POLICE AGENCY ADOPTION OF SOCIAL MEDIA AS RELATED TO AGENCY SIZE,

COMMUNITY-ORIENTED POLICING, AND TECHNOLOGICAL CAPACITY

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by

William Olen Cawley II

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ABSTRACT

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This thesis uses LEMAS data and an original data collection to examine the relationship between the adoption of Twitter and Facebook by municipal police departments and the characteristics of those departments. These characteristics include the size of the department, progressiveness, community-oriented policing, and technological capacity. It was found that that these variables were associated with statistically significant increases in the amount of time a department had Twitter. All variables were also significant to varying degrees for lengthening the amount of time a department was on Facebook, except for community-orientation. These results appear to indicate that social media adoption by law enforcement follows a diffusion of innovations model. Directions for future research are discussed.

KEY WORDS: Law Enforcement, Facebook, Twitter, Social Media, Community-oriented Policing, Diffusion of Innovations

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CHAPTER I

Introduction

Innovation is disruptive. As media theorist Neil Postman (2005) described it, new technology innovations inherently change how people interact with each other in their communities. Or, in some cases, not interact (Putnam, 1995). Police agencies, as guardians of communities, need to find a way to effectively communicate and operate within this "global village" (McLuhan & Lapham, 1994) that connects members of their citizenry. Agencies may connect through the use of social media. Here, I will describe a handful of studies and concepts that already exist to explain the phenomena of social media and their use by police agencies so as to discover areas for research. Namely, this work will describe social media and the current research around their use and adoption by law enforcement agencies.

Social Media Defined

According to Ellison and Boyd (2013), social media, or social network sites, are best conceptualized as:

> A networked communication platform in which participants 1) have uniquely identifiable profiles that consist of user-supplied content, content provided by others, and/or system-level data; 2) can publicly articulate connections that can be viewed and traversed by others; and 3) can consume, produce, and/or interact with streams of user-generated content provided by their connections on the site (p. 158).

Facebook, which began in 2004 and became open to companies in 2007, is one of the largest social media platforms available with 1.55 billion monthly active users

(Facebook, 2015). Twitter, founded in 2006, has also become increasingly common among a wide variety of users, including celebrities, news agencies, and government entities, with 320 million monthly active users (Twitter, 2015). Given the success of Facebook, Twitter, and other social media platforms at attracting users, organizations and businesses were quick to adopt social media, especially Facebook, as a way to engage their customers and advertise products (Anderson, Fagan, Woodnutt, & Chamorro-Premuzic, 2012). These organizations include law enforcement agencies.

Police Use of Social Media

The emergence of the community-oriented policing movement in the 1980s elicited a philosophical shift in law enforcement's intent from a reactive model, where officers respond to community problems as they occur, to a more proactive model, where officers anticipate the needs of their communities through community interaction and communication (Reisig & Giacomazzi, 1998; Rosenbaum, 1988). Social media may be one way for law enforcement agencies to fulfill this goal in community communication. One of the President's Task Force on 21st Century Policing's (2015) recommendations is for law enforcement agencies to "…adopt model policies and best practices for technology-based community engagement that increases community trust and access" (p. 36). Social media are among those technologies. Facebook's use in community relations has been evaluated in Australia, where it demonstrated potential as a community-engagement tool (Kelly & Finlayson, 2015). Also, limited support for police use of social media has been shown in surveys of younger, ethnically diverse populations (Ruddell & Jones, 2013; Spizman & Miller, 2013).

Overall, findings among the limited number of studies exploring the predominant role of social media in policing focus on communications with the public and investigations (Community Oriented Policing Services (COPS), 2013; Denef, Bayerl, & Kaptein, 2013; LexisNexis Risk Solutions, 2014). Crump's (2011) content analysis of Twitter use by 39 police forces and 402 individual officers in England and Wales found that Twitter has mostly been used as a way of bolstering already active means of police communication. Social media accounts mostly were used to push out information such as police-patrol activity, requests for information, and as a public relations tool.

Similarly, in a content analysis of 1,984 public author tweets by Twitter accounts belonging to 30 U.S. cities with populations in excess of 300,000, Heverin and Zack (2010) found that police departments do not use Twitter to engage in direct communication with the public. Instead, Twitter is primarily used to report on crime/incidents, give departmental information, provide details on upcoming events, and report on traffic. A content analysis of Facebook accounts from the 23 largest police agencies in the United States indicated police departments that post frequently tend to communicate crime-related messages while lower frequency posters tend to promote public relations (Lieberman, Koetzle, & Sakiyama, 2013).

Police Adoption of Social Media

The extent of social media's spread in law enforcement agencies has been documented in a few studies. The Bureau of Justice Statistics report (Reaves, 2015) on police-department technology found that 58 percent of all agencies used social media of some kind, with those departments serving larger populations having a higher percentage (ranging from 89 to 100 percent) reported use of social media than smaller departments

(ranging from 36 to 79 percent). The Office of Community Oriented Policing Services (COPS 2014) conducted a Future of Trends in Policing survey that was disseminated to more than 500 police agencies, of which 200 replied. Eighty-two percent of the sample used Facebook while 69 percent used Twitter.

In a recent survey of 553 law enforcement agencies by the International Association of Chiefs of Police (IACP 2015), 96.4 percent of organizations reported using some form of social media. Findings from previous IACP surveys have shown that the number of law enforcement agencies that report using social media in some capacity has consistently increased from 92.4 percent in 2012, to 95.9 percent in 2013 (IACP, 2012, 2013). As of 2015, 40.0 percent of agencies that were not currently using social media were considering its adoption within the following six months (IACP 2015). Use of Facebook was reported by 94.2 percent of the sample and Twitter was used by 71.2 percent. However, the IACP surveys tended to reflect municipal police departments (86.6 percent of the sample) and not sheriff's offices (2.7 percent).

The factors that may influence the adoption of social media have not been thoroughly explored. Analogous situations do exist to inform this line of inquiry. One study (Rosenbaum, Graziano, Stephens, & Schuck, 2011), using a national probability sample of municipal police department websites, found that departments with an emphasis on community policing that served large populations were more likely to have created an agency website. Likewise, Skogan and Hartnett's (2005) study into police innovation found agency characteristics, such as organizational resources and experience in using a new information technology, were key to implementation of the innovation. It

could stand to reason that some of these factors may hold for the adoption and use of social media as well.

The purpose of this Thesis is to understand the relationship between the characteristics of police agencies, such as their commitment to community-oriented policing, size of the organization, and use of information technology, and their choice to adopt the social media platforms Twitter and Facebook. Data used for this study are drawn from a combination of the 2013 wave of the Law Enforcement Management and Administrative Statistics Survey (LEMAS) and an original data-collection endeavor. Those characteristics listed that are linked to the early adoption of social media platforms by police agencies, versus those of later adopters and non-adopters, are the focus of this study.

CHAPTER II

Literature Review

To understand how a police agency's organizational characteristics might influence its decision to adopt social media, this study will draw upon three prominent perspectives in the social sciences literature. The theories examined include community-oriented policing, theories on police adoption of new technologies, and diffusion of innovations theory. The following is an introduction to these three theories and the relevant supporting research behind them as they apply to police agencies and social media. This chapter will conclude with relevant questions and hypotheses that are drawn from previous research that this study will seek to answer.

Community-oriented Policing

Community-oriented policing is a fluid term with criminal justice scholars that can refer to many different concepts. As such, there is no unified definition amongst theorists and practitioners (Fielding, 2005; Goldstein, 1990; Seagrave, 1996). Oliver (2003) has defined community-oriented policing as a philosophy that seeks to create a partnership between the police and their community to solve problems, such as fear of crime, so as to increase the quality of life of that community. This partnership seeks to decentralize the police and implement strategic, neighborhood, and problem-oriented methods in policing practices. Community-oriented policing is meant as an alternative to more reactive forms of law enforcement, even if it has fallen short of this goal when enacted (Bullock, 2013).

Community-oriented policing has its roots in the idea of community partnerships. Citizen participation in government administration processes is valuable because it allows

citizens, regardless of social standing, to contribute to how they are governed. Arnstein (1969) proposed a ladder of empowerment with eight "rungs" towards meaningful citizen participation. At the bottom of the ladder are Manipulation and Therapy, which are non-participatory in nature. Next are Informing, Consultation, and Placation, which are degrees of tokenism. At the top, and interpreted as the highest degrees of citizen power, are Partnership, Delegated Power, and Citizen Control.

Sabel and Dorf (1998), in their idea of democratic experimentalism, describe how citizen partnership can be implemented where power is decentralized to allow citizens to use their local knowledge to create local solutions. Community policing in Chicago, Houston, and New York were cited as areas where this model is emerging during that time. Fung (2006) acknowledged that direct participation varies among who participates, how information is exchanged and decisions are made, and how discussion leads to policy. Of particular note of what can be affected are perceptions of legitimacy and justice. Groups who are excluded cannot influence or affect local politics nor can they access relevant information as to how policy alternatives may affect them and their interests. This inequality informs how they perceive laws as unjust or illegitimate. Community input into how they are policed is important in a community-oriented policing model.

One direction in community-oriented policing to incorporate the input of the community is in situational crime prevention. Clarke (1983) characterized situational crime prevention as composed of measures that are aimed at highly specific forms of crime with the purpose of permanent manipulation of environment so as to reduce perspective prospects for, and increase the risk of conducting, crime. Community crime

preventative measures would be included under this schema. Clarke (1995) would later refine this position by establishing what effective situation crime prevention involves. Specifically, three elements are required, including 1) an articulated theoretical framework, 2) a standard methodology of handling specific crime problems, and 3) a set of opportunity-reducing techniques. For situational crime prevention to work, the assistance of the community would be essential. However, Clarke believed it would be difficult to convince stakeholders of the importance of situational crime prevention.

Another emphasis of police agencies is in public relations. Although some scholars have argued that police-community public relations is an entirely different philosophy than community policing (Oliver & Bartgis, 1998), communication with the public is an important facet of community policing. The United States Department of Justice's COPS office (2014) notes that:

> …community policing encourages agencies to develop two-way communication systems through the Internet that allow for online reports, reverse 911 and e-mail alerts, discussion forums, and feedback on interactive applications (e.g., surveys or maps), thereby creating ongoing dialogues and increasing transparency (pg. 11).

Oliver (2000) saw research into community policing as an evolving process from the late 1970s to the present where small pilot studies of specific methods of community policing (foot patrol, response times, etc.) in large cities gradually became more methodologically rigorous, agency-specific studies. A recent meta-analysis of current research into community-oriented policing found positive effects on desired outcomes such as increased citizen satisfaction, perceptions of disorder, and police legitimacy (Gill,

Weisburd, Telep, Vitter, & Bennett, 2014). However, it failed to find significant effects on measures of crime and fear of crime. Moreover, less than half of residents in small- to mid-sized cities have been shown to even be aware of community-oriented policing efforts (Adams, Rohe, & Arcury, 2005).

Police Organizations and Technological Adaptation

Organizations, including police departments, have been studied in terms of their organizational characteristics by many disciplines. The law enforcement profession is a highly segmented field, with thousands of agencies with specialized tasks. Maguire (2003), a preeminent scholar in the field of police organizational structure, found that much of the variance of structural complexity of police organizations is due to organizational size. In effect, the larger agencies have more people and more resources to handle more tasks. To understand an organization, one must understand its context, including its size, its use of technology, and how it uses its employees.

In addition to size, agency progressiveness, such as being administratively innovative and hiring women onto the force (King, 2000), may signal that the agency is open to other kinds of innovations. Police departments have often utilized specialized units and programs such as a women's bureau (Owings, 1925). This progressiveness has merit as it has been found that a higher percentage of female officers in the police department was related to a greater response to often under-enforced crimes like sexual assault and domestic violence (Andrews & Johnston Miller, 2013; Meier & Nicholson-Crotty, 2006). Perhaps this progressiveness bleeds into other police efforts, such as community outreach through technology.

On the individual level, Davis (1989) identified two factors of technology acceptance for users in his Technology Acceptance Model (TAM). These factors were described as ease of use and perceived usefulness. However, this two-factor model has not been supported by confirmatory factor analysis for police officers (Colvin & Goh, 2005). Rather, for police officers, a four-factor model that included information quality and timeliness was found to better fit the data.

A later review of policing organizations and technology research by Maguire (2014) posits what he believes is the fundamental question that remains to be answered by scholars: How has information technology altered the core functions of policing, its efficiency, and its interactions with the public it serves? There are competing thoughts on the matter. For instance, Manning (1992) holds that information technology has been constrained by the traditional structures of policing. In this way, information technology largely enhances traditional practices (Harris, 2007).

Another key unknown is the link between information technology and perceived legitimacy. Snow (2007) speculates that, when technology is used to solve crimes, especially sensational ones, the technology is seen as necessary for police agencies to maintain its effectiveness, and by extension its legitimacy. Further, a survey conducted by Weiss (1997) of managers of 134 municipal police departments that served populations greater than 100,000 found that police agencies innovate so as to 1) mitigate civil liability and 2) to emulate other similar, successful, agencies. In this view, it may be risky to oppose new technology (Corbett & Marx, 1991). However, Garicano and Heaton (2010) found no statistical significance between information technology and police

effectiveness using a panel design of police agencies from 1987-2003. Rather, productivity increased only when coupled with organizational changes.

In addition, there is the thought that communication technologies alter the structure of policing by flattening the hierarchical structure of the organization (Ericson & Haggerty, 1997). Although Maguire (1997) did not find any major structural changes in large municipal police departments as a result of the community-oriented policing movement of the 1990s, the point remains that communication technology, such as cell phones and social media, could change the organization on a smaller scale.

Diffusion of Innovations

Diffusion of innovations theory is a popular model for describing how innovations are adopted in different social environments. Diffusion of innovations has its popular beginnings in Ryan and Gross's (1943) study of Iowa farmers' adoption of hybrid corn seeds. It has ballooned from these beginnings into a general theory that has been applied to many other settings and situations. Klinger (2003) believed that diffusion of innovations theory can be used to enhance scholarly work in criminal justice by developing an understanding of how programs, ideas, and technology spread through different aspects of the criminal justice system.

The most enduring version of this theory was articulated by Rogers (2003) in a synthesis of more than 3,000 diffusion studies. In this classical version of the theory, there are found to be factors that facilitate or hinder the adaptation of an innovation; these include 1) the characteristics of the innovation, 2) the characteristics of the adopters and 3) the means by which the adopters are persuaded to adopt that innovation. It is also

posited that adoption of an innovation is voluntary and the decision to adopt is made after an independent use of the technology is conducted.

Rogers also developed several hypothesis about innovation diffusion, such as: Innovations possess certain characteristics (relative advantage, compatibility, complexity), which determine the rate of adoption; some adopters are more innovative than others and can be identified by their characteristics; the adoption decision unfolds in a number of predictable stages (knowledge of innovation, persuasion, decision, implementation and conformation); adopters are predisposed to different kinds of influence through communication channels (word of mouth, mass marketing, etc.) at different stages of adoption; certain individuals can accelerate adoption when other potential adopters see that individual as being similar to themselves; and, the diffusion process starts off gradually among innovators and early adopters, who make up the first 16 percent of adopters, and takes off as a community of adopters is created and the effect of peer-influence kicks in. Eventually, diffusion levels off as the population of potential adopters is exhausted, creating an "S-curve" shape.

However, the tenants of classical diffusion of innovations theory are not necessarily true of public organizations and information technology adoption. For instance, there is a different locus of adoption – that is, the decision makers will change – as classical diffusion theory focuses on individual adoption and not organizational adoption. External pressures that organizations must contend with, such as community-mandated adoption of the innovation, violate the tenant of adoption by independent assessment and choice (Katz & Shapiro, 1985; Markus, 1987). Knowledge barriers to the implementation of new technologies also exist that may slow the diffusion of the

technology until such time that the organization has caught up in terms of technological know-how (Attewell, 1992; Hameed, Counsell, & Swift, 2012a). Also, organizations may opt to use different levels of information technology instead of full adoption due to their lack of organization knowledge (Bayer & Melone, 1988).

Diffusion studies fall into two types known as adopter (micro) studies and macro diffusion studies (Li & Sui, 2011; Sahin, 2006). Adopter studies focus on understanding the differences in adopter innovativeness (i.e. early adopter vs later adopters). Macro diffusion focuses on characterizing the rate and pattern of adoption of a technology across a community of potential adopters using mathematical formulas. In another synthesis of diffusion of innovations research, Fichman (1992) found that studies of information technology research tend to produce the strongest results when they focus on individual adoption or independent-use technologies that impose a comparatively small knowledge burden on would-be adopters.

Similar to the definition of community-oriented policing, there is a lack of consensus on defining an innovation. A content analysis (Baregheh, Rowley, & Sambrook, 2009) of definitions across several disciplines found that innovation definitions tend to focus on the process behind the innovation's transformation from idea to tangible benefit so that organizations may position themselves as unique in their marketplace. However, a problem with this approach is that what some regard as an innovation may not be regarded as so by others.

Another problem with Rogers' interpretation of diffusion of innovations is that it is more descriptive than predictive. As such, it is difficult to operationalize innovation for research purposes (Moore, Sparrow, & Spelman, 2010). King (2000) created a typology

of police innovation based on previous research. In this view, police innovation could be operationalized in five ways. They are:

1. Radical innovations, where restructuring or changes to the organization take place. One such radical innovation is community-oriented policing.

2. Administrative innovation, where there is a change in the management of the organization. This would include hiring more women into policing roles and the creation of mission statements.

3. Management-technical innovation, or innovations that appeal to police managers. The Automated Fingerprint Identification System (AFIS) would fall into this category.

4. Line-technical innovation, or innovations that appeal to street-officers. Includes the use of tools such as pepper spray.

5. Programmatic innovations, where new units or operations are created to meet an organizational goal. Programs such as asset forfeiture fall in this category.

However, when King subjected this typology to factor analysis, only management-technical innovation was found to be unidimensional.

One study (Walker, 2006) of 120 upper-tier English local authorities using a multiple-informant survey instrument found that adoption of innovation is both complex and contingent in local governments. Various factors drive the diffusion of different types of innovation. In one meta-analysis of technology diffusion research (Hameed, Counsell, & Swift, 2012b) , it was found that there was a moderately significant relationship between information technology adoption and information system department size. The

research also found weak significance of information technology expertise, resources, and organizational size on adoption of technology.

How these perspectives can be used to understand social media in policing

Community-oriented policing is information-intensive, making technology a key component in providing access to information. Accurate and timely information makes problem-solving efforts more effective and ensures that officers are informed about the crime and community conditions of their beat. Such enhancements can contribute to vital two-way communication pathways between agents of law enforcement and their citizens. Such use of technology provides agencies with an important forum by which to communicate externally with the public.

Communication with the public is key in regards to presenting community services to younger, at-risk populations (Bain, Robinson, & Conser, 2014). Social media appear to have an influence on the creation and refinement of public policy by giving citizens a role as a partner in how public services are distributed (Auer, 2011; Linders, 2012). Thus, social media are used to create a community forum (Brainard & Derrick-Mills, 2011). Instead of this new form of communication supplanting conventional policing, the individual users actually enhance the scope of policing because social media use is composed of individual and institutional activity (Trottier, 2012). Police agencies use media in general as a means of controlling their external environment by promoting themselves and projecting legitimacy (Chermak & Weiss, 2005). Social media, then, allow police agencies to bypass the intermediary and report to the community themselves.

The adoption of social media by governments can be considered as a form of organizational-information technology innovation whose spread can be studied from a diffusion of innovations perspective. Furthermore social media, when used by police to communicate and engage a community, can be viewed as an electronic form of community-oriented policing (Hu, 2016). With many scholars having viewed community-oriented policing itself as an innovation (Gayadeen & Phillips, 2014; Morabito, 2010; Oliver, 2000), it becomes clear that social media can be studied like any other innovation.

Mergel and Bretschneider (2013) saw government adoption of social media as a three-stage process. First, agencies experiment informally with social media outside of accepted technology use policies. Second, government organizations recognize the need to draft norms and regulations. Third, organizational institutions formalize appropriate behavior and types of interactions that become social media strategies and policies.

Law enforcement agencies have their own special barriers to the adoption of innovations. Maranto and Wolf (2013) theorized that the inflexibility of personnel systems, the political costs of disruptive reforms, and the professional norms of agency leaders may limit the diffusion of innovations in law enforcement settings. Indeed, Teodoro (2009) in his survey of 150 law enforcement chiefs and water utility managers found that it was bureaucratic labor markets that affected the emergence of policy innovation. It was found that agency heads who were hired from another organization were more likely to adopt policy innovations than those agency heads who were promoted from within.

Skogan & Hartnett (2005) found three factors that led to the successful diffusion of an information technology innovation – a data warehouse hosted by the Chicago Police Department – in 122 police departments: the active role played by a retired, tech savvy officer, representing the host department; access to the system was free; and that the innovation empowered privileged detectives and did not challenge the traditional mission and organization of participating agencies. In the United Kingdom, it was found that the influence of local decision factors, such as investment of monetary resources, influence of peers, and the fit of information technology to already established policing roles, were shown to be the most influential factors in the decision to adopt mobile technology (Lindsay, Jackson, & Cooke, 2014)

Previous research has shown that organizational level variables, especially size, were great predictors of innovations in public organizations such as hospitals (Kimberly & Evanisko, 1981). However, size predicts innovativeness because it implies organizational resources and may not necessarily hold when an innovation is cheap (Mohr, 1969). Using LEMAS data as well as data from the Crime Mapping Research Center at the National Institute of Justice, Weisburd and Lum (2005) found that larger police agencies had adopted computerized crime mapping at a rapid pace. They also found a significant relationship between the likelihood of early adoption of computerized crime mapping and knowledge of "hot-spot" policing approach research. Nunn (2001) found differences in agency expenditures and police-officer allocations by the level of computerization in each agency. Highly computerized agencies reported larger shares of employees in technical positions, spent more money, but reported fewer officers per capita than agencies with lower computerization levels.

Synthesis, Research Questions and Hypotheses

Where theories on community-oriented policing, organization and diffusion of innovations converge in regards to police use of social media, there are fertile areas for research. From this review of the literature, a few points become clear. Community-oriented policing is a philosophy that has become one of the most talked-about varieties of policing. Police agencies that want to become more responsive to their communities using a community-oriented approach must change portions of their organizational structure to accommodate this philosophy. Among these changes is the adoption of new technologies. What, then, can be made of the adoption of social media by police agencies? What kinds of agencies would be the first to adopt social media? If police use of social media is to be viewed as a new form of community-oriented policing, then it is reasonable to assume that those agencies that already have a system of community-oriented policing would be more likely to adopt social media early. Likewise, it is the large agencies that have the necessary resources to devote to the experimentation with new technologies that are equipped to begin the adoption process of a new technology. In summary, a list of relevant hypotheses that will be tested shall be presented.

Hypothesis 1: Large police agencies will adopt social media earlier than smaller police agencies.

Hypothesis 2: Progressive police agencies with a higher proportion of full-time female officers will adopt social media earlier than those with a lower proportion.

Hypothesis 3: Community-oriented police agencies will adopt social media earlier than police agencies that are not community-oriented.

Hypothesis 4: Police agencies with a higher technological capacity will adopt
social media earlier than those with less of a technological capacity.

CHAPTER IIII

Data and Methods

Data Description

The data set used for this analysis originates from the Law Enforcement

Management and Administrative Statistics (LEMAS) series. The LEMAS survey has

been conducted periodically since 1987 by mail-out survey. It collects data from more

than 3,000 general-purpose state and local law enforcement agencies, including all those

that employ 100 or more sworn officers, and a nationally representative sample of smaller

agencies. The 2013 LEMAS survey, which was the latest survey data set available, was

sent to 3,336 general-purpose state and local law enforcement agencies including 2,353

local police departments, 933 sheriff's offices, and the 50 primary state law enforcement

agencies. The final attempted surveyed population of 3,272 agencies included 2,327 local

police departments, 895 sheriff's offices, and all 50 state agencies. The overall response

rate was extremely high for this survey, with local police departments response rates at

88 percent; sheriff's offices at 80%; and state law-enforcement agencies at 92 percent.

Data obtained from this survey includes organizational measures such as the

number of sworn and non-sworn employees, the number of specialized units, and

measures of technology such as the use of information systems in criminal investigations.

Also included in the survey are questions of social-media use in the form of yes or no

questions. However, these questions alone did not provide an agency's time of joining the

social media networks, which is a critical component to the study. To remedy this

problem, an original data collection effort was conducted over a one-week period in

January 2016 so as to extend the information about social media usage by the agencies.

The names of the law enforcement agencies that were surveyed were extracted from the data set and used in an Internet search engine to locate accounts. Keywords, such as the name of the agency, the state in which it is located, and either "Twitter" or "Facebook," were used to locate the accounts.

This original collection allowed for the gathering of more in-depth information about the social media accounts than are provided in the 2013 LEMAS survey. This new collection allowed the vagueness of the question posed in the LEMAS survey about social media use, which lumped Facebook with Google+, and other services, but isolated Twitter as a choice, to be avoided. In conducting this collection effort, the adoption of Facebook and Twitter among the U.S. law enforcement agencies who responded in the 2013 LEMAS survey was examined. This collection measured the presence of an account, its official verification status, total number of "likes," tweets and followers, the month and year the account was opened and how long had passed since the last post in increments of 365 days, 30 days, and seven days.

Only the first 30 results for each search were examined, reasoning that if the account did not appear in that frame then it likely was inactive or non-existent. Accounts that were shared with other entities, such as the city government, the fire department or emergency-management services, were excluded from the data collection. This indicated that the law enforcement agency lacked control over the account. Also excluded were unofficial, community business pages that compile and re-post online information about a law enforcement agency, but are not controlled by the agency.

Variables

The dependent variable used for this analysis was a measure of how many months the accounts had been open by the time the collection period began. For simplicity's sake, only month and year were recorded during collection. Accordingly, accounts created near the middle or end of the month were credited as having been active during that entire month. This data was paired with each case from the original LEMAS data so the two sets of data from the survey and the original collection effort were consistent.

To test the proposed hypotheses, responses from the LEMAS survey were used to create the independent variables for an analysis. The key independent variables used in the analyses conducted correspond with the hypotheses suggested, as there were measures of size, proportion of female officers in the department, department technology use and commitment to community-oriented policing. The first two independent variables dealt with personnel characteristics of the agencies. The original questions from the survey used to create these variables are shown in Figure 1.

A1. As of January 1, 2013, how many PAID SWORN personnel worked in your agency? *Do not include seasonal employees whose positions are regularly added during peak months of the year and dropped after the peak season. If none, enter '0.'*

	Full-Time	Part-Time
a. MALE sworn personnel	1_____	2_____
b. FEMALE sworn personnel	1_____	2_____
c. TOTAL sworn personnel (sum a and b)	1_____	2_____

A7. As of January 1, 2013, how many PAID NONSWORN personnel worked at your agency? *If none, enter '0.'*

	Full-Time	Part-Time
Paid nonsworn personnel	1_____	2_____

Figure 1. Questions A1 and A7, as they appeared in the LEMAS 2013 survey. Adapted from "Law Enforcement Management and Administrative Statistics (LEMAS), 2013 Codebook," by the Bureau of Justice Statistics.

A measure of the total number of full-time sworn and nonsworn personnel was used to gauge the size of the department. It was thought that the larger the number of full-time personnel, the larger the agency. This variable was calculated by adding the responses from A1 and A7 from the questionnaire. A measure of the proportion of full-time female sworn personnel to all full-time sworn personnel was calculated from A1 by dividing the two numbers. This measure was used to determine the progressiveness of the agency. In this case, the larger the proportion of full-time female officers to all full-time officers, the more progressive the agency was thought to be.

The next variable was created to measure an agencies commitment to community-oriented policing. This measure determined this commitment through the presence of a mission statement that included a community-policing component. The original question used to create this variable is shown in Figure 2.

E1.   As of January 1, 2013, what best describes your agency's WRITTEN
        MISSION STATEMENT?

    □₁   No written mission statement
    □₂   Written mission statement with NO community policing
            component
    □₃   Written mission statement WITH a community policing
            component

Figure 2. Question E1, as it appeared in the LEMAS 2013 survey. Adapted from "Law
Enforcement Management and Administrative Statistics (LEMAS), 2013 Codebook," by
the Bureau of Justice Statistics.

This variable was coded so that agencies with a community-policing component

in their mission statement were separated from those without the component or without a

mission statement. It was thought that those with the component in their statements were

more likely to actually practice community-oriented policing than those without the

component.

Lastly, a variable to measure the capacity of the overall technological use of an

agency was also created. A scale was used that consists of the number of technologies

already adopted by the agency. This scale ranged from 0 to 8 where the higher the

number, the larger the technological capacity for that agency was deemed. The original

question used to create this variable is shown in Figure 3.

F1.   As of January 1, 2013, did your agency use any of the following
        TECHNOLOGIES to collect information?

    Yes   No
    □₁   □₂   a.   Gunshot detection system
    □₁   □₂   b.   License plate readers
    □₁   □₂   c.   Smartphones
    □₁   □₂   d.   Video surveillance of public areas
    □₁   □₂   e.   Video camera in patrol vehicles
    □₁   □₂   f.   Video cameras on patrol officers
    □₁   □₂   g.   Video cameras on weapons
    □₁   □₂   h.   Other types of video cameras

Figure 3. Question F1, as it appeared in the LEMAS 2013 survey. Adapted from "Law
Enforcement Management and Administrative Statistics (LEMAS), 2013 Codebook," by
the Bureau of Justice Statistics.

'Yes' responses by the agencies were added together to create the individual agency scores. It was thought that the higher the score, the more likely the agencies were to adopt new technologies, such as social media.

Plan of Analysis

Although information for all of the sample exists, only local police departments will be examined. This is because sheriff's offices and state agencies are inherently different from local police departments in how they are run and where they receive funding from, which may influence adoption patterns. Also, agencies with departments larger than 1,000 sworn and non-sworn personnel were excluded so as to reduce skewness in the independent variables, particularly size of department.

For the analyses, first independent sample t-tests will be run to determine group differences between adopters and non-adopters of Facebook and Twitter. For the proposed hypotheses to be correct, there needs to be statistically significant differences between the groups among the independent variables of department size, the proportion of full-time female officers to total number of full-time officers, commitment to community-oriented policing, and technological capacity. Second, censored regression analyses, in this case Tobit regressions, will be run amongst adopters where the dependent variable will be the number of months the accounts have been active. In this case, for the hypotheses to be correct, the independent variables will need to be shown to be significantly increasing the amount of time police agency accounts had been active. Lastly, these results will need to be interpreted so as to understand their implications.

CHAPTER IV

Analysis and Results

The following will present results of the analysis in conjunction with description

and interpretation. First, the descriptive statistics of the individual variables will be

reported both with the complete sample and the sample used for analysis. Next, the

results of the independent sample t-tests between adopters and non-adopters for both

Twitter and Facebook will be displayed. Lastly, the results of the Tobit regressions for

the number of months an account has been active for both Twitter and Facebook will be

shown.

Variable Descriptive Statistics

Table 1 presents descriptive statistics for the variables in the study. After the

removal of sheriff's departments, state agencies, tribal law enforcement and those local

agencies over 2,000 sworn and non-sworn personnel, 1,981 local police agencies were

available for analysis.

Table 1

Descriptive Statistics of Full Sample

Variable	**N**	**x̄**	**S.D.**	**Min**	**Max**
Dependent Variables					
Presence of Twitter Account	1981	000.43	000.50	0	0001
Presence of Facebook Account	1981	000.56	000.50	0	0001
Months Active on Twitter	1981	020.28	028.15	0	0093
Months Active on Facebook	1981	023.10	025.88	0	0093
Independent Variables					
Department Size	1981	107.74	203.99	0	1933
Progressiveness	1967	000.08	000.08	0	0001
Community-oriented	1942	000.31	000.411	0	0001
Technological Capacity	1972	002.92	001.48	0	0008

Some departments were missing data on the variables used. However, because this missing data constituted less than 5 percent of the chosen sample, they were removed from the analysis without issue. This left 1,923 cases for analysis. The characteristics of the sample for analysis are displayed in Table 2.

Table 2

Descriptive Statistics of Analyzed Sample

Variable	N	$\bar{x}$	S.D.	Min	Max
Dependent Variables					
Presence of Twitter Account	1923	000.44	000.50	0	0001
Presence of Facebook Account	1923	000.56	000.50	0	0001
Months Active on Twitter	1923	020.53	028.26	0	0093
Months Active on Facebook	1923	023.36	025.97	0	0093
Independent Variables					
Department Size	1923	108.27	204.50	1	1933
Progressiveness	1923	000.08	000.08	0	0001
Community-oriented	1923	000.31	000.46	0	0001
Technological Capacity	1923	002.94	001.47	0	0008

Results of Independent Sample T-tests

Table 3 depicts the results of the independent sample t-tests amongst police departments that adopted Twitter and those that did not. For these t-tests, equal variances were assumed.

Table 3

t-test for Equality of Means amongst Twitter Adopters vs Non-adopters

	Twitter Adopter		Non-Twitter Adopter		
Variable	$\bar{x}$	**S.D.**	$\bar{x}$	**S.D.**	*t*-**test**
Department Size	191.16	277.59	044.27	73.20	016.99***
Progressiveness	000.09	000.06	000.07	00.09	005.64***
Community-oriented	000.88	000.33	000.71	00.45	008.96***
Technological Capacity	003.31	001.44	002.62	01.43	010.55***

*Note: *$p \leq .05$, **$p \leq .01$, ***$p \leq .001$*

For the first round of t-tests amongst departments who either did or did not adopt Twitter, we find results like what was expected. There was a significant difference in the measure of department size where those departments with Twitter ($\bar{x}$ = 191.16, S.D. = 277.59) and those without ($\bar{x}$ = 44.27, S.D. = 73.20). There was also a significant difference in the proportion of departments that were deemed to employ community-oriented policing. Departments with Twitter ($\bar{x}$ = .88, S.D. = .33) were more likely to make reference to employ community-oriented policing than those without ($\bar{x}$ = .71, S.D. = .45).

Similarly, there is a significant difference in the scores for technological capacity where those departments with Twitter ($\bar{x}$ = 3.31, S.D. = 1.44) and those without ($\bar{x}$ = 2.62, S.D. = 1.43). Lastly, there is a significant difference in the scores for the proportion of female officers to total number of officers where those departments with Twitter ($\bar{x}$ = .09, S.D. = .06) and those without ($\bar{x}$ = .07, S.D. = .09).

Table 4 depicts the results of the independent sample t-tests amongst police departments that adopted Facebook and those that did not. For these t-tests, equal variances were assumed.

Table 4

t-test for Equality of Means amongst Facebook Adopters vs Non-adopters

Variable	Facebook Adopter		Non-Facebook Adopter		
	$\bar{x}$	S.D.	$\bar{x}$	S.D.	t-test
Department Size	137.87	233.615	069.19	149.73	7.54***
Progressiveness	000.09	000.07	000.07	000.09	3.80***
Community-oriented	000.83	000.37	000.72	000.45	5.79***
Technological Capacity	003.14	001.49	002.63	001.40	7.82***

*p ≤ .05, **p ≤ .01, ***p ≤ .001

In examining t-tests amongst departments who did or did not adopt Facebook, we find similar results to those examined in relation to Twitter adoption. There was a significant difference in the scores for department size where those departments with Facebook ($\bar{x}$ = 137.87, S.D. = 233.615) and those without ($\bar{x}$ = 69.19, S.D. = 149.73). There was also a significant difference in the scores for community oriented departments where those departments with Facebook ($\bar{x}$ = .83, S.D. = .37) and those without ($\bar{x}$ = .72, S.D. = .45).

Similarly, there is a significant difference in the scores for technological capacity where those departments with Facebook ($\bar{x}$ = 3.14, S.D. = 1.49) and those without ($\bar{x}$ = 2.63, S.D. = 1.40). Lastly, there is a significant difference in the scores for the proportion of female officers to total number of officers where those departments with Twitter ($\bar{x}$ = .09, S.D. = .07) and those without ($\bar{x}$ = .07, S.D. = .09).

These results illustrate that within this sample there is a measurable and significant difference between the adopters and non-adopters of Facebook and Twitter across the variables of department size, community-oriented departments, technological capacity and the proportion of female officers and to all officers.

Results of Tobit Regressions

Censored regression models are used when the dependent variable of interest, in this case the number of months a police department has been active in Facebook and Twitter, is only observable under certain conditions (Fan & Gijbels, 1994). Using a simple linear regression will be distorted by the fact that for agencies that do not use Facebook and Twitter, their effective length of use is zero, even though we have the independent variables for most of the cases in the sample. The Tobit model, a type of

censored regression, is strong with self-report measures like those created from the

LEMAS data set as long as variable skewness is accounted for (Osgood, Finken, &

McMorris, 2002). The Tobit model was created specifically for situations where a

dependent variable is truncated by zeros, even though it can show downward bias as the

number of zeros increase (Stewart, 2009). However, the reasons for these zeros is due to

the lack of having an account and not due to lack of activity. This should mean the risk of

bias is small. For this reason, Tobit models were used for our analysis. Table 5 depicts

the Tobit regression model for the number of months that a department has had Twitter.

Table 5

Tobit Regression for Months Department has had Twitter Account

Variable	Coefficient	S.E.	T	P > |t|
Department Size	00.079***	00.006	12.93	.000
Progressiveness	51.820***	17.405	02.98	.003
Community-oriented	10.323***	02.787	03.70	.000
Technological Capacity	04.860***	00.913	05.32	.000

*Note: *p ≤ .05, **p ≤.01, ***p ≤ .001*

A likelihood ratio chi-square of 325.69 (df = 4) with a p-value of less than 0.0001

tells us that this model fits significantly better than an empty model[1]. The coefficients for

all variables are statistically significant at p ≤ .001 except for the proportion of female

officers to total number of officers which was significant at p ≤ .01. With a one unit

increase in department size, there is a .08-point increase in the predicted number of

months the departments Twitter account will be open. If a department is community-

oriented, there is a 10.32-point increase in the predicted number of months the

departments Twitter account will be open.

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[1] However, the pseudo R^2 is .03, indicating a poor overall fit.

With a one unit increase in technological capacity, there is a 4.86-point increase in the predicted number of months the departments Twitter account will be open. With a one unit increase in progressiveness, or the proportion of female officers to total number of officers, there is a 51.82-point increase in the predicted number of months the departments Twitter account will be open. Table 6 depicts the Tobit regression model for the number of months that a department has had Facebook.

Table 6

Tobit Regression for Months Department has had Facebook Account

Variable	Coefficient	S.E.	T	P > |t|
Department Size	00.032***	00.005	6.64	.000
Progressiveness	29.503***	12.911	2.92	.022
Community-oriented	03.128***	02.169	1.44	.149
Technological Capacity	04.082***	00.693	5.89	.000

*Note: *p ≤ .05, **p ≤.01, ***p ≤ .001*

A likelihood ratio chi-square of 133.62 (df = 4) with a p-value of less than 0.0001 tells us that this model fits significantly better than an empty model[2]. The coefficients for department size and technological capacity are statistically significant at p≤.001 and progressiveness was significant at p≤.05. Community oriented departments as a variable were not significant. With a one unit increase in department size, there is a .032-point increase in the predicted number of months the departments Facebook account will be open. With a one unit increase in technological capacity, there is a 4.08-point increase in the predicted number of months the departments Facebook account will be open. With a one unit increase in progressiveness, or the proportion of female officers to total number

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[2] Like the first Tobit model, the pseudo R^2 is .01, indicating a poor overall fit.

of officers, there is a 29.50-point increase in the predicted number of months the

departments Facebook account will be open.

CHAPTER V

Discussion

The purpose of this study was to determine what relationships may exist between certain characteristics of a police agency – size and proportion of full-time female officers to all full-time officers, community-oriented policing, and technological capacity – and a department's use of the social media platforms Twitter and Facebook. The literature on diffusion of innovations, community-oriented policing, and police organizations guided this inquiry. Data were obtained from the 2013 wave of LEMAS as well as from an original data collection of agency social media. Independent sample t-tests were conducted to ascertain differences between adopters and non-adopters on the variables of agency characteristics, community-oriented policing, and technological capacity. Tobit regressions were conducted amongst adopters to find how much those variables affected the length of time the adopter had the social media account.

Preliminary results indicated support for the hypotheses. When conducting the t-tests, there were found to be significant differences between adopters and non-adopting departments of Twitter and Facebook along the variables proposed. The connection gets cloudy when trying to gauge how much these variables affected how long adopters had used Facebook and Twitter.

For the Twitter Tobit regression, all variables were statistically significant in terms of effect on the age of a police department's account. All variables were shown to increase the amount of time a department had Twitter. The Facebook Tobit regression was slightly murkier. Department size, technological capacity, and the progressiveness were all statistically significant and increased the amount of time a department had a

Facebook account. Community-oriented policing was not found to be statistically

significant in affecting the amount of time a department had Facebook.

The findings for department size, progressiveness and technological capacity fall

in line with previous research into the matter. What is surprising is the lack of statistical

significance for community-oriented policing on the length of time a department account

is active for either Facebook. This appears to dispute the idea that social media is an

electronic form of community-oriented policing, (Hu, 2016) at least in Facebook's case.

There are a couple of reasons for why this might be. It could mean that the measurement

of community orientation may be flawed as it only measures stated orientation by the

department. It could also indicate that Facebook and Twitter are used differently by

departments.

Limitations of the Current Research

While the results are most likely generalizable to municipal police departments in

the United States due to the way that LEMAS is conducted, there are issues with the

study as constructed. The community-oriented variable may not have been

operationalized well enough to capture the concept as intended. Having a mission

statement saying that the department is dedicated to community-oriented policing does

not necessarily mean that the department practices community-oriented policing. The

inverse is also true. The department may not incorporate it into a mission statement, but

they may fundamentally practice community-oriented policing. There also may have

been an issue with time order as the survey was completed in 2013 and the original data

collection was conducted at the end of 2015. Lastly, while the overall Tobit models were

statistically significant in terms of being better than empty models, they did not fit the data well. Perhaps other variables not considered would fit this data better.

Future Directions

Future studies should include other measures of innovation that may have been missed in this study, as well as better constructed measures for the ones that were included. For instance, a better constructed community-oriented policing variable may lead to more support for its effect on the adoption of social media in municipal police departments. Also, the generalizability of these findings to other types of law enforcement agencies in the United States, such as sheriff's offices, should be explored. Lastly, the differences between Facebook adoption and Twitter adoption warrant examination to determine why the agencies might choose to adopt one platform over another.

Conclusion

This thesis used existing research on diffusion of innovations and policing to examine the relationships between a municipal police agency's adoption of Twitter and Facebook along the lines of police characteristics. These characteristics included size and progressiveness, community-oriented policing, and technological capacity. It was found that all variables were statistically significant for increasing the amount of time a department was on Twitter. All variables were also significant to varying degrees for increasing the amount of time a department was on Facebook, except for community orientation. Future research should try to determine what other factors may influence the time of adoption for municipal police departments.

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Education

Sam Houston State University, Huntsville, TX   2014-present
Master of Arts in Criminology and Criminal Justice

Sam Houston State University   2012- 2014
Bachelor of Science in Criminal Justice
- *Summa Cum Laude*
- *Highest Honors*, Honors College
- Undergraduate Thesis: *Profiling Cybercriminals – Feasibility and Practicality*
- Minor: Technical and Professional Writing

Presentations

SHSU Association of Computer Scientists' Future Tech Conference   2016

   "Your Life is Not Your Own: A Study of Facebook and Social Engineering"

American Society of Criminologists   2015

   "Your Life is Not Your Own: A Study of Facebook and Social Engineering"

Introduction to Criminal Justice, SHSU   2015

   "Cybercrime 101"

SHSU Association of Computer Scientists' Future Tech Conference   2014

   "Celebgate and Leaked Pornography: Implications for the Everyday User"

Graduate Research Exchange, SHSU   2014

   "Celebgate and Leaked Pornography: Implications for the Everyday User"

Professional Memberships

InfraGard   2013-present

- Houston chapter

Association of Certified Fraud Examiners   2015-2016

- Sam Houston State University chapter
- Chapter secretary