

## Validation of the technology acceptance model for police

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### Abstract

The Technology Acceptance Model (TAM) developed by Davis (1989) was used to develop a basic theoretical model that would explain why patrol officers embraced or rejected new computer technology. Davis identified two factors of technology acceptance: ease of use and usefulness. Items representing each factor were generated in focus groups with patrol officers, and subject matter experts (SMEs) provided evidence of content validity. Exploratory (EFA) and confirmatory factor analyses (CFA) were conducted to assess the construct factorial validity of the factor structure. The two-factor model hypothesized by Davis (1989) was not supported. The EFA, however, identified a four-factor model that indicated a good fit to the data. The four factors were labeled as ease of use, usefulness, information quality, and timeliness. The findings suggested that the new factors of information quality and timeliness were the most important components of technology acceptance by patrol officers. Policy implications and future research directions are discussed.

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### Introduction

Information technology was one of the greatest influences on police practices. Manning (1992) described some of the changes in policing that evolved from the telegraph in the nineteenth century to the use of two-way radios, computer-aided dispatch, and mobile display terminals (MDTs) in patrol cars during the twentieth century. For example, he noted that the two-way radio and the automobile increased the capacity of urban police to allocate resources and respond to citizens' calls. A more recent innovation was the MDT that facilitated computerized dispatch; access to state, local, and federal crime information databases; report writing; and electronic submission of reports from the field to the station. This technology reduced time spent at the station writing reports and accessing crime

information databases, and increased police presence in the community.

Chan (2001) addressed the question of whether or not information technology made any difference to policing. She noted that although the potential benefits of the application of computers to police work were well recognized, there were very few empirical studies on the impact of information technology on policing. For the most part, studies on this topic had been correlational, expected gains in police efficiency and performance were not realized, and the impact on the social organization of policing was overlooked. For example, Nunn (2001) questioned the efficiency of computerization with his finding that highly computerized cities reported larger shares of employees in technical positions, spent more money per capita, and reported fewer officers per capita. Nunn and Quinet (2002) supported this finding. They reported few performance differences between community policing officers who did and did not use cellular digital packet data systems. Performance was operationalized in their study as observational data, investigative inquiries, officer productivity reports, and quarterly performance evaluations.

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Consideration of the impact of technology on the social organization of policing might explain the lack of expected efficiency and performance gains. Manning (1992) claimed that information technology was constrained by the traditional structure of policing and by the traditional role of officers. For example, MDTs that facilitated computerized dispatch, accessing crime information databases, report writing, and electronic submission of reports from the field challenged traditional roles of officers. Officers using the MDTs were expected to limit their time at the station because they no longer required access to computers located there. Patrol officers might be reluctant to accept new technology if it disrupted established patterns of social organization. Less time spent at the station would limit the amount of time that patrol officers could spend engaged in social interaction with other officers and members of the command staff.

The importance of technology acceptance was documented in previous research. For example, Smith, Caputi, and Rawstone (2000) found that the impact of technology was dependent upon the extent to which employees accepted the technology. In fact, Smith et al. (2000) suggested that understanding why people accepted or rejected computers had proven to be one of the most important issues in information systems research. As important as technology acceptance might be, the factors that affected police officer acceptance of computer technology were not documented. The purpose of the study was to develop a basic theoretical model that would explain why patrol officers embraced or rejected the technology. Patrol officers' acceptance of MDTs that facilitated computerized dispatch, access to crime information databases, and report writing was measured.

#### *The technology acceptance model*

The Technology Acceptance Model (TAM) developed by Davis (1989) was intended to identify the factors that facilitated the integration of information technology into business. It was the most widely used model for identifying the factors that contributed to user acceptance of technology. The TAM addressed why users accepted or rejected computer technology. The model was an adaptation of the theory of reasoned action proposed by Fishbein and Ajzen (1975) and Ajzen and Fishbein (1980). Two dimensions formed the basis for the theory underlying the TAM—perceptions of usefulness and perceptions of ease of use of technology. Research demonstrated that such beliefs about technology led users to (1) form positive attitudes toward technology; (2) develop intentions to use the technology; and (3) use the technology (see, for example, Karahanna & Straub, 1999). In a critical review of the TAM, Legris, Ingham, and Collette (2003) conducted a meta-analysis and concluded that the model explained about 40 percent of

the variance in computer use. Although some researchers urged modification of the TAM to include other components to explain more than 40 percent of system use, Legris et al. (2003) suggested that it had proven to be a useful theoretical model.

#### *Measuring computer acceptance*

A common method for examining user acceptance of technology was the questionnaire composed of multiple scales that measured a particular attitude dimension. Validation studies were conducted for instruments measuring attitudes toward computers among those in a variety of occupations including physicians and lawyers (see, for example, Zolton-Ford & Chapanis, 1982). Although it was possible to use instruments developed for other professions to measure police officers' attitudes toward computers, this approach might not be appropriate. For example, Cork, Detmer, and Friedman (1998) noted that the extent to which members of different occupational groups shared a similar structure of attitudes and beliefs was not known. Furthermore, they suggested that attitudes about computers were shown to differ among professionals. According to these researchers, instruments developed for one type of professional (e.g., physicians) might not address the unique training, roles, activities, and responsibilities of members of other professions (e.g., police officers).

In the health care industry, for example, there was considerable attention devoted to identifying factors affecting physicians' acceptance and use of computers. Chau and Hu (2002) suggested it was important to develop methods for understanding and accurately measuring attributes of physicians that might predict their acceptance of computer systems. Cork et al. (1998) found that responses to technology were influenced by computer knowledge, computer use, optimism, and demand attributes. In many instances, the survey items that comprised each factor were specific to medical tasks and would not be applicable to other professions (e.g., law enforcement). This incongruence established the practical relevance of studying occupation-specific attitudes toward the computer and developing unique instruments for their measurement (Cork et al., 1998).

The TAM was a moderately robust model, and its applicability to law enforcement was examined in this study. The study was intended to develop a basic theoretical model that would explain why patrol officers embraced or rejected technology. Items that represented computer acceptance were developed in a focus group with police officers, and subject matter experts (SMEs) provided evidence of content validity. Construct factorial validity of the factor structure was assessed using exploratory and confirmatory factor analyses conducted on data that were collected from a larger study that considered the effects of computer technology on community policing.

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