Chapter XXXIII
Technology Diffusion in Public Administration

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INTRODUCTION

The ability to understand the salient aspects of innovations, as perceived by the members of a social system, is essential to the success of planned change. The diffusion of information technology in the public sector provides the opportunity to apply the appropriateness of diffusion theory in a combined context of information technology and public policy innovation. Past studies support the salience of diffusion theory and the adoption of information technology (Attewell, 1992; Brancheau & Wetherbe, 1990; Chau & Tam, 1997; Cooper & Zmud, 1990; Damanpour, 1991; Fichman, 1992; Swanson, 1994; Tornatzky & Fleischer, 1990). Other studies suggest that existing theory in public policy adoption adequately provide a framework to guide research in technology adoption in the public sector (Akers, 2006; Berman & Martin, 1992; Berry, 1994; Berry & Berry, 1990; Glick & Hays, 1991; Gray, 1973; Hays, 1996; Hwang & Gray, 1991; Mintrom, 1997; Rogers, 1962; True & Mintrom, 2001; Walker, 1969; Welch & Thompson, 1980) However, there is little research that combines both frameworks for understanding the adoption of information technology in public organizations or within political subdivisions. Using classical diffusion theory, information technology adoption, and public policy adoption

theory, there is sufficient contextual relevance of these theories to guide research in the adoption of public information technology in public organizations and political subdivisions.

BACKGROUND

Everett M. Rogers (1962) was first to outline the terminology and concepts of diffusion theory conceptualized from many different disciplines. Rogers (1995) defines diffusion as "the process by which an innovation is communicated through certain channels over time among the members of a social system" (p. 5). A review of diffusion theory finds three common empirical regularities associated with the diffusion of innovations that provide the framework for the visual understanding of diffusion theory.

First, studies of the diffusion of innovations show a common regularity such that the cumulative adoption time path or temporal pattern of the diffusion process when plotted, takes the general distribution shape of an s-shaped curve (Brown & Cox, 1971:551; Rogers, 1995; Tarde, 1962). Another familiar graphical representation of the diffusion process is a spatial sequence. Spatial representation recognizes that a new adoption is highest in the vicinity of an earlier one and decreases with

distance. This is often referred to as the "neighboring effect" (Brown & Cox, 1971; Hägerstrand, 1967; Klingman, 1980). Finally, there may be a tendency in diffusion for more important places to adopt earlier than less important places creating a hierarchy effect (Brown & Cox, 1971; Leichter, 1983; Rogers, 1962; Walker, 1969).

Rogers (1995) identified four critical elements associated with the analysis of innovation diffusion: the *innovation*, its *communication* from one individual to another, in a *social system* over *time* (p. 11). Several studies applied diffusion theory specifically to organizations as a social system (Becker & Whisler, 1967; Downs & Mohr, 1976; March & Simon, 1993; Menzel & Feller, 1977; Zaltman, Duncan & Holbek, 1973). These four elements provide the basic components for most diffusion studies.

Rogers (1995) defined *innovation* as "an idea, practice, or object that is perceived as new by an individual or other unit of adoption" (p. 11). The *communication system* provides communication from one individual to another, or one social system to another. The purpose of this communication is to share ideas and reach some form of convergence in order to effect a specific change and may be viewed as bi-directional. The domain of the diffusion process is bound within some social system. A *social system* is defined as "a population of individuals who are functionally differentiated and engaged in collective problem-solving behavior" (Rogers, 1962, p. 14). The characteristics of a social system and an organization are generally interchangeable depending on the unit of analysis. The final critical element of the diffusion process is *time*. The length of the diffusion process is measured from the date that the first individual is aware of the innovation until it reaches a saturation point of adoption in a given social system.

PUBLIC SECTOR ADOPTION OF INFORMATION TECHNOLOGY

The salience of classical diffusion theory as a framework to study public policy adoption emerged in the field of public administration with the publication of Jack Walker's (1969) research, "The Diffusion of Innovations among the American States." Walker believed there were other important factors that determined policy outcomes besides the generally accepted expenditure model. His research provided the framework for future public policy adoption studies over the next several decades and provided the initial definition of an public policy innovation "as a program or policy which is new to the states adopting it, no matter how old the program may be or how many other states may have adopted it" (Walker, 1969, p. 881). The focus of Walker's analysis was the adoption process of new ideas and new services within a political subdivision.

Subsequent research identified three prominent models of public policy adoption (Berry & Berry, 1990; Collier & Messick, 1975; Daniels & Darcy, 1985; Eyestone, 1977; Foster, 1978; Mooney, 2001; Walker, 1969). The *determinants model* examined the demographic, economic, and political factors of the governmental subdivision or organization. The *regionalism model* focused attention on the "inter-governmental context," or the horizontal relationships among the states, as the principal influence that regulated the speed of adoption and the patterns of adoption. The *federalism model* noted the affect of federal stimulation to the adoption rate of public policy.

The determinants of public policy adoption are generally divided into two broad categories: socio-economic and political. Past studies show socio-economic variables (i.e., wealth, education, urbanization, minority diversity, and governmental slack resources) and political determinants (i.e., legislative professionalism, executive leadership, government ideology, unified party control, policy entrepreneurs, policy networks, and administrative professionalism) have a significant impact on public policy adoption. Walker was the first to show that a state's general tendency toward public policy adoption can be another important determinant and has been supported by subsequent research that suggest the importance of a state's tendency toward public policy innovation functions as an intervening variable that reflects broad socio-economic and political determinants (Akers, 2006; Berman & Martin, 1992).

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