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## Internet Based Multimedia Services and Technologies in the Context of e-government: A Conceptual Framework

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**Abstract:** Electronic Government (e-government) initiatives are complex change efforts to use new and emerging technologies to support a transformation in the operation and effectiveness of government. In Pakistan government has outline its e-government initiatives. The objectives of these initiatives are to increase the scope of which governments, businesses and citizens can interact with the government online. To accomplish this there is a need to move forward and develop e-government structure by using the internet based multimedia services and technologies. In this study internet based multimedia services and technologies that can play a vital role in the establishment of an efficient and secure e-government services in the context of Pakistan were discussed. In doing so a conceptual framework is developed that can provide the support to the decision makers, while taking the decisions to accomplish e-government services.

**Key words:** Multimedia services, e-government, growth model, framework

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### INTRODUCTION

The recent increase of geographically dispersed users has given rise to greater requirements for better methods of collaboration and interaction between personnel. Accelerated advances in computers and communication technologies have ushered in the increasing popularity of multimedia applications on the Internet (Dong, 2006a, Syed, 2006). The combination of Multimedia and Internet technology has introduced an increasing demand for Large-scale consistent services. Multimedia technology offers many and most popular services on the Internet. This has increased the popularity of technologies such as IP telephony and multimedia protocols such as video-conferencing, Voice mail and text messaging (Yang *et al.*, 2007; Dirk *et al.*, 2005; Toufik *et al.*, 2006).

Multimedia systems have attracted much attention in the last few years in the field of information technology. The use of continuous media such as audio and video multimedia applications brings new methodologies. Therefore, to enable access to time-dependent information such as audio and video data, techniques must be developed and applied which allow for its handling in computer and communication systems and obeying time constraints (Kalogeraki *et al.*, 2007; Tadahiko *et al.*, 2006). Data distribution and sharing between organizations, both government and industry, has increased with the beginning of the Internet technology (Rathindra and Krishnamurthy, 2006).

In recent year's Information and Communication Technologies (ICT) are widely being used in government settings. Governments are increasingly moving towards the use of ICT in their daily operations and businesses. ICT has the potential to transform government structures and to improve the quality of government services. As a result several theoretical and conceptual frameworks have been developed to understand different characteristic of e-government (Ramon and Ignacio, 2006, Christopher, 2005).

It has been well reported in the literature that ICT provides two main opportunities for governments: (1) increased operational efficiency by reducing costs and increasing productivity and (2) better quality of services provided by government agencies. To realizing the benefits of ICT requires organizations to understand and overcome the challenges to their efforts. As a result, this study is an attempt to discuss the scope of internet based multimedia services in the context of e-government.

**Internet Based Multi Media Services (IBMMS):** In the past few years there has been an explosion in the number of people using the Internet via different desktop and hand held devices like notebooks, workstations PDA and Cellular phones (Gianluca *et al.*, 2006). These users expect high quality material to be delivered over the web, including Voice, Video, graphics, Text and animations. Multimedia is became an essential part of internet, various multimedia services are now integrated part of internet

Table 1: Description of internet based multimedia services

Internet based multimedia services			
services	Service	Description of service	References
Video services	Video-on-Demand	VoD systems allow users to select and watch video content over a network as part of an interactive television system. video on demand systems provide the user with a large subset of VCR functionality including pause, fast forward, fast rewind, slow forward, slow rewind, jump to previous/future frame etc	(Lin and Yong, 2006), (Miroslaw <i>et al.</i> , 2006), (Gerassimos, 2005)
	Video conferencing	Video conferencing is a communications technology that integrates video and voice to connect remote users with each other as if they were in the same room. Users see and hear each other in real-time, allowing natural conversations.	(Andrei, 2006), (Mojtaba and Nicolas, 2006), (Reha and Tahir, 2005)
	IPTV	IPTV (Internet Protocol Television) delivers television programming to households via a broadband connection using Internet protocols. IPTV opens the door to real-time participation from people watching at home. Another application would be the ability to turn on multiple angles of an event, such as a touchdown and watch it from dual angles simultaneously using picture-in-picture viewing. IPTV promises more efficient streaming than present technologies and therefore theoretically reduced prices to TV operators and subscribers.	(Carolyn, 2006), (Savvas <i>et al.</i> , 2006), (Dong, 2006)
Audio services	IP telephony	IP telephony is the technology of integrating telephone services into computer networks. Internet telephony converts analog voice signals into digital signals, transmits them, then converts them back again. The transmission of speech signals is done by using data packets.	(Martin 2006), (John and Michael, 2005), (Stephen, 2005)
	Audio-on-Demand	Audio-on-Demand is ability to start delivering an audio program to an individual Web browser whenever the user requests it. A one-way audio transmission over a data network. It is widely used on the Web as well as private intranets to deliver audio on demand or an audio broadcast (Internet radio). Unlike sonnd files (WAV, MP3, etc.) that are played after they are downloaded, streaming audio is played within a few seconds of requesting it and the data is not stored permanently in the computer.	(Gunasekaran <i>et al.</i> , 2006), (Lopamudra <i>et al.</i> , 2006), (Jochen <i>et al.</i> , 2006)
	Live audio	The transmission of live voice or music, live audio is also known as real-time audio. However, technically, real-time means no delays. It implies that there is no delay at the receiving side, or at most, imperceptible delays.	(Miroslaw <i>et al.</i> , 2006)
	Voice messaging	Voice messaging is also known as Voicemail vmail or VMS. It is a centralized system of managing telephone messages for a large group of people. In its simplest form it mimics the functions of an answering machine, uses a standard telephone handset for the user interface and uses a centralized, computerized system rather than equipment at the individual telephone. Messages are recorded in digitized natural human voice similar to how music is stored on a CD. To retrieve messages, a user calls the system from any phone, logs on using Touch-tones (clearing security) and his/her messages can be retrieved immediately. Many users can retrieve or store messages at the same time on the same voicemail system.	(Louis, 2003)
Text services	E-mail	Electronic mail is a store and forward method of composing, sending, storing and receiving messages over electronic communication systems. The term e-mail (as a noun or verb) applies both to the Internet e-mail system and intranet systems allowing users within one organization to e-mail each other. Often these work group collaboration organizations may use the Internet protocols for internal e-mail service.	(Kevin and Michelle, 2006)
	E-Books/Articles	An e-book, or electronic book, it is something you read on screen instead of on paper. E-book is an electronic version of a traditional print book that can be read by using a personal computer. Users can purchase e-books on diskette or CD, but the most popular method of getting e-books is to purchase a downloadable file of the e-Book or other reading material from a Web site and can be read from the user's computer.	(Anuradha and Usha, 2006)
	Text messaging	Text messaging consists of sending real time messages to another Internet user. Instant messaging is comparable to chatting in your own private chat room, with only those people you choose to invite. You can create a list to keep track of welcome guests and alert you when one of them sends you a message. Instant messaging is a bit more private than a typical chat room and it is a much faster and simpler way to communicate than using email. Since instant messaging allows users to communicate in real time, users can respond quickly to questions or comments.	(Christina and Stephanie, 2006)

Table 2: Applications/features of Internet based multimedia services

Service category	Service name	Features/Applications of Service
Video services	Video-on-Demand	<ul style="list-style-type: none"> <li>• Movies-on-Demand: Customers can select and play movies with full VCR capabilities</li> <li>• Interactive video games: Customer can play downloadable computer games without having to buy a physical copy of the game</li> <li>• Catalogue browsing: Customer examine and purchase commercial products</li> </ul>
	Video conferencing	<ul style="list-style-type: none"> <li>• Telemedicine</li> <li>• Distance Learning</li> <li>• Business meetings</li> <li>• Interactive discussions</li> </ul>
	IPTV	<ul style="list-style-type: none"> <li>• Two-way communication for interactive television</li> <li>• Record multiple broadcasts at once</li> <li>• Picture-in-picture viewing without the need for multiple tuners</li> </ul>
Audio services	IP telephony	<ul style="list-style-type: none"> <li>• Free inter-office calls (multiple sites). If you have many offices, these can be linked over the Internet providing you with free inter-office calls.</li> <li>• On-screen dialing</li> <li>• Voicemail. You can have unlimited voicemail boxes and have various rules which determine which message is played to which caller.</li> <li>• Auto-attendant. You can have unlimited auto-attendants, one speaking to you while you pick up your messages, another one to a user while they make a choice which extension in they wish.</li> <li>• Screen popping. See who is calling you when they call.</li> <li>• Disaster recovery. Soft switch systems (telephone systems that can run on your server) also allow you to backup the files and configuration, meaning any problems can often be quickly fixed.</li> </ul>
	Audio-on-Demand	<ul style="list-style-type: none"> <li>• Stored Music files</li> <li>• Less bandwidth required for high quality audio can be transferred using little bandwidth</li> <li>• Users often listen to several audio files, one after another</li> </ul>
	Live audio	<ul style="list-style-type: none"> <li>• RealAudio (RA), is famous audio files</li> <li>• Internet based radio broadcasting services</li> <li>• News and Entertainment programs</li> <li>• Live talk/Discussion shows</li> </ul>
	Voice messaging	<ul style="list-style-type: none"> <li>• click, talk and send</li> <li>• Voice mail services</li> <li>• Voice chatting</li> </ul>
Text services	E-mail	<ul style="list-style-type: none"> <li>• Organize and share information with messages being captured live and archived</li> <li>• Fast</li> <li>• Managing is easy</li> <li>• Inexpensive</li> <li>• Easy to filter</li> <li>• Transmission is secure and reliable</li> </ul>
	E. books/articles	<ul style="list-style-type: none"> <li>• Download e-books through the Internet</li> <li>• Very simple and easy to purchase</li> <li>• Take up less space</li> <li>• Portable</li> <li>• Searchable</li> <li>• Easily resizable</li> <li>• Printable</li> </ul>
	Text messaging	<ul style="list-style-type: none"> <li>• Real time communication</li> <li>• Allows easy collaboration</li> <li>• Possible to save a conversation</li> <li>• Facilitating quick, safe and persistent exchange of information</li> <li>• Improve typing ability</li> </ul>

(Dietmar and Klaus, 2007). These services are daily used by various organizations for different interactions. (Table 1).

**Applications of IBMMS:** Increasing applications of Information and Communication Technologies have lead in the popularity of multimedia applications on the Internet. Many of these applications transmit huge amount of data to many receivers, including real-time

media streaming, video conferencing, distance learning and web radio (Uthman and Mohammed, 2006; Athina *et al.*, 2006) (Table 2).

**E-government stages of growth model:** The stage of growth model plays a significant role in ICT strategies' implementation at an organisation level. In this model organisational progress through a number of successive, identifiable stages are well elaborated. Each stage

replicates a particular level of maturity in terms of the use and management of ICT in the organisation (Donna and David, 2006; Ebrahim and Irani, 2005). Accordingly, Ebrahim and Irani (2005) propose a four-stage model that characterizes the adoption stage of growth model of an e-Government initiative. These four stages are government information delivery, one-way service delivery, two-way service delivery and government integration (Table 3). The authors consider this stage of growth model to understand the applications of internet based multimedia services in the context of E-Government.

can be used to share interactive and on demand visual information source between local governments, organizations and government. Figure 1 is developed to represent the possible interaction of these services.

By using these interactive visual services citizen can participate with government. IP telephony helps to build a strong and low cost two way speech communication source between governments to governments and government to business organizations. Voice messaging facility provides the talk and sends method of voice transfer by which government can send information messages in form of voice mail, a single message can be transferred to many persons simultaneously. Audio on demand facility provide the facility by using for listening the stored speeches, discussions and important messages any time. Live audio service facilitate the government that it can run their own Internet based radio services that can

**A conceptual framework for Internet Based Multimedia Services (IBMMS) For E-Government:** The Internet based multi-media services are categorized in three ways that includes video, audio and text services. In video services Video-on-Demand, video conferencing and IPTV

Table 3: Description of stages of growth model: Source (Ebrahim and Irani, 2005)

Stages	Description
Stage 1	Government information delivery
Stage 2	One-way service delivery
Stage 3	Two-way service delivery
Stage 4	Government integration

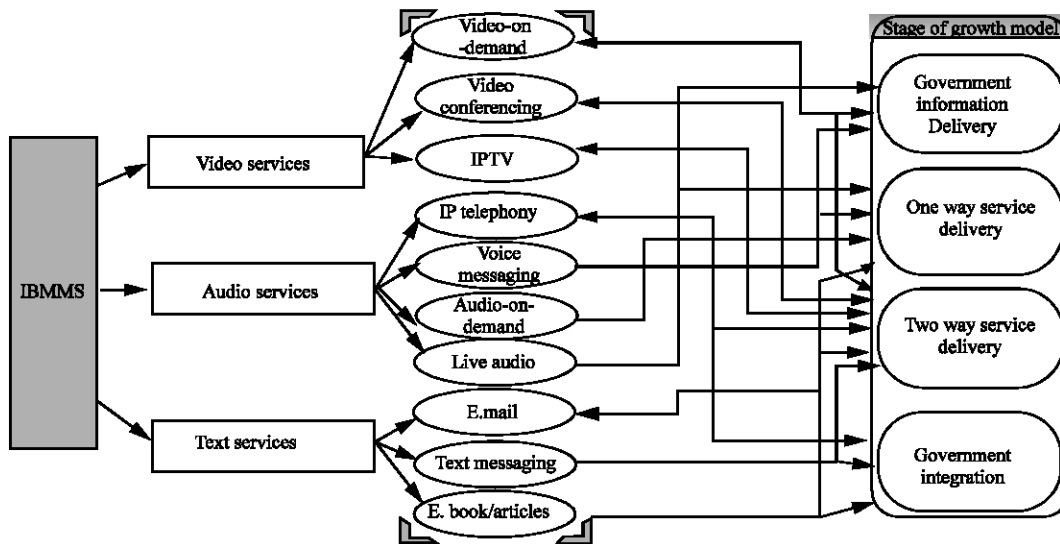


Fig. 1: Conceptual framework for IBMMS in e-government

be used for transfer live government information delivery. Email is nowadays used for various purposes. This two way source can be helpful to develop an interaction in form of text data that can store, transfer and handle in easy way. Text messaging service provides facility to communicate with citizens, government and business organizations using a interactive chatting sessions, that interactive sessions can be stored and printable. E. Books/Articles are sources that can be help to government to electronically publish their policies, meetings minutes, decisions, rules etc, that are formally available on paper. This information format is cheaper and easy to download for any user.

### CONCLUSION

This study presented in this paper proposes a conceptual framework for internet based multimedia services in the context of e-government. This framework can be used as a tool to take the possible advantages of internet based multimedia services and technologies. The successful development of an e-government is required a program and framework to support the organizations. Various services and technologies are being used for different purposes so why not for e-government? The use of these services obviously provides a commanding tool for modernizing governments and their interaction with organizations and public. This framework can be used as tool for the decision makers while taking the decision for E-Government initiatives.

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