

Exploring the Aspects of Digital Divide in a Developing Country

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Abstract

The rapid development and diffusion of the information and communication technologies (ICTs) have fundamentally changed many aspects of life and societies around the world. ICTs, especially the Internet, have affected the way we all live, communicate, work, study, and socialize in many ways. Today, ICTs have become an integral part of the developed countries. ICTs have the potential to support economic growth, to provide opportunities, and to increase democracy in developing countries. Yet, many developing countries have not been able to take advantages of the opportunities offered by ICTs. There are significant differences between developed and developing countries in terms of accessing and using the ICTs. That is defined as global digital divide. There are also different types of digital divide within a country, such as the gender divide, the age divide and the income divide. The main aim of this paper is to explore the digital divide in a developing country, Turkey, and to highlight some approaches to bridge it.

Keywords: digital divide, ICTs, developing countries, Turkey

Introduction

The exponential growth of the use of ICTs has had a profound impact on many aspects of daily life. Over the past few decades, ICTs have dramatically transformed the societies and the economies around the world. Today, ICTs have become an essential part of modern culture and cover almost all aspects of life. With advanced ICTs, especially the Internet, the world has today become like a global village. Although developed countries enjoy the benefits of ICTs in almost all areas of life, developing countries do not benefit enough from these technologies. As a result of advances in information technologies, the knowledge gaps between the information-rich and the information-poor have deepened over time and that has caused excluding certain parts of the world from enjoying the fruits of global village (Iskandarani, 2008). Then, the world has begun to notice the phenomenon, named as the digital divide. There is a significant digital divide exists between richer and poorer countries in the use of ICT and the availability of complementary as-

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sets such as telecommunications networks and skilled ICT professionals (Genus & Nor, 2007; Shih, Kraemer, & Dedrick, 2008).

While the telecommunications infrastructure has grown and ICT has become less expensive and more accessible, today more than ever, the invisible line that separates rich from poor, men from women and the educated from the

illiterate; also separates the connected from the disconnected (Zaidi, 2003). The unequal access to and utilization of ICTs has accepted as one of the prevalent issues of our times (Sciadas, 2005).

Almost every indicator shows that there is a significant difference between developed and developing countries in terms of accessing and using ICTs. For example, according to International Telecommunication Union (ITU), while approximately 72 % of the population is Internet user in developed countries, this ratio is 21 % in developing countries. The number of fixed telephone lines per 100 inhabitants in developed countries is estimated about 41, but, it is 12 in developing countries (ITU, 2010). It can be challenging to access up-to-date knowledge and information in developing countries (Suchak & Eisengrein, 2008).

The main purpose of this study is to explore the digital divide in Turkey and highlight some approach to bridge it. This paper starts by providing overviews of the digital divide, then go on to explore the different aspects of the digital divide in Turkey. Suggestions and recommendations to bridge the digital divide in developing countries are discussed in the end of the paper.

The Digital Divide

The digital divide can be defined as “the gap between individuals, households, businesses and geographic areas at different socio-economic levels with regard both to their opportunities to access ICTs and to their use of the Internet for a wide variety of activities” (OECD, 2001, p. 5). The global digital divide refers to differences between countries in terms of access to ICTs. ICT access inequality is called as the first order digital divide and ICT use inequality is called as the second order digital divide (Jin & Cheong, 2008). The digital divide problem has geographic, demographic, and socio-economic dimensions (Yuguchi, 2008).

The term “digital divide” was introduced by Larry Irving, Jr., former US Assistant Secretary of Commerce for Telecommunication and Communication in the mid-1990s in order to focus public attention on the existing gap in access to information services between those who can afford to purchase the computer hardware and software necessary to participate in the global information network, and low income families and communities who cannot (Boje & Dragulanescu, 2003).

Wilson (2004, p. 300) defines the digital divide as “an inequality in access, distribution, and use of information and communication technologies between two or more populations.” According to Wilson there are eight aspects of the digital divide: physical access, financial access, cognitive access, design access, content access, production access, institutional access, and political access. There are also philosophical and sociological sides of the digital divide because of a potential missed opportunity on the part of millions of people to obtain desirable jobs and enhance their lives by using computers and the Internet (Friedman, 2001).

According to Fuchs & Horak (2007) “The digital divide refers to unequal patterns of material access to, usage capabilities of, and benefits from computer-based information- and communication technologies that are caused by certain stratification processes that produce classes of winners and losers of the information society, and participation in institutions governing ICTs and society.” Fuchs & Horak (2007) defines the types of access to ICTs as follows; material access is the availability of hardware, software, applications, networks, and the usability of ICT devices and applications; usage and skill access is the capabilities needed for operating ICT hardware and applications, for producing meaningful online content, and for engaging in online communication and co-operation; benefit access means ICT usage that benefits the individual and advances a good society for all; institutional access is the participation of citizens in institutions that govern the Internet and ICTs, and the empowerment of citizens by ICTs to participate in political information, communication, and decision processes (Fuchs & Horak, 2007).

The digital divide is not a problem only for developing countries, but also for developed countries. As in the developing countries of today, developed countries also have some inequalities between ICT “have” and “have-nots”. For example, even though the United States is accepted as one of the leading knowledge economies and network societies, it faces the digital divide; Chakraborty & Bosman (2005) found that there is clear evidence of income-related distributional inequalities regarding home PC ownership across the nation. Geographic inequality in access to information and communication services exists in Japan (Yuguchi, 2008).

Today, there are many types of the digital divide at local, national, regional or world levels, such as the gender divide, the age divide, the income divide, each such divide having its specific background, phenomena, evolution trends, perspectives as well as its specific bridging solutions and initiatives (Boje & Dragulanescu, 2003). Because of the continuous development of information technologies and the emergence of new technologies, the digital divide is a dynamic problem.

The digital divide is a complex, and dynamic problem which has political, cultural, and ethical dimensions (Ahmed, 2007). According to Lei, Gibbs, Chang, and Lee (2008), there are two main different thoughts about how to deal with the digital divide. Some scholars accept the digital divide as a natural phenomenon, therefore they don't suggest any intervention to bridge the digital divide and wait for self-correcting with the development of ICT. The others have suggested adopting interventions (Lei et al., 2008).

Measurements of the Digital Divide

Since there is a wide variety of ICT that their capabilities are almost boundless and these technologies are evolving rapidly, there is no consensus on how to measure the information society and the digital divide. Internet usage is one of most used indicators of the digital divide between countries. Even though the term “digital divide” appeared after the Internet's expansion in the mid-1990s; but, it does not refer exclusively to the Internet, other important ICTs such as personal computers, cellular phones, etc. are also highly relevant to the digital divide issues (Vehovar, Sicherl, Hüsing, & Dolnicar, 2006).

Initial studies on the digital divide have been made in the United States and over time, many national and international institutions showed interest in this area and have based their studies on different variables in order to measure the digital divide (Çilan, Bolat, & Coşkun 2009). Because of the multi-dimensional aspects of the information society, various index measures were developed to compare levels of the information society, such as, information society index, digital opportunity index, ICT opportunity index, ICT development index, e-readiness index, network readiness index, digital access index, mobile/Internet index and the technology achievement index (Atici, 2010; Çilan et al., 2009).

ICTs and Developing Countries

ICTs have various advantages and benefits for the developing countries. ICTs can be a powerful instrument in increasing productivity, creating jobs, generating economic growth and increasing international cooperation in finance, trade, foreign direct investment and these technologies help local businesses with tools and services to help them enter into the global markets and to be effective and efficient, enhancing their productivity and competitiveness and/or creating new forms of business (OECD, 2005; Shirazi, Gholami, & Higón, 2009). Access to information, goods and services via the Internet would allow countries and communities to participate, as well as buy and sell goods and services, in the ‘new information economy’, regardless of their geographic location (Holloway, 2005). By connecting people and places, ICT has played a crucial role in na-

tional, regional, and global development, and it holds enormous promise for the future (Buys, Dasgupta, & Thomas, 2009).

Since it has potential to make a country's economy more efficient and globally competitive, improve health and education services, and create new sources of employment, ICT is also important for poverty reduction (Shirazi, Gholami, & Higón, 2009). Also, ICT enhances social inclusion among citizens and promotes more effective, accountable, democratic government, especially when combined with freedom of information and expression (Shirazi et al., 2009). Shirazi, Gholami, and Higón (2009) found that there was a significant and positive link between the growth and expansion of ICT and economic freedom in the Middle East. However, ICT cannot be accepted as a panacea for all the problems of developing countries (Fong, 2009).

Today, the Internet is accepted as one of the most important ICTs affecting our lives. With the Internet and other ICTs, we are more connected to each other than ever before (Vidyasagar, 2006). Internet is being used worldwide for commerce, as well as for communication. Internet technology is not only making communication easier, cheaper, faster and much more effective than before but also changing the lifestyle of people and it is not just providing entertainment but also empowering people to become entrepreneurs and businessmen (Vidyasagar, 2006). There is increasing evidence regarding the role of the Internet in improving access to information in improving health, education and, therefore, economy across the globe (Vidyasagar, 2006).

The Digital Divide Report of the United Nations Conference on Trade and Development (UNCTAD) showed that there is a strong correlation between a country's ICT diffusion index (ICTDI) and its income and level of human development as measured by the United Nations Development Programme's (UNDP) Human Development Index (HDI). According to this report a person in a high-income country is over 22 times more likely to be an Internet user than one in a low-income country. The cost of Internet services in a low-income country is greater than in a high income country. Internet affordability is over 150 times greater in a high-income country than a low-income country (UNCTAD, 2006).

ICT plays a crucial role in advancing economic growth and reducing poverty (Jamwal & Padha, 2009). Guislain, Qiang, Lanvin, Mingos, and Swanson (2006) reported that ICT using enterprises in developing countries have 3.4% sales growth, 1.2% more employment growth, 5.1% more profitability, 2.5% more investment rate, 6% more re-investment rate and produce \$3,423 more value-added per workers than enterprises that do not use ICT.

Some of the socioeconomic opportunities that ICTs can provide to developing countries are summarized as follows (Fong, 2009):

- Social equality. ICTs have the potential to reduce the disadvantages that may be associated with cultural barriers.
- Social mobility. ICTs can improve life for those who are within reach of these technologies and help the upward movement in status of individuals or groups based on wealth, occupation, education, or some other social variable in a society where one status is not dictated or decreed by birth of origin.
- Economic equality. Bridging the digital divide may foster economic equality, educational potential, and earning potential.
- E-democracy. ICTs may lead to increased democratization by enabling citizens or constituents to participate in the decision making process of policymakers and government through the electronic channels and ICTs can also be a powerful tool for increasing transparency and facilitating information and communication processes among stakeholders.
- Economic growth and innovations. ICTs can support long-term economic growth and facilitate innovativeness.

Developed countries enjoy the benefits of ICTs in economic growth. For example, Jalava and Pohjola (2001) found that both the production and the use of ICT played a significant role in the improved economic performance of the United States in the 1990s. The widespread diffusion of the ICT around the world provides developing countries the opportunity to reduce the economic gap between the developing and the developed countries (Meng & Li, 2001). Although, studies found that ICT investments positively affected productivity growth at the macroeconomic level in the developed countries, but not in the developing countries, its role in the developing countries is not clear, yet (Meng & Li, 2001; Shih, Kraemer, & Dedrick, 2008). Some of the reasons this is the insufficient are low level of IT investment in the developing countries, short of capital investment and knowledge know-how (Meng & Li, 2001; Shih, Kraemer, & Dedrick, 2008). Another reason is that there is not enough relevant research has been undertaken in the developing countries (OECD, 2005). It is likely that most developing countries have not reached a level of accumulated investment needed to achieve measurable productivity gains, because of their historically low levels of IT spending (Shih, Kraemer, & Dedrick, 2008). According to Shih, Kraemer, & Dedrick (2008) besides the level of national wealth (They found it as the single most important factor), factors affecting the level of IT investment are resources for technology investments, structure of the economy, complementary assets, and openness to external influences.

The Digital Divide in Turkey

Profile of Turkey

With a population of about 71.5 million, gross national income (GNI) per capita US \$9,340 in 2008, life expectancy at birth 69 for females and 74 for males, Turkey is a developing country. In 2008, for every 100 people in the country, there were 92 mobile cellular subscribers and 24.47 fixed telephone subscribers (TurkStat, 2010a). Turkey is ranked 57th in ICT development index (IDI) in 2008, 43th in e-readiness rankings in 2009, 69th in network readiness index in 2009-2010 ratings, and 43th in digital economy rankings in 2010. Major indicators of Turkey are presented in Table 1.

Table 1: Major Indicators of Turkey

Population (million) (2008)	71.5
Density people per sq. km (2008)	96
GNI per capita (\$) (2008)	9,340
Life Expectancy (2007)	
Male	69
Female	74
PC/100 people (2008)	6.1
Internet Users/100 people (2010)	45.0
Fixed broadband Internet subscribers/100 people (2008)	7.78
ICT expenditures % of GDP (2008)	4.1
Mobile phone subscribers/100 people (2008)	92
Exports of ICT goods (million\$) (2007)	3,227.7
Imports of ICT goods (million\$) (2007)	9,830.5

Sources: TurkStat 2010a, World Development Report-2010, World Development Indicators 2010, Information Economy Report 2009, InternetWorldStats 2010

The Aspects of the Digital Divide in Turkey

In this section the aspects of the digital divide in Turkey are explored using the ICT Usage Survey in Households and Individuals carried out in April, 2010 by Turkish Statistical Institute (TurkStat).

Age

Age is one of the demographic factors affecting ICT use. It is found that the Internet penetration rate among young residents is substantially higher than that among elderly residents in both developed and developing countries (Friedman, 2001). There are various studies explored age differences in the digital divide literature. For example, Loges and Jung (2001) investigated the digital divide between old and young Americans and they reported significant differences between old and young Americans in Internet access. Vicente and López (2008) analysed Internet adoption in the new member states and candidate countries of the European Union and concluded that younger individuals are the most likely to use the Internet in all the countries. Even though Internet and e-mail use has greatly increased between 1995 and 2002, Enoch and Soker (2006) found that there remains a steady and significant gap between the different age groups, especially between the youngest and the oldest university students. Many observers believe that the digital divide is basically a generational phenomenon and it will disappear in time as younger computer literate cohorts replace older non-users (Broos & Roe, 2006). However, since ICT is always evolving, new advanced ICTs may cause new digital divides between young and elderly residents.

According to the results of TurkStat ICT Usage Survey in Households and Individuals in 2010, 16-24 age group has the highest rate of computer and Internet use and 65-74 age group has the lowest rate of computer and Internet use, while the rates of computer and Internet user are 65.2% and 62.9% respectively for 16-24 age group, these rates are 2.7% for 65-74 age group. There is a huge gap between younger and older individuals in terms of computer and Internet use. The rates of computer and Internet use are sharply decreased as age intervals increase. Table 2 presents the distribution of computer and Internet use by age groups and gender.

Table 2: Individuals using the computer and Internet in the last 3 months by age groups and gender (%)

Age	Computer			Internet		
	Total	Male	Female	Total	Male	Female
16-24	65.2	78.5	52.7	62.9	76.6	49.9
25-34	52.0	62.4	41.6	50.6	60.9	40.2
35-44	36.9	46.9	26.9	34.7	43.5	25.7
45-54	23.2	33.6	12.7	22.4	31.9	12.9
55-64	8.3	13.5	3.4	7.8	12.6	3.2
65-74	2.7	4.1	1.6	2.7	4.2	1.6

Source: TurkStat (2010b), ICT usage survey on households and individuals

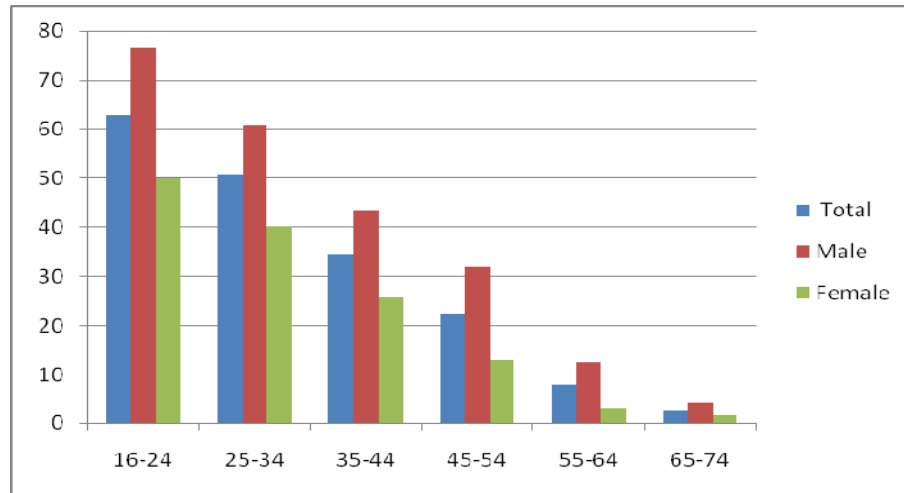


Figure 1: Internet users by age and gender (%)

Source: TurkStat (2010b): ICT usage survey on households and individuals

Gender

Gender issues in the use of ICT have been attracting interests of many researchers. UNESCO accepts the gender divide as “one of the most significant inequalities to be amplified by the digital revolution” (Primo, 2003). Bimber (2000) found that there is a significant gap between genders in terms of accessing and using the Internet. According to Bimber (2000) gender gap in the Internet may exist because of differences between men and women in socioeconomic status, which affects Internet access and use. Chen and Wellman (2004) found that gender is one of the important factors affecting access to and use of the Internet; males are more likely than females both to access and to use the Internet. Carveth and Kretchmer (2002) found that gender is one of the significant predictors of the digital divide in Western Europe. According to Ono and Zavodny (2003) gender gap in being online disappeared by 2000, however, they found that there is a gender gap in frequency and intensity of Internet use. Broos and Roe (2006) found also gender is one of the major factors structuring the digital divide.

TurkStat (2010b) ICT Usage Survey in Households and Individuals between 2004 and 2010 shows that a gender gap exists in computer and Internet use. The rate of computer and Internet use of males is higher than that of females. Even though the number of computer and Internet users has increased, gender gap in using these technologies still remains. While the rates of computer and Internet use among male residents are 53.4% and 51.8% respectively, these rates among females are 33.2% and 31.7% in 2010 (Table 3 and Figure 2). In addition, gender gap exists for all age groups. Percentage of males that use computer and Internet is higher than percentage of females that use these technologies for all age groups (Table 2 and Figure 1).

Table 3: Computer and Internet users by gender (%)

Year	Computer		Internet	
	Male	Female	Male	Female
2004	15.4	8.2	12.7	6.1
2005	14.9	8.0	11.9	5.6
2006	-	-	-	-
2007	42.7	23.7	39.2	20.7
2008	47.8	28.5	45.4	26.6
2009	50.5	30.0	48.6	28.0
2010	53.4	33.2	51.8	31.7

Source: TurkStat (2010b): ICT usage survey on households and individuals

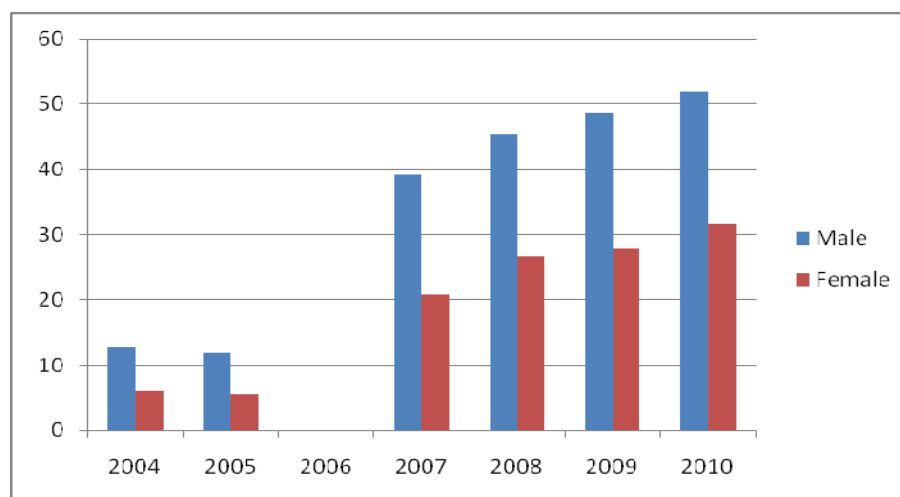


Figure 2: Internet users from 2004 to 2010 by gender (%)

Source: TurkStat (2010b): ICT usage survey on households and individuals

Education Level

Vicente and López (2008) found that educational attainment is one of the main determinants of Internet use; education positively affects the likelihood of an individual using the Internet. According to the results of their study, university education has a stronger effect than high school education in terms of Internet usage. Goldfarb and Prince (2008) found that high-income, educated people were more likely to have adopted the Internet by December 2001 in the United States.

TurkStat survey reveals that as education level increases, the rate of computer and Internet use also increases. While the rate of computer use among people having higher education is 90.4%, 71.8% of high school graduates, and 15.3% of primary school graduates reported using computer in the last 3 months. Similar result is valid for Internet use; while 89.6% of individuals having higher education use the Internet, only 14.0% of primary school graduates reported using the Internet in the last 3 months (Table 4).

Table 4: Individuals using the computer and Internet in the last 3 months by education level (%)

	Computer	Internet
Literate without a diploma	3.4	2.8
Primary school	15.3	14.0
Secondary and vocational secondary school	56.6	54.0
High and vocational high school	71.8	69.9
Higher education	90.4	89.6

Source: TurkStat (2010b): ICT usage survey on households and individuals

Rural-Urban Digital Divide

Geographic location is one of the affecting factors for individuals to access ICTs. Even though ICTs provide distinct advantages to geographically isolated rural residents, rural citizens are expected to lag behind urban residents, because of limited telecommunication infrastructure, and culture (Hindman, 2000). Chen and Wellman (2004) found that geographic location is one of the significant factors affecting people's access to and use of the Internet, with more prosperous regions having higher Internet penetration rates than poorer regions (Chen & Wellman, 2004). Hindman (2000) found that a larger percentage of urban residents have adopted and used various information technologies than have rural residents. Even developed nations face the digital divide because of geographic disparity, but, not much as developing countries. Labrianidis & Kalogeressis (2006) explored the main characteristics of the digital divide in Europe's rural enterprises and found that rural firms appear to be more or less "digital" in the most developed countries, while in the less developed countries adoption has been much slower. Carveth and Kretchmer (2002) found southern Europe countries have less computer and Internet penetration than Northern European countries. Demoussis and Giannakopoulos (2006) found similar result; differences in Internet use between Southern and Northern European states exist; people in the south of Europe show lower probabilities of Internet use than those living in the north of Europe.

According to TurkStat survey, computer and Internet use has increased among both rural and urban residents from 2004 to 2010. However, there is a significant and consistent gap between rural and urban residents in terms of computer and Internet use. In 2010, while the rates of computer and Internet use among rural residents are 25.6% and 23.7% respectively, these rates among urban residents are 50.6% and 49.2% (Table 5 and Figure 3). The main reasons for rural-urban digital divide could be differences in income and educational level between rural and urban areas of Turkey.

Table 5: Computer and Internet users by rural-urban

Year	Computer		Internet	
	Rural	Urban	Rural	Urban
2004	-	-	-	-
2005	11.7	29.6	8.2	23.07
2006	-	-	-	-
2007	17.8	40.1	15.2	36.6
2008	20.6	45.2	18.3	43.1
2009	22.2	47.7	20.7	45.5
2010	25.6	50.6	23.7	49.2

Source: TurkStat (2010b): ICT usage survey on households and individuals

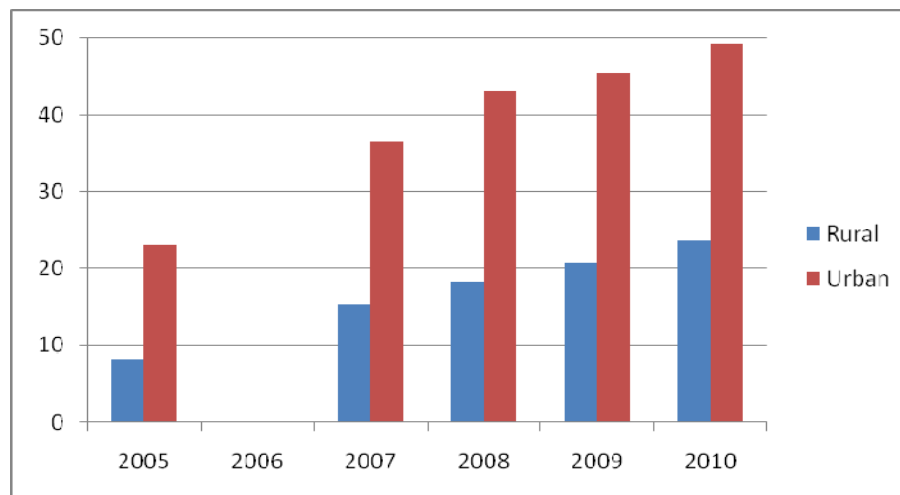


Figure 3: Internet users from 2005 to 2010 by rural-urban (%)

Source: TurkStat (2010b): ICT usage survey on households and individuals

Conclusions

This paper explored the aspects of the digital divide in Turkey. According to the results of TurkStat yearly surveys, computer and Internet use has significantly increased in Turkey over time, but, there is still a digital divide in computer and Internet use within Turkey, and between Turkey and developed countries.

Similar to previous study findings, TurkStats survey results reveal that computer and the Internet usage rate among young generation is considerably higher than that among elders. The age digital divide is expected to diminish steadily as younger computer literate generations replace older non-users (Broos & Roe, 2006).

It is found that the gender digital divide has been consistent among all age groups in Turkey. The rate of computer and Internet use of male residents is higher than that of females.

Education level is important for individuals to access and use ICTs. TurkStat survey shows that as education level increases, the rate of computer and Internet use also increases among residents.

There is a significant gap between rural and urban Turkish residents regarding computer and Internet use. People living in the rural areas of Turkey show lower probabilities of computer and Internet use than those living in the urban areas of Turkey. The findings from this study indicate that the digital divide between rural and urban residents in Turkey will likely to continue.

ICT adoption rate among residents and other information society indicators are closely related with socio-economical development of the country. Therefore as socio-economic development of Turkey advances, it is expected that its information society indicators get closer to the developed countries and the digital divide starts to close. Enhancing level of literacy and designing appropriate IT tools around the capabilities of users can help a wider population to benefit from technology and information revolutions (Rao, 2005). Thus, education, especially in rural areas, and taking necessary measures for providing ICTs and information technology services with affordable costs are essential for bridging the digital divide in developing countries.

The gender digital divide is a critical issue in developing countries. A better understanding of all aspects of the gender digital divide is crucial in order to prevent the adverse impact of the gender

digital divide on women (Huyer & Sikoska, 2003). The gender digital divide could be bridged with increasing the education and socio-economic level of females. It takes time and devotion to achieve bridging the gender digital divide in developing countries.

The government plays an important role in bridging the digital divide in developing countries, like Turkey. Given the significant age, gender and rural-urban digital divide Turkey faces; government should make significant physical and social investments in ICT access, especially in the urban areas.

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Biography



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