officers using the POLNET system.*

This study found that police officers are more likely to consider the POLNET system to be useful because it is easy to use. For every one standard unit increase in the Perceived Ease of Use, it is estimated that Perceived Usefulness will increase 0.54 standard unit ($\gamma=0.54, P<0.05$). This is similar to the studies conducted in policing settings that found that perceived ease of use significantly affected perceived usefulness (Colvin & Goh, 2005; Hu et al, 2005; Tosun, 2006) and parallel to other studies conducted in different environments. Mao et al (2005) also found significant results between perceived ease of use and perceived usefulness. Culturally, this situation can be explained by the Turkish cultural factor, risk avoidance. Complex systems are not preferable for police officers although they have a cognitive understanding of the system (addressed in the Hypothesis 8).

4. *H 4: Perceived usefulness has a positive effect on the attitude of police officers using the POLNET system.*

Consistent with the prior research, Perceived Usefulness has a strongly significant effect on Attitude and Intention to Use the information technology, which implies that the Turkish police officers using the POLNET system are more likely use the system if they perceive that the system is useful. Thus, for every standard unit increase in the Perceived Usefulness, it is expected that the latent endogenous variable, Attitude will increase by 0.49 standard units ($\gamma=0.49, p<0.001$). Particularly because of its
mediating factors, results demonstrability and prestige, in addition to perceived ease of use, perceived usefulness is a predictive factor on attitude and an officer’s intention to use the POLNET system. As discussed earlier, perceived usefulness has been found as a very strong factor for system attitude, intention, or usage (Colvin & Goh, 2005; Hong, Thong, & Tam, 2006; Hu et al., 2005; Lee, Kang, & Kim, 2007; Premkumar & Bhattacharjee, in press; Srite, Thatcher, & Yaprak, 2005; Vankatesh & Davis, 2000).

Similarly, studies conducted in different cultural environments also found that perceived usefulness has a positive effect on intention to use the information technology (Koeszegi, Vetschera, & Kersen, 2004; Malhotra & Galletta, 1999; Mao, Strite, Thacher, & Yaprak, 2005; McCoy, 2002; Straub, Keil, & Brenner, 1997; Veiga et al., 2001).

5. **H 5: Subjective norm has positive effect on intention to use the POLNET system.**

Subjective norm has relatively significant effect on Intention to Use the information technology. This situation can be attributed to mandatory system usage, but voluntariness shows a negative direct effect on subjective norm to intention to use (γ= -.24, p<0.001), contrary to the predicted outcome. With respect to the total amount of significance, it can be evaluated that police officers using the POLNET system are likely to listen to those whose opinions are valued by the police officers. With every standard unit increase in the subjective norm, it is expected that the latent endogenous variable, Intention to Use will increase by 0.49 standard units (γ=.49, p<0.001). However, it appears that the subjective norm is not the only predictor of intention to use the system. This factor may be mediated by perceived usefulness, as
tested by previous studies. Hu, et al, (2005) found similar results in their study of the COPLINK.

6. **H 6: Prestige has a positive effect on perceived usefulness of police officers using the POLNET system.**

   Prestige was found to be a very strong predictor for Perceived Usefulness. This hypothesis was supported by a significant coefficient value ($\gamma=0.79, p<0.001$). Every standard unit increase in the latent exogenous variable, prestige, is expected to increase the latent endogenous variable, perceived usefulness, by 0.49 standard units. Police officers using the POLNET system are more likely to find useful the information technology if they believe that technology helps to increase their prestige in their work environment. This behavior can be understandable because in the police environment where every individual’s social position is determined by rank, an officer may seek other factors to gain prestige, so using information technology may serve under these circumstances. Similarly, Yi et al, (2006) found significant effects on image to perceived usefulness.

7. **H 7: Prestige has positive effect on the subjective norm of police officers using the POLNET system.**

   As with the previous hypothesis, the positive strong effect from Prestige to the Subjective Norm was found in this study ($\gamma=0.65, p<0.001$). Every standard unit increase in the latent exogenous variable, prestige, is expected to increase by 0.49
standard units the latent endogenous variable, subjective norm. Police officers are more likely to be affected by their important others if they believe they will gain prestige as a result of that recommendation. In their study, Yi et al. (2006) found the opposite relationship between image and the subjective norm; They found significant results from subjective norm to perceived usefulness via image.

8. **H 8: Behavioral control has a positive effect on perceived ease of use of police officers using the POLNET system.**

   Consistent with the previous research (Venkatesh & Davis, 2000; Huang & Chuang, 2007), behavioral intention was found as a significant predictor directly to perceived ease of use and indirectly to attitude. Predictably, police officers found it easy to use the information technology if they have enough resources and control over the system. For every standard unit increase in the behavioral control, it is expected that the latent endogenous variable, perceived usefulness will increase by 0.34 standard units. ($\gamma=0.34$, $p<0.001$).

9. **H 9: Behavioral control has positive effect on intention to use the POLNET system.**

   Although this hypothesis was supported with a significant result ($\gamma=0.16$, $p<0.05$), it is not as powerful a predictor as attitude via perceived usefulness and perceived ease of use in terms of intention to use the information technology. With every standard unit increase in the behavioral control, it is expected that the latent
endogenous variable, intention to use the system to increase by 0.16 standard units. This condition may stem from the particular work conditions of the sample respondents because they more likely work in offices with enough computers and resources. The researcher assumes that the result may be different if the study were conducted in other departments in the TNP. The significant degree effects of facility prove this statement because police officers perceive they have control over the system if they have enough facility. Yi et al, (2006) found similar results in their study conducted among physicians.

10. \textit{H10: Result demonstrability has a positive effect on perceived usefulness of police officers using the POLNET system.} 

This hypothesis was also found significant, yet the direction of this hypothesis is negative ($\gamma = -0.61$, $p<0.01$). This may stem from another variable effect, such as perceived ease of use, because this variable appears to be an important determinant from the path through perceived ease of use. Police officers find the information technologies useful if they see explainable results and perceive the system to be effort free.

11. \textit{H11: Result demonstrability has a positive effect on perceived ease of use of police officers using the POLNET system.} 

This hypothesis was supported with the coefficient level ($\gamma = 0.67$, $p<0.001$) evidencing the significant effect from result demonstrability to perceived ease of use.
For every standard unit increase in the results demonstrability, it is expected that the latent endogenous variable, perceived ease of use will increase by 0.67 standard units. This is predictable because police officers find the system easy to use if they find tangible and explainable results. Particularly, in cultures with relatively high risk avoidance levels like Turkey, results play an important role. In their study Yi et al, had similar findings as well.

12. **H 12: Personal Innovativeness has a positive effect on Behavioral Control of police officers using the POLNET system.**

This hypothesis was not supported. ($\gamma = 0.03$) The reason for rejection may stem from two possible explanations. First, police officers’ self esteem may generally be very high due to the fact that they are very technical people, have strong affiliations with computers, or have been worked with the POLNET system for several years. Thus, innovativeness does not play a significant role over control beliefs for behavioral intention. Second, cultures that have high risk avoidance, like Turkey, may take less of an innovative approach to new technology. They may hesitate to use these new technologies due to avoidance from possible risks. In either case, this study found that personal innovativeness has no significant effect over behavioral control.

13. **H 13: Personal Innovativeness has a positive effect on Perceived Ease of Use of police officers using the POLNET system.**
This hypothesis was also rejected, contrary to theoretical predictions. Personal innovativeness has no significant effect over perceived ease of use (γ = 0.03). As discussed above, other factors, such as a technological affiliation or a cultural feature, such as risk avoidance, may influence this variable to be insignificant.

14. H 14: The facility of the POLNET system has a positive effect on behavioral control over police officers using the POLNET system.

Facility is found to be the most significant result in this study. With every standard unit increase in the latent exogenous variable, facility, it is expected that the latent endogenous variable, behavioral control will increase by 0.85 standard units (γ = 0.85, p < 0.001). Police officers feel control over the system if they have enough facility for the information technology system. This finding highlights the importance of the infrastructures and technical capabilities of system. In the literature, although Venkatesh and Davis (2000) asserted that availability (rephrased as facility in this study) is a mediating determinant for intention to use the system, Hu et al (2005) found insufficient results from availability to intention to accept the information technology.

15. H 15: Voluntariness has a positive effect on subjective norm for police officers using the POLNET system

It was predicted that if the technology usage were not voluntary, then the relationships of variables offered by traditional technology acceptance models would be different. Moreover, individuals are affected by opinions of their significant others, but
not in voluntary settings. Similarly, this study found that voluntariness has significant
effect on subjective norm, but the direction of the hypothesis is negative. This may
stem from other factors that may correlate both the voluntariness and subjective norm
in terms of intention to use the system. The coefficient of this hypothesis is (γ=-24,
p<0.024).

Summary

Of the 500 surveys, 407 participants responded (81.4%) to the questionnaire
designed for this study. The largest group of the respondents was male, between 31
and 40 years old, had more than 10 years job experience, and had at least a two-year
college degree. Although the validity and reliability of instruments had already been
demonstrated in several studies, they were retested in this study due to survey being
translated from English to a different language, Turkish. The results of the composite
reliability test indicated that all items passed the reliability threshold, which proves that
the responses were consistent and steady. As for the validity, first, the convergent and
discriminant validity were tested by explanatory factor analysis (EFA) by using principal
component analysis with varimax rotation. Convergent and discriminant validity were
satisfied because most of the items were above the 0.70 loading threshold.

The main data analysis was handled in two stages: the measurement model and
the structural model. CFA was used in the measurement model to test how manifest
variables accounted for latent variables. The results indicated that these manifest
variables loaded on their corresponding latent variables, evidencing convergent validity.
Moreover, AVE values were also assessed to test validity, which showed that every
constructs passed the 0.5 threshold. In terms of goodness of fit statistics, a good model fit was ensured by passing all thresholds. Discriminant validity was tested by comparing chi squared values in constrained and non-constrained conditions.

In the structural model, causal paths were established and the model was tested by the goodness of fit criteria. Again, the model passed the necessary threshold and showed a good fit. Paths coefficients indicated that most of the paths were significant, showing 13 out of 15 hypotheses were supported. Only personal innovativeness was found to be significant in its causal relationships with other variables. In addition, the explanatory power statistics were also assessed and found that the high variance explained 75% value for the independent variable, Intention to Use.
CHAPTER 5

CONCLUSION and RECOMMENDATIONS

Introduction

The final chapter discusses the findings of this study with respect to the research questions. This chapter presents the recommendations to the practitioners including Turkish National Police (TNP), policy implications, and suggestions for future studies. The conclusion section wraps up the study.

General Discussion of Findings

The findings in this study can provide a foundation for an integrated technology acceptance model explaining why police officers using the POLNET system in Turkey would accept or reject information technology. Intention to use, the dependent variable of this study, can account for 75% of the variances which indicates a very good explanatory power. Moreover, the goodness-of-fit statistical results for both the measurement model and the structural model indicate that the model may explain the police officers’ behaviors about their adoption of information technology with high probability. The reliability tests also reveal that there is a high internal consistency in the scale of the instrument.

Having found these results, this study positively answered the first research question “Does the integrated technology acceptance model, designed for this study, confirm information technology adoption of police officers using the POLNET system in
Turkey?” The following section addresses the second and third research questions exploring the adoption factors in policing and national culture.

In line with the findings of previous relevant studies, among all variables, attitude via perceived usefulness and perceived ease of use seems a more significant determinant of technology adoption of police officers compared with the other determinants, behavioral intention and subjective norm. Particularly, perceived usefulness emerged as a strong determinant of information technology adoption for police officers. As for the perceived ease of use, although its path coefficient was lower than that of perceived usefulness, it also had a significant direct affect on attitude toward intention to use and an indirect effect through perceived usefulness. However, this result should be assessed with the knowledge that most of the police officers working in the Computer and Communication department had familiarity with the computers. Thus, the cognitive understanding of easiness may be attributed to the user-friendly interface of the POLNET system. From this point of view, it can be evaluated that designing a user-friendly system increases the adoption of technology by Turkish police officers. In addition, along with prestige and results demonstrability, these determinants play a significant role in explaining, and therefore, understanding which dynamics influence information technology adoption.

Perceived usefulness and perceived ease of use are technology oriented variables. Other variables selected based on the criteria of policing and national cultural aspects are more social in nature. This study combined these two aspects to come up
with a model that has the ability to understand the work culture and social culture facets of technology adoption.

Particularly, prestige has a significant effect both on perceived usefulness and on subjective norm. This is understandable because most of the police officers in the Computer and Communication Department are working in the same condition with the same hierarchical structure. That any benefit, such as “prestige’ provokes the acceptance of technology is predictable. Prestige had also an effect on subjective norm. In a cultural environment in which the groups’ interests are more important than the individual’s, it is obvious that social status and prestige affect the normative beliefs. Moreover, these findings can also be attributed to one of the characteristics of policing, creating a positive image from other people. Gaining prestige at work by using information technology may help to increase a positive public image.

Another strong determinant found in this study was results demonstrability. Generally, it is believed that police officers have a very pragmatic, tangible, and anti-theoretical perspective to their job. This finding also supports the belief that explainable and tangible results have positive effects on attitude and intention via perceived usefulness and perceived ease of use. Results demonstrability, particularly, can account for its effect on perceived ease of use. If the Turkish police officers see the tangible results, they are more likely to perceive the information technology as effortless. This situation can be explained by a cultural value, risk avoidance. People having the high risk avoidance cultural future hesitate to take risk in complex and unknown conditions.
Subjective norm was found to be a moderately significant variable. For police officers having strong attachments to their peers and jobs, the opinions of important others are very valuable. Moreover, in cultures having high power distance, supervisors’ opinions affect the people who have the lower power status. However, in this study, the subjective norm was not found as a very strong determinant of technology adoption. There may several explanations for these results. In a police department, quasi military in nature, most of the tasks are determined by rules including the scope of POLNET usage, so important others’ opinions affecting the users of the POLNET system may not be an appropriate research tool to test subjective norm.

Interestingly, this study found that facility of the system was the most significant factor that affects control beliefs of police officers. In public management, resources are critical elements, so police officers think that their control over the system depends on the number of computers and their technical capacities. One of the projects under the umbrella of POLNET is to support city police agencies by providing new computers along with the necessary sources. Thus, this policy matches the findings of this study.

Personal innovativeness was not found as a significant determinant for perceived ease of use and behavioral control. The reason for this may stem from several factors discussed above, such as high self esteem of police officers toward technology, in addition to fact that police officers may not perceive the POLNET system as a new innovation since they have been using it since 2005. Consistent to previous research, voluntariness affects technology acceptances, either it influences subjective norm found in this study or in other ways.
Limitations and Delimitations of the Study

The research has several limitations. First, in terms of generalizability, the participants of this study were drawn from the TNP, so the results of this study may not be generalizable to the other police officers in different countries because of the fact that specific acceptance determinants may change with different technology tools, user groups, or cultures.

Second, the sampling design of this study is non-probability of purposive sampling. The sample of this study was drawn from two departments, computer and communication in the General Directory of the TNP and its affiliate branches in other cities due to availability and security reasons. Therefore, the results of this study may not refer to all members of the TNP since the users sampled in this study may have different user characteristics than other police officers in different departments.

Third, the findings of this study are based on a single study by testing a specific information technology tool, the POLNET software system. Longitudinal studies may give different perspectives or outcomes than this study presented here (Vankatesh & Davis, 2000). In addition, other technological devices may have different effects on the information technology acceptance of police officers.

Fourth, although it is believed that this study will contribute to the cross-cultural understanding of information technology acceptance, cultural factors were not tested directly. The variables of technology acceptance models were referred to as cultural factors to understand the adoption of information by police officers in Turkey.
Fifth, the constructs and survey items administered in this study were mostly drawn from previous research written in English. Although the translated and rephrased survey items were reviewed by several researchers who are fluent in both English and Turkish, there is always possibility of the slight loss of meaning in the translation, though reliability and validity tests were re-conducted.

In this study, the main focus is on users of information technology. Human beings are so complex that it is difficult to determine all factors at one time when considering behaviors, attitudes, and beliefs, so caution needs to be taken when analyzing this study.

Recommendations to the Practitioners Including TNP and Policy Implementations

This study has important policy implementations and ramifications for executives and policy makers of information management practices in the TNP. As information technology spread out to the organizations gradually, understanding the usability factors of technology adoption gives an important advantage to the administrators in the organizations.

The empirical findings of this study offer strategic directions by suggesting a policy for even greater acceptance that can be achieved by considering the importance of results demonstrability and prestige over main TAM constructs, perceived usefulness and perceived ease of use, and attitude. Executives, administrators, or policy makers that are responsible for making purchasing decisions about technology hardware and software on behalf of the TNP should give strong preference to systems that facilitate ready availability of the information and that give observable and understandable
outcomes. Administrators should also pay attention to promoting, commending, or rewarding the users of the systems by increasing their social prestige in the work environment. In the TNP, this can be achieved by giving extra credit or recognition to successful users as is done in the business sector. The findings also imply that policy makers and administrators should be clear about the purpose of the deployed technology deployed and its usefulness. It is important to develop implementation strategies that show how useful the information technology systems are. If they explain and emphasize to the users how this system can increase their performance and how it is easy to use, this study asserts that they are more likely to accept this new information technology. Thus, executives should be keen on obtaining feedback from the adopting users regarding the perceived usefulness of the system, and respond to all the adaptations needed to increase performance. In addition, to increase adoption, executives may assign to the supervisors of users to encourage them to use the information technology system, POLNET in this case. This situation can also be achieved by increasing the support of the social network within the organization.

Since the proper allocation of systems’ hardware and software, as much as possible, increases the acceptance of its use, executives and administers should be careful about deploying the system. Police officers who readily adopt information technology may optimize the resources which were deployed to assist policing. Thus, having recognized these factors found in this study, it is assumed that administrators or information technology professionals can create an environment which fosters technology adoption of police officers.
Directions for the Future Research

While the results confirmed and fit the research model, further research is needed to confirm either this model or create another model which may be more fitted to the given data. Although explaining a great deal of the variance in factors depicted in this study, the scope of this study can be expanded to gain a more complete picture of the information technology adoption of police officers in future research.

This research presented a model based on theoretical facts and tested it on police officers using the POLNET system, in accordance with the confirmatory perspective. Although statistical results of this shows good fit for this model, there is always the possibility that other factors may affect the technology acceptance of police officers. In future research, researchers may also want to consider other possible psychosocial or contextual variables that may affect behavioral intention of information technology usage.

The sampling design of this study is purposive sampling in which the researcher determines the sample based on his/her experience. This sampling is also used in pilot studies before conducting the main research. Thus, a future study can be conducted by choosing probability sampling utilizing this research approach to provide generalizability.

Conclusion

This study may provide a theoretical perspective for successful information management system design and implementation and may contribute to determine the problems before the system is implemented. Design and usage of advance information technology systems can improve the quality of policing from various perspectives.
Especially, crime fighting and crime prevention, the core elements of policing, can be enhanced with optimum usage of information technology in today's world. To fully utilize these anticipated technological benefits, it is obvious that police agencies should consider user adoptions of information technology. However, the relevant literature and theories indicate that various dynamics influence technology acceptance depending on user and task characteristics including the structures of their environments. In this context, organizational and national culture and the basic structure of technology acceptance play important roles in the acceptance of information technology.

Thus, this study has produced insights into factors that affect the technology adoption of police officers by presenting a model inspired by three important aspects, national cultural factors, the factors of policing, and the basic technology acceptance factors tested in previous studies. Overall, the results indicate that the model fit the data drawn from Turkish police officers using the POLNET system. In doing so, it is assumed that this study helps to fill the gap of empirical and theoretical knowledge about information technology acceptance in the TNP since there is a dearth of research in this area.
APPENDIX A

SURVEY QUESTIONS
<table>
<thead>
<tr>
<th>SURVEY QUESTIONNAIRE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1=Strongly Disagree</strong></td>
</tr>
<tr>
<td><strong>2= Disagree</strong></td>
</tr>
<tr>
<td><strong>3= Neutral</strong></td>
</tr>
<tr>
<td><strong>4= Agree</strong></td>
</tr>
<tr>
<td><strong>5= Strongly Agree</strong></td>
</tr>
<tr>
<td>Assuming I have access to the POLNET system, I intend to use it.</td>
</tr>
<tr>
<td>Given that I have access to the POLNET system, I predict that I would use it.</td>
</tr>
<tr>
<td>In my work, if I have access to the POLNET system, I want to use it as much as possible.</td>
</tr>
<tr>
<td>I prefer to use the POLNET system even though I can do my work with other tools.</td>
</tr>
<tr>
<td>I do not want use the POLNET system for policing in Turkey.</td>
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<tr>
<td>Using the POLNET system improves my job performance.</td>
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<tr>
<td>Using the POLNET system in my job increases my productivity.</td>
</tr>
<tr>
<td>Using the POLNET system enhances my effectiveness in my work.</td>
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<tr>
<td>The POLNET system meets the requirements of my job.</td>
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<tr>
<td>The POLNET system increases the communication within the TNP.</td>
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<tr>
<td>The POLNET system enables us to do our job more quickly.</td>
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<tr>
<td>I find the POLNET system to be useful in my work.</td>
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<tr>
<td>My interaction with the POLNET system is clear and understandable.</td>
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<tr>
<td>Interacting with the POLNET system does not require a lot of my mental effort.</td>
</tr>
<tr>
<td>I find the POLNET system to be easy to use.</td>
</tr>
<tr>
<td>It is difficult use the POLNET system in my work</td>
</tr>
<tr>
<td>I find it easy to get the POLNET system to do what I want it to do.</td>
</tr>
<tr>
<td>In my work, people who influence my behavior, such as my supervisors think that I should use the POLNET system.</td>
</tr>
</tbody>
</table>
In my work, people who are important to me, such as my colleagues think that I should use the POLNET system. | 1 | 2 | 3 | 4 | 5 |
---|---|---|---|---|---|
People in my work who use the POLNET system have more prestige than those who do not. | 1 | 2 | 3 | 4 | 5 |
People in my work who use the POLNET system have a high profile. | 1 | 2 | 3 | 4 | 5 |
Having the POLNET system is a status symbol in my work. | 1 | 2 | 3 | 4 | 5 |
The POLNET system increases the prestige of the TNP | 1 | 2 | 3 | 4 | 5 |
I have no difficulty telling others about the results of using the POLNET system. | 1 | 2 | 3 | 4 | 5 |
I believe I could communicate to others the consequences of using the POLNET system. | 1 | 2 | 3 | 4 | 5 |
The results of using the POLNET system are apparent to me. | 1 | 2 | 3 | 4 | 5 |
I would have difficulty explaining why using the POLNET system may or may not be beneficial. | 1 | 2 | 3 | 4 | 5 |
Using POLNET in policing would be a good idea. | 1 | 2 | 3 | 4 | 5 |
Using POLNET in policing would be a wise idea. | 1 | 2 | 3 | 4 | 5 |
I like the idea of using the POLNET system in policing. | 1 | 2 | 3 | 4 | 5 |
Using the POLNET system in policing would be a pleasant experience. | 1 | 2 | 3 | 4 | 5 |
I would be able to use the POLNET system in my job. | 1 | 2 | 3 | 4 | 5 |
I plan to continue using the POLNET system. | 1 | 2 | 3 | 4 | 5 |
Using the POLNET system gives me greater control over my work in policing. | 1 | 2 | 3 | 4 | 5 |
When I am using the POLNET system, it is totally in my control. | 1 | 2 | 3 | 4 | 5 |
I have enough resources and necessary documents. | 1 | 2 | 3 | 4 | 5 |
If I heard about a new information technology, I would look for ways to experiment with it | 1 | 2 | 3 | 4 | 5 |
Among my peers, I am usually the first to try out new information technologies. | 1 | 2 | 3 | 4 | 5 |
I like to experiment with new information technologies. | 1 | 2 | 3 | 4 | 5 |
There are enough computers for everyone to use the POLNET system. | 1 | 2 | 3 | 4 | 5 |
I have no difficulty finding a computer to use the POLNET system when I need it. | 1 | 2 | 3 | 4 | 5 |
The availability of computers for accessing the POLNET system is not going to be a problem. | 1 | 2 | 3 | 4 | 5 |
My use of the POLNET system is voluntary. | 1 | 2 | 3 | 4 | 5 |
My supervisor does not require me to use the POLNET system. | 1 | 2 | 3 | 4 | 5 |
Although it might be helpful, using the POLNET system is certainly not compulsory in my job. | 1 | 2 | 3 | 4 | 5 |
People whom I think they know information technology very well think that the TNP use the POLNET system. | 1 | 2 | 3 | 4 | 5 |
In my work, people whose knowledge I value think that I should use the POLNET system. | 1 | 2 | 3 | 4 | 5 |

**Demographic Information**

*(Please select the appropriate option for you)*

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<th>Gender</th>
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<th>2-Female</th>
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<td>31-40</td>
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<td></td>
<td>Over 61</td>
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</tr>
<tr>
<td>Job Experience</td>
<td>0-2 years</td>
<td>3-6 years</td>
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<tr>
<td>Education (Please select last graduation)</td>
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<td>Community College</td>
</tr>
</tbody>
</table>

APPENDIX B

INSTITUTIONAL REVIEW BOARD (IRB) FOR THE PROTECTION OF HUMAN RIGHTS IN RESEARCH APPROVAL
May 4, 2007

Ramazan Yalcinkaya
School of Library and Information Science
University of North Texas

RE: Human Subjects Application No. 07-139

Dear Mr. Yalcinkaya:

In accordance with 45 CFR Part 46 Section 46.101, your study titled “Police Officers’ Adoption of Information Technology: A Case Study of Turkish POLNET System” has been determined to qualify for an exemption from further review by the UNT Institutional Review Board (IRB).

Enclosed is the consent document with stamped IRB approval. Please copy and use this form only for your subjects.

No changes may be made to your study’s procedures or forms without prior written approval from the UNT IRB. Please contact Sheila Bourns, Research Compliance Administrator, ext. 3940, if you wish to make any such changes.

Sincerely,

Scott Simpkins, Ph.D.
Chair
Institutional Review Board

SS: sb
APPENDIX C

CONSENT FORM
Dear Participant:

I, Ramazan Yalcinkaya, PhD student in Information Science at University of North Texas, seek your expert opinion on the POLNET system. You are being asked to participate in a research study involving the POLNET. No risks are involved in participating in this study. The study is anonymous: no names, addresses, or other identifying information will be collected, stored, or used in any reports. Only group data will be aggregated and analyzed. Your privacy will be protected to the maximum extent allowable by law.

In this study, you will complete a questionnaire concerning various factors that may or may not encourage the use of POLNET by Turkish Police. There currently are no data from the users’ perspective to indicate what factors do or do not promote usage of POLNET. The results of this study can be used to develop organizational factors that will help to maximize the use of POLNET. The questionnaire contains 51 items which I estimate will take 10-15 minutes to complete.

Your completion of this survey is completely voluntary. You are free to not answer any question or to stop participating at any time without penalty. All questionnaires are anonymous, and will be kept confidential by me to the maximum extent allowable by law. By completing this survey, you indicate your voluntary consent to participate in this study and to have your answers included in the research data set.

If you have any question about this study, you may contact me, ramazanyalcinkaya@yahoo.com (1 940-382 4421), or you may contact my dissertation advisor, Dr. Brian O’Connor, at boconnor@lis.admin.unt.edu (Phone number: 1 940 565 2445)

Information Science- University of North Texas. This research project has been reviewed and approved by the UNT Institutional Review Board (940) 565-3940. Contact the UNT IRB with any questions regarding your rights as a research subject.

If you agree to participate, you may keep this document for your records.
Sayın Katılımcı,


Eğer ankette ilgili herhangi bir sorunuz olursa, bana, Ramazan Yalçınkaya (1-940-3824421) ramazanyalcinkaya@yahoo.com veya tez danışmanım Dr. Brian O'Connor'a (1-940-5652445) boconnor@lis.admin.unt.edu ulaşabilirsiniz. Ankete Kuzey Texas Üniversitesisi IRB (Kurumsal Araştırma Komitesi) Bürösuna tarafından onaylanmıştır. Katılımcı hakları hakkında bir sorunuz olursa, IRB yi (1-940-5653940) arayabilirsiniz.

Bu anket sorularını kendi kayıtlarını için tutabilirsiniz.

APPROVED BY THE UNT IRB
FROM 5/4/07 TO 5/3/08

159
APPENDIX D

SURVEY APPROVAL FROM THE TURKISH NATIONAL POLICE (TNP)
657 sayılı DMK’nın 80. maddesine istinaden hazırlanan “Yetiştirilmiş Anayla Yurtışına Gönderilecek Davlet Memurunu Halkındakı Yönetmelik” hükümleri çerçevesinde halen ABD Kuzey Teksas Üniversitesi’nde doktora eğitiminin devam eden 182691 sivil sayılı Emniyet Amiri Ramsan YALÇINKAYA’ının “POLNET Sistem Yazılımı Kullanan Türk Polisinin Bilgi Teknolojilerine Adaptaasyonu ve Banları Etkileyen Faktörler” konulu tez çalışmasına ilişkin talebinin uygun değerlendirildiğiine dair ohar yazısı cüte gönderilmiştir.

İlgi kaydı yazılı adı geçen teblig edilerek, düzenlenecek olan teblig belgesinin ve söz konusu çalışmanın sonuçlarının önümlerinin Eğitim Daire Başkanlığına gönderilmesini rica ederim.

[Signature]

Dr. Recep GÜLTEKİN
Dışişleri Dairesi Başkanı
1. Sınıf Emniyet Müdürü

Ek :

İlgi kaydı yazılı (11 sayfa)
T. C. İÇİŞLERİ BAKANLIĞI
Emniyet Genel Müdürlüğü

Sayı : B.05.1 EGM 072.02.03/340

Könu : Anket Uygulaması

GENEL MUDÜRLÜK MAKAMINA

Yetiştirilmiş Amacıyla Yurtçına Gönderilecek Devlet Memurları Hakkındaki Yönetmelik hükümleri çerçevesinde ABD Kuzey Teksas Üniversitesinde doktora eğitimi devam eden 182691 sicil sayılı Emniyet Amiri Ramazan YALÇINKAYA'nın teşkilatımız personeline yönelik olarak "POLNET Sistem Yazılımı Kullanılan Türk Polisinin Bilgi Teknolojilerine Adaptasyonu ve Bunları Etkileyen Faktörler" konusunda anket uygulama talebinde bulunduğu Dışişkil Dairesi Başkanlığının işi sayılan yazaları ile bildirilmiştir.

Adı geçen personelin, Bilgi İşlem ve Haberleşme Dairesi Başkanlıklarında anket çalışması yapabilmeleri hususunu onaylarımıza arz ederim.

Mustafa ÇANKAL
Eğitim Dairesi Başkanı
1. Sınıf Emniyet Müdürü

Uygun Görüşle Arz Ederim.

13/03/2007

Dr. Necati ALTINTAŞ
Emniyet Genel Müdür Yardımcısı
1. Sınıf Emniyet Müdürü

O L U R

14./03/2007

Oğuz Kağan KOKSAK
Emniyet Genel Müdürü
Vali
APPENDIX E

CORRELATION MATRIX OF SURVEY ITEMS
Table 13

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REFERENCES


Fornell C. R., & Larcker, D. F. (1981). Structural equation models with unobservable variables and measurement error: Algebra and statistics. *Journal of Marketing Research, 18*(3), 382-388.


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