



# Diffusion of Innovation: A Preliminary Assessment of the Perception and Use of Technology in Complex Social Environments

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## ABSTRACT

*It is clear from current literature that information communication technologies (ICT) will continue to evolve at a rapid pace. As a result, ICT will diffuse into new domains and be used in innovative ways by new groups of people. The research described in this paper presents a point of departure from previous studies because this research was conducted on a new population in a social setting that is unfamiliar to the majority of information systems (IS) researchers and practitioners. In particular, faith-based organizations have become viable economic community enterprises that can truly benefit from ICT. However, these complex social environments have often been overlooked. In order to make a preliminary assessment of the factors that inhibit or facilitate the adoption and use of Information Communication Technologies (ICT) in these complex social environments, the Technology Acceptance Model (TAM) was used to form the intellectual basis of this study. The results revealed that the research population is interested in adopting ICT. However, faith-based organizations lack the financial resources and technical expertise necessary to implement ICT solutions.*

## INTRODUCTION

It is clear from current literature that information communication technologies (ICT) will continue to evolve at a rapid pace (Karahanna & Straub, 1999). For this reason, ICT will continue to diffuse into new domains and be used in innovative ways by new groups of people. As a result, all organizations are unlikely to be able to adopt and use the technology at the same pace, with the same level of expertise, or with similar gains in performance and productivity.

This research presents a point of departure from previous studies in that this research was conducted on a new population in a social setting that is unfamiliar to the majority of IS researchers and practitioners. The population consisted of current and potential users of a single functional form of ICT that is termed "E-Outreach", which is the utilization of the Internet to augment or supplement self-help and social service programs provided by faith-based organizations. From an E-Outreach perspective, emphasis is placed on the service mission of the organization rather than the evangelical mission.

Faith-based organizations have become viable economic community enterprises that serve both the spiritual and social needs of their congregations and communities. In their social orientation, there has been an increase in the number of faith-based organizations that have created non-profit Community Development Corporations designed to support the community at large. The importance of the societal role of faith-based organizations is evident given

the creation of the White House Office of Faith-based and Community Initiatives.

In order to effectively communicate, collaborate, and administer programs in the Information Age, the use of ICT is a prerequisite. Findings from IS research should filter down into practitioner communities in order to be used for prescriptive action and aid in the implementation of IT. However, previous research has largely ignored the use of ICT in faith-based organizations. As such, research is needed in order to guide the diffusion of ICT in these organizations.

For the purpose of this study, the "Black Church" is given considerable attention. The Black Church has a long history of serving the African-American community. In addition, the Black Church can be considered a mediating institution that operates in two realms of reality – providing spiritual and social needs. In this study, the author focuses solely on the social role of the Black Church and suggests that the church can be used as a conduit to affect social change. However, the success of the Black Church's social outreach may be limited or adversely affected by its inability to effectively use ICT to augment their social services.

In this inaugural study, the author makes a preliminary assessment of the innovation and adoption behaviors in this complex social environment. The study is guided by the following questions: (1) To what extent are Black Churches using ICT to support their social outreach objective? (2) Do Black Churches have the resources necessary to implement and use ICT? (3) Is E-Outreach a viable option for the future? This research draws from the Technology Acceptance Model (TAM) in order to provide an intellectual basis for this study. Therefore, the emphasis is on the constructs and not the model itself.

## BACKGROUND

In today's Information Age, we tend to assume that all organizations are benefiting from the emergent use of ICT. In light of the Digital Divide and the varying dimensions of social stratification, it becomes quite evident that there are groups in our society who have not realized the benefits of technological innovations. Moreover, there is very little empirical data to identify the barriers that these groups face in adopting ICT (Kvasny, 2002). The author begins to address the issues regarding the diffusion of technology in the urban community through an empirical examination of the adoption and diffusion of technology in the Black Church.

When analyzing the literature, there was limited information regarding the research population. Therefore, a brief history of the Black Church is

provided here in order to situate this population in a socio-cultural context. The term “Black Church” is used as a sociological and theological shorthand reference to the pluralism of Black Churches in the United States (Lincoln & Mamiya, 1990). Additionally, the Black Church represents the first coherent and stable form of social interaction for Africans in America (Dubois, 1970).

Seven major historic Black denominations account for 80 percent of the Black religious affiliations in the United States: the African American Episcopal (A.M.E.) Church; the African Methodist Episcopal Zion (A.M.E.Z.) Church; the Christian Methodist Episcopal (C.M.E.) Church; the National Baptist Convention, U.S.A., Incorporated (NBC); the National Baptist Convention of America, Unincorporated (NBCA); the Progressive National Baptist Convention (PNBC); and the Church of God in Christ (COGIC) (Lincoln & Mamiya, 1990).

The Black Church has a longstanding history of being a focal point for social change, support and a resource for overcoming adversity (Frazier, 1964; Lincoln, 1974; Burris & Billingsley, 1994; Billingsley, 1999). Moreover, the Black Church has a rich history of providing education, safe haven, and *social services*. During the Antebellum period, group identity and social solidarity among disenfranchised slaves were achieved through interdenominational alliances. Furthermore, Black clergy used the pulpit to disseminate messages of self-help and community empowerment.

Over the years, various media, including print, radio and television, have had a dramatic impact on the transmission of information. Additionally, the evolution of ICT presents many opportunities to communicate, build and sustain meaningful social networks, and provide up-to-date information to communities (Rodin et al., 2001). No longer are ministers limited to the sermon and the pulpit as the main modalities to disseminate information. Additionally, ministers are not limited in their ability to mobilize the larger community in order to affect social, political, and cultural change.

Technological innovations present new methods for the Black Church to increase organizational effectiveness, information dissemination, and communication. As such, many faith-based organizations are currently exploring the opportunities made available by ICT. However, the academic discourse has been relatively silent on this issue. To effect change, researchers must first begin to study the minister as a leader and manager of information technology and perhaps the IT champion of the urban community. In this inaugural study, the first approach will be to view the faith-based leader as an agent that is largely charged with the enculturation and socialization process.

## THEORETICAL FRAMEWORK

Studies on adoption and diffusion of technological innovations in MIS research have primarily relied on two theoretical models: Diffusion of Innovations (Rogers, 1983; 1995) and the Technology Acceptance Model (Davis, 1989; Davis et al. 1989). Most of these studies have been conducted in business and academic environments. In most cases, these studies may not be generalized to other social settings.

ICT has been used to improve organizational performance by supporting planning, decision-making and communication. However, ICT can only result in expected efficiency and effectiveness if used (Agarwal & Prasad, 1999). Factors that contribute to the acceptance of new technologies are likely to vary with the individual and the context in which it is used (Agarwal & Prasad, 1999). Compeau et al. (1999) found that there is a significant relationship between anxiety and use. The process of understanding why people accept or reject ICT has been most challenging (Swanson, 1988). To better understand the factors that inhibit or facilitate user acceptance of ICT, we need to understand why people accept or reject technology and identify those factors that will increase the adoption of ICT (Davis et al., 1989).

The Technology Acceptance Model (TAM) is the most widely used model in MIS research for predicting user adoption of ICT. TAM is based on two theoretical constructs: *perceived usefulness* and *perceived ease of use* (Davis, 1989). Several studies examined perceived ease of use, perceived usefulness (Davis, 1989; Davis et al., 1989) and found each to be positively associated with the adoption and use of ICT. Prior studies have relied on static constructs which neglect the aspect of the context and socio-cultural factors.

TAM as proposed by Mathieson et al. (2001) is based on three theoretical constructs: perceived usefulness, perceived ease of use and perceived user resources (Figure 1). According to Mathieson et al. (2001), one of TAM’s limitations is that it assumes that usage is volitional and that there are no

barriers that would prevent an individual from deploying and using ICT if he or she chooses to do so. In order to evaluate the user’s perception of available resources, the researchers found perceived user resources to be a valuable addition to TAM. “Perceived user resources (R) is the extent to which an individual believes that he or she has the personal and organizational resources needed to use an IS, such as skills, hardware, software, money, documentation, data, human assistance and time” (Mathieson et al., 2001, p. 92).

## METHODOLOGY

The participants of this study were members of an Interdenominational Ministers Conference (IMC) in a metropolitan area. This IMC was founded more than 50 years ago. Currently the IMC consists of 57 Churches and 18 affiliate Churches for a total of 75 churches. Membership represents a divergent group of denominations or faiths.

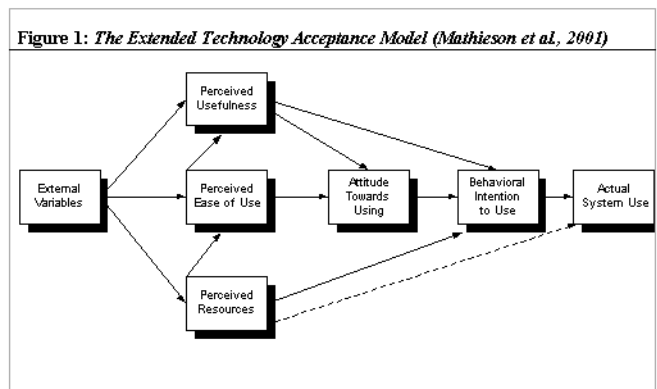
A research packet was sent to each member of the IMC. Each research packet contained an endorsement letter from the president of the IMC urging clergy to participate, a letter of explanation that described the purpose of the study, and a questionnaire. A week after the distribution of the packets, respondents were reminded of the study in order to encourage participation. A total of 75 questionnaires were distributed and 26 were returned, representing a 35 percent response rate. From those who chose to participate in this research, 16 were male and 10 were female (Table 1).

Additionally, 25 identified themselves as African-American and one respondent identified him- or her-self as other. More importantly, 96.2 percent of those who participated in this research represented churches from the urban city.

Items used to operationalize the constructs were adopted primarily from Davis et al. (1989) and Mathieson et al. (2001) with modifications for the target audience. The instrument asked respondents questions related to their perception of using technology to augment community outreach (E-Outreach). Items were measured using a five-point Likert-type scale. To ensure balance and prevent systematic response bias, questions appeared in different sections of the questionnaire. Three clergy from different denominations with different specialties – including law, public policy and community advocacy – tested the instrument for content validity and suggested minor corrections. Corrections were made prior to disseminating the research packets.

The Technology Acceptance Model illustrated in Figure 1 has been thoroughly tested and has been deemed both reliable and valid. As such, the model is used only to form the intellectual basis of this study. Therefore, instead of extending the model as previous researches have done, this study examines the perceptions of a novel population by using an existing model. In this research TAM uses three key constructs: perceived usefulness (U), perceived ease of use (EOU) (Davis et al., 1989) and perceived user resources (R) (Mathieson et al., 2001).

The strength of the relationships was tested using Multiple Linear Regression. Eigen value thresholds were set to 1 and missing values were replaced with the mean. Cronbach’s alpha was used to test the inter-item reliability. The reliability for usefulness, ease of use, resources and attitude was .60, .33, .73 and .74 respectively. Additional information was extrapolated



**Table 1 Demographic characteristics of the participants**

Characteristic	Number	Percent
Gender		
Male	16	51.5
Female	10	38.5
Position		
Pastor	17	65.4
Assistant Pastor	3	11.5
Associate Minister	5	19.2
Other	1	3.8
Ethnicity		
African American	25	96.2
Hispanic	0	0
Other	1	3.8

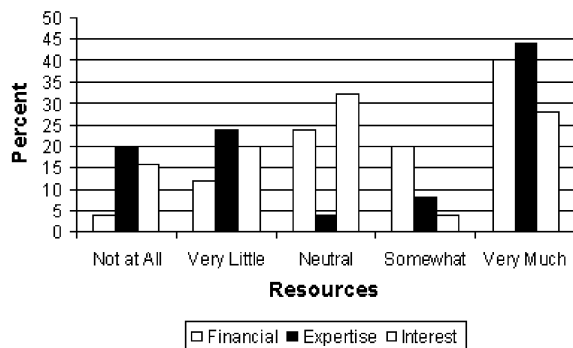
from other questions. Furthermore, interviews were held with a few members of the population to assist in interpreting the results.

**RESULTS**

This research was guided by three questions: (1) To what extent are Black Churches using ICT to support their social outreach objective? (2) Do Black Churches have the resources necessary to implement and use ICT? (3) Is E-Outreach a viable option for the future? With respect to the first question, this study revealed that the research population lacks ICT that are required for effective participation in a Digital Society. Analysis of a current copy of the IMC Roster revealed that 47 percent of the 75 churches do not have fax machines and 65 percent of the 75 churches do not have email capability. When making follow-up calls, the author found that only a few churches have voicemail systems. Through interviews, the respondents revealed that in order to use such technologies, there must be a clear value before justifying the expenditure.

In regard to the second research question, the respondents feel that lack of financial resources and technical expertise hampers their ability to adopt and use ICT (see Figure 2). Interest among members of the congregation does not appear to be a limiting factor. This indicates that the congregational members are willing to use ICT. Therefore, these data suggests that lack of available resources will have a negative impact on behavioral intention, while attitude will have a positive impact, which in turn will affect usage behavior. In short, there is a desire to use the technology; however, the organizations lack the available resources that are necessary for implementation and use.

**Figure 2 Perception of Lack of Resources (R)**



With respect to the third question, the results revealed that 52 percent plan to use E-Outreach very much and 32 percent plan to use the technology somewhat. This indicates a strong desire by the respondents to use E-Outreach in the future. Again, financial resources and technical expertise are negatively affecting adoption.

**IMPLICATIONS**

Ministers have a captive audience and are strong candidates to be the primary spokesperson for technology in urban cities. In addition, African-American clergy exert a significant amount of social influence over members of their congregations and communities. This same influence spurred a literacy movement at a time when African-Americans were denied access to education. Churches operated ad hoc schools in their basements. Today we face a similar situation in which digital literacy has become the hallmark of liberation.

The author postulates that introducing technology to leaders of the Black Church may spur a digital literacy movement that is much needed in urban cities. Such a movement has the potential to have a tremendous impact in bridging the gap between the haves and have-nots.

The findings of this study also have public policy implications. In regard to the White House Office of Faith-Based and Community Initiatives, other faith-based and technology initiatives, the historic role and current state of the Black Church needs to be clearly understood. Steps should be taken to collaborate with some of the 75,000 existing historic Black Churches in America and provide government sponsored stimulation programs to provide resources and technical expertise. Additionally, steps should be taken to develop an infrastructure that connects faith-based with other community organizations. The latter will lead to more collaboration among faith-based organizations and leaders, which will in turn have a positive impact on interdenominational alliances and group solidarity.

As a result of the very limited academic discourse and dialogue on the church in general, clergy and religious organizations do not understand the impact that IT has on the church as an institution, individuals and society, nor do they fully understand how to incorporate IT into their ministries. The Black Church has a central role in addressing digital inequality by encouraging technological literacy and developing a framework for the responsible use of technology. However, the lack of email, fax, and voicemail capabilities in a Digital Society limits the church's ability to lead social change.

Given the rate of technological advancement, it is imperative that academicians and practitioners identify appropriate models that can be effectively deployed in faith-based organizations. These models should be designed to improve efficiency and organizational effectiveness. In addition, innovation adoption and diffusion initiatives should be focused on highlighting how the technology can build the capacity of the church, increase efficiency, improve productivity and increase social capital.

**LIMITATION**

While this study provides important insights into a novel social setting, the results must be interpreted with caution. By virtue of their operation, churches are not considered high technology organizations. Also the findings are limited in the size of the research population and number of respondents. TAM is limited because it does not account for personal anxiety toward technology, fear of using technology, perceived value and relevance of technology, and perception of technology in general (i.e., is technology inherently evil?) by non-traditional ICT users. Although the results of this study are based on a specific population, the findings represent a basis to guide future research.

**CONCLUSION**

This study provides an initial understanding of the diffusion and use of ICT in a complex social environment. The results revealed that while clergy are interested in adopting ICT and E-Outreach, they lack the financial resources and technical expertise necessary to implement ICT solutions.

By exposing this context, it is my sincerest desire that other academics would come to the aid of the most stable and central-institutions in our society. Future research is needed on a significantly larger sample in order to understand the socio-cultural and other societal factors that influence the adoption and diffusion of technology in the Black Church, as well as, other faith-based organizations. Additionally, we must begin to study the faith-based sector *in*

*situ*. Only then can we take positive steps to develop strategic technology initiatives to bridge the divides between organizations that have access to technology and those that do not. Using the church as proxy for the urban community may also provide insight into the Digital Divide.

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