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Convergence Through Mobile Peer-to-Peer File Sharing in the Republic of Armenia[1]

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Armenians are adopting personal computers and the Internet more slowly than are individuals in neighboring and more economically developed countries. However, mobile phone usage is rapidly expanding. The reasons for this pattern of information and communications technology adoption may be cultural, political, or economic, but the delay in some technological access also, paradoxically, fosters creativity. Through peer-to-peer content sharing via mobile devices, the consumption and exchange of digital content has become quite common. Indeed, these uses of the mobile phone exemplify *convergence*, the integration of digital audio, video, text, and data, as well as a social change in the way media circulates. Ethnographic research and interviews conducted in Armenia during the spring and summer of 2008 examine how, by whom, and what types of digital content are being socially shared through mobile devices. Theoretical possibilities to explain the social utility of this phenomenon are presented as well.

Introduction

Adoption of personal computers and the Internet by citizens of the Republic of Armenia lags behind that of neighboring countries, as well as more economically developing countries. Yet Armenians' adoption of mobile phones has reached almost complete penetration. One might assume that because of this limited personal computer and Internet penetration, digital content and information are not entering or being used in Armenia. However, through peer-to-peer content sharing via mobile devices, the consumption and exchange of digital content is quite common. Indeed, Wei (2008) argues that the mobile phone exemplifies convergence, the integration of digital audio, video, text, and data within and across media (Atkin, 2002; Baldwin et al., 1996; Herring, 2004; Jenkins, 2004, 2006). First, this paper will present a brief introduction to recent Armenian history, with a focus on the country's economy and the economic situation of its citizens. Next follows a discussion of multimedia mobile devices and multimedia

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sharing, including factors such as the specific type of multimedia sharing occurring in Armenia, and the cost, frequency, utility, and social implications of sharing.

This paper will look at creative uses of digital content beyond mere adoption. This adds to a body of research that is attempting to go beyond adoption to examine *appropriation*, the ways in which individuals implement and use information and communication technologies (Karnowski, von Pape, & Wirth, 2009; Katz & Aakhus, 2002; Lievrouw & Livingstone, 2002; Salovaara, Helfenstein, Wahlstrom, & Oulasvirta, 2009; Silverstone & Haddon, 1996; Taylor & Harper, 2002; Wirth, von Pape, & Karnowski, 2008). This study hopes to add to this body of research by analyzing convergent communication through mobile devices in Armenia.

Armenia

History and Economic Profile

Armenia was the first non-Baltic republic to break away from the disintegrating Soviet Union in 1991. Since gaining its independence, Armenia has been challenged by external conflict, internal instability, and political strife (Heritage Foundation, 2008). The small state's transition to democracy and a market economy had a promising start as its new leaders embarked on political and economic reforms. However, democratization slowed with the outbreak of war with neighboring Azerbaijan over the disputed Nagorno Karabakh region. In addition, Armenia's gross domestic product shrank by more than half from 1992 through 1993 and the new regime developed authoritarian tendencies that increased following a 1994 ceasefire agreement with Azerbaijan (Freedom House, 2006). Since then, Armenia has improved its economic but not its political structures (Freedom House, 2008). Armenia's GDP purchasing power parity is US$16.82 billion with a GDP per capita purchasing power parity of US$5,900. The official unemployment rate is 7.1% with 26.5% of the population living below the poverty line (CIA WorldFactbook, 2009), although many economists believe that the unemployment rate is closer to 30% (Danielyan, 2006).

Technology Use

Although Armenian citizens' economic situation has improved slightly over the past 20 years, daily life is still difficult. With many families struggling to pay for household necessities, information and communication technologies (ICTs) are out of reach of most Armenians (see Table 1 for a summary of the Armenian technology landscape). Schools, universities, and libraries also lack the funds to provide substantial access to ICTs. Not surprisingly, only 14.7% of Armenian households own a personal computer, 77.4% of respondents report no basic computer skills, and 71% report no Internet skills (CRRC, 2008). The International Telecommunication Union (2009) reports that only 6.21% of the Armenian population are Internet users. However, while access to personal computers and the Internet is low, access to mobile phones is not. The CRRC (2009) finds that 80.8% own a mobile phone, while the ITU (2009) reports 85%. This discrepancy may be due to the ITU's reliance on 2001 census data and subscription data from telecommunication companies (overcounting with lapsed subscriptions and old SIM cards) while the CRRC data is based on self-reported ownership.

Table 1. Technology Landscape of Armenia

ITU ICT Development Index: "Level of advancement of information and communication technologies (ICTs)," 2009	
Overall (40% access, 40% use, 20% skills)	72/154
Access	66/154
Use	111/154
Skill	54/154
BuddeComm (Evans, 2009)	
Ownership of land-line telephone	21%
Ownership of mobile phone	85%
Ownership of Internet subscription	4%
Ownership of personal computer	27.5%
Ownership of land-line telephone (CRRC, 2006)	N = 2514
No	28.4%
Yes	71.6%
Ownership of mobile phone (CRRC, 2008)	N = 2076
No	22.8%
Yes	76.8%
Number of mobile phones (CRRC, 2008)	N = 1593
1	44.1%
2	32%
3	14%
4	7.3%
5+	2.5%
Ownership of personal computer (CRRC, 2008)	N = 2075
No	84.9%
Yes	14.7%

Multimedia Mobile Devices

Mobile phones entered the Armenian market in the late 1990s after the introduction of a second mobile phone company and pre-paid cards. Mobile phones rapidly diffused to much of the population. With the addition of a third operator in late 2009, growth is expected to continue. Adoption data is shown in Table 2 and Figure 1.

Table 2. Adoption Rates for Mobile Phones

	2002	2003	2004	2005	2006	2007	2008	2009
CRRC				24.5%	46.8%	69.6%	76.8%	80.8%
ITU	2.3%	3.7%	6.6%	10.5%	41.0%	61.0%	75.0%	85.0%

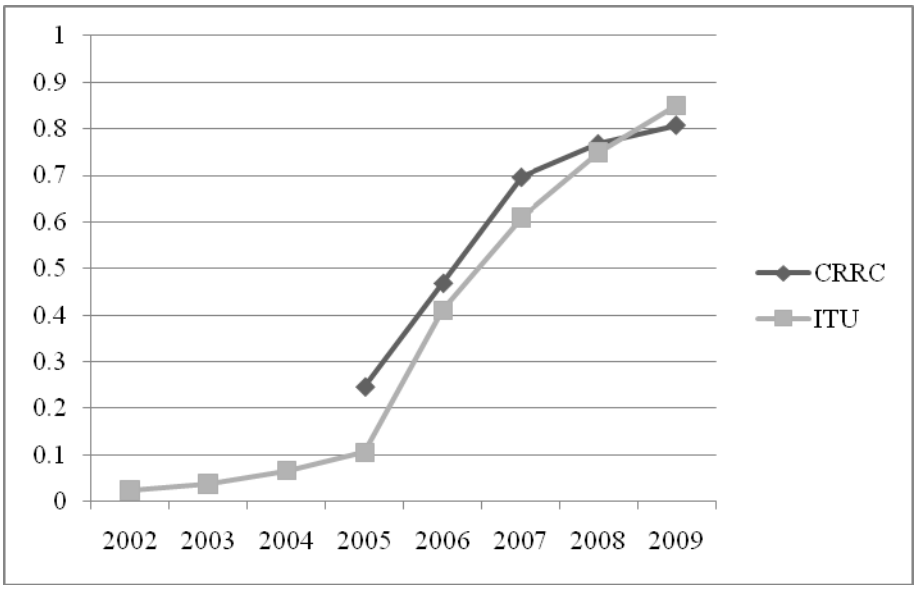

Figure 1. Adoption Rates for Mobile Phones

As mobile phone service prices dropped, the availability of handsets increased. Simple and affordable Nokia phones with monochrome screens and basic functions of voice and SMS were common in the early years of Armenian mobile phone use. Between 2006 and the present, however, multimedia phones became much more common globally and in Armenia.

One of the primary features of multimedia phones is the ability to process digital audio, photo, and video files. Koskinen (2007) calls these devices mobile multimedia and in his ethnographic study he defines these as "a set of technologies that enable people to capture, send, and receive photographs, sounds, and sometimes video. These devices are small . . . [and] perpetually available" (p. 3).

Multimedia phones must be distinguished from "smart" phones that feature fast data connections. While all smart phones are multimedia phones, not all multimedia phones are "smart." Eighty percent of global phones are multimedia (i.e., have at least a color screen, camera, Web browsing and multimedia

messaging capabilities) (Universal McCann, 2009), but only 7% of all mobile phones shipped in 2008 were "smart" (Abramsky & Treiber, 2008).

The inherent portability of mobile devices creates a noteworthy difference in how individuals appropriate, (i.e., adopt and use) these technologies into their lives. As Slayden Mitchell, O'Hara, and Vorbau (2010) found, mobile multimedia is used in a large variety of places.

How Does Sharing Take Place?

Digital content can be stored on a mobile phone but must first be transferred via a direct USB or Bluetooth connection with a personal computer, an SD card, a download from a service provider or independent company (commonly advertised as sending an SMS to a number and receiving a digital file in return for a fee), or, as will be discussed in this study, shared by a peer either through a Bluetooth wireless connection or via a multimedia messaging service (MMS). Bluetooth is a short-range wireless signaling device built into many mobile devices (as well as other devices, such as personal computers and headphones). A device can scan for other Bluetooth-enabled devices within a 10-meter radius and send files to those devices. MMS is a standard for sharing multimedia digital files between mobile devices. It is similar to SMS (short messaging service), a standard for sending 160 characters of text between mobile devices. While nearly all mobile devices are capable of SMS, MMS is a relatively new feature. Globally, 34% of mobile users send at least one MMS message a week (Universal McCann, 2009).

Digital Content Media Types

Multimedia files can be images, audio, or video. Goh, Ang, Chua, and Lee (2009) conducted a study of mobile media sharing and found that the overwhelming majority of media-sharing content consisted of images (98.76%) while only 1.07% was video. Images were the preferred media type, as participants noted limited storage capacities, longer transmission time, and higher fees for transmission of other types.

Digital Content Types

The type of content shared varies. For example, in one study, 15% of media shared was associated with people (personal photographs, etc.), 14% represented places, 14% were events, 13% were objects, 11% was architecture and the remainder were other (Goh et al., 2009).

Convergence

This exemplifies "device convergence," meaning that "many kinds of extant devices and terminals used for various means are incorporated into a new, converged device that enables consumers to use the converged services and connect to the converged network" (Kim, Lee, & Koh, 2005, p. 818). Device convergence can also mean that mobile devices go beyond phones and are used essentially as mobile computers (Ojanpera, 2006). The common element to these definitions is the sense of integration of multiple sources of digitized content across devices and into single devices with multiple functions.

Examples of such devices include multifunction mobile phones, smart phones, Internet-enabled PDAs, and MP3 players such as iPods. Moreover, while most studies of device convergence have focused on the developed world, the Armenian example demonstrates that device convergence is occurring in the developing world as well.

Jenkins (2006) further describes convergence as "a word that describes technological, industrial, cultural, and social changes in the ways media circulates" (p. 282). Jenkins argues that this cultural shift of consumers seeking out new information and making connections, occurs in the brains of the users through social interactions, and is not purely a technological process bringing together multiple media functions within the same device. It is these social changes in the way media circulate that is the second way that the Armenian example exemplifies convergence. To paraphrase Geerts (2010), both multimedia content and mobile devices are known for the social practices they enable. The two converged together may have even more of a social impact.

Due to the low penetration of personal computers and the Internet in Armenia, device convergence may have different uses and social outcomes that need to be studied more extensively.

Given this background, I was interested in learning how individuals in the Republic of Armenia were using converged devices to socially share digital multimedia content, what that content was, and who was doing the sharing.

RQ1: How are Armenians sharing multimedia content via mobile phones?
RQ2: Who is sharing multimedia content?
RQ3: What types of content are being shared by Armenians?

Method

Interviews

Semi-structured interviews with Armenian citizens (n = 25: 15 female and 10 male, ages 16–40) were conducted through the spring and summer of 2008. Participants were recruited using a snowball sampling technique. I first approached individuals in public cafes and parks and, second, I used research assistants to recruit participants from the university cafeteria. Interviews were conducted in the Armenian language except for five interviews in which the participants' English language skills were at a near-fluent level and the individual preferred to speak in English. All were digitally recorded. I worked directly from the Armenian audio files and did not translate them. The English language audio files were transcribed with a transcription program.

Ethnographic Observations

The ethnographic observations were conducted formally in the spring and summer of 2008 with typed and audio recordings of field notes and photographs, and had been ongoing informally since 1998

during my time as a student and professional in the region, staying for a few months every few years. The observational data is used to provide explanatory background to the interview work and to add context.

Results

How Is Content Shared?

In some parts of the world, SMS and MMS messages are more affordable than voice calls on a mobile device. This is the case in Armenia, where MMS messages are 50 dram per message and SMS messages are 20 dram per message on both mobile phone companies serving Armenia, Vivacell (www.vivacell.am) and Beeline (www.beeline.am). (All prices are as of April 2008, during which time the exchange rate hovered around 310 dram = US$1 and 490 dram = €1; Central Bank of Armenia, 2008). Bluetooth file exchange does not cost a user per message as MMS file exchange does. The implication of this in developing countries is particularly significant, as Maunder, Marsden, and Harper (2007) argue, where users can afford handsets but not necessarily airtime. Bluetooth sharing with personal area networks would allow users to access relevant information in public places without incurring network charges.

Who Is Sharing?

Within the Republic of Armenia, consumption and exchange of digital content is quite common: "Everybody's sharing—from young to old," according to one informant, who added, "I've watched two serious government officials in fancy suits share ringtones at a conference." The commonality of this practice does not seem to be exclusive to Armenia, as Donner and Gitau's (2009) discussion of South African mobile phone users found that peer-to-peer content sharing is common even in poor neighborhoods. They argued that this experience with Bluetooth multimedia file sharing is a way for inexperienced users to gain experience with communication technology and thus enhance their ability to use more complicated mobile Internet applications.

It is not only individuals in the developing world using their phones as file-sharing devices, however. Svoen (2007) found that Norwegian youths use their mobile phones for content sharing and storing of images, videos, music, and ringtones. Similarly, British children use their mobile phones to trade songs and games (Haddon & Vincent, 2009). This sort of sharing also takes place in Singapore among university students (Goh et al., 2009).

What Type of Content Is Shared?

Two primary content areas emerged from the interviews and observations. And thus this study will focus on these two primary areas of peer-to-peer content sharing in Armenia—specifically, entertainment and political information. Entertainment content is commonly accessed on all media. Political information is newsworthy content, although it is not necessarily mainstream news. Certainly these categories are not static.

Entertainment

A primary reason Armenians are purchasing these feature-rich devices is to share files for entertainment purposes. All interview participants cited entertainment as a primary content type, as well as the first content type that they were exposed to. For example, a 23-year-old female participant said that ". . . You must buy a phone that is capable of viewing fun clips. After seeing humorous clips on my brother's phone, I wanted one myself." And one 19-year-old male participant noted: "Pretty much every clip on my phone is something fun." Similarly, a 30-year-old male participant said that ". . . everyone uses their phones for entertaining clips." These statements are quite representative of all of the interviews.

A story illustrates this use. A few days after I arrived in Armenia for a data-collection trip in 2008, I contacted my first Armenian language instructor, as is my custom, and he always asks me to come to his home for a large dinner (though family dinners in Armenia are almost always large). I have known him and his family for more than a decade. I have always been close with his now-teenaged nieces and nephews, but had not seen any of them for two years. On this particular evening, one of the nephews was enjoying his last night at home before returning to his army post after a week's leave. I have enjoyed dinner with this family countless times and, as usual, there were various family and friends present, multiple toasts, strong encouragement to eat more, and many simultaneous conversations.

However, something was different at dinner this time: the presence of mobile phones. Everyone had a mobile phone, but the teenagers were particularly enamored with these devices. While they did speak on them and use SMS, their more frequent activity was file sharing. These young people were primarily drawn to entertainment clips. Every few minutes, one of the teenagers would receive a photo, a video, or an audio clip from a friend via SMS or MMS. Then the recipient would use his or her Bluetooth device to share the clip with siblings and cousins who then would send the clip to their friends via SMS or MMS. After asking to look at their mobile phone logs, I saw that during the course of a five-hour dinner, each of the teenagers had received between 20 and 70 clips. What is particularly interesting about this group of teenagers is that they were lower middle class. They had never used the Internet and only a few had ever used a computer at school.

I also observed many other young people sharing entertainment clips at the university, during classes, and at cafes. Music audio and video clips were quite popular, as were slapstick comedy, clips from comedy television shows, and clips featuring animals. One informant said of sharers: "Many also share sensational stuff, like the female singer Shprot making [a] fool of herself while very drunk, or Ex-President [Robert] Kocharian blurting something about being Albanian." Although the young men did not discuss this with me, when observing them browsing for a particular clip to share, it appeared that erotic and pornographic images and videos were not uncommon. It seemed that the content shared by these young people for entertainment purposes was not unlike what young people in a more personal computer-oriented society would view on YouTube.

Political Information

Later in the first week of data collection I was working at one of two free wireless Internet cafes in the capital city of Yerevan. Not only was it near my apartment, but it also had great, affordable food, an espresso machine, and air conditioning (the latter heaven in the Armenian heat). As a new and frequent customer sitting for hours at a time, and being an Armenian speaker, I quickly befriended the waitstaff. One waitress in particular, a 24-year-old woman from a rural area who had been sent to Yerevan to earn money for her family, was quite interested in learning about computers. She acknowledged that her lack of computer skills was prohibiting her from obtaining better-paying work, but that formal classes were too expensive and did not coordinate well with her long hours at the cafe. I worked with her to show her the basics of Windows and Microsoft Word, and we moved into browsing the Internet. Like many Armenian Internet users, she saw the benefits of e-mail and chat for interpersonal communication, but did not understand the value of information seeking. This was reasonable, as there was not much Armenian language content available. (It is difficult to determine how much Armenian language content is available. The .am domain is commonly used by American AM radio stations and the .com domain is frequently used to host sites in the Armenian language. However, top.am, an Armenian Web site-ranking site, has 1,347 sites in its catalog as of June 2009.) Also, the difficulty of sorting through it all can seem daunting to a new user. We discussed how the Internet could be used as an alternative news source. This topic came up because less than a month earlier, an attempted coup had taken place in Armenia, during which the outcome of the presidential election was contested. It was difficult to find uncensored news, as the government declared an information state-of-emergency that required only official sources to be cited for any national political story. It was then that my waitress friend told me that she was able to see "the truth" through video clips of police brutality via MMS. She took out her phone and showed me dozens of clips I had never seen before. Although some clips of police brutality had reached YouTube and I had seen them from the United States, upload speeds were so poor in Armenia that the clips reaching YouTube were often uploaded by Armenians who had left the country with the clips on their mobile phones. She and many others told me that "everyone" saw these clips.

In later discussions with friends involved in the opposition movement and actively protesting the outcome of the presidential election, it seems that broadcasting politically charged clips via Bluetooth was very common at rallies and protests. One informant said of this phenomenon: "[The] opposition was quick to grasp its [Bluetooth's] significance and they had opposition campaign ringtones [and] photos circulated." During the pre-election campaign season, mobile phone videos became common for all candidates. "I remember seeing some dark propaganda videos about various candidates . . . but the videos were mainly 'not official' and unprofessional." Another informant explained: "At a later stage, mobile phones were used to share videos of clashes in Yerevan's streets between the security forces and pro-opposition protesters."

One activist told me that she liked using Bluetooth because you could "blast" videos to everyone quickly and anonymously. The Associated Press reported in June 2009 that Iranians were also sharing videos via Bluetooth (Weissenstein & Johnson, 2009). The power of mobile video is a lesson learned by the Armenian opposition movement, which has continued to use mobile video since May 2009, with banned opposition television station A1Plus sending MMS subscription-based news video clips twice a day

(A1Plus, 2009). In October 2009, another politically oriented clip quickly diffused amongst Armenians, showing privately owned lions attacking a donkey. Armenian language discussion was heard in the background. Many Armenians believe that the only privately owned lions in the country belong to a particular oligarch. The clip shared was entitled with this oligarch's name. As of yet, Armenian national television has not shown this clip. In 2010, more videos depicting events emerged. In September 2010, a video showing abuse of two army conscripts was distributed. In October 2010, an interview given by the sister of a young woman who was beaten to death by her husband and mother-in-law brought about greater public awareness of the case. Also in October 2010, a video of a secondary school teacher physically and verbally abusing a student was filmed on a mobile phone by a classmate and distributed quickly.

Discussion

Utility of Peer-to-Peer File Sharing on Mobile Devices

With the *how*, *who* and *what* questions of mobile peer-to-peer file sharing addressed, the question of *why* remains. The absence of other ICTs (personal computer and the Internet in particular) which traditionally have led the way for digitalized content consumption and sharing, and the arrival of multimedia phones in Armenia with which to access digitized media, have created a situation in which device convergence enables media convergence. Armenians find new ways to seek out and use information through social sharing.

Further, Armenian cultural norms and social structures may influence this convergence. It is possible that there is something unique about Armenians and their social sharing of digital content.

First, the social harmonious nature of Armenian society may influence social sharing. Certainly, Armenians are a highly social, harmony-oriented culture. (If this is a traditional value compounded by socialism or is a value born from socialism is an interesting question to be discussed elsewhere.) Pearce (in progress) found that Armenians highly value "family security," "true friendship," and "honoring of parents and elders," but did not highly value "social power," "being daring," or "being . . . influential." Similarly, the World Values Survey (1997) reported that 86.3% of Armenians rated family as very important, while 12.1% reported it as rather important; 44.7% rated friends as very important, while 46.6% rated friends as rather important. How such social harmony-oriented values influence social sharing is a topic worthy of exploration. It is possible that in such an environment, socially sharing content is of greater importance than it would be in a culture in which social harmony is not as valued.

Second, Armenian social structures related to social capital and social maintenance are relevant to understanding social sharing. Social capital is the individual and social resources developed and made accessible through relationships and interpersonal trust among individuals in a social network (Putnam, 2000). Additionally, with Armenia's Soviet past, social capital is a salient concept. The Russian term "*blat,"* a "distinctive Russian form of social capital" (Marsh, 2000, p. 187) (although this could be expanded to be a distinctive *Soviet* form of social capital), was used within dense personal networks to secure resources (Busse, 2001; Howard, 2003; Ledeneva, 1998). It is possible that social capital or "*blat*" is even more

relevant in post-Soviet societies than in more resource-rich societies. The ways in which social capital manifests itself within a socially harmonious society is also an interesting topic to be discussed elsewhere.

The dynamics of social capital and technology make up a common area of study. While Putnam drew no conclusions about the relationship between information technologies such as the Internet and social capital, Katz, Rice, and Aspden (2001) found that computer-mediated interactions benefit from social dimensions and that mobile phones were used for reinforcing social ties (Christensen, 2009; Oksman & Turtianen, 2004) and increasing social capital (Goodman, 2005), although there is mixed support for the value of SMS in maintaining ties (Kim, Kim, Park, & Rice, 2006). In terms of digital content sharing, Slayden Mitchell, O'Hara, and Vorbau (2010) found that content shared via mobile devices is seen as social currency.

In terms of social maintenance, some researchers argue that people can maintain a sense of interconnectedness through mobile phones, even if the network members are geographically dispersed (e.g., Campbell & Kelley, 2006; Katz & Rice, 2002; Licoppe, 2003; 2004; Ling & Yttri, 2002; Rice & Hagen, 2010). Within mobile multimedia explicitly, Scifo (2005) views content sharing as a small group activity that takes place in a network of strong relationships for sentimental purposes. In one study (Goh et al., 2009), it was found that the primary motivation for mobile media sharing was social maintenance (52.8%), followed by the reminder of individual and collective experiences (41.6%), self-expression (including environmental issues, social complaints, and news reporting) (21.1%), and task performance (reminders, replacement for note-taking) (22.93%). This mobile media sharing took place primarily with friends (30%), acquaintances (28%), family (24%), and colleagues (18%).

Convergence is inherently social. In addition, with greater device convergence comes greater opportunities for social maintenance and social capital generating.

Conclusion

Armenia provides an interesting site to explore convergence through peer-to-peer file sharing due to the mobile phone's dominance of the ICT landscape and lack of digital content and information from other ICT sources. Also, while entertainment is not a surprising type of content, Armenia's challenging political situation and the need for alternative information sources has created an interesting use of mobile multimedia through peer-to-peer file sharing that, as discussed above, may also be used in other heated political situations such as Iran. Perhaps, as Donner and Gitau (2009) explain about Bluetooth peer-to-peer file sharing as "training" for other mobile applications, the experiences that Armenian citizens have had with peer-to-peer entertainment sharing prepared them for political information content. Since it appears that "everyone" is sharing content in this manner, perhaps "everyone" has the opportunity to be exposed to a wider variety of political information as well. While it remains to be seen if motivations for the use of entertainment content have any relationship to motivations for the use of political information content, the skill involved in receiving, viewing and sharing the content and the political contexts for sharing otherwise censored information are there.

Further, more study of the motivations and social implications of peer-to-peer file sharing via mobile devices will be an important contribution to the study of both smart phones and the adaptation of devices. Many scholars (e.g., Gergen, 2008; Hermanns, 2008; Rheingold, 2002; Shirky, 2008; Suarez, 2005) have claimed that mobile devices can serve to increase political power. This is particularly true in the case of "smart mobs" and, more recently, the Moldovan "Twitter Revolution" (see Mungiu-Pippidi & Munteanu, 2009 for review), as well as the Iranian elections in June 2009 where Twitter and other mobile services were discussed in the popular press as having played a key political role (see Morozov, 2009, for review), and the ongoing Egyptian protests (Newbert, 2011). Mobile devices and services are indeed changing the political landscape. Certainly mobile devices are a strategically important area of innovation, change, and reinvention of older existing media (Goggin & Hjorth, 2009), and places like Armenia where creative reinvention is occurring are important in the study of "mobile-only" digital content viewing and convergence.

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