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Working Paper Series



**Information
Communication
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ICT for Development Working Paper Series

Spearheading ICT4D Knowledge

Volume 2

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Groups at Risk of Digital Inclusion

Welcome to the second issue of the Working Paper Series on ICTs for Development!

For this issue, the editors have put together six articles that dwell on the concept of digital inclusion; zeroing on societal groups at risk of being excluded from using Information and Communication Technologies (ICTs) to better their lives. In the first paper "Digital Inclusion: Constructions of ICT Award Giving Bodies," the author (Jude William Genilo) provides the conceptual crux of digital inclusion. It traces the evolution of the term "Digital Divide" – from its original physical accessibility and connectivity perspective to the skill-based and literacy models. Afterwards, it follows the shift in paradigm from digital information equality towards digital inclusion/exclusion. It then investigates how ICT award giving bodies construct digital inclusion and participation as evidenced by the winning innovations and projects.

The next two papers describe the groups at risk of being excluded from the benefits of digital technology. Khan and Whalley, in their article "How Connected are Pakistanis?," explores broadband Internet adoption and user profiles in the cities of Karachi, Lahore and Quetta. The data shows that groups at risks include the youth, women, low education groups and low income groups. Safitri and Zanuddin, in their piece "Internet Dependency among the Youth in Indonesia," surveys 431 high school students in East Java. They find that the youth are slowly adopting the Internet and that they primarily rely on it to get news, entertainment, communication and researching for particular information.

Investigations on ICT adoption among the Indonesian youth are furthered in the next two papers. Putri, in her contribution "Youth, Digital Media and their Roles in Social Changes," focuses on the youth's adoption of digital tools such as still cameras, video camera, web blogging, social networking sites and youtube. She posits that the youth in Indonesia have an important role in bringing about positive social change as shown in different events of the country's history. Hence, the youth can utilize ICTs to become agents of change in the country. Widiastuti and Putri, in their paper "Twitter and Teenager Self-Disclosure," pay particular attention to the use of the social networking site Twitter among the Indonesian youth. They want to know how the youth express themselves over this platform for the purpose of self-disclosure.

In the last article, "Illegal VoIP: How to Detect and Counter," Adnan, Islam and Nizam tackle a grave problem in Bangladesh, i.e., illegal Voice over Internet Protocol (VoIP). The government loses a lot of revenue from such activities and are countering these through various measures – issuing licenses for VoIP, revising telecommunications policy and regulating the sale of Subscriber Identity Module (SIM) cards. The authors use Data Mining techniques to discover valuable knowledge about call pattern of SIMs used in illegal VoIP

and then find SIMs suspected for taking part in illegal VoIP calls (from all active SIMs) using the knowledge discovered. In this manner, these SIMs can be easily barred from taking part in illegal VoIP.

From these articles, we hope for a better understanding of the digital world – especially on why ICT adoption is not equal among various groups in society. With this understanding, governments and private organizations can think of ways to make digital technology more inclusive – not only looking at access and connectivity, skills and literacy, societal patterns such as gender, age, income, ethnicity, etc. but also mindful of the quality of use as well.

On behalf of the entire editorial board,

A handwritten signature in black ink, appearing to read "Jude Genilo". The signature is written in a cursive, flowing style.

Prof. Jude William Genilo

Editor

Digital Inclusion: Constructions of ICT Award Giving Bodies

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Abstract

The paper discusses the jurors' constructions of the term "digital inclusion" in Bangladesh's National Digital Innovation Awards. It then compares these constructions with concepts surrounding the digital divide in academic literature – from its original definition to the shift towards multiple digital divides; the movement to incorporate digital or information inequality; and the swing towards digital inclusion (to include avoiding exclusion and making meaningful use of ICTs). It proceeds with benchmarking these constructions with those in other award giving bodies such as the Manthan Award, m-Billionth Award, Asia Pacific ICT Award, World Summit Award and World Summit Award Mobile. Findings reveal that ICT award giving bodies generally follow academic literature on the digital divide and digital inclusion. However, awards have also been given to innovations benefiting groups that are not at risk of being digitally excluded such as large corporations and government organisations.

Keywords

Digital Inclusion, ICT, Awards, South Asia.

Introduction

My interest in digital inclusion stems from my role as a juror in the National Digital Innovation Award in Bangladesh for the past two years – 2010 and 2011. The annual contest, jointly organised by the Ministry of Science and ICT (MOSICT) and the ICT4D Social Enterprise D.Net, recognises the most innovative e-content and ICT (Information and Communication Technology) application in the country. Winners of this award are eligible for final selection at the World Summit Awards (WSA) and WSA Mobile, which was initiated by Austria in 2003 within the framework of the UN World Summit on Information Society. WSA supports the UN Millennium Development Goals and the UN Agenda for the development of the information society.

To ensure the award's integrity, the jurors (leading experts in various fields of knowledge

and enterprise) in both years followed the WSA standard three-round selection process. In the first round, submitted nominations were screened for completeness. The following round, each submission was evaluated and scored by at least two jury board members. Based on this, submissions were short-listed for final selection. The jurors discussed and chose among the said nominations in the third round. There were 14 categories for the awards (e platform only) in 2010 and in the following year, the m (mobile) platform was added. Hence, the process took a long time to accomplish – two full days extending into the night.

It is not my intention in this paper to discuss all categories in the two platforms. I only aspire to delve on the e/m-inclusion (also known as digital inclusion) and participation category given a couple of observations I had during a field visit to a rural knowledge centre in Mirsarai, Chittagong back in 2009. The first observation: although local youth had access to Internet and training on computer usage, they were unable to understand the most common language in the medium – English. The second, the persons who utilised the services of the knowledge centre – computer training, printing, government forms downloading and document lamination – were overwhelmingly male.

Hence, when I was evaluating submissions for the e/m-inclusion and participation category, I thought about the rural folk of Mirsarai who in spite of having access to computers and the Internet still experienced some sort of marginalisation given their gender and/or poor English comprehension. What other groups in Bangladeshi society get excluded from using this potentially powerful medium in improving their lives and participating in development efforts? What e/m-innovations and applications have been developed to help overcome such exclusions? These questions were running through my mind during those times.

To guide the jurors in their deliberations, the organisers provided a general description of the e/m-inclusion and participation category. We were basically looking for:

Innovative measures supporting integration of the global information society; bringing least developed countries into the knowledge society; reducing digital divides between technology-empowered and technology-excluded communities and groups such as rural areas and women; bridging society and strengthening social and political participation of individuals and groups through ICTs. (E-Content and ICT for Development Award, 2010: 77)

The winners and finalists in the e-inclusion and participation category of the National Digital Innovation Awards for Bangladesh in 2010 and 2011 are presented in Matrix 1 and 2. From looking at the matrices, one immediately notices marked differences in the construction of digital inclusion between the time periods. In 2010, the champion and finalists were from academic institutions and non-government organisations. Also, the initiatives focused on

avoiding exclusions of certain societal sectors (print disabled, farmers, rural villages and small entrepreneurs). At the same time, jurors recognised projects that allowed these groups to make meaningful use of ICTs such as managing a village web portal and using agricultural data as guide in making economic decisions. The jurors felt that if not for the said projects, these marginalised groups would have been unable to benefit from the advantages offered by ICTs.

In 2011, the champions and finalists were from government organisations, especially local units offering basic services such as transportation, food and health. The jurors believed that these initiatives fostered social inclusion given that the lives of many marginalised groups would improve through the use of ICTs. These projects enhanced government efficiency and responsiveness in the delivery of social services. Without these innovations, these sectors would have been excluded from receiving such assistance.

Matrix 1

Champion and Finalists in the e-Inclusion and Participation Category of the National Digital Innovation Award for Year 2010

INITIATIVE/OWNER	DESCRIPTION
DAISY FOR ALL/ Young Power in Social Action (Champion)	The initiative seeks to serve an estimated 56 million Bangladeshis who are considered print disabled due to visual, perceptual or physical disability. With a DAISY software, a book text can be displayed on screen and its font size and colour may be adjusted or a voice recording of the text may be played. The book can also be printed in Braille format.
GramWeb/ Grameen Communications and Kyushu University (Finalist)	Gramweb is a web-based platform to provide a point of information storage and sharing for 85,000 villages of Bangladesh. This One Village One Portal (OVOP) movement envisions that each village will have its own website maintained by an individual or group of villagers.
AMIS/ Daffodil International University (Finalist)	The Agricultural Management Information System (AMIS) provides farmers with daily information relating to wholesale prices of agricultural products. This way, they can get better prices for their produce from middlemen. The system is currently functioning in one district in the country.
e-Talk/ Newsnet Information (Finalist)	e-Talk is a web-based electronic forum where people can discuss livelihood-related issues. A moderator facilitates the discussions, which form basis of a booklet to be published and widely distributed.

Source: E-Content and ICT for Development Award (2010).

Matrix 2

Champion and Finalists in the e-Inclusion and Participation Category of the National Digital Innovation Award for Year 2011

INITIATIVE/OWNER	DESCRIPTION
RHD Central Management System/ Roads and Highways Department Ministry of Communication (Champion)	In July 2003, the Roads and Highways Department launched a website containing technical and managerial issues relating to roads and bridges, financial project information, design standards for roads and bridges, etc. RHD's division offices use this central management system to hold tenders and publish contract information to include payment certificates, vouchers and cheque book records. It also shows both physical and financial progress of RHD works.
Public Food Distribution System (PFDS) Owner Directorate General of Food (Runner-up)	PFDS operates a common Virtual Private Network (VPN) for government officials at various levels to monitor the inflow and outflow of food stocks (donor food aid, public imports and domestically procured grains). Such information is needed to make critical operational decisions in the areas of food grain stock management, shipping and disposal of imported wheat, efficient food grain movement and private sector food grain marketing.
Office Attendance Monitoring System/ Management Information System (MIS), Directorate General of Health Services (Runner up)	Absenteeism of staff in health stations is a serious problem in Bangladesh. To overcome this challenge, Ministry of Health & Family Welfare implemented the 'Office Attendance Monitoring System' from November 2010. The system uses combination of telephone based monitoring; surveillance by web camera; web based attendance monitoring and remote biometric time attendance system for attendance monitoring. A Monitoring Cell at MIS office randomly calls the health centres for checking staff's, particularly doctors' attendance.

Source: National Digital Innovation Award (2011).

It should be noted that although there were entries for the m-inclusion and participation category in 2011, the jurors felt that these were not up to the mark. Hence, there were no winners or finalists.

Comparing the results, I ponder about the marked difference in the way jurors defined e/m-inclusion or digital inclusion. In 2010, it was centred on bridging the digital divide between societal sectors but in 2011, it was about using ICTs to expand the recipients of government services to include traditionally excluded clusters. Of course, in the two years, the ICT initiatives submitted for judging were not the same and the jury panel (many were retained but a few were added and/or removed) had changed. Nevertheless, I found the jurors' constructions of digital inclusion interesting albeit badly wanting some sort of benchmarking.

In this context, this paper documents the debates and definitions surrounding digital inclusion in academic circles and international government bodies. It begins with the origins of the digital divide concept, followed by the move from a digital divide to many digital divides. It proceeds with a discussion of digital inequality and digital inclusion/exclusion. It then compares such discussions with the constructions of digital inclusion in ICT award giving bodies in South Asia and beyond. Concretely, it parallels the winners and finalists of Bangladesh's National Digital Innovation Awards e/m-inclusion and participation category

with the Manthan Award (which covers South Asia for the e-platform), m-Billionth Award (which covers South Asia for the m-platform), WSA (which covers the entire globe for the e-platform), WSA Mobile (which covers the entire global for the m-platform) and Asia Pacific ICT Awards or APICTA (which covers Asia Pacific region).

Origins of the Digital Divide Concept. In the late 1980s, development workers and communicators started looking into the promise of ICTs in bringing about rural development (Genilo 2004: 19). Given their interactive nature, ICTs were viewed as agents of change, which enabled marginalised sectors to proactively seek information on health, education, agriculture, environment and others. More importantly, ICTs brought about the opportunity for disadvantaged groups to make their voices heard; thus, realising a bottom-up approach in development. Keniston (2003: 2) states “the digital age inspired optimistic hopes and fantasies. It is said that it has brought or will soon bring transparency in government, rationality of markets, universal access to information . . . blessings of democracy and prosperity.” All these would happen since ICTs were believed to enhance equality of access to information (DiMaggio and Hargittai 2001: 1).

By the late 1990s, surveys indicated massive differences between access to ICTs in economically developed countries – differences between the rich and poor, whites and non-white, educated and the non-educated (Keniston 2003: 2). In the US and the Netherlands, growing divides were apparent among different categories of income, employment, education, age and ethnicity (Van Dijk and Hackerb 2003: 315). In low-income countries, statistics were likewise grim given the lack of necessary infrastructure such as electricity and telecommunications to allow access to ICTs. Many development scholars began to fear that ICTs are bypassing low-income countries (Parsons and Hick 2008: 1). For this reason, many of them doubted the potential of ICTs to bring about societal change (Genilo 2004: 21).

In light of these concerns, the original “digital divide” terminology attached great importance to the physical availability of computers and connectivity. Warschauer (2002: 5-7) explains that at first, the most common model was based on ownership or availability of a device (computer). Later, the conduit model became more popular as the computer needs connection to a supply line on a regular basis. People, even if they own computers, may fail to have access to the Internet due to absence of the infrastructure or may find the cost of regular monthly fees prohibitive.

Another factor affecting the digital divide is literacy. English is the language that dominates digitised information. Without the ability to read or write in English, people would be unable to access most of the information provided by ICTs. Due to this, Warschauer (2002: 8) argues that a better model of access to ICT is provided by the concept of literacy, which may be defined in the broader sense as having “the mastery over the processes by means of which culturally significant information is coded.” Literacy requires cognitive processing skills, background knowledge about the world, and the motivation, desire and confidence to read.

From Digital Divide to Digital Divides. One big problem scholars had about the original digital divide concept was its insistence on a bipolar societal split – dividing the world into the haves and the have-nots due to the lack of computer accessibility, Internet connectivity, computer literacy and/or English/ language ability. Parsons and Hick (2008: 2) demonstrate such implication by defining “the digital divide as the gap between persons who have access to ICT and the tools to use it effectively and those who do not. This digital disparity creates the information rich (information haves) and the information poor (information have-nots).”

These “information haves” have greater privileges and opportunities as compared to their “have-nots” counterpart. Parsons and Hick (2008: 5) underscore that the lack of Internet services increasingly threatens the chances of many people to find good jobs and participate in the affairs of the broader society. Such theorising is reminiscent of the knowledge gap research conducted in the US in the 1970s. Husing and Selhofer (2002: 1274) explain the research findings: “intensive users of media services would continuously increase their information advantage by making optimal use of the information offered through media compared to those who do not use this offer.” Hence, scholars like Di Maggio and Hargittai (2001: 1) contend that ICTs – instead of bridging – may exacerbate social inequality given that the knowledge gap never closes. Parsons and Hick (2008: 2) assert that the existing ICT infrastructure prevents an equal flow of communication between people and social structures. With this, they speculate that the knowledge gap already is ten times the income gap.

Nevertheless, scholars did not agree with the notion of a binary divide between the haves and the have-nots. Verdegem (2011: 29) criticises this approach as technological deterministic, weak in empirical foundation and overly assumes an evolutionary progress. Describing it as inaccurate, Warschauer (2002: 6) also calls it patronising as it fails to value the social resources that diverse groups bring to the table. Mancinelli (2007: 7) proposes instead the concept of multiple divides, which relate to a variety of factors affecting lack of access to and inadequate use of ICTs such as gender, age, ethnic clustering, uncertainty of living/financial conditions, work insecurity and social insecurity. For her, “it is basically about social access to digital technologies. It considers social relations around the uses of ICTs.”

For these scholars, a digital divide framework is a poor roadmap as it puts emphasis on the physical presence of computers and connectivity. The digital or multiple divides framework, on the other hand, incorporates other considerations such as how people utilise ICTs for meaningful ends. What is more important than availability is people’s ability to make use of that device in ways that improve the quality of their lives (Warschauer 2002: 8). In light of this on-going debate, a number of scholars made endeavours to summarise the shifts in conceptualising the digital divide or divides. Keniston (2003) speaks of four digital divides while Mancinelli (2007) illustrates the changing types of digital divide as people adopt ICTs. Matrix 3 encapsulates Keniston’s ideas.

Matrix 3

Summary of the Four Digital Divides

NUMBER	DESCRIPTION
First Divide	The digital divide between those who are rich, educated and powerful, and those who are not.
Second Divide	The digital divide that is linguistic and cultural – those who can speak English or another West European language and those who do not.
Third Divide	The digital divide associated with the growing digital gap between the rich and poor nations.
Fourth Divide	The digital divide that brings the emergence of a new elite group – the beneficiaries of the enormous successful information technology industry and other knowledge-based sectors of the economy.

Source: Keniston, Kenneth (2003). "Introduction" in: *The Four Digital Divides*, Editors: Kenneth Keniston and Deepak Kumar. Sage Publishers, Delhi.

Van Dijk (2006) made an inventory of digital divide research from 2000 to 2005. His results showed four types of access – motivational, physical, skills and usage. Likewise, he notices a shift in attention from physical access to skills and usage. With the problem of availability and connectivity, the quality of usage has come to the fore. Mancinelli (2007: 9), meanwhile, provides the main types of digital divide reflecting these trends.

Matrix 4

Main Types of Digital Divide

ADAPTATION STAGE	TYPE	TERM	DESCRIPTION
Early Adaptation	Access Divide	Early Digital Divide	Describes the difference between those with and without access
Take-off	Usage Divide	Primary Digital Divide	Describes the difference between users and non-users
Saturation	Quality of Use	Secondary Digital Divide	Describes the difference between users and users.

Source: Citing Molnar, Szilard 2003. *The Explanation Frame of the Digital Divide* in: Mancinelli, Elisa. (2007). *E-Inclusion in the Information Society*. Network for Teaching information Society (NETIS). Budapest.

When ICTs were new, the concern was on the difference between those with and those without access. Later on, when ICTs became more popular, the focus shifted towards the differences between users and non-users of the technologies. With the ICT saturation in many developed countries, the attention is now on the quality of use; investigating the difference between various users.

From Digital Divide to Digital Inequality. With this shift in emphasis, scholars began to devise measurements on how people use the Internet. Roy (2005: 125-6), for one, adopted

Peter Wilcott's (1999) parameters in valuing Internet dimensions in India to include spread, dispersion, sectoral capacity, connectivity, organisation and nature. He likewise constructed a scale of Internet usage from no use, email available, email used for official and unofficial communication, dynamic websites with e-commerce applications, and basic structural changes in institutions. Parsons and Hick (2008: 2) mention Hawkins and Oblinger's 2006 criteria of machine vintage, connectivity, online skills, autonomy and freedom of access and computer use support. They likewise describe Bradbrook and Fisher's 2004 5Cs – connectivity, capacity, content, confidence and continuity. DiMaggio and Hargittai (2001: 8) look at Internet use in terms of equipment, autonomy, skill, social support and purposes for using the technology.

Using statistics such as percentage of computer and Internet users (at home or elsewhere), Husing and Selhofer (2002: 1277) developed a Digital Divide Index or DDIX. A major finding in their study is that the European DDIX has not changed very much between 1997 and 2000. Groups at risk of digital exclusion continue to be women (for gender), 50 years and older (for age), low education (for educational status) and low income (for social class). In Australia, Notley (2009: 6) highlighted that young people are also at risk from digital exclusion due to lack of Internet access at home and in local areas, restricted and censored Internet access in school, lack of peer networks for whom online networks play an important role, and a lack of enabling learning environments which support and encourage online network use. Parsons and Hick (2008: 9) add other groups are at risk based on disability, race and culture, and shifts due to economic globalisation.

From these dimensions, it became clear that certain social groups (such as women, young people, old people, low education and low income) in society are lagging behind ICT usage, which brings about information inequality and digital exclusion. Yu (2011: 660) defines information inequality as “multifaceted disparity between individuals, communities or nations in mobilising society's information resources for the benefit of their lives and development.” Such a phenomenon has been termed in various ways – information poverty, information divide, knowledge gap, digital exclusion, social exclusion and digital divide.

From Digital Inequality to Digital Inclusion. In many European countries, there is a consensus about making ICT access a right of citizenship (irrespective of gender, age, income, education, race, ability, location and others) in the information age. For this reason, governments should take responsibility at paying attention to the link between digital inclusion/exclusion and social inclusion/ exclusion (Verdegem 2011: 30). Of the two terms, social inclusion/ exclusion is more encompassing. Notley (2009: 4) argues that social exclusion occurs when people do not or cannot participate in key activities in society. This inability of the individual or a group to fully participate is dependent on his/her/their relative position in the whole context of society. In this sense, social inclusion/exclusion manifests recurrent patterns of social relationships – which societal segments may have access to goods, services and resources; and which groups may not. The said concept first emerged

in France in the 1980s in response to the inadequacy of social protection to meet the needs of diverse populations.

Digital Inclusion or e-Inclusion, on the other hand, is particularly concerned with ICT use that supports meaningful participation in society rather than use in general (Notley 2009: 5). According to Parsons and Hick (2008: 12), digital exclusion is further marginalising already oppressed and disenfranchised individuals and communities. These inequalities “are not only being transferred into the information society, but are reinforcing social differentiation and polarisation of groups.” The consequences of this exclusion are academic failure, social isolation, increased unemployment, lower productivity and competitiveness and exclusion from social and political spheres (p. 6).

Given this, Verdegem (2011: 31) indicates that digital inclusion should consist of two dimensions. First, it should focus on policy measures that prevent disadvantaged groups to be left behind in the information society. Second, it should exploit opportunities for a better inclusion of socially disadvantaged people or groups. Based on this, Couldry (2002) and Lister (2003) focus on social exclusion in the public sphere given that online groups and communities are seen as the heart of a newly revived deliberative democracy. Contributing to this, Skuse et. al. (2007) documents 15 local community media and ICT initiatives across India, Nepal, Sri Lanka and Indonesia – showing how low income groups can use ICTs to make their voices heard and help promote positive social change.

Having discussed the shifts in academic literature from digital divide to digital divides; and from digital inequality to digital or e-inclusion, the paper turns its attention to the constructions of digital inclusion in award giving bodies. It starts with the Manthan and m-Billionth Awards; then APICTA and WSA/WSA Mobile follows. There are other ICT award giving bodies such as the Frost and Sullivan and INFOCOM ICT. These are not included given the absence of a category on digital inclusion.

Digital Inclusion in the Manthan and m-Billionth Awards. In October 2004, the Digital Empowerment Foundation launched Manthan Award to recognise the best in e-Content in India. In 2009, the awards expanded to cover Sri Lanka and in 2010, Bangladesh followed. In 2012, the awards reached in Pakistan, Nepal, Maldives, Bhutan and Afghanistan. With this, it may be understood why most of the winners in the Manthan Award from 2003-04 to 2008 hailed from India. Matrix 5 shows the winners in the e-Inclusion category by year.

Matrix 5

Manthan Award Winners e-Inclusion Category by Year

YEAR	INNOVATIONS/ORGANISATIONS	FORMAT	COUNTRY
2003-04	N-Logue/ Midas Communication Technologies and IIT Madras	Rural Service Provider	India
2005	aAQUA: Almost All Questions Answered/ Krithi Ramarithan and others	Broadband/Online	India
	Vaachak: Text to Speech Software for Indian Languages/ Prologix Software Solutions	Broadband/ Online	India
	Dissemination of Animal Health/ Rajiv Gandhi College of Veterinary and Animal Services	Broadband/ Online	India
	Save the Girl Child/ Datamation Foundation Charitable Trust	Broadband/ Online	India
	Disability India Network/ Society for Child Development	Broadband/ Online	India
2006	Biometric Tracking of Payments/ Life Line to Business (LL2B)	Medium Biometric Tracking/Offline	India
	E-ChoupalSanchalak/ ITC LTD – IBD	VSAT, Internet, kiosk, PC, Web and CD/DVD	India
	Asha – Hope for Farm Prosperity/ Government of Assam	Web and Internet	India
2007	OSCAR/ French Institute of Pondicherry	Broadband/ Online	India
	DAISY Book Reader/ Kritikal Solutions	Mobile Content	India
	Braille Literature/ Rotary Bangalore Cubbon Park	Offline	India
2008	Arpit's Wheel/ Radiophony	Offline	India
	Digital Talking Books/The DAISY Lanka Foundation	CD/DVD	Sri Lanka
2009	DAISY Forum of India/ Saksham Trust	Cross Media	India
	Employment Generation and Marketing Mission/ Department of Rural Development, Government of Andhra Pradesh	Web and Internet	India
	ICT for Teaching the Hearing Impaired/ Infolume Limited	CD/DVD, Web and Internet	Sri Lanka
2010	Affordable Indigenous Assistive Technologies for People with Disabilities/ Mindtree Foundation	Offline	India
	Financial Inclusion Network and Operations (FINO) Technology Solutions/ FINO Limited	Cross Media	India
	Ability/Villager	Cross Media	India
2011	mFoods/ Women Child Disabled and Senior Citizen Welfare Department, Government of Andhra Pradesh	Web-based Supply Chain	India
	Andhra Pradesh Smart Card Project/ Commissioner of Rural Development, Government of Andhra Pradesh	Smart Card and Biometric	India
	RangDe.Org India/RangDe	Internet and Web	India

Source: Manthan Award South Asia Website: www.manthanaward.org.

As can be gleaned from Matrix 5, the winning initiatives basically catered to groups that have been digitally excluded such as people with disabilities (9), farmers (5), low income

earners (5), women/youth (3) and illiterate people (1). Several of these initiatives involved the development of technologies to provide marginalised groups access to ICTs. The first winner “N-Logue,” in fact, is a technological innovation that enables cheap connectivity throughout India. Many of these winning technologies were along the lines of providing physical access to ICTs. Targeting differently abled people, entries included DAISY book reader, braille literature, Arpit’s wheel, digital talking books, teaching hearing impaired, text to sign language software, etc.

Some winning projects served the provision of catering information to marginalised groups. The Society for Child Development, for example, built a website containing information on laws, rights, landmark legal cases and organisational databases on people with disabilities. The Datamation Foundation Charitable Trust, on the other hand, launched an ICT campaign “Save the Girl Child” to advocate against femicide (aborting female foetuses). A number of academic and government organisations, meanwhile, provide advice through ICTs to farmers regarding seed selection, pest management, animal health, new farming techniques, etc.

A few innovations were simple expansions of existing services; reaching out (through the use of ICTs) to disadvantaged groups such as providing banking services to rural areas, ensuring the employment of out-of-school youth and bringing microcredit to more remote areas. There was also a winner that ensured the efficiency and effectiveness of a development programme. The Government of Andhra Pradesh initiated “mFoods” to ensure the timely supply of fortified nutritious food to children and women. With the help of stakeholders, its centralised system can keep track of the supply chain and schedules. Lastly, one project sought to address the problem of language. Prologix Software Solutions created a text-to-speech software for Indian and English languages that would address the digital exclusion of people who cannot read and write (as well as the visually-impaired).

In 2010, the Digital Empowerment Foundation (along with several partners) held the m-Billionth Award South Asia. It acknowledged that the mobile phones have reached the bottom of the pyramid in South Asia given their affordability and ubiquity; thus, the platform has great potential in reaching disadvantaged groups. Matrix 6 shows the winners for the m-Billionth Award South Asia m-Inclusion category.

Matrix 6

m-Billionth Award South Asia m-Inclusion Category 2010 and 2011

YEAR	INNOVATIONS	DESCRIPTION	COUNTRY
2010	Dialog Tradenet	A multi-pronged trade information platform that integrates multiple technologies including web, wireless access protocol, unstructured supplementary service data, short message service and voice to reach segments seeking to trade goods and service via mobile phones.	Sri Lanka
	Dakia	A rural empowerment mobile service where people of a region can share relevant information with members of their group by simply dialling a short code and recording a voice message.	India
	Voice of Youth	A free SMS service providing the youth to voice their opinions on contemporary issues. It combines mobile technology with the web and national radio networks to develop a mechanism to disseminate public opinion.	Nepal
	Panini Keypad	A patented multi-lingual keypad enabling a user to type regional languages of India on the keypad of his or her mobile phone.	India
	Nepal Wireless	A project bringing benefits of ICT to rural, urban and remote areas with a focus on telemedicine and education.	Nepal
2011	Nabajob.com	A start-up in Bangalore using web and mobile technology to connect employers and bottom of pyramid informal sector workers such as maids, cooks and drivers.	India
	Benefit Disbursement System	A project aimed at disbursement of benefits like wages and social security pensions to beneficiaries, allowing participation of people residing in villages.	India
	SETT Browser for Android	A free and open-source mobile web browser application for Android with the capability of rendering and displaying Sinhala/Tamil Unicode text in the web with no rendering errors at all.	Sri Lanka

Source: m-Billionth Award South Asia Website: <http://mbillionth.in/>.

As can be gleaned from Matrix 6, the winners in the m-Billionth Award m-Inclusion category centred on either avoiding social exclusion due to language illiteracy or promoting better inclusiveness through meaningful use of ICTs. Regarding the former, a Panini keypad was invented to enable users to type regional Indian languages onto a mobile phone. Another project acclaimed was the SETT browser for Android where users can render and display Sinhala/Tamil Unicode text without errors.

A number of m-initiatives sought to bring marginalised groups into mainstream commerce. Dialog Tradenet, for example, used multiple technologies to respond to market irregularities; providing the bottom of the pyramid with reliable information regarding the prices of goods and services. Similarly, Nabajob.com connected employers with informal sector workers such as maids, cooks and drivers. Nepal Wireless brought telemedicine and education as well as other applications such as e-commerce, virtual ATM service and hotel booking to remote areas. The Benefit Disbursement System allowed rural folk to participate in social security pensions.

Two winners were all about participation in the digital public sphere. The Voice of Youth encouraged the Nepalese youth to express and disseminate their opinion on contemporary issues using a free SMS service. Dakia enabled rural people to share relevant information

across India regarding a host of topics such as power cuts, weather reports, crop diseases, market prices and general welfare. The user simply needs to dial a short code and record a voice message.

Digital Inclusion in the APICTA Awards. The Asia Pacific ICT Awards (APICTA) was first held in Kuala Lumpur in 2001. It aims to increase ICT awareness and bridge the digital divide by providing networking and benchmarking opportunities to ICT innovators and entrepreneurs in 16 Asia Pacific countries – Australia, Brunei, China, Hong Kong, India, Indonesia, Korea, Macau, Malaysia, Myanmar, Pakistan, Philippines, Singapore, Sri Lanka, Thailand and Vietnam.

The APICTA has 16 categories and the e-Inclusion and e-Community category started only in 2008. The award for this category is given to ICT solutions that best supports, promotes or encourages social inclusion or community cohesion. Matrix 7 lists the winners of the said category.

Matrix 7

APICTA Award Winners e-Inclusion and e-Community Category by Year

YEAR	ORGANIZATIONS	DESCRIPTION	COUNTRY
2008	Central Provident Fund Board	The organisation revolutionised public service by providing retirement planning e-services customised according to life events of citizens.	Singapore
	Hong Kong Society for the Blind	The organisation developed a tele-digital voice library capable of delivering reading materials in audio format via telephone or Internet.	Hong Kong
2009	Senior Citizen Home Safety Association	The charitable organisation provides a 24-hour emergency relief service to elderly. It has a Personal Emergency Link Service, which has extended to mobile phones.	Hong Kong
2010	Hong Kong Society for the Aged	The organisation has established 30 service units that helps around 25,000 elderly on a daily basis.	Hong Kong
	Aerocar	It designs and manufactures automated business machines used as self-service kiosks for banks and other institutions.	Pakistan
2011	Isara Dream Bender/ Institut Teknologi Telkom	Isara is a sign language learning application that is interactive, real time and attractive through its use of motion sensor technology.	Indonesia
	Engro Foods/ Orix Leasing Engro Milk Automation Network	Engro Foods has invested heavily in milk process and collection infrastructure where it uses state-of-the-art technology.	Pakistan

Source: Asia Pacific ICT Awards Website: www.apicta.org.

As can be gleaned in Matrix 7, most of winning initiatives targeted socially excluded groups such as senior citizens and people with disabilities. Some entries used ICTs to address retirement planning (Singapore), relief services (Hong Kong) and care services for the elderly (Hong Kong). Other innovations developed applications to help differently abled people such as a digital voice library in Hong Kong and a sign language learning application using motion sensor technology in Indonesia.

Aside from these, there were two winning projects that did not relate directly to socially excluded groups. Instead, two Pakistani business firms that successfully automated their operations got the prize. Engro Foods, for one, invested heavily in ICT to improve its milk collection infrastructure. Aerocar built better automated business machines for use as self-service kiosks for banks and other institutions. The jurors argue that both deserve the award since their efforts resulted in enhanced social cohesion in their respective communities.

Digital Inclusion in the World Summit Award and World Summit Award Mobile.

Initiated in Austria in 2003, the WSA has grown to become the world's best e-Content and most innovative ICT award. Held every two years, the award seeks to encourage creative ICT use and make the information society more inclusive. The entries eligible for WSA are those that have won national contests and pre-selections such as Bangladesh's National Digital Innovation Award and the Manthan Award South Asia.

The WSA has eight categories; one of them being the e-Inclusion and Participation. Matrix 8 provides the winners of the category from 2003 to 2009 while Matrix 9 describes the awardees for the same category in 2011.

Matrix 8

World Summit Award Winners e-inclusion and Participation Category by Year (2003 to 2009)

YEAR	INNOVATION/ORGANIZATION	COUNTRY
2003	Big hART/ Dept. of Communications, Information Technology and the Arts	Australia
	Time to Market/ MANOBI	Senegal
	WOUGNET Website/ Women of Uganda Network	Uganda
	n-Logue Centers/ n-Logue Communications	India
	Infocentros/ Asociacion Infocentros	El Salvador
2005	Ajb'atz' Enlace Quiche	Guatemala
	DeafPlanet/ Marblemedia	Canada
	Web Content Translation Engine/ Al Alamiah Group (translates from English to Arabic)	Kuwait
	Children@Hospital	France
	WomenGateway/ Alnadeem Information Technology	Bahrain
2007	IBSAR – Vision for Blind/ Sakhr Software Company	Kuwait
	Telecenters of Information and Business/ Ministry of Development, industry and Foreign Commerce	Brazil
	Infoblago.ru/ Information Center Charity in Russia	Russia
	Bwindi impenetrable National Park/ Conservation through Public Health	Uganda
	Higher Education Admission Center	Oman
2009	Voices of Africa/ Voices of Africa Media Foundation	The Netherlands
	Homeless Nation	Canada
	ICT for Illiteracy Eradication	Egypt
	TradeNet/ Esoko track inventories and monitor crop behavior	Uganda
	Impaired Aid	Sri Lanka

Source: World Summit Award Website: www.wsis-award.org.

Matrix 9

World Summit Award Winners e-inclusion and Participation Category for 2011

INNOVATION/WEBSITE	DESCRIPTION	COUNTRY
Erada http://erada.kenanaonline.com	A specialised portal addressing the needs of people with disabilities – those with impairments in hearing, visual, physical, mental and learning.	Egypt
News and Learning by Sign Language www.hallatlan.hu	A website that provides an effective learning tool popularising the everyday use of Hungarian sign language.	Hungary
Mexico in Community www.mexicoencomunidad.org.mx	A project supporting poorest villages and towns focusing on Community Creation System (web page for each community) and Support Programmes Platform (information on GO/NGO programmes)	Mexico
Epoq www.epoq.net	An experimental means for reliving past moments by recalling and telling stories. Users write texts, use images and record videos or audios, or mix these together.	Finland
Help the Children www.pagalbavaikams.it	An extension to the children's helpline as a professional phone-in service for children, teens and even adults concerned about child rights protection. The website was designed to deliver better and quicker help to them.	Italy

Source: World Summit Award Website: www.wsis-award.org.

Given that the WSA uses the same criteria and process as the Manthan Awards South Asia, one can notice similarities in the profile of winning entries in these two award giving bodies. More importantly, two Manthan awardees also got a WSA – India's n-Logue and Sri Lanka's Impaired Aid. Several of the WSA winning ICT innovations target social excluded groups such as farmers, fishermen, women/children, low income groups and people with disabilities. However, one group given emphasis in the WSA was the indigenous communities. Big hART, for example, sought to integrate indigenous people of Australia through ICTs, particularly in the area of the arts. Ajb'atz' Enlace Quiche aimed at empowering the indigenous population in Guatemala.

Projects that involved people with disability included DeafPlanet in Canada, Children@Hospital in France, IBSAR Vision for Blind in Kuwait, Impaired Aid in Sri Lanka, Erada in Egypt and Learning Sign Language in Hungary. For farmers, fishermen and small businessmen, winning ICTs projects included Senegal's Time to Market, Brazil's Telecenters of Information and Business and Uganda's Tradenet. For the women and youth, winning entries were Uganda's Women of Uganda Network website, Oman's Higher Education Admission Center and Bahrain's Women Gateway.

Some innovations simply sought to make ICTs available to rural communities such as India's n-Logue and El Salvador's Infocentros. Others provided information on basic issues such as Canada's Homeless Nation and Italy's Help the Children. There were two entries addressing the issue of illiteracy/language such as Egypt's ICT for Illiteracy Eradication and

Kuwait's Web Content Translation Engine from English to Arabic. Interestingly, there were innovations that allow socially excluded groups to make their voices heard through the use of ICTs. Mexico in Community, for one, has a community creation system where each village has a web page and has access to information on government/non-government programmes that helps poor communities. Finland's Epoq, on the other hand, enables people to relive past moments by recalling and telling stories using texts, images, audio and video recordings. The Netherlands' Voices of Africa enables young people in Africa to become mobile reporters.

With mobile usage outgrowing Internet usage by threefold (with more than 4.4 billion connections worldwide), the WSA launched its awards in the m-platform in June 2010. The first ceremony took place in Abu Dhabi – emphasising cultural diversity and identity since mobile phones have become smarter and more intimate; and touch screens have revolutionised ways of communicating. Matrix 10 shows the winners for the WSA Mobile m-Inclusion and Empowerment category for 2010. The next award is still to take place later in 2012.

Matrix 10

World Summit Award Mobile m-Inclusion and Empowerment Category 2010

INNOVATION/ORGANISATION	DESCRIPTION	COUNTRY
Mobile Link Service/ Guatemalan Emergency Relay	An innovative 24-hour outdoor emergency support and care service to enhance the social inclusion of seniors by empowering their independence and mobility in the community.	Guatemala
MyHandicap app	An iPhone app that targets persons with disability who are dependent on accessibility information due to mobility restrictions.	Germany/ Switzerland
Mobile Voices	A platform for immigrant and non-immigrant low wage workers in Los Angeles to create stories about their lives and communities directly from cell phones, allowing greater participation in the digital public sphere.	USA
Dialog tradenet	An innovative solution to overcome information asymmetry in the market, especially for communities at the bottom of the pyramid. It provides a multi-model information platform that enables matching of buyers and sellers.	Sri Lanka

Source: World Summit Award Mobile Website: www.wsa-mobile.org

As can be gleaned from Matrix 10, two innovations focused on providing services to socially excluded groups such as senior citizens and people with disabilities. Guatemala's Mobile Link Service ensures outdoor emergency support to the aged population giving them independence and mobility. Germany/Switzerland's MyHandicap is an iPhone application allowing differently abled persons to access information relating to mobility restrictions such as parking spaces for them in shopping malls. The other two winners dealt with how low income groups make meaningful use of the m-platform. USA's Mobile Voice allows low wage earners to create stories about their lives directly from cell phones – thus, participating in the digital public sphere. Sri Lanka's Dialog Tradenet, which also won in the m-Billionth Award South Asia, corrects information asymmetry in the market. It allows those in the bottom of the pyramid to find suitable buyers for their products.

Summary and Conclusion. From the above discussions, it is apparent that the ICT award-giving bodies largely share the various conceptions of the digital divide and its evolution into digital divides, digital inequality and digital inclusion/exclusion. In the Manthan Award South Asia, m-Billionth Award South Asia, APICTA, WSA and WSA Mobile, a number of innovations dealing with Internet accessibility and connectivity have received recognition. The same goes for ICT applications that dealt with language either as problems understanding the English language or being able to use one's language in ICTs.

A large number of winning entries are focused on avoiding the digital exclusion of marginalised groups such as women/children/youth, farmers/fishermen, low income groups, indigenous communities, people with disabilities, senior citizens, and small businessmen. More recently, award-giving bodies have started to recognise meaningful use of ICTs by citizens participating in the digital public sphere, engaging more equitably in trade and commerce, and creating stories/managing narratives about themselves and their communities.

Be this as it may, there are also winning initiatives that fall outside the purview of existing academic literature on the changing concepts of the digital divide. APICTA's citation of two large business groups that contribute to community cohesion by utilising ICTs to improve operations is one of them. Large corporations have never been under threat of digital exclusion and a community's social cohesion does not readily translate to a person's meaningful use of ICTs. The Manthan Award's recognition of government organisations adopting ICTs to improve service delivery is another example. In a way, better government effectiveness and efficiency extend resources to benefit more constituents but this hardly relates to the concepts of the digital inclusion.

In Bangladesh's National Digital Innovation Award, recognition has been rightly given to entries avoiding the digital exclusion of farmers, small businessmen, people with disabilities and low income groups. It has likewise valued projects that dealt with ICT access and meaningful use. However, similar to the Manthan Awards, it has cited government responsive projects that used ICTs to deliver better services and in the process, reach more disadvantaged groups. Again, these projects do not directly relate to the existing concepts of digital divide to digital inclusion. Nevertheless, these innovations deserve some form of recognition for their important contributions but perhaps, under a different category.

As a juror of the National Digital Innovation Award, I am glad to have written this paper. It has provided me with the conceptual frame to evaluate the merits of ICT innovations vying for recognition. It has likewise allowed me to benchmark with other award giving bodies – similarities and differences in the construction of digital inclusion. Hopefully, I get to be picked again as a juror in the coming year and I promise to do a better job at recognising wonderful e/m-innovations and applications being undertaken here in Bangladesh.

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How connected are Pakistanis?

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Abstract

Pakistanis have been using the internet for more than a decade now and yet there is little or no independent academic research data that explores broadband internet adoption and usage profiles of internet users in the country. This paper looks at slow and unequal broadband internet adoption patterns in the country using survey data collected from three cities (Karachi, Lahore and Quetta) of Pakistan based on various socio-economic demographics while the author was a research student at University of Strathclyde. The data presented in this paper illustrates that household with lower income and education levels are well below the average rate of adoption of broadband in the country. In contrast household with high income and education levels are far above the average rate of adoption of broadband internet. This paper explores this uneven access and illustrates the disparity to participate online between households with different economic and educational levels. The discussion section in the paper considers this problem of slow adoption and uneven access and the future impact of being disconnected for the younger Pakistani generations. The aim of the paper is to present this empirical research data and raise awareness about the situation for further research and effective ICT policies and strategy to be adopted at national levels if we are to reap the future benefits of ICTs in the country.

Keywords

Access, Policy, Poverty, Citizen, Strategy

Introduction

National broadband internet coverage has been a policy objective adopted in many developed and developing countries. Although some countries have advanced towards this goal more than others, an increasing number of developing countries are now following the developed countries to achieve widespread broadband availability. Broadband internet access is widely recognised as a catalyst for the social and economic development of a country. Broadband roll-out has a more potent impact than the spread of basic telephony. For it not only allows people to communicate, but also to do business more efficiently over longer distances, be better educated, have access to better health services, benefit from better governance, and has enhanced entertainment services. A major part of the expected increase in GDP and economic uplift due to broadband access will come from the benefits that high speed data networks and internet access will have on corporate efficiency and success (PTA 2004). Economists are already predicting significant macroeconomic benefits from the proliferation of broadband networks. It is believed that widespread broadband usage can extend the IT revolution and further improve national and regional productivity, helping to promote robust economic growth and increase the standard of living especially in the developing countries like Pakistan. The World Summit on Information Society (held in Geneva in 2003 and Tunis in 2005) recognised that “access to information and sharing and creation of knowledge contributes significantly to strengthening economic, social and cultural development”. Information is a fundamental driver of increased efficiency and global competitiveness in this age of IT revolution. It is shaping the future by providing opportunities to information, invention and wealth creation. Global economic processes including international and national trade is increasingly influenced by the creation, dissemination, accumulation and application of knowledge and information (UNCTAD 2006). Recent research suggests a strong link between broadband penetration and economic growth. In the 21st century, affordable, ubiquitous broadband networks will be as critical to social and economic prosperity as networks like transport, water and power. Broadband will serve as tomorrow’s fountain of innovation. It represents the ripening of the digital revolution, the fruits of which have yet to be invented or even imagined (Broadband Commission 2010). In a globally competitive world, there is little room for complacency in terms of both broadband deployment and the effective use of broadband applications. Countries that fall behind in their broadband and other ICT connectivity will indeed suffer as their global rivals seize economic opportunities. Broadband can play a very pivotal role not only in economic development of a country but also in its social development if it is properly implemented and utilised. Economic developments which are measurable and hence are shown up in GDP, national accounts statistics, FDI, are not the only component of development. Development can also include improvements in the capabilities of the population, such as education, health and nutrition, independently of any direct or indirect economic impact.

History of internet in Pakistan

The journey of internet in Pakistan started in 1990 when two Pakistani computer enthusiasts established a UUCP (UNIX to- Unix Copy) email connection to the global internet from the IMRAN.AR.PK host. Located in New York City, this node would batch email traffic through an international phone call to Lahore, exchange email with domestic servers. Soon afterwards policymakers had begun to appreciate the potential of the medium for socio economic development in the country. Proposal was invited from different companies to set up a public email service. Sixteen companies were awarded licenses for email and internet services in February 1996. Digicom launched the first online internet service, in Karachi, in 1995. This service was connected to the global internet by a 64 Kbps line. In 1996, the PakNet data network, operated by the local incumbent operator PTCL (Pakistan Telecommunication Limited) was upgraded to provide internet services as well. PakNet was connected to the global internet via a total of 512 kbps. By mid-1997, nine ISPs were operational, offering services in five cities. By mid-1999, licenses to provide internet service had been issued to approximately 100 organisations. To further facilitate the growth of broadband internet in the country, PTA took a major initiative in 2004 by allowing all ISPs to provide broadband internet services. Government announced Broadband Policy with the objective to spread an affordable and high speed internet and encourage private sector investment in local content and broadband services. As part of this strategy, it has been recommended that broadband internet access be made available to all households to become active participant in the information revolution and contribute to the socio economic development of the country in the information economy.

Broadband internet, in Pakistan defined as “Always on Internet connection with a download speed of at least 128kbps connectivity” (PTA 2004), is one of the fastest growing markets in Asia. However this growth has been limited to the leading economies in the region and Pakistan lags behind in penetration of internet in the country. According to the latest figure released in June 2010 by ITU, the total penetration of internet in Pakistan stood at 11.5% with estimated 20,350,000 internet users in the country.

Internet Usage and Population Statistics

YEAR	USERS	POPULATION	% PEN.	GDP P.C.*	USAGE SOURCE
2000	133,900	163,985,373	0.1 %	N/A	ITU
2006	12,000,000	167,806,831	7.2 %	US\$ 821	ITU
2009	18,500,000	174,578,558	10.6 %	US\$ 1,017	ITU

Note: Per Capita GDP in US dollars, source: International Monetary Fund.

Countries with high penetration of broadband internet users have all implemented conscious policies for the growth of broadband internet. These policies have included growth enablers such as price reductions for the use of infrastructure, unified licensing for service providers; government's setting of strict annual broadband penetration targets, content and e-commerce development incentives and lowering of the price and tax barriers on the broadband terminal equipment. The resultant growth and high penetration of broadband has contributed significantly to the social and economic standing of these countries. Pakistan government's progress on broadband has been almost non-existent and the current state of broadband with only 0.2% penetration reveals the government's failure to fully recognise the importance of broadband access for socio economic development in the modern information economy. Even though the importance has been highlighted in the National ICT policy and broadband policy but we are yet to witness the substance of implementing them on the ground and make sure that Pakistanis from across communities and regions are able to participate in the modern information economy, which has been deemed so important for the success and development of nations.

Theoretical foundation and previous research

The above discussion shows the importance of being connected and citizens' access to information society the economic and social developments internet brings with itself. Information and Communication Technologies (ICTs) are arguably the most potent tools shaping the 21st century as they redefine the way human beings communicate, learn, work and play. In essence, ICTs are re-defining how we live. As tools for human development and empowerment, ICTs have no equal. Their ability to enable inclusion and access to information as well as to offer a vast array of opportunities across the social, economic, environmental and political domains, make them strategic tools for individual, national and global development (Rahim 2008). The purpose of this paper is to give an overview of broadband internet adoption in Pakistani households in order to understand the extent to which Pakistani households are able to participate in the knowledge economy that is deemed so essential by government.

When reviewing literature and published material on internet adoption in Pakistan it was striking to see how little or no material was available. There is no previously known work available which examines broadband internet adoption trends over a longer period of time. Researchers have been studying the adoption and impacts of Information and Communication Technologies (ICTs) at the organisational and individual level. However, studies related to household adoption and the impacts of ICT especially broadband internet are largely overlooked. One of the first studies to examine the adoption of Personal Computers and internet in the household was undertaken by (Venkatesh and Brown 2001). The findings of their research revealed that the decisions of the adopters and non-adopters are significantly different. The adopters were influenced by social factors, while non-adopters were partial to changes in technology. To continue the aforementioned research but in different country and subject area (Anckar 2003) offered an understanding

of the drivers and inhibitors of E-commerce adoption within the households located in Finland. Although such studies are becoming prevalent, they are yet to be extended to examine the adoption of emerging ICTs such as broadband internet. This is due to the technology in question, which is broadband is still taking off. It can be found that the majority of the research associated with the topic of broadband is exploratory in nature, mainly focusing on the various aspects of technology in use and provides very little insight into consumer adoption or rejection determinants.

Using South Korea as a case study, (Lee et al 2001) found three major factors that explained the high rate of broadband adoption in the country. A recent study suggested that there are six success factors that are responsible for achieving the highest penetration rate of broadband in South Korean households (Lee et al, 2002, and Choudrie et al 2003). Dwivedi et al, (2003), who examined the Internet Service Providers opinion upon the deployment of broadband, offered a different perspective. The findings suggest that a high price, lack of content, and lack of awareness are amongst the major factors that have severely affected the uptake of broadband in the UK households (Dwivedi, et al, 2003). The South Korean and UK studies are not the only contexts that have been investigated for broadband adoption at the national levels. Other exploratory studies conducted on different countries are those of Shim, et al (2003) - Sweden; Gardner, (2003); Chang et al (2003) - Australia and Canada. These studies are valuable in recognising the macro factors; however they provide little insights on broadband adoption at household level. The differential rates of usage and adoption of broadband internet suggest that understanding broadband connectivity is a complex milieu. Therefore, systematic research efforts like the present research on the adoption of broadband in households is necessary to identify the possible factors for unequal adoption.

Data sources

Previous research has revealed that the survey method is most appropriate when investigating unequal technology adoption and usage patterns (Tan, et al. 2000; Venkatesh, et al. 2000; Venkatesh and Brown, 2001; Ankar, 2003). On the basis of previous research, survey research was considered to be the most suitable research method for this investigation. The interviewer administered questionnaire survey is considered to be the most appropriate methodology to collect representative data of the target population within a limited time frame and resources. This questionnaire-based method also addresses the issue of reliability of information by reducing and eliminating differences in the way in which questions are asked (Cornford & Smithson, 1996) and facilitates the collection of data within a short period of time from the majority of respondents (Walliman 2001). Different factors such as social, economic, ethnic, cultural, modernisation and access to internet was considered before selecting the three research locations, i.e. Karachi, Lahore and Quetta. The primary objective was to get a diverse sample from all regions of Pakistan holding different ethnicity, language, cultural values, and socio-economic status of their populations, along with different stages of modernisation and access to ICTs.



Figure 1 Research Locations

Sampling

The overall survey methodology was designed under the supervision of Prof David Souter. The first phase of the research consisted of researching into slow broadband uptake and internet growth in Pakistan over the years and the benefits that broadband can bring to the economy of Pakistan under favourable conditions to promote broadband growth. Since there was no information available on the usage pattern of internet users of the country the idea was to analyse the bottlenecks of broadband and also get information on the usage patterns of internet in the country. The second phase consisted of questionnaire design and it was made sure that the overall length of the questionnaire wasn't too long as there is always a limit to how much time respondents are willing to devote to answering questions for a household survey. Secondly, with the limited timeline for the research it would not have been possible to gather a lot of information so it was decided to focus more on the questions that would answer the research question for this study. The selections of questions were done on the nature of information required to achieve these research objectives.

In the light of this, questionnaire was designed to secure information about:

1. **Demographic Descriptors** - Respondents name, gender, age, address, education level, household characteristics (Monthly Income, Monthly Expenditure and Number of dependants)
2. **Access and Online Behaviour** - Respondents have access to computer, internet, places to access internet, amount of time and money spent on internet connection, advantages and disadvantages of internet, usage of internet connection and preferred language for the internet user.
3. **Awareness and Adoption** - Awareness of broadband services, reasons for not adopting broadband services and amount of money willing to spend to acquire broadband services.

The first draft of the questionnaire was sent out for field testing to give an idea how the questionnaire works and are the respondents able to understand it easily. 20 people were selected for the pre testing of the questionnaire which consisted of 24 questions and took 5-10 minute on average to fill the survey form. Generally most of the people interviewed for the survey were happy with the length of the questionnaire, the wordings of the questions were easy to interpret and the amount of time it took to complete the survey form. The targeted sample size for survey at each research location was set around 250 households. This would provide an aggregate sample of 750 household's individuals, which is a large enough sample to provide statistically useful data for analysis and comparisons. The cities were divided in different zones based on the socio-economic status of the people. The reason for dividing the cities in to zones was to get a diverse sample that was representative of the population and also sufficient enough to indicate patterns of behaviour, usage, availability and access to ICTs based on socio-economic demographics. Random sampling method was adopted in the selected research locations for interviewing the household's individuals. It was very important for the research sample to have a full range of income level groups, gender groups, and literacy level group in order to assess the adoption and non adoption of broadband and usage patterns of individuals belonging to different income level, age bands and literacy level. The samples collected from the three cities were consistent enough for cross city comparison and representativeness of the population as a whole.

Figure 1.1 (A) Map of Karachi City Showing Research Areas

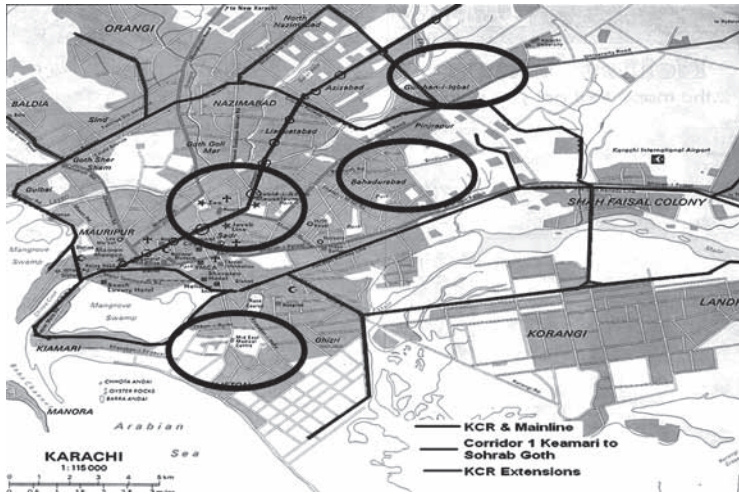


Figure 1.1(B) Map of Lahore Showing Research Areas

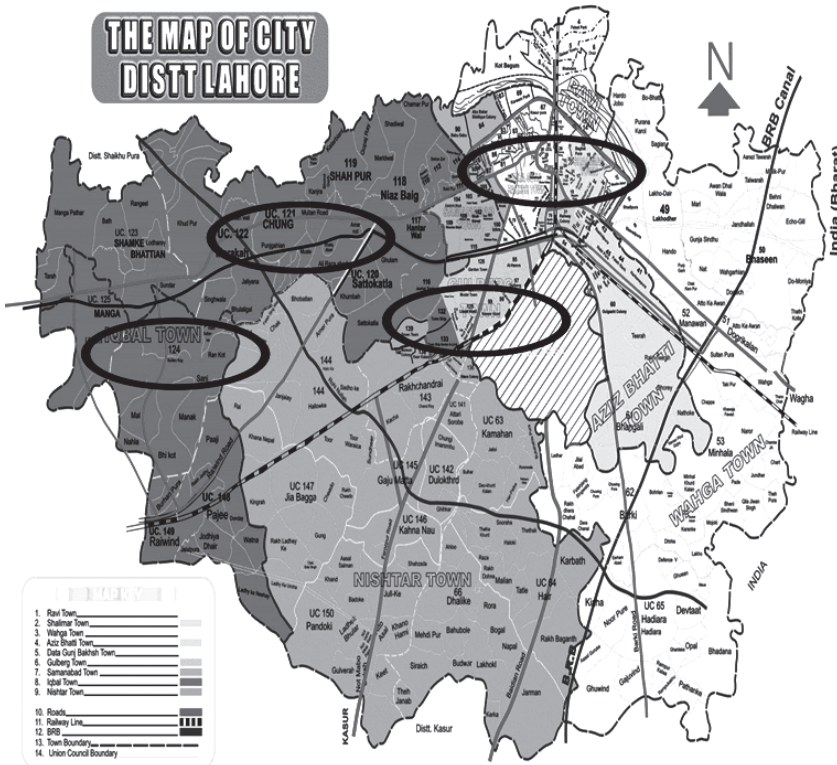


Figure 1.1(C) Map of Quetta Showing Research Areas

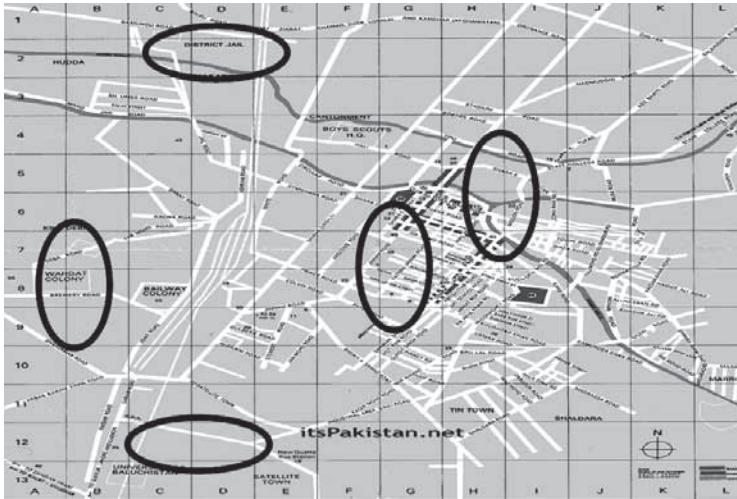


Table 1.1 Respondents Breakdown by Location

CITY	RESPONDENTS	MALE	FEMALE
Karachi	233	196	35
Lahore	214	101	113
Quetta	225	173	52
Total	672	471	201

The demographic data reveal that least number of respondents belongs to the age group of 55 and above while the age groups between 15 and 35 represent the maximum number of respondents. Both the male and female genders were represented almost equally in the returned sample.

Table 1.2 Demographic details of Respondents

CITY	MALE	FEMALE	MALE %	FEMALE %	TOTAL
15-25	139	138	50.2	49.8	276
26-35	230	40	85.2	14.8	271
36-45	70	11	86.4	13.6	81
46-55	28	04	87.5	12.5	32
55+	03	03	50	50	6

Using the sample data our research analysis reveals the difference between adopter and non adopter's households and explores the impact that age, income, education and location have in determining who is online and connected in Pakistan. This data set can be used as a basis for the assessment of how well an information society fits the need for various groups of Pakistanis.

Research analysis

The slow and unequal adoption of broadband in many countries including developing country like Pakistan generates considerable academic and public debate. Despite the provision of broadband access the demand for broadband has not increased as expected in many countries around the globe. Researchers are suggesting that the provision of broadband can be more 'demand constrained' than 'supply constrained' (Haring et al, 2002). (Ford et al, 2007) argue that a household's decision to subscribe to broadband is influenced by a number of factors, including income, education, availability and affordability. Household income is one of the major determinants for broadband internet adoption and to analyse the opportunity households with various income levels have to participate in the information economy.

Table 1.3 Monthly Incomes of Respondents

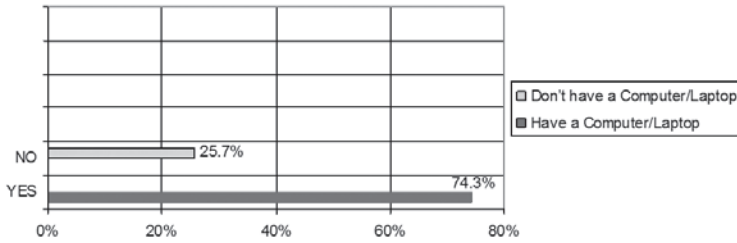
MONTHLY INCOM		MALE	FEMALE	MALE %	FEMALE %	TOTAL
10-20K PKR	117-235 USD	161	92	63.6	36.4	253
21-30K PKR	247-352 USD	82	27	75.2	24.8	109
31-40K PKR	364-470 USD	49	13	79	21	62
41-50K PKR	482-588 USD	19	04	82.6	17.4	23
51K+ PKR	600 + USD	36	08	81.8	18.2	44
Total		347	144			491

The above monthly income table show the economic status of household individuals interviewed from all three cities. The monthly earning of 51% of the respondents was between 10-20 thousand rupees per month which also resembles to the economic condition of the country since most of the population belongs to upper and lower middle class and a very limited higher class. Second highest percentage is the income group of 21 to 30 thousand rupees and very few in the highest range of monthly income. Adoption of any technology, including broadband Internet, requires investments in initial fixed capital as well as recurring variable costs. A lower income level implies that users have to invest a higher proportion of their income in acquiring and using a technology. The total perceived sacrifice in adopting the technology is, thus, higher for individuals with lower income levels. From the income levels it can also be seen that the higher the income level rises the more the percentage of males increases. The overall percentage of income per month of women is less than that of man.

Adoption of personal computers

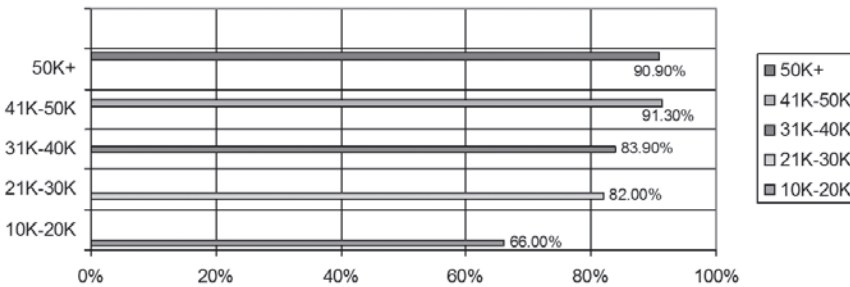
The issue concerning adoption of PC technology at household is both a cultural and an economic one. The potential complexity or ease involved in computer use is also a strong attitudinal antecedent which may influence the computer adoption decision. The influx of second hand cheap computers in Pakistan has also seen the adoption of computers taken off in the country. The result of the survey shows that 74.3% household individual interviewed in the survey owned a laptop or computer at home.

Figure 1.1 Ownership of Computer in household



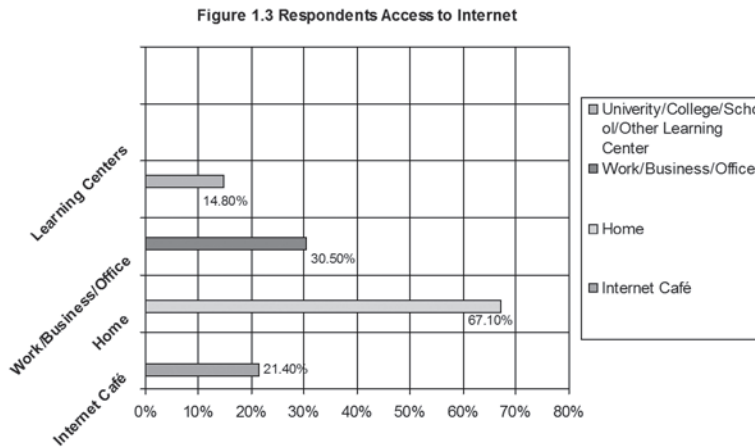
The general perception of the individuals who owned a computer at home felt it was necessary for their children to be growing up computer literate and adults used it for information and entertainment purposes. The people who didn't own a computer were mostly not able to afford to buy a computer/laptop or didn't felt the need to buy one. Figure 1.2 details the ownership of PC at households in Pakistan on the basis on monthly income. The gap between the lowest income cohort and the highest income cohort is considerable and may be due to lack of financial resources households are unable to afford a PC at home.

Figure 1.2 Ownership of PC on Economic Basis

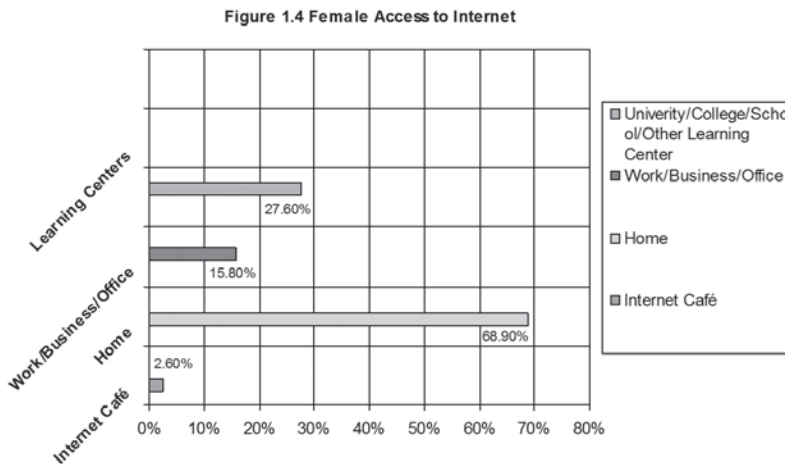


Adoption of Internet

Internet adoption patterns in Figure 1.3 highlights interesting trends in access to internet among households in Pakistan. Majority of the individuals interviewed in the survey use the internet from home (67.10%) while access to internet from work location was second highest (30.50%).



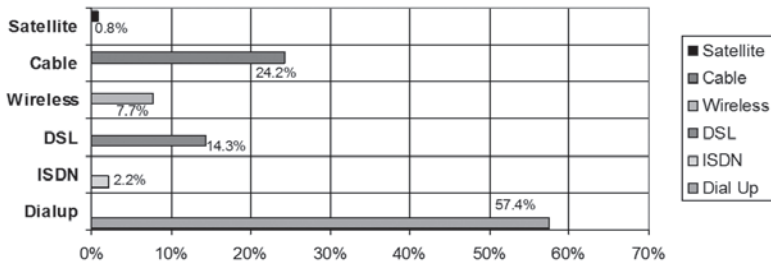
Most of the females interviewed in the survey access the internet from home and internet cafés were their least preferred locations to access the internet from, owing to the cultural barriers and limited accessibility for females.



Accessing the internet

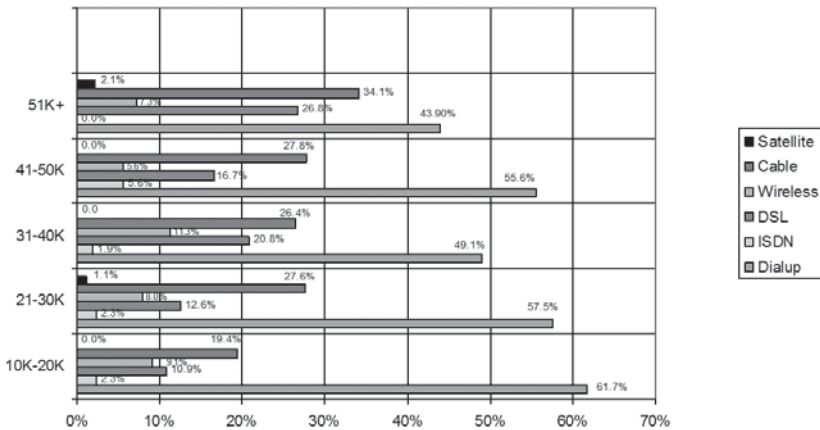
Level and type of internet access at home strongly depends upon a number of complex variables such as availability of technology, gross income, education, age and gender. Figure 1.5 shows the type of internet connection available to access internet at home in Pakistan. As it is apparent, dialup is still the most dominant methods of accessing the internet in Pakistan. Even though we have witnessed a surge in take-up of other broadband services, majority of households are still connected to internet using the narrowband connection.

Figure 1.5 Methods of Connecting to the Internet at Home



Dholakia (2006) and others indicate that economic resources and availability of technology is a key determinant in choosing connection type at households. Figure 1.6 details the type of connection against income. High speed broadband connections such as DSL and Cable have a high percentage of adoption in high income households compared to low income households in Pakistan.

Figure 1.6 Income and Type of Internet Connection

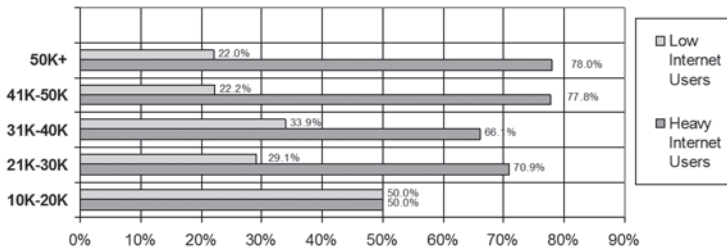


Time spent online

The average weekly time spent online depends upon various factors such as income level of the household, age (younger and middle aged group people tend to spend more time online), larger households and type of connection (broadband and narrowband) used to access the internet. Figure 1.3 indicated patterns of average weekly time spent online by household individuals. The weekly time online spent is distributed in to two groups:

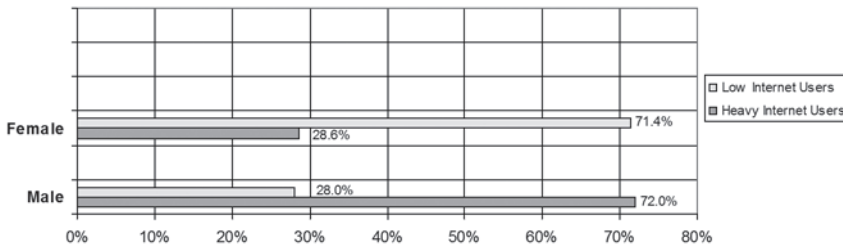
- 1. Heavy Internet Users:** Household individuals who are spending more than 10-50+ hours a week online are categorised as heavy internet users.
- 2. Low Internet Users:** Household individuals who are spending 1-10 hours a week online are categorised as low internet users. These categorisations have been done for the ease of understanding and comparisons for the research work.

Figure 1.7 Patterns of Heavy and Low internet Users on basis of Income



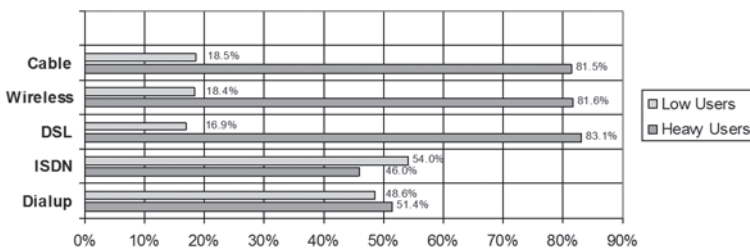
With rise in income levels the time spent online, also increases which is creating a divide between high and low income households. The divide is more evident between men and women where 72% of the men were spending more than 10-50 hours online in a week compared to 28.6% of women who were spending the same amount of time online in a week. 28% of men were spending 1-10 hours a week compared to 71.4% of women who spent 1-10 hours online in a week.

Figure 1.8 Divide between Men and Women in Spending Time Online



Women in Pakistan fall short of men in the amount of time they spend on the internet. It appears from previous studies and as highlighted above that the time spent online depends on common characteristics such as age, gender, race/ethnicity, weekly employment hours, education and income (Davidson and Cotten 2003; Fallow 2005; Nie et al. 2005; Dholakia 2006). Other relevant factor is the speed of the internet connection (dial-up/broadband) associated with time online (Davidson and Cotton 2003). The effects of all these variables are often quite complex and interwoven with one another. Figure 1.9 details the time spent online and type of internet connection used to get online. It is clearly evident that households with broadband connection facilitating high speed are spending more time online in Pakistan than compared to narrowband internet connection users.

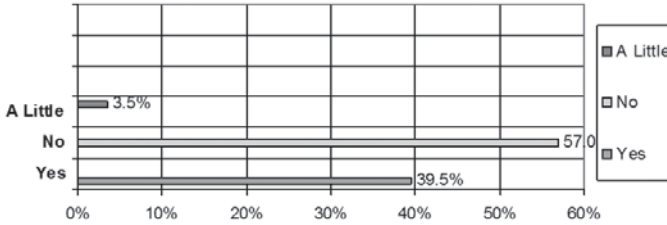
Figure 1.9 Type of Connection and Time Spent Online



Broadband adoption

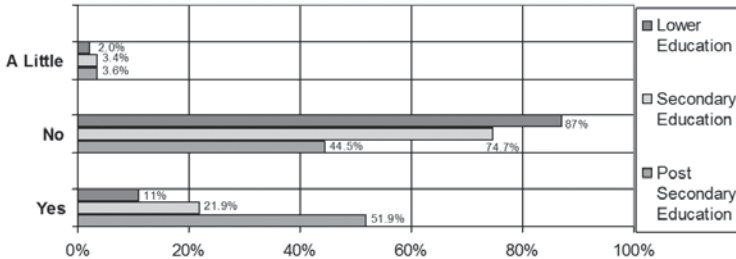
The rate of broadband adoption is strongly related to a number of demographic and economic conditions, including household income, income inequality, and education. The present research reveals that majority of household were unaware of broadband services before this interview and the same is reflected in Figure 2.0.

Figure 2.0 Awareness about Broadband Services



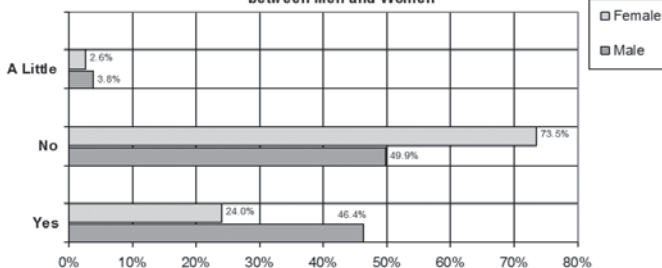
Education is an important factor that increases broadband growth. Some experts like (Ford et al, 2007) argue that education impacts broadband adoption at a far larger magnitude than income levels. Figure 2.1 depicts the importance of education and how the lack of it can have a disastrous affect on the adoption and growth of broadband internet in Pakistan.

Figure 2.1 Education and Awareness of Broadband



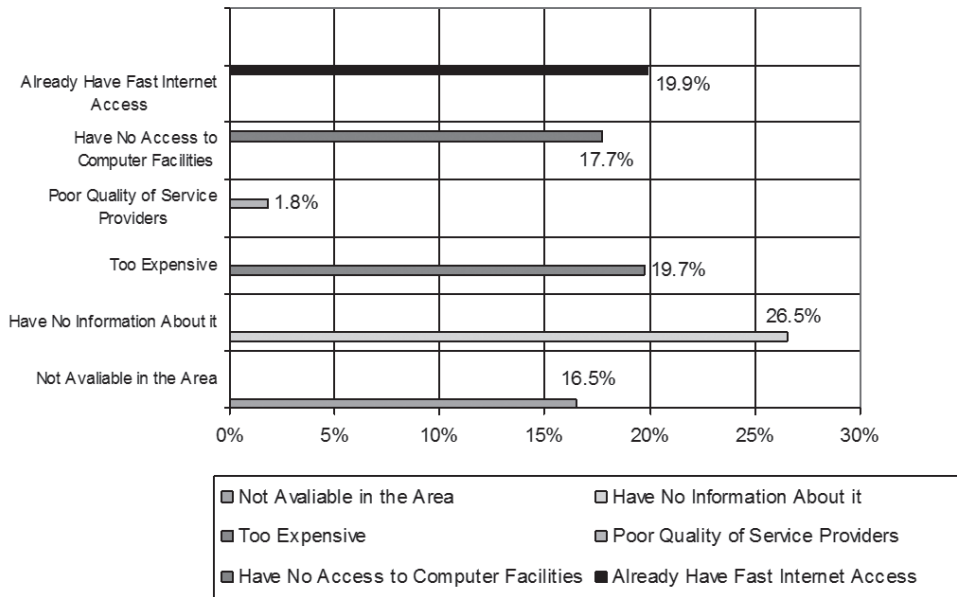
As we can see from Figure 2.1 that there are a very high percentage of respondents who are not aware of broadband services especially household individuals with lower and secondary education. The lack of awareness about broadband service is much higher in women than men. A handful of PTA (Pakistan Telecommunication Authority) initiatives seek to improve consumer awareness on the issue especially focusing on women.

Figure 2.2 Awareness of Broadband Services between Men and Women



The pace of broadband availability and adoption is drawing increased attention from policymakers at local and regional level, as a growing body of evidence shows a strong link between broadband and economic development. The level of adoption of broadband in Pakistan remains relatively low with penetration level at 0.39% (PTA 2009). The data and studies regarding the reasons for non-adoption of broadband internet suggest that there are a variety of factors that explain why household individuals choose not to subscribe to broadband. The key factors are affordability (e.g., the cost of broadband service, the cost of a PC), usability (e.g., lack of digital literacy skills) and having basic information to use the service.

Figure 2.3 Reasons For Not Adopting Broadband Connection



Effective broadband policy must deal with issues that arise from income inequality if Pakistan is to become part of the information economy. Similarly cost plays an important role in making decision to adopt broadband services. A number of studies suggest that broadband adoption in particular is sensitive to costs (having what economists call a high elasticity of demand). As the US Government Accountability Office (GAO) has reported, the “price of broadband service remains a barrier to adoption of broadband service for some consumers” and noted that “households with high incomes were 39 percentage points more likely to adopt broadband than lower-income households (Cohen 2008). In Pakistan the tariff for broadband services has been declining over the year but still the price paid to be connected online is higher for majority of population. Table 1.4 provides a look at the comparison of 1 Mbps connection available in Pakistan (Source PTA 2009).

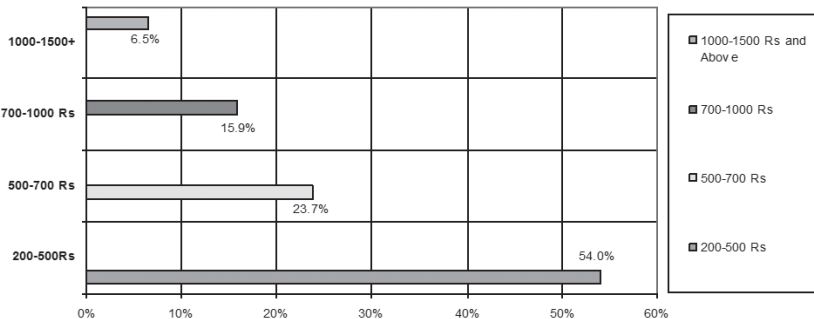
Table 1.4 Broadband Tariffs in Pakistan

Broadband Tariff Comparison

Technology	Company	Price (Rs/month)	Data Volume (GB)	Additional Cost (Rs)	
				Installation	CPE/Device Charges
DSL	Micronet*	740	Unlimited	750	2,454
	PTCL**	839	Unlimited	Free	Free
WiMax	Wateen	490	5	2,400	90
	Wi-Tribe	650	5	Free	Free
FTTH	Nayatel***	1190	10	--	--
EVDO	PTCL	2000	Unlimited	Free	3,999

The present research findings in Figure 2.4 reveal that majority of the households can barely afford the minimum package of broadband services. The cost of broadband service is likely to be a major barrier for low-income families and it is likely to explain why a disproportionate number of people in lower income families have access to broadband at home. The results also suggests that efforts to reduce costs can play a role in spurring demand, particularly among lower income households who are unable to adopt broadband services due to higher tariffs and limiting economic factors.

Figure 2.4 Household Willing to Pay to Acquire Broadband Connection



Discussion

The data presented here illustrates that Pakistani households with less income and education levels are well below the national average for broadband adoption while households with higher income and education levels have higher rates of broadband adoption. In simplest terms, privileged Pakistanis are online while less privileged compatriots are not. Although the government argues that the digital divide is narrowing and access to broadband internet is spreading, the research reveals that gaps between haves and have-nots are still pronounced. The benefits of broadband for the socio economic development of communities are enormous but we are yet to fully reap the benefits of the online revolution. For instance the present data revealed that low income households who had access to broadband, used the service more for education (53.8%) and business

related work (30.3%) compared to high income households who used the service more for leisure activities. The paper also showed Pakistani government's realisation and efforts to create and sustain knowledge based economy, which has been deemed so important for development, has failed to deliver in practice. At first glance, it seems a clear fact that Pakistanis who are not online are those who are disadvantaged by income or education to be connected and represent the failure of our policies and system to provide equal access to the information society. It is reasonable to conclude that despite the government fanfare promoting its success in connecting Pakistan to broadband internet, it has failed to reach the disadvantaged segments of Pakistani society. I believe it is extremely important for every Pakistani to be able to choose to participate in the information society if we are to become information economy participants.

If Pakistan is to, become connected and achieve near universal broadband adoption on the order of mobile phone adoption rates at least in the near to moderate term, the government will have to develop and implement policies designed to spur broadband adoption. These policies should satisfy several criteria. First, and most obviously, demand-side broadband programmes need to be effective. Second, programmes also need to be able to be at a sufficient scale to make a difference. There are programmes around the nation that appear to be successful in getting people to adopt and use broadband, but many are quite small in scale, serving only hundreds of people, not tens of thousands. Some of the policy initiatives which can address barriers to adopting broadband in a unified manner are:

Attracting subscriber in low income communities

Broadband appears to be widely available in most low income communities located in urban and suburban areas. But adoption rates are much lower than in higher income areas. One way to encourage adoption would be to provide stronger incentives for broadband service providers to sign up new customers, particularly in low-income neighbourhoods. Currently, they have limited incentives to do so because the costs of getting new customers in these areas can exceed the revenues expected. These costs may include digital literacy training, computer subsidies, and marketing to explain the benefits. But harnessing the competitive spirit of providers to get more customers could prove a cost-effective way to increase adoption.

Innovative pricing

Compared to the wire-line and wireless phone industries, there is a relative paucity of different pricing plans in the broadband industry. No company in Pakistan appears to sell low cost plans based on limited use. Yet, for many consumers, particularly lower income consumers, having access to a plan that is priced on the basis of limited bit use might be quite attractive. Likewise, some consumers might be more willing to adopt broadband if a computer was included for free. PTA can make it clear through their national broadband plan that it wants to encourage such innovative pricing plans, particularly if there was evidence that such plans were leading to lower priced alternatives that could spur adoption

rates, then ISPs might be more willing to engage in such innovative service offerings.

Funding digital literacy programme

Given that lack of digital literacy appears to be an important factor limiting broadband take-up, simply providing USF-like subsidies is unlikely to be enough. When telephones were first adopted, “telephone illiteracy” was not the major barrier to deployment because phones were relatively easy to use. Notwithstanding constant improvements in usability, computers and the internet are, in comparison, quite complicated and difficult to use. Despite the fact that an increasing number of applications rely on broadband, many people who cannot live without a phone feel perfectly comfortable living without the internet. This suggests that a universal service policy focusing solely on subsidising costs will not be enough to maximise broadband adoption. Any policy to expand broadband use must include efforts to make non-users comfortable with, and interested in, computers and broadband.

Cost saving to citizens for e-government services

If citizens, particularly lower income citizens, could save more money by being online, they would be more able to subscribe to broadband. One way for government to enable this is to pass along the savings from online interactions to citizens. For many governmental activities, it costs government less if citizens use an online channel, as opposed to using mail, telephone, or in-person channels. Some governments provide a discount for citizens using the lower-cost e-government channel. Pakistani government should do the same. By doing this, they will provide stronger financial incentives for citizens to get online and use broadband.

Conclusion and future research directions

This study provides a snapshot of how connected Pakistan is in terms of adoption and usage of broadband. The results themselves are not surprising as factors such as income level, education, family type and region play an important factor in adoption of broadband internet. What is surprising are the differences that exist in adoption rates within each category. It is also surprising that very little academic mention has been made of such differences. This paper only scratches the surface of Pakistan broadband internet adoption data and highlights inequities in access and discusses solutions to the empirical finding. To fully understand the extent to which Pakistanis are prepared to engage in the information society, a fuller understanding of their usage is required and it can be garnered from further analysis of the present data set. Further analysis can provide much needed insights to policymakers to better understand the market and develop policies and insight of the research analysis.

Acknowledgements

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Internet Dependency among Youth in Indonesia

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Abstract

The emergence of information and communication technology (ICT) has changed society significantly, in terms of the way they communicate. The internet as the fastest technological mode of communication, enables one to connect with anyone easily – at any part of the world – as geographic boundaries become virtually 'borderless' and the space 'narrower', just like a global village, as predicted by Marshall McLuhan. The amount of Internet users among youth is increasing every year. Do such uses cause dependency on the Internet? For what purposes do the youths use the Internet? The study aims to explore internet dependency among the youth. A survey of 431 students was conducted at 21 senior high schools in Malang, East Java, Indonesia. Factor Analysis was used to categorise the dependency among youth. The data reveals that the primary use of Internet pertains to getting news and entertainment, communication and getting particular information. Data has been analysed with Factor Analysis for categorising the Internet dependency among youth.

Keywords

Internet dependency, youth, social networking sites (SNS)

Introduction

The purpose for this research is to focus on the use of Internet by identifying the variables of its rapid development, either in terms of the number of users or the vastness of the technology. Over the years, the number of Internet users in Indonesia increased significantly. Besides, the access to Internet has become cheaper and easier than any time before. A survey conducted by Yahoo, indicated that the amount of Internet users in Indonesia bounced to the number of 15 million people in 2009. The online activities mostly done are visiting online portal, reading online news, using emails, using search engines, and using the service of Internet Messenger. (Tempo Interaktif 6 March 2009). The amount has increased 17% from the amount of Internet users assessed in 2005. About 64% internet users in Indonesia are teenagers aged between 15-19 years old (densetiawan@yahoo.co.id)

A research conducted by Robert Kraut and Sara Kiesler (2002) about "Internet Usage in US" was aimed at understanding the effects of the specifics of the Internet. Research done by Kraut et al (2002) showed a mixed pattern, in which using the Internet for entertainment and information search has been socially reflected more than using it for communication with friends and family or for meeting new people online. Overall, people who use the Internet for social purposes are generally more socially engaged offline as well, but their use of the Internet for social purposes, surprisingly, apprehends a decline in some measures of social engagement. (p.4)

The research concerning Internet's social impacts conducted by Kraut et.al (2002) has given surprising result. The research in 1998 in United States (US) found that greater use of Internet was associated with declines in users' communication with family members, declines in the size of their social circle, and increase in their depression and loneliness. In 2002, the same research was conducted and the outcome was that using the Internet for communication and social involvement increases in the size of their social circles, face to face communication, community involvement, trust in people, and positive effect. It is further explained by Kraut et.al (2002:2) heavier Internet use was associated with the increases in stress already mentioned and declines in users' knowledge of, and commitment to, their local area. Consistent with a 'rich get richer' hypothesis, having more social resources amplified the benefits that people got from using the Internet.

There are studies which explain media dependency toward attitude and behaviour. Mafe and Blas (2006:1) analyse key drivers of Internet dependency and its impact on willingness to purchase online. It is found that Internet dependency determines willingness to purchase online, with the most relevant factor being that of searching for information to take decisions. Dependent users are mainly young, highly-educated, feel Internet affinity and have high levels of exposure and experience as Internet users.

Patwardan and Ramapardhan (2005:1) conducted comparative study between USA and India regarding the Internet dependency relations as a predictor of online consumer

activities. Within a context of primary online activities (e-commerce, information search, communication, and entertainment), relationships between Internet dependency and activity exposure, involvement and satisfaction were investigated. They found that generally Internet dependency oriented to action, interaction, and social understanding goals exerted a positive influence, while Internet dependency for self understanding goals exerted a negative influence on online activity variables. In addition, information search activities appeared to be driven by social understanding goals, e-commerce activities by action orientation goals, communication activities by action and interaction orientation goals, and entertainment activities by play goals.

There are few studies regarding Internet dependency in Indonesia. Considering the amount of Internet users in Indonesia increasing especially among youths, there is indication of the dependency getting higher and requiring deeper studies for it.

The discussion concerning Internet dependency often related to the negative effects of Internet, one of them is Internet addiction. Most researchers who studied the negative effects of Internet mentioned that Internet addiction might emerge as the lack of social interaction with family and friends, as well as creating clinical depression. It is also mentioned that Internet is the media which isolates its users. The users addicted to Internet would be willing to spend hours of their time in front of their computers and finally become anti-social.

The observation conducted by the researcher found that terms such as 'dependency' and 'addictive' are used often in the media. Young (1999:5) defined addictive as pathological use of Internet. Young (1999:3) also developed a brief eight-item questionnaire which modified the criteria for pathological gambling to provide a screening instrument for addictive Internet use. Patients were considered 'addicted' when answering 'yes' to five (or more) of the questions and when their behaviour could not be better accounted for by a Manic Episode. Young stated that the cut off score of 'five' was consistent with the number of criteria used for Pathological Gambling and was seen as an adequate number of criteria to differentiate normal from pathological addictive Internet use. Sun (2006:69) quote Charlton explained that Internet dependency or high engagement is not the same as pathological Internet use. But, in certain circumstances, such as social isolation, high Internet engagement might develop into Internet addiction. Addiction often is regarded as pathological use of computer and the Internet.

Subsequently, to get a picture of Indonesian teenagers in the cloud of Internet, we used Internet Dependency concept. The study regarding Internet dependency becomes interesting due to the fact that it is indicated that dependency towards Internet can lead to the behaviour of an anti-social. In Indonesia, the existence of Social Networking Sites (SNS) in particular and Internet in general surfaced both pros and contras. However, there are still few studies in Indonesia in this regard. The pros point of view concerning the Internet has positive impacts such as the ease of information access, technological development, and

enlarged friendship networking. On other hand, those who have contra point of view toward Internet stated that it might dump the youth toward pornography, cyber crimes, and Internet addiction. Furthermore this study is aimed at finding the form of Internet dependency among the youth once they are acquainted to its usage.

Internet Development in Indonesia

Speaking about Internet development in Indonesia, it is inseparable with the great role of the prior Minister of Research and Technology (1987-1998), B.J. Habibie. Habibie is the first Minister in Indonesia who has his own homepage on Internet. Explained below is the root of Internet development in Indonesia which has been quoted by the writer from a book entitled "Media, Culture dan Politic in Indonesia"(see Krishna Shen and Davis T.Hill h.229).

Began in 1986, National Research Council under the surveillance of Habibie, recommended the development of Science and Technology Information services. In 1989 this idea was crystallised in the form of a IPTEKnet information network plan. Universities such as Institut Teknologi Bandung (ITB), Institut Teknologi Sepuluh November Surabaya (ITS), University of Gajah Mada (UGM) and University of Indonesia (UI) collaborated since 1986 in an effort to develop networking among the Universities and UniNet which is funded by the Department of Education and Culture.

In the mid 1990's, the first commercial Internet company PT. Rahajasa Media Internet (RADNET) was commissioned in Indonesia. The demand for Internet started rapidly increasing since then, which reached its peak in 1996. Ever since, both public and private telecommunication kiosks (warung telekomunikasi/ wartel) were vastly emerging in cities of Indonesia.

Internet's emergence was apparently creating confusion among Indonesian government. The Department of Information which at the time was officially responsible regarding the content of Internet made a slow response toward the issue. The department which was accustomed with information media such as television and radio were experiencing difficulties in facing a medium whose ability in broadcasting is highly developed than any other media.

In May 1996, the Programmes of Law of Broadcasting (Rancangan Undang-Undang Penyiaran) also did not mention the regulation of Internet media, because it was considered as 'information provider services'. Yet there are many regulations on the Law which are inappropriate to be applied on Internet's ways of work. As the time goes by along with the emancipation of more varied contents of Internet, particularly the development of Web 1.0 to be Web 2.0, the regulation in virtual world is becoming growingly important.

Therefore, Law No. 11/2008 regarding Electronic Information and Transaction which contains of the regulation concerning Internet contents was established. The regulation roused pros and contras amongst Indonesian Society, particularly among pers community, because it is considered as obstructing the freedom of speech. The articles which are

considered as the most troublesome for the freedom of pers are especially article 27 and 28. Regulations contained in these articles are deemed to be too broad and too general. Herein provided Article 27 section (2) and (3) as well as Article 28 section (2):

Article 21 Section (1)

Any person intentionally and without any rights distributing and/or transmitting and/or creating the accessibility of Electronic Information and/or Electronic Documents containing any immoral conducts.

Article 27 Section (3)

Any person intentionally and without any rights distributing and/or transmitting and/or creating the accessibility of Electronic Information and/or Electronic Documents containing any insults and/or aspersion conducts.

Article 28 Section (2)

Any person intentionally and without any rights spreading information intended to create individual and/or particular society group hate or hostility due to tribes, religions, races, and inter-communal.

Internet Dependency

Ahuja quote Albert Memmi (2007:2) explained dependency as a dual need between dependent and provider; he defines it as a system of exchange. Yet Memmi often theorises dependency from the perspective of the dependent, seeing it as a 'trinitarian relationship' of three parties: the dependent, the object on which the dependent depends, and the provider of the object. Memmi directly acknowledges that 'there is in almost every dependency, even if it is apparently parasitic, some sort of symbiotic relationship'. He first identifies a 'reciprocal dependency' in his portrait of the dependent. In this situation, it is impossible to identify one member of the relationship as provider and another as dependent since both members give and receive.

Ball-Rokeach and De Fleur on Littlejohn (2009:979) showed that audiences, media and the larger social system work together. There are a number of things that can increase or decrease dependencies on a particular medium including the individual's needs and motives, social conditions outside of the individual control, and life attributes.

The study regarding media dependency has also been done to various kinds of media. For example Grant.et.al dalam Miller (2005:264) examined the dependencies among merchandisers, programme producers, television network, and local stations in explaining the dependencies that develop between audience members and television shopping programme. Bentley (2000) explored the power of habit and ritual on newspaper readership. While some newspaper habits – such as the morning trudge down the driveway for the paper or the mind clearing daily battle with the crossword puzzle have taken on folkloric status in popular literature, scholarly research on habitual reading is scarce. This

study attempts to quantify the so-called 'newspaper habit' and measure its impact on readership.

Data analysis revealed that habit is a force in newspaper readership that is independent of the traditional demographic drivers of readership. Regression analysis clearly showed that while the effect of habit on both the perceived importance of reading a newspaper and on reading frequency is small, it is significant, very definite and quite robust. Readers with high levels of newspaper habit also have identifiable characteristics. They were less concerned with utility than readers with low levels of habit and were more likely to feel 'inconvenienced' if newspaper delivery was delayed. Entertainment-related items such as comics and crosswords were of greater interest to those with high levels of habit, but classified advertising was of lower interest.

There are studies which explain media dependency toward attitude and behaviour. Mafe and Blas (2006:1) analyse key drivers of Internet dependency and its impact on willingness to purchase online. It is found that Internet dependency determines willingness to purchase online, with the most relevant factor being that of searching for information to take decisions. Dependent users are mainly young, highly-educated, feel Internet affinity and have high levels of exposure and experience as Internet users.

There are few studies regarding Internet Dependency in Indonesia. Considering the amount of Internet users in Indonesia has increased especially among youths, there is indication of dependency on Internet which is getting higher and requires deeper studies for it.

The discussion concerning Internet dependency often related to the negative effects of Internet, one of them is Internet addiction. Most researchers who studied the negative effects of Internet mentioned that Internet addiction might lead to lack of social interaction with family and friends, as well as creating clinical depression. Yet, it is mentioned that Internet is the media which isolates its users. The users addicted to Internet would be willing to spend hours of their time in front of their computers and finally become anti-social.

The observation conducted by the researcher found that there are the usage of terms 'dependency' and 'addictive' toward the media. Young (1999:5) defined addictive as pathological use of Internet. Young (1999:3) also developed a brief eight-item questionnaire which modified criteria for pathological gambling to provide a screening instrument for addictive Internet use. Patients were considered 'addicted' when answering 'yes' to five (or more) of the questions and when their behaviour could not be better accounted for by a Manic Episode. Young stated that the cut off score of 'five' was consistent with the number of criteria used for Pathological Gambling and was seen as an adequate number of criteria to differentiate normal from pathological addictive Internet use. Sun (2005:69) quote Charlton explained that Internet dependency or high engagement is not the same as pathological Internet use. But, in certain circumstances, such as social isolation, high Internet engagement might develop into Internet addiction. Addiction often is regarded as pathological use of computer and the Internet.

Media System Dependency Theory

According to Miller (2005:261) media system dependency theory (MSD) and uses and gratifications are often compared or seen as nearly identical in presentations of media theories. Indeed, there has been an attempt to combine these two theories into a 'uses and dependency model of mass communication (Rubin and Windahl in Miller 2005:261). Henceforth Miller explained that MSD also places a strong emphasis on both individual characteristics and on interpersonal relationships among individual.

MSD stated by Ball-Rokeach and DeFleur which emphasises on the complex system in which the media, individuals, their interpersonal environment and the social environment are seen to have dependency relationship with each other.

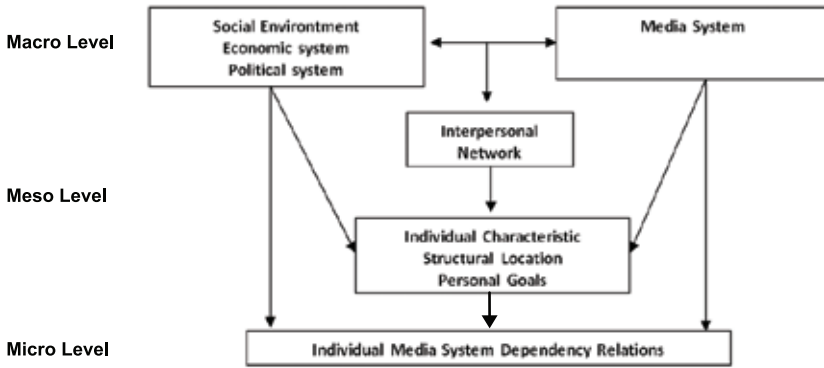


Figure 1. A model of media Dependency Relationship, source Katherine Miller (2005:261)

Each component in the system is seen to be dependent to the other components in order to gain gratification. As defined by Ball-Rokeach and DeFleur: dependency is 'relationship in which the satisfaction of needs or the attainment of goals by one party is contingent upon the resources of another party. Explained by Miller (2005:262) in Media System Dependency Theory (MSD), particular attention is given to the resources of media system in modern society and the consideration of the conditions which will increase or decrease individual's reliance on media system.

The theory attempts to explain use of micro level individual media through the analysis of structural dependency relations at the macro-level, and posits that individual media use is goal-oriented activity, and that the effects of media are a function of how dependent individuals are on mass media as a source of goal satisfaction (Ball Rokeach & De Fleur, 1976). Further in Miller (2005:262) Media System Dependency Theory (MSD) divides these various system components into three levels: The macro level of the social environment and media system, the micro level of individuals with particular goals and positions within the social environment and the meso-level of interpersonal relationship.

Next Loges and Ball-Rokeach (Miller 2005:262) figured that: 'as individuals develop expectations that the media system can provide assistance toward the attainment of their goals, individuals should develop dependency relations with the media or medium they perceive to be the most helpful in pursuit of their goals. Miller has given a very interesting example to explain this matter. The sample is taken from the American Idol programme which relies on audience calls in order to determine the contestants who are appropriate to move on to the next stage. Miller explained that individual decision (micro-level influence) could no longer be disputed to be influenced by interpersonal relationship and electronic dialogue (a meso-level influence) and by the media coverage of the relative strengths and weakness of contestants (a macro level influence). Therefore it results on the variety of dependency relationship which might influence either the media content or individual reaction.

Further explained by Miller (2005:262), that Media System Dependency Theory (MSD) enlarges the concept of dependency relationship with specific antecedent and its consequences to this relationship. First, this theory mentioned that dependency to media would be increased where there are conflicts and changes in the society. DeFleur and Ball-Rokeach believe that in the era, there will be some increase in information needs and the proper relationship would be insufficient to provide such information.

The structural dependency relations involve the media relationship with the economic system, political system and other social systems (educational, religious). The relationship between the media system and socio-economic system can be reciprocal or subordinates.

Reaserch Question

The first question in this study is how far do Indonesian teenagers depend on Internet? The second question is, on what purposes do the youths depend on Internet?

Method

Sample dan procedure

In answering these questions, a survey was conducted toward 500 students of Senior High School in Malang-Indonesia. The study was conducted among 21 schools comprising of both public and private ones in Malang, 3 schools were not willing to be explored, so the study results cover 18 schools only. The questionnaires spread among 500 students, and about 55 questionnaires were not returned and 14 questionnaires were not completely filled, therefore the research data covers only 431 respondents.

Table 1. Characteristics of Respondents

Characteristic	Category	Frequency	Percentage (%)
Gender	Boys	192	44.5
	Girls	239	55.5
Age	14 years old	44	10.2
	15 years old	166	38.5
	16 years old	119	27.6
	>= 17 years	102	23.5
Access Internet /day	11-15 times	355	82.4
	16-2 times	40	9.3
	21-25 times	11	2.6
	< 25 times	25	5.8
Length of access	5 minute	69	16.0
	6-15 minute	104	24.1
	16-30 minute	95	22.0
	31-60 minute	74	17.2
	< 60 minute	89	20.6

The respondents of the study were mostly girls (55.5%) out of 431 respondents, aged between 15-16 years old (66.1%), accessing the Internet for about 11-15 times per day (82.4%) for the duration of about 6-30 minutes (46.1%). These findings reflect that Internet has become a part of High School Students activities today.

Measures

The respondents were asked to voluntarily fill the questionnaires concerning their usage of Internet. Generally the respondents spent around 7-15 minutes in filling the questionnaires.

Demographics

Boys were given the code of 0 and the girls were given the code of 1. In the questionnaire the age of the respondents were also asked.

Internet Dependency

Adapted from Melton & Reynolds 2007, this variable explained youth dependency on Internet in aspect of information, communication, entertainment and news. To fulfil the research interest, business factor was included. Respondents reported their agreement with 20 statements. Five points of Likert Scale were used in answering the questions, 1 defines highly disagree, 2 defines disagree, 3 defines neutral, 4 defines agree, and 5 defines highly agree.

Finding

Internet dependency is measured by 5 indicators; they are information, communication, entertainment, online news and marketing. Internet attracts students more because of the need of information. A student even stated that he often uses search engines to find information or answer to some questions. This indicator has average value about 4.01 – 4.49. The dependency toward Internet from communication aspect among the students

obtained an average value in the sixth place for about 3.20 - 3.65. In the activities of online group or online chatting, the students mostly chose communication. Dependency towards Internet in the indicator of entertainment varied. It can be seen from the average value of 2.86 – 4.32. Students mostly prefer to download files, watch video clips or share files with others. The indicator of independency toward news is also quite strong, the average value is 4.11 – 4.42, showing that students often access news both global and local having proximity with their city or community. Meanwhile internet dependency from the side of online marketing is not too high with the average value of 2.59 - 3.77. In addition, dependency on online marketing can be seen more on information searching only. It can be seen from the table below.

Table 2. Descriptive Statistic of Internet Dependency

STATEMENT	MINIMUM	MAXIMUM	AVERAGE
Information			
1. Using online search engine to find information ^a	2	5	4.49 ^a
2. Determining what to purchase and where to purchase it ^b	1	5	4.01 ^a
3. Using search engine facilities in Internet to find answers of some questions	1	5	4.02 ^a
Communication			
1. Becoming part of an online group where you can feel as being its part ^a	1	5	3.65 ^a
2. Visiting an online support group	1	5	3.23 ^a
3. Chatting in a chat room or participating in an online discussion	1	5	3.48 ^a
4. Expressing your ideas (Ex: in a group discussion, in an online bulletin services)	1	5	3.40 ^a
5. Learning more about yourself	1	5	3.42 ^a
6. Making appointments with friends to visit some places ^b	1	5	3.20 ^a
Entertainment			
1. Downloading files such as games, videos, or pictures ^a	1	5	4.32 ^a
2. Sharing files with other people	1	5	3.97 ^a
3. Watching video clips, or listening to music clips	1	5	4.23 ^a
4. Downloading and sharing videos of popular artists ^b	1	5	2.86
5. Interested in online games such as Dota, and Point Blank	1	5	2.99
News			
1. Getting news	1	5	4.37 ^a
2. Finding out what is currently happening/ happened in the world ^a	1	5	4.42 ^a
3. Finding out what is currently happening/ happened in my city/community ^b	1	5	4.11 ^a
Online Marketing			
1. I'm looking for information about things I want (shoes, watches, t-shirts, clothes, etc.) ^a	1	5	3.77 ^a
2. I'm buying my needs from online shop	1	5	3.02 ^a
3. I'm selling goods/ services online ^b	1	5	2.59

Definition: ^a = average value more than 3; ^a = higher average value; ^b = lowest average value

Results of Factor Analysis

In this study, factor analysis test was conducted in four processes consisting of interdependency test, factor extraction, factor matrix, and formed factor labelling. The interdependency testing was done to acknowledge whether there was interdependency between one variable and the other. In other words, the variables having no correlation with other variables could be excluded from the analysis (to be retested later on).

This variable interdependency testing was meant to filter the suitable variables to be used in factoring process and to exclude the improper variables. This test was conducted by using scores of Keiser-Meyer-Olkin (KMO). Factor Extraction could be done when the score of Keiser-Meyer-Olkin (KMO) was more than 0.50.

The core process of factor analysis has to do with extracting a group of attributes in order to form one or more factors. The method in factor extraction in this study is Principal Component Analysis (PCA) method. This method is based on the eigenvalues, the variance percentage or the cumulative percentage. Eigenvalues is the value representing the total of variants defined for every factor. Besides, in factor extraction the result is a communality value for each variable. Communality is meant as the amount of variance owned by each attributes which can be defined by the extracted factors. The last part is interpreting the results of factor loading which measures the correlation between attribute and the formed factors.

The measurement of KMO score obtained the value of 0.839 which explained that the result of observation of 20 Internet dependency attributes are correlated with each other. The score of KMO in the analysis is more than 0.50. Then, a factor extraction would be conducted by using the method of Principal Component Analysis (PCA) to identify the dependency on Internet. It was measured by 20 attributes which were resulted in the extraction of 6 factors. The total of cumulative variance which could be explained by these six factors is 64.429%. The results of factor extraction in detail can be seen in the next table.

The result of factor analysis toward the problem of Internet dependency among Senior High School students is structured into 6 main problems; (1) news and entertainment, (2) communication media, (3) particular information, (4) online marketing, (5) video downloads and (6) online games. The first factor consists of the newest global news, local news or communities, watching video clips or music, downloading entertainment files (e.g., games, videos and pictures). This factor can explain about 28.516% internet dependency of a student. In other words, the internet dependency of a student would be emphasised when the student often uses internet as a media to search for news and entertainment.

Table 3. Result of Factor Analysis Variable internet dependency

Factors	Name of Factors	Attributes	% Total Variance	% Cumulative of Total Variance	Loading Factor
1	News and Entertainment	1. Finding out what is happening/ happened in virtual world	28.516	28.516	0.854
		2. Obtaining news			0.818
		3. Finding out what is happening/ happened in my city/ community			0.720
		4. Watching video clips, or listening to music clips			0.598
		5. Using online search engine to find information			0.566
		6. Downloading files such as games, videos, or pictures.			0.550
		7. Sharing files with others			0.500
2	Communication media	1. Expressing your ideas	11.287	39.804	0.768
		2. Chatting a chat room and participating in an online discussion			0.683
		3. Visiting online support group			0.656
		4. Learning more about yourself			0.611
		5. Being part of an online group where you can feel as a part of it			0.580
3	Particular Information	1. Using search facility to answer a specific question	8.190	47.994	0.775
		2. Determining what to buy and where to do it			0.614
4	Online Marketing	1. I buy things I need online from online shop	6.499	54.493	0.818
		2. I sell goods/ services online			0.808
		3. I'm looking for information about things I want (shoes, watches, t-shirts, clothes, etc)			0.507
5	Downloading video of popular artists	1. Downloading and sharing videos of popular artists	5.152	59.645	0.685
		2. Making plans with friends to go somewhere			0.632
6	Online Games	1. Interested in online games such as Dota and Point Blank	4.784	64.429	0.715
Value of KMO = 0,839; O3 = Entertainment;		O1 = Information; O4 = News;	O2 = Communication; O5 = Online Marketing		

Discussion

Nowadays, almost all teenagers are familiar with Internet. The findings showed teenagers' high dependency on the Internet. There were five indicators of internet dependency, namely information, communication, entertainment, news, and online marketing. Factor analysis explained that the teenagers' internet dependency was influenced by (1) news and entertainment (2) communication media, and (3) getting particular information. Teenagers' activities at school and their age were the logical reasons for the need of news and entertainment. Teenagers preferred hot and up to date news in the world, popular video clips or music, and online discussions.

This study was in line with Kraut et al (2003) research. Through the Home-Net project it is known that American teenagers mostly use Internet for entertainment, information and communication with friends and family or for meeting new people online. It appears that youths need to gain new information and also entertainment through Internet, for example from youtube or downloading music, games and videos.

Teenagers mostly use Internet to get updated news and entertainment about what is happening in virtual world and also in local community. Youths like to watch video clips and also use online search engine to find information. They also like downloading videos, pictures, and games. Youths use the internet as a communication media to express and exchange their ideas, chat and participate in online discussions and learn about themselves. The last factor is Internet for getting particular information. Youths use Internet to access search engine for example: google, yahoo, mspace to find answer to specific question. Surprisingly youths also often look for information about what to buy and where to do it.

The findings indicated that in an average teenagers used internet 11-15 times a day. It could happen because schools provide them with assignments that require them to access the Internet to complete the homework, especially schools with E-Learning programmes. The study stated that teenagers' internet dependency was positive considering their needs of news and entertainment. Further, it cost only USD 20 cent per hour to access information through internet at anytime.

The findings showed that Internet was accessible for teenagers to meet their personal and group needs. In addition, it also suggested that teenagers with good interpersonal relationships would rely on internet to support their activities. It meant that internet provided many benefits to teenagers, particularly in terms of entertainment.

This research shows that teenagers in Indonesia have a relatively high dependence on the Internet. This is in line with Don Tapscott (2009) that mention teenagers as 'digital native' where they grow and rouse along with the information technology itself, so it is not surprising that teenagers are the most experts as well as the most users of information technology, especially Internet.

Internet Dependency among teenagers in Indonesia require attention. Appropriate media literacy should be developed for teenagers to consider the aspects of value and culture espoused by Indonesia, so that, the Internet can be used wisely by Indonesian teenagers

Limitations and Further Research

The use of MSD theory in this research was limited to a research of media effects. However, this theory is capable of photographing an individual relationship with the media and they also see the dependence on other media very well.

The research sought to specifically examine the dependence on Internet content, for political news, health, business, and also on other aspects. National research can provide new perspectives about why teenagers depend on the Internet. The research can also be done to compare the dependence on the Internet and other media such as newspapers or television.

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Youth, Digital Media and their roles in Social Changes

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As media and its content rapidly transform—youth today can access a wide variety of online goods and services to fulfill their personal needs and to explore multiple identities. Youth are now playing a more active role in responding to current societal issues through digital media and increasing their participation in addressing social issues in a spontaneous manner. However, such youth participation in society was monitored by various authoritative groups such as the educators, parents, coaches, and religious leaders before the invention of digital media but at present, digital media is arguably diminishing the impact of these gatekeepers on youth participation.

This research intends to explore the question of how digital media can be used as a tool of empowerment in building the capacity of Indonesia's youth to participate in social changes. In this term, digital media is defined as digitized content (text, graphics, audio, and video) that can be transmitted over internet or computer networks.

This research provides a descriptive study focusing on the intersection between Indonesia's youth creativity in making video feature for social media as a type of digital media and their roles in social changes. In particular, the research examines the fundamental implications of a potential alignment or misalignment, between two entities: the youth video feature on social media (YouTube, twitter and Facebook) and their roles in the social changes. Also, why does it contain the biggest potential for changing the way Indonesia's youth live their lives?

Introduction

New Media and Youth

Every day, a story runs in the news media that relates to teenagers and the internet or social networking or digital media. There are many stories – one of them for example – about sexual predators tracking down teen users through social networking site, or tonnes of

stories about personal disclosure. However, there are very few stories about young people using new digital media for good.

The media sometimes give stories that prey on audience's fears about the invasion of new digital technology. Reporters often intentionally mislead audiences about youth and digital technology. Teens are considered as passive audiences and are mostly portrayed as victims of the new technology. Is it really that bad?

Research Perspective

This paper analysis focuses on the youth's possible participation in social change using new digital media. Underlining the short film/video, made by HD SLR, which are uploaded on Youtube and other internet sites (website, blog or social networking site), the paper talks about three perspectives: uses of internet sites, short film/video made by HD SLR, and social changes. The social change is viewed from the perspective of intercultural communication.

There are stories of youths who perform remarkably with the facility of internet. The result is of course different for some teens having varying effects of the new media. 'Adolescence' not being defined by a chronological age makes it merely a textual referent for the stage where abstract thinking emerges, identities are being tested, and peer relationship are of paramount importance, bringing different perceptions to the fore about youth. Uniquely, although the result shows differently, new media has been a component fostering youth's creativity, participatory cultures, artistic expression and strong support for creating and sharing creation. This paper considers how youths are impacted by the affordances the new digital media offer, and how these new values and beliefs lead to new social changes.

Research Methodology

The literature methodology sought to explore the question about how youths are changing today, as a result of broad social and cultural changes, including the advent of new digital media. This body of work focuses primarily upon digital tools exploring – specially short film/video format – made by HD SLR, as they manifest in an individual's achievement of the uses of new media, such as Internet web site, blog and social networking sites, using Youtube link and how their involvement lead to social changes.

Throughout this paper, we focus primarily, on young people. We apply the terms 'teen', 'adolescent' and 'youth' to distinguish among subtle points of development. The terms 'teen' and 'adolescent' refer to someone who is more experienced, capable of abstract thought and wrestling with a host of emotional, social and physical development challenges. Youngsters for instance are typically 15 years of age or older. The term 'youth' refers to a generation in the liminal space between childhood and adult, representing an era.

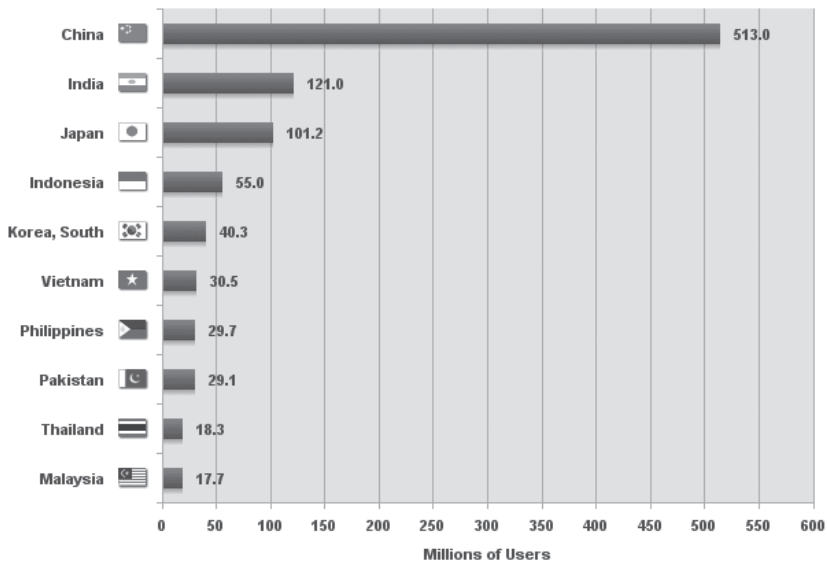
Indonesia Youth Recent Issues – The Internet

Undeniably, the teen culture now is permeated with technology. There's no way could talk to a teenager without talking about social networking or digital technology. The Internet and digital world is really the province of teenagers.

Research shows, based on data obtained from [internetworldstats.com](http://www.internetworldstats.com) per December 31, 2011 that the amount of Indonesian internet users reached 55 million peoples. Indonesia was ranked 4th in Asia after China, India and Japan.

(<http://www.internetworldstats.com/stats3.htm>)

**Table 1: Indonesia's Internet Users
Asia Top Internet Countries
December 31, 2011**



Source: Internet World Stats - www.internetworldstats.com/stats3.htm
2,267,233,742 Internet users in the World estimated for 2011 Q4
Copyright © 2001-2012, Miniwatts Marketing Group

(<http://www.internetworldstats.com/stats3.htm>)

Indonesian Internet users grew rapidly from only 2 million people in 2000 to 55 million in 2011. It is about 23% of a total population of 245 million. This amount has a penetration of only 22.4% and the average number of internet users in urban areas is 60% under 30 years old and other data show nearly 30% of internet users in Indonesia come from among teenagers aged 15-24 years. (<http://www.internetworldstats.com/stats3.htm>)

Table 2: Indonesia's Internet Penetration

ASIA INTERNET USAGE AND POPULATION						
ASIA	Population (2011 Est.)	Internet Users, (Year 2000)	Internet Users 30-Dec-2011	Penetration (% Population)	Users % Asia	Facebook 31-Dec-11
Afghanistan	29,835,392	1,000	1,256,470	4.2 %	0.1 %	257,180
Armenia	2,967,975	30,000	1,396,550	47.1 %	0.1 %	242,140
Azerbaijan	8,372,373	12,000	3,689,000	44.1 %	0.4 %	604,040
Bangladesh	158,570,535	100,000	5,501,609	3.5 %	0.5 %	2,252,800
Bhutan	706,427	500	98,728	13.9 %	0.0 %	64,000
Brunei Darussalam	401,890	30,000	318,900	79.4 %	0.0 %	234,800
Cambodia	14,701,717	6,000	449,160	3.1 %	0.0 %	449,160
China *	1,336,716,015	22,500,000	513,100,000	38.4 %	50.5 %	527,380
Georgia	4,585,874	20,000	1,300,000	28.3 %	0.1 %	725,160
Hong Kong *	7,122,508	2,283,000	4,894,913	68.7 %	0.5 %	3,793,100
India	1,189,172,906	5,000,000	121,000,000	10.2 %	11.9 %	41,399,720
Indonesia	245,613,043	2,000,000	55,000,000	22.4 %	5.4 %	41,777,240
Japan	126,475,664	47,080,000	101,228,736	80.0 %	10.0 %	6,267,540
Kazakhstan	15,522,373	70,000	5,448,965	35.1 %	0.5 %	362,420
Korea, North	24,457,492	--	--	--	--	n/a
Korea, South	48,754,657	19,040,000	40,329,660	82.7 %	4.0 %	5,355,880
Kyrgyzstan	5,587,443	51,800	2,194,400	39.3 %	0.2 %	64,620
Laos	6,477,211	6,000	527,400	8.1 %	0.1 %	129,660

(<http://www.internetworldstats.com/stats3.htm>)

Uniquely, from the statistics, the internet uses still dominated on the access of social networking media and online forums like Facebook (rank 4), Blogspot.com (rank 4), Youtube (rank 6), Kaskus (rank 7), and Twitter (rank 10). (<http://www.alex.com/topsites/countries/ID>)

Detik.com, one of Indonesia's famous news sites said that Indonesia's facebook users registered up to nearly 43 million users, in early 2012 period. The amount made Indonesian facebook users one of the largest numbers in the world. In terms of age, facebook users with an age range 18-24 years dominate approximately 41.2%. (<http://inet.detik.com/read/2012/04/18/170412/1895579/398>).

Table 3
Indonesia's Facebook User



(<http://inet.detik.com/read/2012/04/18/170412/1895579/398>)

Meanwhile, active Twitter users in Indonesia reach 5.6 million users. The numbers of 'bloggers' in Indonesia are also increasing. Initially, the number of 'bloggers' in 2007 only amounted to 130,000 people, then in 2008 to 600,000 'bloggers', increasing further to 1.2 million 'bloggers' in 2009. That number increased dramatically to 3.4 million in 2010. (<http://www.alex.com/siteinfo/twitter.com>)

From this amount, teenagers dominated the Internet users in Indonesia. The word "teenagers" itself derived from latin word "adolescence", which means to grow or to grow maturity. According to Papalia, Olds and Feldman in his book Human Development, adolescence is a developmental transition between childhood and adulthood which generally begins at age 12 or 13 years and ends in late teens or early twenties (Papalia, Olds & Feldman, 2009: 11).

A variety of group has interpreted the word 'teens' differently. WHO said teens is the age group between 12 and 24 years; meanwhile Indonesia Health Department defined teens in the age group of 10-19 years; and the 1998 Youth Manifesto sets teens in the age of group of 10-24 years; even Indonesia Youth Regulations proposes that teens between ages of 18 and 35 years.

In general Indonesian young people, according to BPS (Badan Pusat Statistik – Indonesia Central Statistical Agency) Catalog: 3101015 August 2011, considered the adolescent age between 10 and 24 years old in Indonesia. This age bracket, according to the census in 2010, reached 63,426,993 million, or nearly 30% of the total population of Indonesia. The amount consists of 32,151,398 million male and 31,275,595 million female.

The Internet affords independence to teenagers. They're able to have a private space even while they're still at home; they're able to communicate with their friends and have a social life outside of the purview of their parents without actually having to leave the house (Gee, 2010: 15). And social networking sites in particular have taken off because teen culture is a social culture. That's what being an adolescent at this time means; it is being social.

A recent study conducted by Danah Boyd, sought to investigate whether young people use the social networking sites to emulate their everyday lives. The same or similar social structures that they know and that already exist in the real world are the same ones that they construct and maintain online. Friend lists are usually made up of people that they already know in the real world, and they are interested in socialising with as opposed to strangers. In many ways, they make their online world an extension of their offline world. (<http://susan-roberts.hubpages.com/hub/Teenagers-and-the-Social-Networking-Phenomenon>)

Adolescence defined as time of "identity consolidation", is when teens prefer going around and trying on many different identities. What Internet sites allow them to do is to display that identity in a very dramatic and very succinct way. Whereas, teens had to rely on visual cues or say, "I listen to rock music", or "I had gothic style because this is going to say something about me", now they can literally say on Internet sites, "This is my identity, this is my music,

these are my friends, these are my heroes, these are the people I don't like", and that really defines an identity in a really public way for them. (Sarwono, 2009:34) In a way, the Internet sites are this digital representation of what we think of as adolescence.

Media sometimes are a little paranoid, shaping the thought that the new media and the Internet have really bad influences on youth. We seem to forget that youths of today are cleverer – and of course have easier access to the information around the world, and they're a lot savvier than we think they are. Keeping teens away from digital technology and new media, doesn't stop them from being curious. It just shuts down excitement and shuts down any chance the teens have of finding their role in society.

The privacy restrictions built on Internet sites make it possible for teens to share as much information as they want with their friends and with anyone within their social circle. At the same time, it allows them to block anyone they have not given approval to communicate with them. Youths will most likely continue to socialise online through whatever good web sites and web tools are available, this probably will not change. Thus, in other words, besides being paranoid on how new digital media could harm youths, the condition could potentially empower them with fulfilling their role in the society.

HDSLRs, Video And Youtube

Needless to say, it is almost impossible to stop Internet penetration among youth. The development of technology will only increase in its complexity. And youth, who always tends to figure out how technology works, will explore whether adults give permission or not. One of the technologies that complements the new digital media era and is popular among the youth is high-definition single lens reflex camera (HDSLR). This digital camera is popular among youth because it promises great performance of photo and video, ease of use, sophistication and a match to the lifestyle of youth. HDSLRs have transformed from being tools used by professional photographers into a 'must have item' for Indonesian youths nowadays.

Together with the emergence of large CMOS imagers, HDSLRs are nothing short of a revolutionary moviemaking technology, as important as the invention of colour film, 16mm, or HDTV. (Koo, 2010: 6) To emphasise: these cameras are not designed to shoot movies. Their primary function remains to shoot still photos, but it just so happens that they shoot amazing video very inexpensively. The camera meets what was a dream few years ago: a video camera that is cheaper than any of us imagined (Koo, 2010: 6). HDSLRs has an ability to work with shallow depth of field, while at the same time creating a sense of intimacy difficult to achieve with standard (small chip) prosumer video cameras (Bork, 2003:22).

The main advantages of a HDSLR are in terms of its ISO sensitivity, focal length, and depth of field. In addition, HDSLRs is able to decrease the ISO noise and the depth of field (with the HDSLR features of small aperture and big CMOS sensor) (Koo, 2010: 7). Even though these cameras offer a world of advantages, they also come with a considerable set of drawbacks. However, these drawbacks are worth dealing with in order to get the kind of

amazing images possible with an imaging sensor that has twenty to thirty times more surface area than that of a similarly priced, dedicated video camera. (Koo, 2010: 8)

There are no doubts that videos are more popular among youths than other media – for example books. Videos facilitate learning and entertainment faster. With audio and visual element, video is expected to capture nearly 100% of the audience's concentration. People tend to watch videos, because they are unique presentations. Besides that, video can demonstrate how tasks are performed, something which written materials cannot do. It can bring material to life and learning will never be boring. And although there are some unique technical challenges to learn HDLSR cinematography, the technology gives youths a huge jumpstart in figuring out how to make beautiful, inexpensive videos using a HDLSRs. Using HDLSRs, youths can become a part of video production not just a viewer.

The Jakarta Book Festival Website referenced the UNDP while stating, Indonesian youths' lack of reading interest is lowest in ASEAN, finding video a crucial media for more effective communication among the Indonesian youth. HDLSRs give youth an opportunity to express themselves and their thoughts about issues in clearer terms. Nowadays, phenomenon shows that many Indonesian teens choose short film as their work of expression, in either experimenting with fiction or documentary film.

The condition above leads youths as producers of the film and allows them full control of the content. And not stopping there, in the end, they publish their short films using the Internet in order to disseminate their ideas and perception over various issues and secure an identity for themselves. In this stage, YouTube play a significant role because short films usually shared via YouTube link to personal sites of the content producer.

YouTube identifies itself as a video-sharing website, created by three former PayPal employees in February 2005, on which users can upload, view and share videos. The company is based in San Bruno, California, and uses Adobe Flash Video and HTML5 technology to display a wide variety of user-generated video content, including movie clips, TV clips, and music videos, as well as amateur content such as video blogging and short original videos. (<http://en.wikipedia.org/wiki/YouTube>)

Most of the contents on YouTube are uploaded by individuals, although media corporations including CBS, the BBC, VEVO, Hulu, and other organisations offer some of their material via the site, as part of a YouTube partnership programme. Unregistered users can watch videos, while registered users can upload as many videos as they want. Videos considered to contain adult contents are available only to registered users aging 18 and above. (<http://en.wikipedia.org/wiki/YouTube>)

By February 2008, the YouTube was grabbing one-third of the estimated 10 billion views of online videos that month, up from 15 percent in 2007, according to internet marketing research company comScore. (<http://www.certmag.com/read.php>) Ten billion views a month show that online video is an explosive new medium, and YouTube has proven to be one of the most influential domains. And even though, some sites provide video, they are

linked with YouTube. YouTube is proving to be a medium for expressing and documenting of ideals, issues and learning contents.

YouTube Video more easily known among youths as medium to transfer issues, allow human beings to gain much of their initial understanding of others through our sensory capabilities – both visual and auditory. According to some studies, the written word only communicates 7% of what we mean. Voice tones and inflections can account for as much as 38% of understanding a normal conversation. Video can add another 55% to the understanding (Yudhawati & Haryanti, 2011:78). Video allows all those body language cues – the smile, the twinkle of the eye, the raised eyebrow, the lean, the crossed arms and the tilt of the head to communicate a message. The instantaneousness of moving image and impact of human voice is very powerful.

Videos are the most powerful communicative tools in history. Video allows the communicator to communicate his message quickly and effectively, while holding the audience's interest. One of the reasons why video is such a powerful medium is because it involves the audience's emotions. Even for specific purpose, the ease of learning can alleviate audience's fear to a particular subject. Also, producing a video often costs no more than any other media. In fact, video is able to give a great deal of information in a short amount of time. (Juhasz, 2011: 14)

Short films and documentaries become the key forms visual representation in research. According to dictionary, film is defined as a sequence of images of moving objects photographed by a camera and providing the optical illusion of continuous movement when projected onto a screen and a form of entertainment, information, etc., composed of such a sequence of images and shown in a cinema, etc (<http://www.thefreedictionary.com/film>). A film and television school in Paris, EICAR The International Film and Television School, explains film as encompassing individual motion pictures, the field of film as an art form, and the motion picture industry; films are produced by recording images from the world with cameras, or by creating images using animation techniques or special effects; films are cultural artifacts created by specific cultures, which reflect those cultures, and, in turn, affect them. Film is considered to be an important art form, a source of popular entertainment and a powerful method for educating — or indoctrinating — citizens. The visual elements of cinema give motion pictures a universal power of communication. Some films have become popular worldwide by using dubbing or subtitles that translate the dialogue. (<http://www.eicar-international.com/definition-film.html>)

Often, film is not just a result of imagination experience, but it could be a lesson for the audience. Many things can be explained through the film: the process that occurs in the human body or in an industry, natural events, lifestyles in a foreign country, mining, teaching skills, the history of world leaders, and many more (Usman and Asnawir, 2002: 95). Film functions in the areas of illumination (entertainment), education (education), and entertainment (recreation). Therefore, a film can be used as a medium for publication or to convey messages about the programme of development in all fields. (Permadi, 1999: 55).

Film has power to visualise human being's civilization at one period of time as well as influence civilization. As one of the mass communication forms, film is perceived to be able to persuade and manipulate public opinion and take a part in human civilization.

Indonesia's Youth Film The Community, Festival And Idealism

One of the measurements of development in filmmaking among Indonesian youths can be observed from the increasing number of film communities. Presently, there are no less than 80 film communities in a big city and other parts of Indonesia carrying out their activities independently through film screening, discussions and film production. The film community is not only managed by enthusiastic individual/non-formal organisations but also cultural centres, campuses and schools. What makes the spirit of the filmmakers and the film community flared up again?

If we trace its development from the beginning, Indonesian independent film communities first appeared shortly after Indonesia had the first film academy in 1970 (Jakarta Arts Institute). At that time Jakarta Arts Council held a mini film competition and was followed enthusiastically by filmmakers even outside the students of Jakarta Arts Institute. The participants named their groups as independent film communities. During the year Indonesia is experiencing extraordinary growth in film production, indicated by the appearance of 125 films developed in just one year. Unfortunately, due to lack of support, the scenario sustained only for a year.

Afterwards there has been a vacuum for almost a decade. Movements in Indonesian independent film industry started again when Forum Film Pendek (FFP – Short Film Forum) took the centre stage in 1980s. Community founders from various backgrounds and members created a huge impact in the independent film industry. FFP screened a film, the response of which was immense and ran in festivals at Medan, Lombok and Bali. FFP is also listed as the first community to formulate a short film as an alternative and independent film. Among the significant highlights of events, Gatot Prakosa was invited to play his movie at the Oberhausen Film Festival Germany – the oldest and most prestigious short film festival in the world.

Although the film community during the 80s and early 90s did not flourish as much, with the opportunity given, the independent film industry developed rapidly –in a positive way, during this period. Conversation and discourse about film permeated not only among film academics and activist, but also the audio-visual art practitioners and pop culture fans. The industry influenced youths began to delve into the world of short film creativity, to express their opinion about different issues. The spirit was alive even when Indonesia film industry was in its lowest point between 1994 and 1998 when almost 95% of Indonesian films categorically produced only adult films. The independent film industry started positioning itself as the opposition party for the mainstream of Indonesian film industry (read: national film).

A critical year was 1997 for the development of Indonesian film industry. The year produced one of the best Indonesian independent films created by Seno Gumira Ajidarma (Indonesia humanist), *Kuldesak* – a combination of four story (short film) in one movie. *Kuldesak* happened because of the spirited Indonesian youth film activists, who were determined to give audience different perspective of Indonesian films. On the other hand, the film also became a proving point for Indonesian youth filmmakers' existence since the directors who were involved in the film (Mira Lesmana, Riri Riza, Nan Achnas, Shanty Harmayn and Rizal Mantovani) were young people and newcomers in the Indonesian film industry. The film carried unusual story at the time: portraying restlessness of the young through the lens of young people themselves. The interesting part is all about the young directors above now became a leader of Indonesia film industry. Another interesting thing is that in this year the digital technology of filmmaking arrives in Indonesia. All these short films took part in *Kuldesak* film made by digital film technology. Since then, many youth filmmakers joined the industry, published their project and positioned themselves as independent filmmakers raising social issues.

Furthermore, with Indonesia's film community growing consistently – most of them focused on the appreciation, while others plunged into the world of practice by producing short films, documentaries and feature films. In 2000, six feature independent films were produced: *Beth* (Aria Kusumadewa), *Bintang Jatuh* (Rudi Soedjarwo), *Jakarta Project* (Indra Yudhistira), *Pachinko & Everyone's Happy* (Harry Suharyadi), *Tragedi* (Rudi Soedjarwo) and *Sebuah Pertanyaan untuk Cinta* (Enison Sinaro). Some of them succeeded playing in Indonesian cinema while others played from university to university among Indonesia cities. The fall of Indonesian government (called: Orde Baru government) in 1998 brought freedom for many young people to escape from the doctrine 'silence is golden'. Youth – with his new passion, translated the word 'independent' as the freedom to express their opinion through creative art forms. Film community began presenting in Bandung, Yogyakarta, Solo and other cities beside Jakarta.

On the way, all the film communities started to be able to synergise each other for the progress of Indonesian film industry. As an example, some of the film community (Kineruku – Bandung, Kinoki – Yogyakarta and Arisan Film Forum – Purwokerto) have joined to publish a quarterly journal of film studies, which will be distributed in places across Indonesia. Due to this, the outline of each independent film communities tend to share knowledge and experience (technical and appreciative), as well as creating a community of critical and appreciative audience. The presence of the communities feels stronger as they take responsibility to educate Indonesia's film audience. It's why until now most of the communities produced independent films – fiction or documentaries, to be free from insistence to promote something or take side for certain parties. Being independent, the film project could stand neutral and focus on the recent issues in the society.

In line with film communities' growth around the same time, Indonesian film festivals were held continuously around Indonesia. There are some old names which still run today, such as: Purbalingga Film Festival (FFP, 2007), Q! Film Festival (QFF, 2003), Indonesia

International Fantastic Film Festival (iNAFF, 2007), Documentary Film Festival (FFD, 2001), Jogja-NETPAC Asian Film Festival (JAFF, 2006), and Festival Film Indonesia (FFI, 1955, absent from 1992 to 2004). Each of them has own focus. FFP concentrates on developing the local film community in Purbalingga, while iNAFF and QFF have their meeting points in the capital city of Indonesia: iNAFF is for fans of horror and fantasy films, while QFF raises issues about LGBT (lesbian, gay, bisexual and transgender). Jogjakarta, FFD and JAFF are meeting points for the film community in Yogyakarta. The FFI is considered to be a barometer for the national film industry.

Three pillars of film that can be served through the film festival are the exhibition, appreciation, and distribution. To achieve this ideal picture, the film festivals must be consistent. The film festival, which could continue to be held, will be growing from year to year until it reaches (or at least nearly) ideal conditions. Unconsciously, film festival represents the nation's identity and become a meeting point for film appreciation activities. The festivals not only provide an alternative spectacle, but also provide an alternative space for the audience to "celebrate" films.

Two issues that should be highlighted here: are the contribution and the survival of the film communities and festival. Ideally, a film community and festival can contribute to the two parties: the filmmakers and audiences. For the filmmakers of course, besides the film screening, appreciation, and knowledge, they have an opportunity to shape their opinion through projects related to recent issues. Thus, the youth filmmakers deliver their messages about issues which are interesting for them and the audiences. At the same time, audiences can respond to the messages directly when the screenings are held or in discussion forum.

Many cases tell that Indonesian audiences' opinion can lead to specific movements in the country. Digital technology has helped achieve this goal in recent years.

Social Changes

The Impact Of The Film

Today, the various elements are indirectly but simultaneously supporting the development of Indonesian independent film industry: first, the development of digital technology and their freindliness (digital video cameras and editing software on personal computer); and secondly, the internet that opened up a chance to publish the project and get insights about film education and perspective. Youth has a lot of resources more than before to make some changes in their communities. With the digital technology and new media, and the engagement between HDSLR and YouTube, youths became a great power in its role to changing communities.

If in 1997 the digital technology gave filmmakers an easy way to produce independent film, now, youths have a chance to publish the project without waiting for some organisation held film festival or created film community –via YouTube. However, the condition shows that even the film festival and community use the social networking and YouTube as their tools to approach youth independent filmmakers. Hence, digital technology, new media and

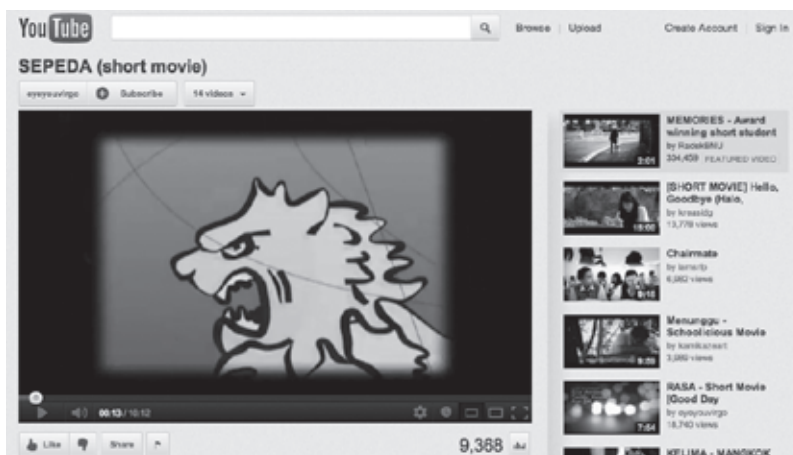
youth become powerful resources to impact the social changes.

Youth filmmakers used YouTube to publish their project –usually film trailer. Most of them are the project to fulfill university or school assignment. Surprisingly, many short film shows on YouTube gain lot of viewers. During the time when trailer on air many of the audience will give responses and if they have same paradigm about filmmaking they usually gather and build their own community –film community. It is also become a beginning step of film online forum.

Image 1: Example of Youth Film in Youtube



Image 2: Example of Youth Film in Youtube



When youth use film as their tools in represent their response to one issues youth able to direct the content. They have absolute power in choose and expose the material, finding the similarity in peers. Some youth –mostly group leader, exposes their group to a link to a film

and so they watch it. What they mostly are watching is video that they know of through some other source, and they use YouTube for its capacity to serve that video. (<http://www.certmag.com/read.php>) New media arrive on the scene in a number of dimensions and interactive. Thus, in the end, through peer online forums, in the short of time, the video will popular and add more viewers and comment.

Because of learning is a social process and involves active acquisition of new knowledge and understanding through group and peer interaction, the YouTube film could lead a youth perception to one issue. And considering the amount of youth using internet as their daily communication tools, the effect could reverse, to the good purpose of youth development. The film could be used to share values, attitudes and beliefs of certain issue among youth like enculturation process in intercultural communication, which in the end, lead desired social changes in youth.

Intercultural communication is communication between individuals or groups from different cultural backgrounds whose diversity of symbol systems and cultural perspectives in influences the communication exchange. The culture itself defined as group of people who share values, attitudes, beliefs, customs, and a symbol system that differentiates them from other group. (Perkins, 2008: 155-156) Meanwhile enculturation refers to the process of socialization experienced by a collective group of people for the purpose of maintaining an agreed-upon worldview of values, attitudes, and beliefs within a common symbol system. (Perkins, 2008: 156)

Through the process of enculturation, there is a layering of identity that creates our cultural, sociocultural, and psychocultural selves. (Perkins, 2008: 157) It is the totality of the individual that we interact with and create relationships with, not just that aspect which is familiar to us. The aim is for varying perspectives to meet some specific objectives.

What we must be agreed is that the responsibility to help them fulfill their role are task of all parties. After all, teenagers, has a lot of great potential: teenagers have a fit physical; intellectual progress that shows the development of abstract thinking abilities, an ability to made in-depth analysis when faced with the problem; spirit and passion that became the impetus to work hard and strive for achievement; idealism, high aspirations and creative; sociable; and have the interest and enthusiasm for new things. The evolution of complex models eventually formed the concept of adolescents with comprehensive coverage, diverse, and trying to touch every aspect of human life: physical, ethical, intellectual, emotional, social and spiritual. Unfortunately, concept of adolescence describes with more negative terms: labile, moody, easily swept away, naughty and must be protected. Adolescent phase seemed to be complicated and difficult routines that must be passed by a human being.

In fact, with the number of youth in Indonesia and all their superiority youth become a great power in its role in a changing community. History shows most of the Indonesia monumental movement which shaping the form of 'Indonesia' in recent time fronted by Indonesia youth.

In this term of research, few youth whose could play a role in peers through their films, will become 'agents of change' for the group and bringing the group opinion. In the end, lead to social changes to better community.

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Twitter and Teenager Self-disclosure

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Abstract

Internet as a new media has developed rapidly. Nowadays, internet acts not only as a tool or communication media but it has already become a lifestyle support for community. One of many phenomena which occurred in the internet is the emergence of social media, such as Twitter. Through Twitter, one could express themselves in written text. The thin boundary in virtual world such as Twitter has made it a communication media in many fields including interpersonal communication. People feel free to disclose their thoughts and feelings either personal or impersonal through Twitter. Based on that phenomenon, we are interested in observing how Twitter usage pattern affects one's self disclosure. Self-disclosure Theory and Computer Mediated Communication Theory is used as theoretical frameworks. In this case, teenagers as active audience are the object of research. This research uses qualitative approach. Data collection method is using in-depth interview and observation. Research finding shows that Twitter has not yet completely become a replacement of close friends and computer has limited function in terms of giving people the wide space to share everything. It is because Twitter usage does not contribute too much on self-disclosure, the level of Twitter usage — either high or low — does not have significant influence on self disclosure of students who become Twitter users, and there is not enough proof suggesting that Twitter usage is directly connected to self disclosure.

Keywords

self-disclosure, computer mediated communication, social media.

Introduction

Twitter, nowadays, has become everybody's 'belonging'. Various people from many different ages and diverse social status utilise it. Internet surfers, browsing from one site to another, surely will not forget to visit Twitter. Twitter has made everyone feel attached and

stay online for long even for those who previously used the internet only to open emails. Social networking sites with a simple concept has drawn attention of many people to avail it. Twitter was found in March 2006, as a result of brilliant idea of 3 (three) persons, Jack Dorsey, Biz Stone, and Evan William. However, it was first launched in July 2006.

New Media is a term that has ushered in a combination of the emergence of digital, computer, and information and communication technology network at the end of 20th century. Most of the technologies described as new media are in digital form. Technology often has the characteristics of being able to be manipulated, network type, interactive, and impartial (van Dijk, 2011). Currently internet is one of the new media that has become the main consumption of communities. Communities can easily obtain any information and entertainment with low cost. Social networking sites are a component of the internet technology, which provides both information and entertainment. By accessing these sites, one is enabled with numerous activities related to interacting with others. Social network sites are multifunctional and can cause people to become attached and addicted. Apart from obtaining information, we are able to connect with others and explore contents pertaining to entertainment and others. Twitter is such an example of a social networking site, which is widely used across the world.

Twitter is a social network and micro-blogging avenue that facilitates a person to update information about them, their business, and etc (Tim Elcom, 2010). Literally, Twitter means "chirp". This site employs micro-blogging concept in its utilisation. The basic principles are quite simple, known as followers and following. Via Twitter, we come across many trending topic, we can see what is a hot issue not only in Indonesia but worldwide. Twitter has a significant number of active users in Indonesia. Twitter's success has made a lot of other sites trying to imitate its concept, sometimes offering local specific services or combining it with other services. A source mentions that there are at least 111 websites that is similar to Twitter.

Twitter is widely popular in Indonesia. Social networking sites are basically aiming to provide means where people can communicate freely and more intensely with others. Those who are not into it are considered outdated. These sites have become the main needs in gathering information and interacting with others. The use of Twitter has made many people, especially Indonesians, have their own world virtually. Majority of them are more active at communicating in the virtual world than interacting directly or in person. Using Twitter even an introvert can express their feelings through status updates. This site has an amazingly significant effect on an individual's personality development.

Based on statistics by ComScore in February 2011, it is learned that until December 2010, Indonesia ranked 5th out of 10 countries with the largest Twitter user base. Indonesia is placed in the 5th position after Netherlands, Brazil, Venezuela, and Japan. Up to 2011, Twitter users in Indonesia maintained a consistent growth.

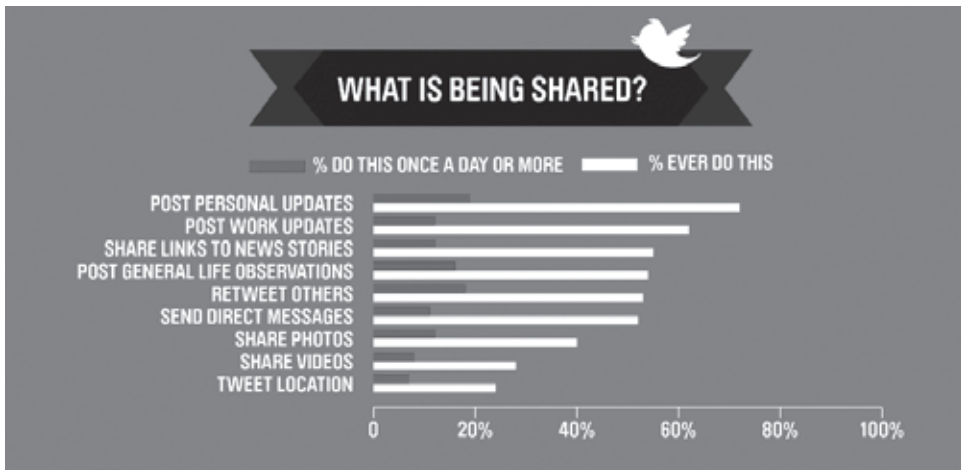
Figure 1. Top 10 Countries with the Largest Twitter User

Mass media is functioned to supply and spread information required for attitude determination, and facilitated establishment of public opinion by positioning itself as an independent vessel (Haryatmoko, 2007:12). Based on this statement, it can be observed that Twitter users are alleged to use this media to trade information and not just use the site as a regular social networking site. Through Twitter, one can promote an event or inform incidents occurring all over the world, as well as market products or services.

Twitter is a media which started as an internet application to send short messages to other applications. In 2007, Twitter was apprehended to survive not only as an internet application but it developed into a media which promoted candidates for elections, supported demonstrations, and turned into a tool to spread crisis and emergency information (<http://socialnewswatch.com/how-people-use-twitter-graphic/>). We can display information about our personal, business, etc. According to a research by Flowtown (A Social Media Marketing Application), Twitter users nowadays use the platform more as a media to reveal and divulge issues which other would not have become public.

We usually do this activity by sharing feelings and information that we have with others where the communication lies in the area for interpersonal communication. Self-disclosure consists of two kinds, descriptive and evaluative. Descriptive is our disclosure by describing ourselves to others. Example: our favourite colour and food. While evaluative is the self disclosure type where we express our dislikes to others or types of person that we like.

Figure 2. Twitter User Activities



One's motivation at making self disclosure is generally derived out of a feeling that their authenticities such as address, age, or types of people that they like needs to be put into a social relationship. Other than that, they usually expect reactions from others towards their self disclosure. For example, when we feel sad because we just broke up from a relationship, we hope that there is someone we can share it about. Bear in mind that self disclosure does not happen by itself. This process requires three main factors to make it happen which are trust, support and open behaviour. Without the presence of these factors, it is impossible for someone to make self disclosure to others. Most people during this modern era prefer to do self disclosure through social networking sites, and the most popular one is Twitter. This micro-blogging site can make an introvert into very extrovert and vice versa. Extroverts can be quite self-contained and never tweet in Twitter.

Self disclosure lies in the field of interpersonal communication. However, self disclosure is now shifting into the field of mass communication. Through Twitter, people can receive feedback from others who become their followers. Anybody can express their restlessness and get support from a lot of people. It has to be remembered though, that trust is now beginning to be embedded in this site despite its massive nature.

The emergence of Twitter as a self disclosure tool has both positive and negative impact. Twitter is now being used in media to build relationship with others. Meaning, that self disclosure done by two persons now is no longer confined to face to face interaction but it has opened up through social networking sites like Twitter.

To obtain a more precise research, a specific problem formulation is required. The focus in this research is how Twitter's utilisation plays a role in the process of self-disclosure among college students.

Literature Review

Twitter as Computer Mediated Communication

Computer Mediated Communication is the process by which people create, exchange, and perceive information using networked telecommunications systems that facilitate encoding, transmitting, and decoding messages. (<http://www.december.com/john/study/cmc/what.html>). Computer Mediated Communication (CMC) learns how human behaviour is shaped through information exchange using computer media especially internet. Internet as a computer network makes information or data transfer possible in a form of transmission protocol according to global addressing system.

One of the main differences in CMC is between synchronous and asynchronous. In synchronous, people discuss directly face to face or talk via telephone as in CMC in chat rooms. There are numerous softwares to facilitate this kind of communication. In this process, there is a significant possibility that a time delay would happen between the message transmissions until it is read. In offline communication, this process is similar to sending letters, fax, etc (Romiszowski & Mason, 2004:397-431).

Included in CMC is electronic mail, group discussion systems, real-time chat, personal blogs, micro-blogs, online conversation components, dating sites and social network website. Through this platform, people send messages to other individuals or to a group of people where that message can be read by many. The important thing in CMC is that it is used for personal objectives and activities. Sometimes, CMC is considered as a simple alternative in spreading information.

CMC perspectives according to Joseph Walther (1996:1-43), such as:

1. Impersonal

This theory explains that each media brings a different degree of message substance reception in an interaction. Degree of reception is determined by the number of nonverbal information cues provided by media. The theory which supports this perspective is Social Presence Theory (Short, Williams, and Christie, 1976). Social presence is the degree where we as an individual see others as personal individuals and interaction between them is reciprocal.

2. Interpersonal

Social context sign plays a role as indicator of behaviour which can be accepted socially assuming that there are rules that control communicator, either intentionally or not, directs appropriate information and to whom the information is being delivered, adaptive with the surroundings. This perspective refers to the innovation of methods in delivering emotional contents in their message using emoticon. There are 4 types of emoticons i.e. verbal type, physical activities description, stressing, and smiles.

3. Hyperpersonal

Hyperpersonal communication occurs when an individual finds that they can express themselves better in an environment where they interact face to face. Hyperpersonal communication is based on 4 factors:

- a. Source factor: has significant control over themselves.
- b. Recipients: can directly receive feedback depending on transmitted message.
- c. Channel: asynchronous.
- d. Feedback: reciprocal and occurs continuously over a long period of time.

Self-Disclosure Theory

Devito pointed out that self disclosure is one type of communication where confidential personal information can be shared to others (Lubis, 2011). Self disclosure is different for each individual under five dimensions below (Devito, 2001, Lubis, 2011:18):

1. Amount

Quantity of self disclosure can be measured by knowing the frequency of whom that individual disclose themselves to and the duration of self-disclosing message or the time needed to convey individual self disclosure statement towards others.

2. Valence

Valence is the positive or negative side of self disclosure. Individuals can expose themselves regarding pleasant or unpleasant things, praising or criticising. Value also influences the basic attitude and level of self disclosure.

3. Accuracy/Honesty

Accuracy and honesty reveals what is to be told. Accuracy of an individual's self disclosure is limited by the awareness level of that individual. Self disclosure may vary in terms of honesty. An individual could be totally honest or exaggerating, skipping through important parts or lying.

4. Intention

How broad does an individual can express what they want to say, how conscious are they when controlling information that are sent to others

5. Intimacy

Individual can express the most intimate details of his/her life, things that are considered peripheral or impersonal, or just lies.

Research Method

Research method used in this research is a case study. Case study is a research strategy which focuses on one case (an individual, a group, an organisation, etc.) within its social content at one point in time, even if that one time spans months or years, or a design with a long and respected history. In case study, generalisability is limited due to relatively small numbers of participant (Clark, 2011:178–181). For data collection techniques, this research applied in-depth interview and observation. Interview and observation have been implemented among college student at Universitas Bakrie.

Research Findings and Discussion

Informants in this research are college students of Faculty of Communication Studies, Bakrie University, cohort 2010. Interview was conducted among 25 students, with majority female informants, comprising of 15 female students and 10 male students. According to age characteristics, informants are mainly between 17 and 18 years old. Referring to Twitter usage duration, most of the respondents access Twitter at least an hour a day.

Based on the variable of Twitter usage in intensity dimension and its features towards informants, the influence of Twitter variable will be explained as follows:

1. Intensity Dimension

The research finds the intensity of Twitter usage is positive among the informants. This is because most of the informants (20 persons) use Twitter at least an hour a day.

2. Feature Dimension

The research finds the knowledge about Twitter is negative among the informants. This is because most of the informants (17 persons) do not know much about the functions of Twitter. They use Twitter in terms of giving or responding to some opinions by which they are becoming followers.

Based on the variable of self-disclosure in the dimensions of amount, valence, accuracy, intensity, and intimacy towards informants as part of teenager community, the influence of self-disclosure variable will be explained as follows:

1. Amount Dimension

The research finds the amount of self-disclosure trends positive among the informants. This is because most of the informants (16 persons) disclose themselves frequently in Twitter.

2. Valence Dimension

The research finds the quality of self-disclosure trends negative among the informants. This is because most of the informants (21 persons) often disclose themselves in a low quality manner in Twitter.

3. Accuracy Dimension

The research finds the accuracy and honesty of self-disclosure trends negative among the informants. This is because most of the informants (16 persons) often disclose themselves with a low accuracy level.

4. Intensity Dimension

The research finds the broadness and awareness level of self-disclosure trends positive among the informants. This is because most of the informants (16 persons) disclose themselves broadly and are aware of it.

5. Intimacy Dimension

The research finds the level of self-disclosure either personal or impersonal trends positive among the informants. This is because most of the respondents (22 persons) disclose themselves in a personal and impersonal manner in Twitter.

New media as second media age in communication world combines three components which are computer, cable, and network. In 1990, Mark Poster through his book *The Second Media Age*, marked the new period of interactive technology, network communication, and virtual world will change the community (Mark Poster, 1995). New media can be identified as computer system which is able to distribute and display message rather than just producing it (Robert Hassan & Julian Thomas, 2006:5).

In the evolution of media in this world, there are two ages. The first age is identical with something that is broadcasted to emphasise on broadcasting, while the second age is new media which emphasises on network. However, the two ages have several differences on social interaction and social integration approach. New media has a higher interactive level than television. It also creates a new understanding on interpersonal communication (Robert Hassan & Julian Thomas, 2006:5).

World Wide Web or more popular by WWW becomes an open information environment and enables human kind from all over the world to gain new knowledge. Virtual world provides a pseudo rendezvous point which broadens the social world and gives a place to share new visions (Robert Hassan & Julian Thomas, 2006:5). With new media, we do not have to be directly face to face in communicating with others all around the world, we just use a new interaction form through internet. This kind of interaction form also brings us to a different way of interpersonal communication. Internet also makes us interact less with others and more with the media itself. Whereas social integration describes media not in the form of information, interaction, and distribution but in a form of how people and media creates communities. Media is not just instrument of information but it integrates us in communities and gives us a sense of belonging.

Referring to theoretical explanation above, Twitter has the effect of Computer Mediated Communication (CMC) where people exchange information through Twitter; in this case

author wants to see the relation between Twitter usage and self-disclosure. As one of the social network sites, Twitter is also capable of becoming a tool of self-disclosure for its users. People can share happiness or problems to other Twitter users, or share light information not just to one person where self-disclosure is usually done. For example, when we feel sad because of a broken heart, our friends can instantly give their support or sympathy by commenting on our tweet or just by re-tweeting to show their empathy. A lot of Twitter users express their emotions in a form of swearing or other inappropriate words. All those things can happen in Twitter.

Twitter is like a diary for them, because through Twitter they can share various things that happen in their lives, even the smallest piece of information where they tell their locations. Aware of it or not, a Twitter user has already shared more intimate things about themselves especially to their followers. This phenomenon is related to the emergence of new media, namely internet. Many people feel freer to express themselves on the internet as it makes them feel they have a very comfortable personal space. The comfort which is provided by the virtual world has made many people shift their social interaction on the internet, be it finding information, entertainment, or just to have a chat with their friends.

The process of self-disclosure also moves to the virtual world along with a higher social interaction intensity level happening there. Rituals of self-disclosure previously done by two or more people maintaining a close relationship have become a ritual between one people to hundreds, or even thousands of people. Self-disclosure which was previously intimate has become massive through Twitter and comprises of many people.

The most interesting information that we find from the data collection is that Twitter cannot replace true friendship. Most of the informants share their opinion on Twitter, but they still have to protect others' feeling. An example of the amount of the divulgence would be when someone tweets their feelings, others usually respond in support or comment without a deep feeling. Even though they frequently use Twitter, the personal and face to face communication is still relied on friendship.

Regarding to valence dimension, informants use Twitter more as follower than as developer. They tweet some topics mostly based on trend topics that become popular issues on Twitter. The respondents do not want to share their personal and sensitive information with strangers following them. For example when someone's parents got divorced she did not want to tweet this topic on her account. She felt that giving such personal information would be embarrassing.

The low accuracy dimension was employed to understand how informants give name on their Twitter account. Most of informants give fake name or alias better than give their full name. If they have serious problems, sometimes they share it but not in full version. From this we can analyse that computer has limited function in terms of giving wide space to people sharing everything on Twitter. Thus, people have to be selective in putting important things on Twitter. In the selection process, it could affect the accuracy level because it is not full information.

Even though most of the respondents disclosed themselves broadly and were aware of it, but related to third dimension above — they still keep some important personal issues only for themselves or best friend. Self-disclosure includes openness, revelation, secrecy, and transparency. CMC theory facilitates phenomena when people communicate through computer that helps develop a relationship become intimate. Even though some informants disclose information both personal and impersonal, they cannot count it as a medium to create intimacy.

Discussing intimacy in Twitter could be interesting. If there is a couple talking personal problems through Twitter, it could be strange. For example when Indonesian celebrity — Ahmad Dhani & Mulan Jammela — tweet and re-tweet through their account, it generates gossip and criticism. Teenagers use Twitter as a medium to create friendship, but do not want to use it as a medium to maintain close relationship.

Conclusion

This research observes the role of Twitter usage towards self-disclosure. After the research is conducted among students of Faculty of Communication Studies, UniversitasBakrie that use Twitter, it can be concluded:

- Twitter has not yet completely become a replacement of close friends.
- Computer has limited function in terms of giving wide space to people for sharing everything on Twitter.
- Twitter usage does not contribute too much on self-disclosure.
- The level of Twitter usage, whether high or low, does not have significant influence to self-disclosure of students who become Twitter users.
- There is no proof which shows that Twitter usage is directly connected to self-disclosure.

Referring to the research result, author has several recommendations, such as: Theoretically, similar research has to be done more thoroughly and using more informants within aspect intercultural communication. This is necessary to make the research gain various aspects including cultural aspect that has not been included in this research. Practically, similar research is better if conducted in a more diverse and broad environment. This is necessary in order to obtain a variety of data from respondents belonging to a cross section of cultures.

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Illegal VOIP How To Detect And Counter

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Abstract

Voice over Internet Protocol (VoIP) is illegal in Bangladesh if a voice call is transferred to cellular network bypassing designated International Gateway. The Government of Bangladesh gets revenues from the telecom industry in different ways. Illegal VoIP primarily deprives the telecom industry from their business and thus restrains government's revenue earning. As this phenomenon negatively affects the economy by lowering revenue earning, it is very important to fight against illegal VoIP in all possible ways. Recently, the Government of Bangladesh has been taking strict measures to counter illegal VoIP, yet some people are persisting on the illicit means to make money. At present, there are quite a few reliable approaches to detect VoIP activities notably by deploying Deep Packet Inspector (DPI) at International Internet Gateway. These approaches intend to reveal packet destination by detecting the IP addresses of the VoIP setup. But DPIs can be deceived by smartly managing multiple VoIP setups in multiple locations. To overcome this situation, we look into this illegal VoIP detection problem in a different way. Our primary target is to detect those Subscriber Identity Modules (SIMs) that are used in illegal VoIP. To do that, we have used several Data Mining techniques to discover valuable Knowledge about call structure of SIMs used in illegal VoIP and then find SIMs suspected for taking part in illegal VoIP calls (from all active SIMs) using the Knowledge discovered. Finally, these SIMs can be easily barred to exclude them from taking part in illegal VoIP. Those

communications can be channelled in through legal means to the economy.

Keywords

VoIP, Illegal VoIP, Cellular Network, Telecom Industry, Data Mining, New Knowledge.

Introduction

Voice over Internet Protocol (VoIP) commonly refers to the delivery of voice communications over Internet Protocol (IP) networks, such as the Internet. VoIP employs session control protocols to control the set-up and tear-down of calls as well as audio codecs, which encode speech allowing transmission over an IP network as digital audio via an audio stream. The choice of codec varies between different implementations of VoIP depending on application requirements and network bandwidth; some implementations rely on narrowband and compressed speech, while others support high fidelity stereo codecs.

VoIP in a nut shell

A major development on VoIP-based communication services started in 2004 that utilised existing broadband Internet access, by which subscribers place and receive telephone calls in much the same manner as they would via the public switched telephone network (PSTN).

In traditional PSTN, each time a call is placed for routing, the destination number (also known as the called party) is entered by the calling party into their terminal. The destination number generally has two parts, a prefix which generally identifies the geographical location of the destination telephone, and a number unique within that prefix that determines the specific destination terminal.

In VoIP, every phone number has an IP address. Each time a device (PC, IP phone, ATA etc.) engages in a VoIP call, auditory voice is converted into a digital signal that travels over the Internet. If we are calling a regular phone number, the signal is converted to a regular telephone signal before it reaches the destination. VoIP can allow us to make a call directly from a computer, a special VoIP phone, or a traditional phone connected to a special adapter (Figure 1).

VoIP Protocols

VoIP uses different protocols at different stages like setting up a call, routing packets and establishing a conversation over the Internet. For call setup, the two most used protocols are H323 and SIP [3]. H323 is based on an ITU standard and has commonality with traditional PSTN. H.323 is more mature of the two and covers a wider range of services. SIP, which was developed by the Internet Engineering Task Force (IETF), has no commonality with the PSTN format. Though SIP is less defined, it is more flexible, more scalable, and more easily integrated into the internet application. For example, it has better capabilities in Network Address Translations (NAT). SIP is an application-layer protocol that can establish, modify and terminate media sessions such as internet telephony calls and multimedia connections. It works independently of underlying transport protocols and

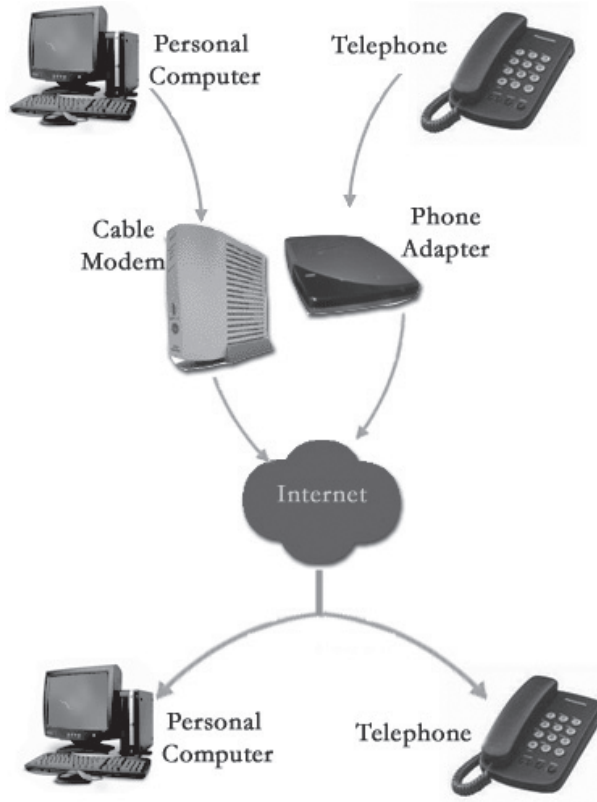


Figure 1. VoIP through the Internet

without dependency on the type of session that is being established. As a result of these advantages, the usage of SIP has surpassed that of H323. However in terms of traditional networks, H323 is more efficient, as its message encoding format is binary while SIP is text based and therefore bulky for networks.

For routing packets across the network, codecs are used to encode and decode at both ends of the conversation, so that it can be sent and received across the network. Different codecs have different characteristics and bandwidth requirements that can impact network performance. Codecs that employ no compression technology require more bandwidth. Those that use compression, require less bandwidth, but can impact voice quality.

For the transfer of voice conversations, VoIP uses mainly Real-time Transfer Protocol (RTP). RTP was originally designed for unidirectional real-time applications, but voice is a bidirectional real-time application. To facilitate the bidirectional nature of the VoIP application, RTP uses transmission header fields, containing data instructions for routing the voice packet. This adds to the packet size, and hence to the bandwidth requirements.

Why VoIP

There are many lucrative benefits of VoIP which in turn contributed to its proliferation. Some of those are:

Saves a lot of money

In traditional PSTN, time counts money. Someone needs to pay for each and every second spent in communication over the phone. For international calls it is more expensive. Since VoIP uses the Internet as its backbone, the only cost we have for VoIP calls is the charge for the Internet. In fact, most of the people use Internet as a common service which generally causes a bill of a fixed amount. We can speak as much as we wish over VoIP and the cost will still remain the same. Studies have shown that, compared to using a PSTN connection, VoIP can potentially make someone save up to 40% on local calls, and up to 90% on international calls [1].

More than two persons

In traditional PSTN, only two persons can speak at the same time. With VoIP, we can setup a conference call which can serve a whole team communicating in real time. VoIP compresses data packets during transmission and this causes more data to be handled over the carrier. As a result, more calls can be handled on one communication line.

More than voice

VoIP is based on the Internet Protocol (IP), which in fact – along with Transmission Control Protocol (TCP) is the basic underlying protocol for the Internet. By virtue of this, VoIP can accommodate media data like image, video and text along with the voice. For instance, you can speak to someone while sending him files or even showing yourself using a web cam.

Flexible network layout

The underlying network for VoIP does not need to be of a particular layout or topology like PSTN. This makes it possible for an organisation to make use of the power of proven technologies like ATM, SONET, Ethernet and etc. VoIP can also be used over wireless networks like Wi-Fi. When using VoIP, the network complexity inherent in PSTN connections is eliminated, yielding an integrated and flexible infrastructure which can actually support many types of communication. The system being more standardised requires less equipment management and is therefore more fault tolerant.

More productive software development

VoIP is able to combine different data types and make routing and signalling more flexible and robust. As a result, network application developers will find it easier to develop and deploy emerging applications for data communication using VoIP. Moreover, the possibility of implementing VoIP software in web browsers gives a competitive edge to e-commerce and customer service applications.

VoIP drawbacks

The advantages of VoIP over PSTN are vast. It has attracted millions of people and companies worldwide, especially in the US, with numerous benefits it offers. Whether you have already switched to VoIP or are still considering the option, you need to be aware of the VoIP Cons – the different pitfalls it entails and the disadvantages attached to it. Mainly, these are:

Security

Security is a main concern with VoIP, as it is with other Internet technologies. The most prominent security issues over VoIP are identity and service theft, viruses and malware, denial of service, spamming, call tampering and phishing attacks. VoIP systems may have come a long way in terms of online data security since their early days of development; but with the passage of time, security breaches have become a common phenomenon. There is always a possibility of loss of valuable data in the hands of hackers or intruders. VoIP transfers voice and data over the Internet, so it is easy for prying eyes to steal valuable information while it travels.

Voice quality

While it offers more advantages, the VoIP technology proves to be less 'robust' than that of PSTN. Data (mainly voice) has to be compressed and transmitted, then decompressed and delivered. All of these need to be done in a very short period of time. If this process takes some milliseconds more (due to slow connection or hardware), the quality of the call suffers. This gives rise to echo, which is the phenomenon where you hear your voice back some milliseconds after your speak.

Bandwidth dependency

VoIP highly depends on bandwidth. Another name for VoIP is Internet Telephony. When you say about Internet connection, you say about bandwidth. Since VoIP depends on broadband connection, if the connection goes down, phone goes down as well. The formula is simple: With VoIP, no Internet means no call.

Power dependency

Someone needs to plug in Modem, Router, ATA or other VoIP hardware to the electric power supply – unlike PSTN phones. If the supply of power is interrupted, VoIP is also interrupted.

Emergency calls

VoIP service providers are not bound by regulations to offer emergency calls. If a business office just went up in flames it will not be able to reach the nearest fire station in time causing you irreparable losses of property, money and image.

Illegal VoIP

It is illegal when the VoIP call is transferred to mobile network bypassing designated International Gateway. Softswitch server like Asterisk [6] (installed in a PC) allows taking voice signals from the Internet and terminating them on SIM cards. We frequently use Skype, Yahoo messenger to make VoIP calls. If we can relay a Skype call into a SIM then we don't need to pay at all for that call.

In Bangladesh, for a legal VoIP system we need to buy a router from Bangladesh Telecommunication Company Ltd. (BTCL) for the softswitches to make a VoIP call. VoIP providers like Agni bought router from BTCL but illegal VoIP ventures setup their own softswitches to establish illegal VoIP calls. They just need required bandwidth to establish 64 kbps voice signal with checksum.

To explain the scenario of an illegal VoIP call; say, someone is calling from London, UK to Dhaka, Bangladesh. At first, s/he buys a VoIP card from a designated illegal retailer. S/he uses software like "cooldialer" [4] to communicate with the pre-programmed computer (which possesses an IP address) in UK for authentication (Figure 2). Then the pre-programmed computer will check if the caller has enough credit or not. If the caller has enough credit then the pre-programmed computer will forward the call to the softswitch server. Then the softswitch server will encrypt caller's voice data packet to make them look different (to avoid getting caught) and send it using TCP/IP protocol to another pre-programmed computer (which also possesses an IP address) located in Dhaka, Bangladesh.

Figure 2. How VoIP call initiates

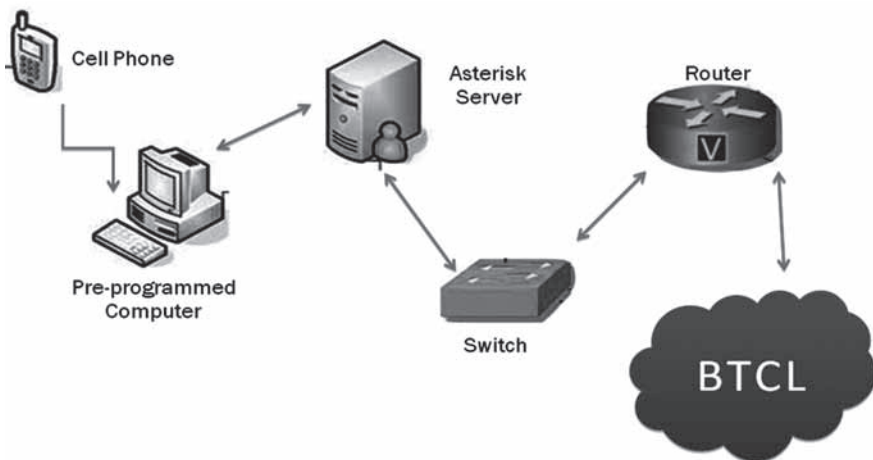
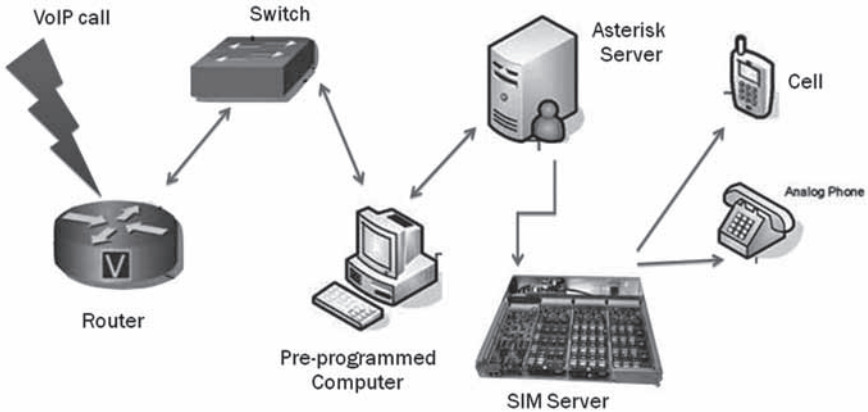


Figure 3. How VoIP call reaches destination

As the voice packets are encrypted, they easily pass through any suitable International Gateways from Bangladesh's side. Now in Dhaka, the pre-programmed computer forwards the call to softswitch server where voice packets get decrypted (Figure 3). Then it passes the call to any available SIM in the SIM server connected to it. Finally the call reaches its ultimate destination by a local call from that SIM through telecom infrastructure. Software like MagicDial can hide the caller ID for further protection.

Conflict of interest between VoIP and telecom operators

Building up a mobile network is a matter of huge investment and in order to foster the return on the investment, ISP and Telecom business should not be allowed to mix together. If any ISP is allowed to send/terminate international incoming voice data into mobile network, it is like someone having a bus ticket from Dhaka to London could use the same ticket for travelling by boarding into an airliner. So, we need to keep the business models of these two entities separate to guarantee a healthy business environment for telecom operators and also make sure that government will earn revenues from corporate taxes, frequency fees etc.

Challenges to detect and counter illegal VoIP

Law enforcing agencies are striving to counter illegal VoIP by trying to locate the physical location of IP addresses of VoIP setup using Deep Packet Inspector (DPI). But nowadays, illegal VoIP stakeholders try to evade law enforcing agencies by smartly managing multiple setups in multiple locations. This complicates their detection using DPI.

Our approach to detect and counter illegal VoIP

As of February 2012, law enforcing agencies detected almost 300 illegal VoIP setups with around 150,000 SIMs from their SIM servers [5]. These SIMs proved to be invaluable to us.

As those SIMs were involved in illegal VoIP by initiating local calls to the ultimate destination, we utilised Data Mining to study their call patterns to discover new Knowledge related to illegal VoIP activity.

We collected all transaction data associated with those SIMs. Then, we started to prepare those data to make them suitable for Data Mining activity.

Data preparation

It is well known that over 80% of the time required to carry out any real world Data Mining project is usually spent on data pre-processing. Data preparation lays the groundwork for Data Mining. Before the discovery of

Table1: Voice Data

Call Date and Time	Calling Number	IMEI	CALL TYPE	Duration in Seconds	Charge in Taka	Called Number	CELL ID	Package Code
			O=Outgoing					S=Smile
			F=Forwarding					D=Djuice

Table2: SMS/MMS Data

Trigger Date Time	Sender Number	IMEI	SMS TYPE	Charge in Taka	Receiver Number	CELL ID	Package Code
			S=SMS				S=Smile
			M=MMS				D=Djuice

Table3: Value Added Service Data

Trigger Date Time	Mobile Number	Volume	Duration	Charge in Taka	CELL ID	Package Code
						S=Smile
						D=Djuice

Table3: The Base Table

Mobile Number	Package Code	MD	CD	IDS	ODS	FDS	SMS/MMS Bills	VAS Bills	Calling Bills	Is Illegal VoIP

new Knowledge, the target data set must be properly prepared. It is well known that success of every Data Mining algorithm is strongly dependent on a quality of the target data.

In this context it is natural that data preparation can be a very complicated task. Data preparation primarily consists of data attribute selection, data cleaning and missing value resolution. The traditional data preparation method is reactive as it starts with raw data that is assumed not ready for analysis and there is no feedback associated with those data. Establishing relations between data sets is the main difficulty for the data preparation task to counter.

Now, we face the task of data preparation from available transactional call data. A transaction is committed against each call or SMS/MMS or for using any value added service. Other than updating Balance, bulk of transactional information is captured in some database tables (Table 1, Table 2 and Table 3).

In Table 1, Table 2 and Table 3, we have some columns to elaborate.

Here, IMEI is the International Mobile Equipment Identity number which is usually unique for all available mobile phones.

CELL ID is a generally unique number used to identify each Base transceiver station (BTS) or sector of a BTS within a mobile network. Therefore, CELL ID indicates caller's location information inside the mobile network.

All these scattered transactional tables contain data related to every Mobile Number (SIM). To prepare data for Data Mining activities, we need to quantify all these transactional data in similar fashion. To do that, we compute aggregated values for some selected attributes for every SIM for a specific period of time (say by month). Those attributes with the table which we call The Base Table is shown below (Table 4).

Also, in Table 4, we have some columns which require elaboration. Here,

MD is Mobility Distribution.

CD is Call Distribution.

IDS is Incoming Duration in Seconds.

ODS is Outgoing Duration in Seconds.

FDS is Forwarding Duration in Seconds.

VAS is Value Added Service.

"Is Illegal VoIP" has a value against a particular mobile number. The value "Y" indicates that particular SIM was used for illegal VoIP activities. The value "N" indicates that particular SIM was not used for illegal VoIP activities or an undetected VoIP SIM.

Now we describe how we arrive at the Base Table from Table 1, Table 2 and Table 3.

Mobility Distribution (MD) is computed from the CELL IDs in transactional data. If all the CELL IDs for a SIM are the same for all transactions, then this phenomenon determines that the SIM is stationary in a location. In this case MD is assigned with the value "Y". Different CELL ID implies different locations associated with a SIM. If a mobile phone user calls from different locations, different CELL ID is recorded in transactions associated with that SIM. In this case MD is assigned with the value "N".

Call Distribution (CD) is determined by the set of Called Numbers from a SIM from transactional data. If the calls generated from a SIM involves almost different numbers rather than calling most of the time to some defined numbers (like FnF) are said to be

distributed. In this case CD is assigned with the value “Y”. If most of the calls involve a set of defined numbers CD is assigned with the value “N”.

Incoming Duration in Seconds (IDS), Outgoing Duration in Seconds (ODS), Forwarding Duration in Seconds (FDS), SMS/MMS Bills, Value Added Service (VAS) Bills and Calling bills are computed on a monthly basis from transactional tables for each SIM.

After completion of data preparation, we are ready to utilise the capabilities of Data Mining activity in search for new Knowledge.

Data mining

Data mining is analogous to mining a mountain for valuable ore [2]. We use data mining activities to extract hidden predictive Knowledge from large data sets which can be utilised as a business advantage. In other words, data mining is an automated process of detecting previously unknown interesting patterns and relationships in a large data set. A pattern is a collection of measurable characteristics that can be linked with additional characteristics. We can infer new Knowledge from these patterns and relationships and this new Knowledge can be used to classify new data that helps in business decisions. Most of the Data Mining activities are realised through the following major data mining functions:

Data mining functions

Major Data mining functions are divided into two groups:

* Supervised (used to predict a value)

1. Classification
2. Regression
3. Attribute Importance

* Unsupervised (used to find relationships among different individuals to form a group)

1. Clustering
2. Association Rules
3. Anomaly Detection
4. Feature Extraction

Now, we present a brief description about the functions stated above:

Classification: In a classification problem, you have a number of cases and want to predict the categorical target to which each case belongs. Each case consists of multiple attributes. The attributes can take one of the several possible values in each case. There are a number of predictor attributes and one target attribute. The target attribute value is a class to be predicted on the basis of its predictor attribute values.

Regression: The regression models are similar to classification models. Regression models work with numerical or continuous targets rather than categorical target.

Attribute Importance: Attribute Importance helps a user identify a proper subset of these attributes that are most relevant for predicting the target. It determines the predictive usefulness of each non-target attribute and ranks them according to their predictive importance. This ranking is done by eliminating redundant, irrelevant, or uninformative attributes. Thus, classification or regression can proceed using the selected attributes.

Clustering: Clustering identifies clusters embedded in the available cases. So, in clustering, there is no target attribute. Clustering algorithms can be used to find whatever natural groupings may exist. A good clustering algorithm produces high-quality clusters to ensure that the inter-cluster similarity is low and the intra-cluster similarity is high. Clustering is useful when there are many cases with no obvious or known groupings.

Association Rules: Association Rules function is used to discover relationships or correlations among a set of items. So, using Association Rules function, we can predict the percentage of people who buy spaghetti, wine and sauce will also buy garlic bread. It is used in case analysis for direct marketing, catalogue design, and other decision-making processes.

Anomaly Detection: With anomaly detection, you can find rare or novel cases. Anomaly detection is useful for finding frauds, non-compliances, disease outbreaks, network intrusions or outlier detection.

Feature Extraction: With feature extraction, a set of features is created based on the original data. A feature is a combination of attributes that is of special interest and captures important characteristics of the data.

Our Problem

Our main target is to predict whether a live SIM is involved in illegal VoIP or not. We can easily determine that this is a classification problem as we want to classify each case (SIM) into two categorical targets i.e. whether it is involved in illegal VoIP or not.

Abstractly, the classification problem is: given that cases belong to one of several categories and a given past instance (called training instance) of cases along with the categories to which they belong, the problem is to predict the new case to which it belongs. Here, predictor attributes of a new case are used to find the target attribute of that case (which in turn determines the category in which the case belongs to).

Here, our past instances are the call summaries of all the illegal VoIP SIMs which were detected by law enforcing agencies and subsequently blocked by their respective telecom operators. Now, we need to predict each SIMs whether they are involved in illegal VoIP or not based on yet undiscovered Knowledge in the past instances.

Now, classification is usually done by finding rules that partition the given cases into disjoint groups. The decision tree classifier is a widely used technique for classification. As the name suggests, decision tree classifier uses a decision tree (where each leaf node has an

associated class) to create a model that predicts the value of a target attribute based on several predictor attributes.

Now, the question is how the decision tree classifier is built, given a set of training cases. Initially, there is only one node, the root and all (or almost all) training cases are associated with that node. At each node if all training cases belong to the same class then the node becomes a leaf node associated with that class. Otherwise, a partitioning attribute and a set of partitioning conditions must be generated to create child nodes. The cases associated with each child nodes are the set of training instances that satisfy the partitioning condition for that child node.

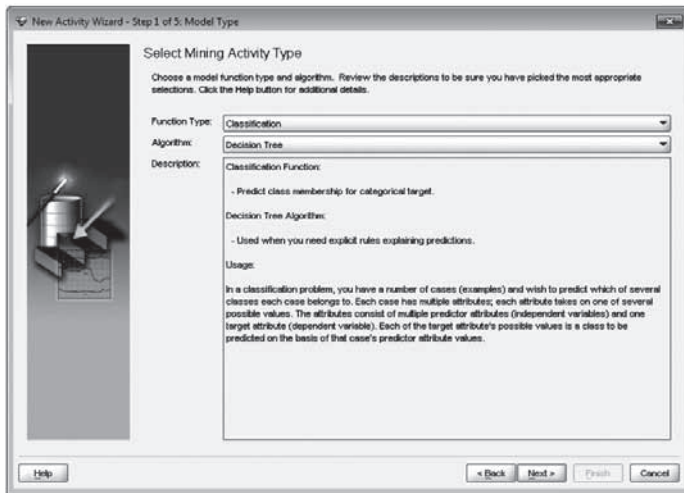
We can easily infer new Knowledge from the decision tree itself by scrutinising the partitioning attributes and partitioning conditions by which we can infer what is the condition to be a potential VoIP SIM. In the following section, we shall see the process of generating the decision tree and predicting the target attribute (whether illegal VoIP SIM or not) for all the current operational SIMs using the generated decision tree.

Classification using Oracle Data Miner (ODM)

ODM [7] is a very powerful data mining tool that supports several data mining functions including classification function realised through decision tree classifier.

The first step toward our desired solution is to build a model based on the existing call summary which in turn generates the desired decision tree.

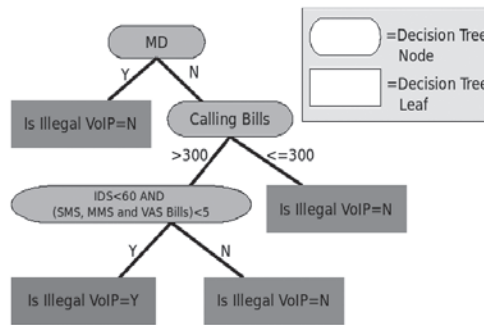
Figure 4. Selection of Classification function and Decision Tree algorithm in ODM



In this step, we select “Classification” as data mining function type and “Decision Tree” as the algorithm to perform classification (Figure 4). In the second step, we specify the Base Table (set of training cases) where call summaries related to all operational SIMs (including

some 150,000 illegal VoIP SIMs) are stored. In the third step, we determine the attribute “Is Illegal VoIP” as the target where two categorical values are stored. One categorical value “Y” determines that the associated SIMs are involved in illegal VoIP. Another categorical value “N” determines that the associated SIMs are not involved in illegal VoIP, yet some of them may have been involved without being detected. Now we let the ODM generate the decision tree aiming to comprehend the decisions to reach the “Y” value. Here we present the decision tree obtained from ODM (Figure 5):

Figure 5. Decision Tree from ODM



Knowledge assimilation

From this decision tree, we can infer many important issues related to illegal VoIP SIMs. We can easily recognise that illegal VoIP SIMs are stationary, generate high calling bills through dispersed calls (rather than calling most of the time to some defined numbers), receive very low incoming calls and generate very little SMS/MMS and VAS bills as well. Surprisingly, Package Codes or Consecutive Mobile Numbers do not play any role in determining illegal VoIP SIMs. Now, we can use this Knowledge to find SIMs suspected for taking part in illegal VoIP calls among all active SIMs and help respective operators block those SIMs from further involvement.

Effect on economy

VoIP technologies dramatically reduce the cost in telecommunication and thus have tremendous impact on overall development of business and the growth of GDP. It has also opened up new avenue for employment. But the existence of illegal VoIP has been dampening the economy of Bangladesh in several ways. First of all, revenues from international calls have been declining for past several years. Revenues from international calls now consist of only 6% of total revenues from the telecom industry of Bangladesh. But we have the potential to achieve the percentage as high as 35%. Thus, numerically, our government is losing another 6,000 crores of taka as revenues [8]. On the other hand, illegal VoIP can encourage money laundering.

Conclusion

In this paper, we have addressed the issues of illegal VoIP in technical and economic perspective and have proposed a novel solution to detect deceiving illegal VoIP activities. Using our data mining approach, we have identified some tale-telling signature of the illegal VoIP SIMs, which are used in VoIP setups. Using the tale-telling signature we can suspect SIMs which are potentially involved in illegal VoIP. Now, by barring illegal VoIP SIMs from activities, we can foster positive impact on the growth of GDP and also on the growth of telecom industry.

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INTRODUCTION

Internet and mobile phone penetration has opened-up new horizons for ICT based services to benefit communities at the bottom of the pyramid. Primarily driven by donors, development agencies, local and international NGOs, civil society, mass media, these services have extended even to the rural areas. Telecenter networks, for example, have reached previously inaccessible places using nonprofit and for profit models.

Although a large amount of work has been done in using ICT for Development, there has been no conscious effort to explicitly capture these initiatives. Hence, there is a pressing need to document success stories, lesson learnt and shortcomings. There is a call to write case studies on projects, programs and policies in this regard. As knowledge has become central to development, it is timely to publish a journal that specializes on ICT for Development issues. Academicians, practitioners and researchers can use the journal as a reference point for their work. It will contribute a great deal to strengthen knowledge management. Simultaneously, it will also enable them to share their experiences, works and knowledge.

OBJECTIVES

The ultimate objective of the working paper series is to articulate, capture and document success stories, best practices, lessons learnt and shortcomings of ICT4D projects or researches in developing countries.

TOPICS:

Academics/researchers/practitioners are invited to submit their work that addresses issues related to adoption, diffusion, and implementation and monitoring/impact assessment of ICT for development projects in developing countries. In fact, ICT4D being a crosscutting issue the working paper series will feature writing from almost any sectors or area namely E-Agriculture, E-Livelihood, E-Governance, E-Health, E-Education, E-Commerce, E-SME, E-Environment, Climate Change, etc in relation to ICT. The WPS encourages papers that are problem-finding, problem solving, forward-looking, sharing relevant experiences and investigating controversial and important issues.

AUDIENCE

The target audience of this working paper series are those who wish to learn how to encourage adoption of ICT, applications and impact assessment, and also researchers who are interested in the diffusion of ICT for developmental projects in developing countries. Therefore, the target audience includes ICT service providers, policymakers, and academics/researchers, students of social science, information systems, and information technology and development studies.

SUBMISSION REVIEW PROCEDURE

Researchers and practitioners will be asked to submit an abstract of the paper. Those whose abstracts have been approved will be invited to submit complete papers. Papers must be written in English. The full paper must be between 4,000 to 9,000 words including all diagrams and references, and in MSWord or PDF format. All submissions must have names, affiliations and full contact details (including email addresses) of all authors. Authors should utilize the APA Stylebook.

All submitted papers will be reviewed on a double-blind review basis by two unanimous reviewers. The reviewers will be selected by the editorial. The reviewers will provide constructive feedback to authors upon acceptance and rejection of the article. Articles submitted for publication are evaluated according to the following criteria:

- | | |
|-------------------------------------|---|
| o Significance of the topic | o Appropriateness to the Working Paper Series |
| o Adequacy of the literature review | o Development of concepts/hypotheses |
| o Quality of research design | o Adequacy of data analysis |
| o Legitimacy of conclusions | o Significance for practice |
| o Contribution to literature | o Clarity of presentation |

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