Does More IT Utilization Improve Police Performance?

Emergent Research Forum Paper

Mobark Q. Aldossari
University of North Texas
Mobark.Aldossari@unt.edu

Dan J. Kim
University of North Texas
Dan.Kim@unt.edu

Abstract

The purpose of this research is to examine the impact of the use of information technology on local U.S. police departments’ performance. Drawing upon major organizational capabilities suggested by a literature (Pang et al. 2014), we propose a theoretical model to investigate whether IT resources have enabled U.S. police departments to fight crime more efficiently by reducing crime rate. To test the proposed model, we use a set of secondary empirical data about the use of IT in police departments from the Law Enforcement Management and Administrative Statistics (LEMAS), and crime data from the FBI’s Uniform Crime Reports (UCR). The study is expected to contribute to the IS literature by attempting to mitigate the shortage of IT public value research.

Keywords

IT Public value, police performance, IT investment, e-government, public information dissemination.

Introduction

Over the past decade, many governments all over the globe have been constantly increasing IT spending. According to a report by the Whitehouse, IT spending has witnessed a steady increase in the Federal Budget since 2001, and the Budget’s total planned IT spending in 2017 is estimated to be $89.9 billion. This phenomenon is anticipated to continue in the future in many nations all over the globe. Thus, it is very crucial for both policy makers and citizens to determine whether increasing IT investments are adding value to the public in terms of helping governments to provide and deliver better products and services (Pang et al. 2014).

Astonishingly, there is a limited number of studies focusing on IT value in public sector in IS scholarly journals. Pang, Lee, and DeLone (2014) conducted a comprehensive literature review for articles studying topics related to IT value in public sector between 1990 and 2012. Their literature search included 13 mainstream IS journals and produced 139 articles that are indirectly related to IT value in public sector, but only 11 papers that are focusing on government IT investment. On the other hand, literature on IT business value in private sector has been well established in IS journals. Another literature review by Melville et al. (2004) included 198 IS papers that are mainly focusing on IT value in private sector. This review paper clearly shows the abundance of IT business value literature in IS journals compared to IT value in public sector. The paucity of articles focusing on IT value in public sector in the IS scholarly journals creates rich areas for future research. In this paper, we strive to capitalize on that opportunity by studying the impact of using IT on the performance of police departments. Drawing on a theoretical work on organizational capabilities (Pang et al. 2014), we seek to measure the impact of information technology resources on police departments’ productivity in the United States. Specifically, we endeavor to answer the following question: Do IT resources help U.S. police departments to fight crime more efficiently by reducing crime rate?

There are several reasons that we choose the theoretical work by Pang et al. (2014) to study the impact of IT resources on U.S. police departments’ performance for several reasons. First, to the best of our

---

1 Analytical Perspectives, Budget of the U.S. Government, Fiscal Year 2017
knowledge, their model is the only theoretical foundation in IS literature that attempts to understand the role of IT resources in value creation for public sector. Second, the model draws on the public-value management theory which is more suitable to studying IT value in public sector than the resource-based view (RBV), because the resource-based view does not account for the fundamental differences between private and public realms (Pang et al. 2014).

The purpose of this research is to examine the impact of the use of information technology on local U.S. police departments’ performance. This research will contribute to IS literature by extending the existing knowledge on IT public value. This research will also investigate whether IT resources help local police departments create greater digital presence by 1) disseminating more safety information to public and 2) increasing public engagement, which in turn aids in reducing crime in the United States. The remaining of this paper will be structured as follow: IT use in police, theoretical background, research model, research method and data collection, and expected contribution.

Literature Review and Theoretical Background

IT Use in Police

A great deal of the literature related to IT use in police departments is published in public administration and criminal justice journals. The major focus of that literature is on the adoption, implementation, and use of information technologies in police departments (Brown and Brudney 2003; Colton 1980; Colvin and Goh 2005; Manning 1996; Manning 2001; Nunn 2001; Pica and Srensen 2004). (Colton 1980) is one of the earliest examiners of information technologies design and implementation in law enforcement, through his evaluation of the implementation of computer-aided dispatch system in San Diego police department, he concluded that the greatest problems were people’s morale and motivation towards the new technologies. Drawing upon the Technology Acceptance Model (TAM), Colvin and Goh (2005) found that information quality and timeliness were the most important factors of technology acceptance by patrol officers. Others emphasize the impact of new information technologies on the work processes, authority, and organizational structure of police departments (Manning, 2001, Manning, 1996).

The other stream of the literature related to IT use in police departments attempts to investigate the benefits of information technologies on police performance and productivity (Chan 2001; Colton 1979; Garicano and Heaton 2010; Ioimo and Aronson 2004; Nunn 2001; Pang et al. 2011). At the early stage of evaluating information technologies in law enforcement, Colton (1979) points out that San Diego and New York police department reported positive impact on services and processes since the implementation of computer-aided dispatch systems and early communication technologies. In their empirical investigation, Garicano and Heaton (2010) found that the increasing use of IT in police departments are not strongly associated with lower crime and conviction rates. However, they argue that improvement in police productivity become relatively larger when IT adoption is occurring as a part of the whole package of organizational changes. In addition, Chan (2001) evaluated the information technology resources in law enforcement from the user prospective. In his interviews of 23 senior police and information technology specialists and 506 police offers at the Australian Eastern Police Service, Chan found that the majority of police officers revealed that information technologies helped them to work more efficiently and improved communications among them.

Theoretical Background

As noted earlier, in the main stream IS journals, there is a lack of research studying the IT resources contribution to value creation in public sector. Pang, Lee, and DeLone (2014) rationalize the lack by identifying two challenges, first it is not easy to define value in public sector as it is in for-profit sector. Unlike the business setting in which there is a number of factors to measure organizational performance such as revenue and market share, there is no consensus on how to measure performance and productivity of governments in research. Second, there has not been a solid, comprehensive theoretical foundation that IS scholars can draw on to study IT public value.

By combing strategic IT management from IS field and public-value management from public administration, Pang, Lee, and DeLone (2014) introduce a theoretical model that could be used to study public value creation through IT resources. In their study, they identify five IT resources (i.e., digitized
administrative processes, public intelligence analytics, inter-organizational system integration, online public interactive interfaces, and public information dissemination) and five major organizational capabilities (i.e., public service delivery capability, public engagement capability, co-production capability, resource acquisition capability, public sector innovation capability). They argue that through utilization of IT resources managers in public organizations can develop and cultivate the organizational capabilities and thus advance public value frontier, which they define it as “the set of maximum multiple public values that is achievable given available resources and the constraints among certain values”. In this study, we draw upon this model to investigate whether IT resources have enabled U.S. police departments to fight crime more efficiently by reducing crime rate.

**Research Model and Hypotheses**

We measure IT use by the intensity of information technologies in a police department. We define IT intensity as the degree to which a police department utilizes IT resources. Police departments in the United States use different kind of technologies for a vast variety of tasks (Maguire 2000; Manning 2001). Most of technologies used in police are for automating administrative work and creating computerized record system of criminal incidents. Many police departments nowadays acquire advanced technological tools to identify emerging crime trends and patterns and allow police officers to respond in real time (Cope 2004). Technologies such as license plate readers, video surveillance of public areas, video cameras in patrol vehicles and officers, and geographic information systems have increased the efficiency of police work and introduce new capabilities in law enforcement (i.e. crime mapping and crime analytics). The increasing adoption of information technologies in police department increases the IT intensity in police operation. With increasing IT intensity in police work, we hypothesize that:

H1: IT intensity in police department is positively associated with reduction in crime rate, both violent and property.

In addition, more and more police departments in the United States are using Web 2.0 technologies and social media. These technologies have increased the digital presence of police departments, which we define as the digital footprint of a police department, represented by possessing a website and presence in social media channels. The increasing digital presence of police departments has created new ways for citizens’ participation in police work. Web 2.0 technologies and social media allow the public to report crimes and other problems, which aids in crime reduction. Moreover, people can ask questions, provide feedback about the police department or officers, or file agency or officer complaints. This IT-enabled public communication and engagement in law enforcement reflect positively on police performance, which in turn assists in overall crime reduction. This discussion leads to formulate the following hypotheses:

H2: Digital presence of police department is positively associated with public engagement.

H3: Public engagement in police work is positively associated with reduction in crime rate, both violent and property.

In addition, Web 2.0 technologies and social media and other technologies such as email and text messaging allow police departments to disseminate more public safety information to general public. Information such as summaries of crime statistics and street-level maps that report the location and nature of a variety of specific crimes boost the public safety by raising the citizens’ awareness of safety and crime situation in their areas. For example, a family traveling to another city can utilize the information about crime statistics by neighborhood to avoid crime-intensive areas when booking a hotel. The public information dissemination as IT resource, which we define as the degree to which a police department publicly distributes public safety and crime information, has not been identified in previous IT research and is uniquely related to public sector field (Pang et al. 2014). With increasing police department digital presence, I hypothesize the following:

H4: Digital presence in police department is positively associated with public information dissemination.

H5: Public information dissemination is positively associated with reduction in crime rate, both violent and property.
Does More IT Utilization Improve Police Performance?

Research Method and Data Collection

The data used for testing hypotheses is drawn from the Law Enforcement Management and Administrative Statistics (LEMAS) series by the Bureau of Justice Statistics (BJS). LEMAS is a survey of local law enforcement agencies in the United States conducted every three years. Along with other reported data, LEMAS provide detailed and rich data on the use of different types of information technologies in law enforcement operation. For the purpose of this study, we used LEMAS report published in 2013 by the Bureau of Justice Statistics (BJS) which is the latest issue of the report and represents 2012. To measure the outcome of using information technologies in police operation, we match LEMAS data with total violent and property crime data from the FBI’s Uniform Crime Reports (UCR) for the year 2012. After matching the two data sources, we ended up with 1004 police department files containing detailed use of information technologies and total numbers of violent and property crime for 2012. The final sample represents police department from all the states except Hawaii due to the lack of violent and property crime rates in FBI’s Uniform Crime Reports 2012.

Measures

IT intensity in a police department is measured by quantifying the different information technologies used in police operation. LEMAS reports the use of a vast variety of information technologies in law enforcement agencies including license plate readers, smartphones, video cameras in patrol vehicles, and electronic access to criminal history. LEMAS also reports the degree of computerization of criminal records including incident-based statistical records, victim characteristics, offense location, suspect characteristics, and geocoded address of offense. Our strategy to numerically assess IT intensity is based on the use of the different types of technologies reported in LEMAS by assigning binary values (1 for use and 0 for not). After looking at the use of the different reported technologies, each police department is assigned a value of IT intensity that is comparable to the other police departments in the final sample.

Digital presence is measured through the use of social media and communication technologies such as Twitter, Facebook, YouTube, and having an agency website. Similar to IT intensity, digital presence of a police department is measured by assigning binary values (1 for use and 0 for not) for the use of reported social media and communication technologies. Public engagement is measured based on the number of the types of information people can provide to police through website and emails such report crime, ask questions, and file a complaint. We measure public information dissemination by looking at the different kind of criminal information published by the police departments such as jurisdiction-wide summaries of crime statistics, and street-level maps that report the location and nature of a variety of specific crimes. Finally, to measure the performance outcome of using IT, we use the violent and property crime rate per 100,000 population. All of the independent variables in this study are measured in binary scale, as 1 represents use of the technology and 0 represents lack of use of the technology. To test the proposed model, we will run multiple regression models.

Expected Contributions

This study explores the role of IT in public value creation by investigating the impact of using information technologies on public safety in police context. Specifically, we examine whether greater degree of IT use
Does More IT Utilization Improve Police Performance?

in U.S. police departments engenders reductions in crime rates, both violent and property. We expect the results of the study to support our main hypothesis that using more information and communication technologies is positively correlated with reductions in both property and violent crime rates. We also expect the results to offer support to the roles of public information dissemination and public engagement in the reductions of property and violent crime rates. In addition, the study is expected to contribute to the IS literature by attempting to mitigate the shortage of IT public value research. In addition, the study expects to offer an understanding and empirical evidence of the role of IT in U.S. police performance and in turn on public safety. The study will also contribute to the IS literature by highlighting the paucity of IT public value research in IS literature and encouraging IS researchers to exploit the rich areas of research in IT public value.

REFERENCES