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FACTORS AFFECTING DEMAND FOR INTERNET ACCESS IN SAUDI ARABIA

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Abstract

As internet use in Saudi Arabia are dramatically increasing, a powerful demand is being laid down on internet service purpose where this paper aims at identifying major factors that influence these demand pertaining to internet services. Within a selected theoretical model, such multiple factors are being conceptualized and interrelated. Using time series data, the Ordinary Least Square (OLS) technique is employed to analyze the relationships. The results of the model indicated clearly that using the internet in Saudi Arabia is influenced most strongly by the number of educated people, the number of mobile subscribers, income, the number of fixed lines, and employment level. The results also suggest that demographic factors have a significant impact on the demand for internet, specifically, the number of educated people and levels of employment. This paper concludes with a recommendation on increasing the level of understanding of those the factors affecting practitioners who plan and promote new forms of internet services in the current competitive market.

Keywords: Internet Access, Internet Demand, Demographic Factors, OLS

1. Introduction

Getting people online is considered an essential step in delivering the expected economic and social benefits of information technology (IT). It seems the Internet plays a critical role in enhancing the economic growth and development, because it is seen as an effective method of communication, providing a promptly enormous amount of information largely used by public and private sector and by individuals from any location. It is projected that 10% raise in broadband access would result in boost 1.21 and 1.38% in GDP growth in the average for high-income and low/ middle-income countries respectively, depicting that the internet started to play an important role in economic growth in developed as well as developing nations (World Bank, 2009).

The Internet access provided as a dial-up in the 1990s commercially. Later, Broadband access emerged as a higher quality and more expensive alternative for delivering Internet access to a limited number of providers in certain locations at the end of the 90s in both emerging and developed markets. Since then, broadband has been regarded as a vital infrastructure in the growing worldwide digital economy. The Internet economy is vast and rising fast, estimating to reach around US$ 2.3 trillion G20 countries or 4.1% of GDP in 2010, and nearly double to US$ 4.2 trillion in 2016 (GSR, 2008).

By the end 2015, the Internet users reached 3.2 billion globally, of which 2 billion were from developing countries, indicating the number of Internet users in the developing world was double the one in the developed world. Despite that, 66% of the population (4 billion people) in developing countries was without Internet services. The worldwide Internet penetration increased significantly from 6.5% to 43% over the period from 2000 to 2015. Many of these were because of the high usage of the mobile device by people to access the Internet, which totaled to more than 7 billion (75% in developing countries) in early 2015 (ITU, 2015), and was the worldwide spread of mobile phone Internet user reaching 52.7%. It is expected that more than 63.4% of mobile phone users will access online content through their devices in 2017 (Statista, 2016).

The growth of internet usage was even more amazing in the MENA region. In 2000, the Internet users increase from under 3 million to nearly 129 million (a penetration of less than 1% to 23% of the total population). The raise is as extraordinary for the GCC countries: from 5.3 million to 113 million users or a raise of more than 2000% between 2000 and 2015. It is estimated that 19% of Internet users in the GCC countries are Saudi Arabian users.

In Saudi Arabia, the internet was first introduced for educational, medical and research institutions in 1993. However, Internet entered Saudi Arabia officially in 1997 by a ministerial decision and was allowed to the public by 1999. Since that time the number of internet users had grown tremendously from 1 million in 2001, and increased to 3 million users in 2005, and rose to 11.4 users in 2010, and finally reached to 21.6 million in 2015 with a penetration rate of %68.5, and the percentage of internet users is rapidly growing.

Demand for the Internet in Saudi Arabia and its determining factors are not deeply investigated matters, except for the limited studies available. Hence, a study like this one aims to understand the factors that affecting demand for the Internet in Saudi Arabia. Unlike most works of Internet demand, this study uses time-series analysis, with yearly data for the period 1994 to 2014, to estimate factors affecting Internet demand in Saudi Arabia. This study is expected to be a major input in the policy formulation to improve the penetration level of the service in different sectors.

This paper is organized as follows: Internet demand is introduced in the first and second sections and the related empirical work of Internet demand will be reviewed. In the third section, the Internet in Saudi Arabia will be explored. The fourth section will set up the research methodology used. In the fifth section, the main findings will be discussed. Finally, the conclusion, recommendations, and highlights for further research implication will be provided.

2. Literature Review

During the past years, the internet demand has attained special attention in academic studies which focused on investigating factors of Internet demand. The expansion of broadband infrastructure, services and applications is demanding, especially in the existing economic climate. The Internet has expanded in speed, size, scale, and scope worldwide, and is expected to ameliorate.

There are numerous theoretical models in the literature to explain the factors that determine the adoption and use of ICTs. Early studies showed that in developed countries, socioeconomic factors had a primary role in the adoption and use of ICT by households Hoffman and Novak (1996). Other factors that influence the adoption of ICTs by households include localization, household size, social network, and lifestyle (Le Guel, 2005).

As a pioneer study of the adoption of the broadband Internet service, Madden *et al.* (1996) studied Australian homes by examining 5,000 survey responses. It was the first study to discover that demographic characteristics such as education level, people racial, and age have a major impact on the individual decision to use the broadband Internet service.

Later on, studies such as Hausman *et al.* (2001) and Rappoport (2002) indicated that household income is an essential factor of broadband acceptance. Furthermore, Beilock and Dimitrova (2003) concluded the inter-country Internet diffusion factors are mainly the per capita income and the non-economic factors like the civil liberties, he also concurred on the importance of the ICT infrastructure influence.

In the study of Internet penetration determinants, Chinn and Fairlie (2004) found that variables such as income per capita, years of schooling, illiteracy, youth and aged dependency ratios, urbanization rate, telephone density, electricity consumption and regulatory quality were statistically important in most specifications for Internet use.

Moreover, by investigating of Internet demand in Spain, study showed that internet usage increases with high income and other technological attributes, and decreases with low socio-demographic attributes such as habitat and age (Cerno and Amaral 2005).

In a cross-country analysis, Oyelaran-Oyeyinka and Lal (2005) confirmed the essential significance of telecommunications infrastructure, represented by the high link between telephone density and the Internet, irrespective of per capita income level of the country. In a related study, Genc *et al.* (2006) estimated the demand of the Internet use in the U.S. by employing logit and probit models containing a range of variables such as gender, race, income, age, education level, marital status, parenthood, employment status and student status, in addition to the Internet familiarity and availability and need were incorporated. The results indicated no gender or a racial digital divide in the use of the Internet, however, employment variable was found to negatively related to Internet use, while, marital status has no considerable effect on Internet use.

Meanwhile, Neira *et al.* (2008) employed a panel data model using all the available data for the period 1996-2005 to capture the common evolution of Internet use in 38 African countries. The main conclusion of the study is that the income effect on the Internet use is not relevant; however, other variables included in the different specifications of the model are significant. Both the three minutes call cost and the monthly subscription cost variables have a negative impact on the Internet use. Meanwhile, with respect the infrastructure technologies, both personal computers and telephone lines per 100 inhabitants have positive and very significant coefficients on the Internet use in African nations.

Cadman and Dineen (2008) indicated that the pace of broadband penetration in the OECD is highly affected by income, with an increment of 1% in income resulting in an increment of 0.78% in demand. This is in line with the study by Rosston and Savage (2010). While, Horrigan (2009) argued that broadband Internet service was adopted by 63 percent of households as of 2009, which differed by variables such as income, age, and education.

In South American countries, by utilizing a multivariate discriminative model, Hilbert and Peres (2010) studied the influence of variables such as education, Income, household size, historic period, gender and ethnicity on household Internet access penetration. They concluded that both income and education variables have impacts on Internet access penetration. Furthermore, countries with high income and high education level have the highest Internet penetration rate (ITU, 2011).

Furthermore, Kholilul and Bohlin (2011) constructed a probit model to study the impact of income and geographical area, in addition to other variables on mobile broadband in Indonesia. The findings showed that income plays a less significant role than geographical area in explaining the demand for mobile broadband access.

Mukoko (2012), using a household survey in 2008, showed that socioeconomic factors such as the level of education and age, and psycho-sociological factors such lifestyle, perceived utility and perceived difficulty appear to be more important factors in the adoption and use of the computer and the Internet in Cameroon. Other studies concluded that literacy in addition to income is important factors in using the Internet significantly (Chaudhuri *et al.* 2005, Hilbert 2011).

As far as Saudi Arabia is concerned, Al-Shohaib *et al*. (2009), in his study of the effect of individual, organizational, and social contexts on the Internet use of Saudi public relations professionals, found that just 46% of the study's sample used the Internet for public contracts, with organizational context variables as the prominent predictors of Internet use.

Furthermore, in a survey study of Internet adoption in Saudi Arabia, Simsim (2011) studied demographic and socioeconomic factors that affect Internet service penetration. The results revealed that the Internet is spreading more between males than females and between young than older people. Moreover, improving the speed and quality of the Internet connection

was found to be more important variables than decreasing the price of the service. DSL was the most frequently used communication system to connect to the Internet.

As it has shown above, jointly with other socioeconomic factors, it is generally conceived that income, educated people and other technological attributes are an important factor in determining the demand for Internet.

3. Internet in Saudi Arabia

The Kingdom of Saudi Arabia is by far the largest country in terms of land when compared to the rest of the Middle East, to add it has a population of 30.8, and the demographic trend is led by males (male: 54.8% female: 45.2%) in 2014. Saudi Arabia's population is believed to be real young when compared to other nations. The average age in Saudi Arabia is 25.3 years while on the other hand, Europe has a median age of 38, 35 in the USA and 45 in Japan. The younger generation is more prone to using the internet via digital devices; tablets, smart phones to access social network sites, e-shopping and e-learning. Nevertheless, Saudi Arabia's economy compared to the rest of the world is ranked number one in the MENA region and 19th worldwide.[1]

In Saudi Arabia the first establishment to connect up to the internet was King Fahd University of Petroleum and Minerals (KFUPM) in 1993. Thus, two DNS domain names were set aside and classes dedicated to Internet protocol were allotted to KFUPM, due to truncated speed of the portal the only service offered was e-mail.

A major stride was taken in 1994 when King Abdulaziz City for Science and Technology (KACST) became the registered domain manager for Saudi Arabia; this meant they would coordinate Internet services within the Kingdom.

Then in 1995 KASCT was given additional responsibility which was the supervision of Internet connection, to add the internet speed went from 64kbps to over 1.5Mps, this was via King Faisal Specialist Hospital (KFSH), which was connected to the Baltimore's Johns Hopkins Hospital for tele-medicine and health education in the US.

In 1996 KACST decided to implement a pilot project, this entailed some members of staff at KACST were given access to dial-up connections, furthermore, some governmental institutions were given access to the internet by KFSH. However, ARAMCO took the bold step and leased a 64kbps line via the US.

It was not until 1998 that KACST was finally connected directly to the Internet via Saudi Telecommunications Company (STC). After much deliberation on the pros and cons of allowing the public internet access the local ISP's were finally given the go ahead in 1999.[2]

Eight years later in 2004 IT sector was to be supervised and regulated by the Communications and Information Technology Commission (CITC), there was vision was "Universally available, high quality and affordable communications and information technology services" (CITC, 2014). Thus they were responsible for granting telecommunications and IT services, licenses, managing the frequency spectrum and network interconnections, overseeing telecoms tariffs and providing internet content filtering (CITC, 2014).

The overall capability for global Internet connectivity in the Kingdom rose from 318 to 1321 Gbits/s over a period of four year (2010 and 2014). Meanwhile, the total number of domain names registered has grown rapidly, reaching 37,547 by the end of 2014 compared to 21,599 in 2000, and 1 in 1995.

Three main companies (STC, Mobily, and Zain) provide fixed broadband (DSL, Fixed Wireless, FTTx), and mobile broadband in Saudi Arabia. By the end of 2015 internet users in Saudi Arabia had reached 21.6 million, this was an increase of 68.5%, compared to 41% in 2010 and 13% in 2005 (CITC, 2015). The recent an augmented demand for Internet services was as a result of increasing adopt of many universities and colleges e-learning methods as part of their curricula, and more government sectors and banks and companies would provide more services online, which expect to increase the number of consumers who use Internet

[1] The Global Evolution of Digital Commerce and MENA e-Commerce, 2014.
[2] See Al-Tawil (2001), for more historical information regarding the Internet in Saudi Arabia.

services, in addition to high use of social media, video and game. It is estimated that the total of Saudi e-Shoppers reached 4.5 million. Moreover, the total Saudi users of Facebook consist 50% of GCC users with more than 5 million, ranking at 32 worldwide. In addition, Saudi Arabia ranked at 34 and 41 in e-Readiness and e-Government respectively.

Due to household size, the high competition, and the spread of mobile connected devices, the mobile broadband market is expected to continue growing beyond the 100% per capita penetration in Saudi Arabia. Recently, mobile operators contributed to the rise in the number of users, in addition, the wide range of the (3G) & (4G) networks supported by offering different data packages increased the data traffics (CITC, 2014).

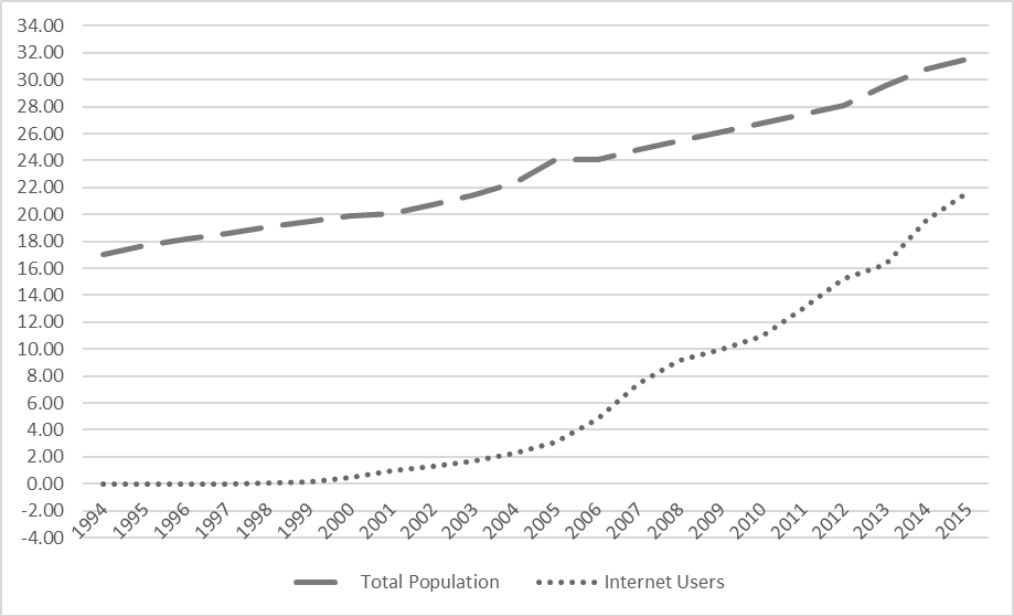

Figure 1. The Relation between Internet Users and Total Population

Figure 1 shows the relation between Internet users and total Saudi population. As shown in figure 1, the relation is directly proportional to Internet users and the total population in Saudi Arabia. As the population increased, the Internet users increased as well. However, it is notable that the huge change in internet users in comparison with the change in the population. The growth rate of internet users from 2001 to 2015 reached to more than 2000%, where the rate of population for the same period increased by 58%. In 2010, an estimation done by Internet subscription data showed that the Saudi Arabia took place in 34 around the internet users in a worldwide and 79 in population. (World Telecommunication, 2010) One of the main causes of the growth in Internet users in Saudi Arabia is young demographics where 60% of the population aged less than 18 years and this segment of the population that can deal with new technologies faster than expected.

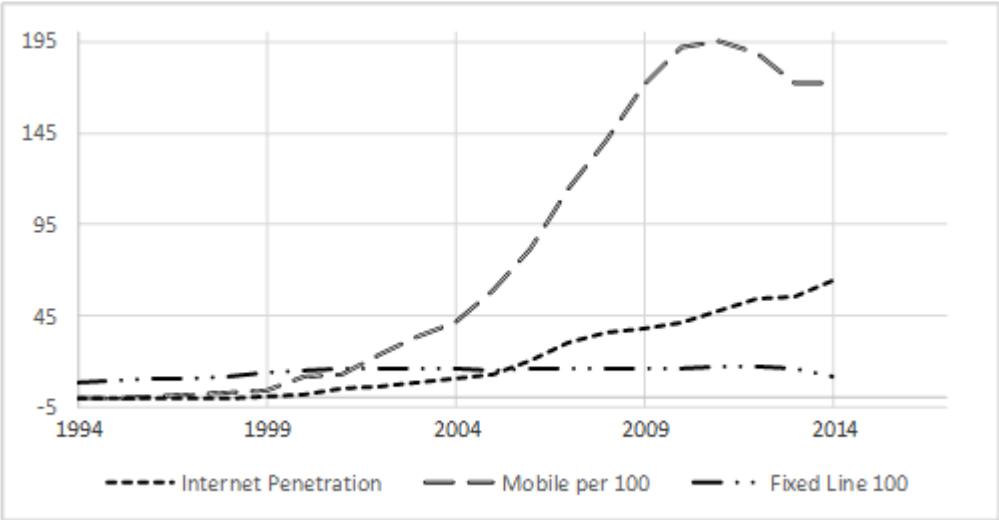

Figure 2. Trend of Internet Penetration, Mobile and Fixed Line per 100

Figure 2 shows the trend of Internet penetration and mobile and fixed telephone line subscriptions. It is estimated that mobile subscriptions reached 53 million, with a population penetration rate of 171.4%, while, fixed telephone line subscriptions stood at 3.62 million by end of 2014. This represents 11.8% of a population teledensity and 45% of a household teledensity. Fixed telephone line subscriptions have decreased, like in other countries in the world, owing to the powerful competitiveness of mobile services and the comparability of their prices, where subscribers are substituting mobiles for fixed devices (CITC, 2014).

As a consequence of liberalization of the Saudi telecommunications sector and the opening of its markets to competition, the quality and coverage of services improved and service prices started to go down over the past years, even though the significant boost in other goods and services prices. Even though, the general cost of living index raised by roughly 30.1% cumulatively over the period of 2007 and 2014, the prices of telecom services declined by almost 6.3% (CITC, 2014).

The total spending on the ICT services increased from $9.6 to $30 billion between 2005 and 2014, with an average annual growth of about 12%, of which about 40% were spending on IT services. This is because of the investment in infrastructure for Next Generation Networks and 4G mobile networks, the adoption of e-services (e-government, e-health, e-education, e-commerce, etc.) as well as spending on information security (CITC, 2014).

The employment of new technology and its applications seems to enhance the efficiency of other economic sectors as well. The contribution of the ICT sector was 2.78% and 8.7% of GDP and non-oil GDP respectively in 2014. Additionally, there is a direct relationship between the diffusion of broadband services and the GDP growth rate. It is projected that as broadband services increase by 10%, GDP grows by about 1.3%. (CITC, 2014) Saudi Arabia's Internet economy growth rate hit 19.5% compared favorably to other growing countries in the G-20, which are growing at an average of 17.8%. It is estimated that Saudi Arabia will rank number 10 in the G-20 in Internet economies, with its contribution to GDP growing to 3.8%.[3]

4. Methodology and Data

Unlike most studies, this study will depend on time-series data to estimate factors affecting the Internet demand in Saudi Arabia. Most empirical studies which have been conducted to estimate the factors affecting demand for internet were based on questionnaire data from several developed and developing countries, which provided different results. However, this

[3] The Internet Economy in the G-20 (2012).

study uses a time series data for Saudi Arabia to examine the factors affecting demand for internet in Saudi Arabia. The regression tools used in the estimation process are those specifically designed for time series data such as the Ordinary Least Square (OLS) method. The data used contains several years of time series of annual data available covering the period from 1994 to 2014. Data used is all available secondary data since entering the Internet service to Saudi Arabia, collecting from Saudi Arabia government official publications and international publications and reports.

4.1. Hypothesis

The study attempts to explain the relationship between numbers of educated population, mobile phone subscribers, fix phone line subscribers, employees (employment level) and annual average per capita expenses on IT and on the demand on Internet penetration in Saudi Arabia. Thus, this study aims to answer the following main research questions were:

What crucial factors need to be considered in the development of Internet demand by measuring its consumer characteristics and observable demographics such as education, income, employment, and technological attributes such as mobile service subscriptions and fixed phone line subscriptions?

1. Are there any significant positive relationships between a number of educated population and the Internet penetration in Saudi Arabia?
2. Are there any significant positive relationships between income and Internet penetration in Saudi Arabia?
3. Are there any significant positive relationships between a number of fix phone line and Internet penetration?
4. Are there any significant positive relationships between a number of mobile phone subscribers and Internet penetration?
5. Are there any significant negative relationships between employment level and Internet penetration?

4.2. The Model

This study used Internet penetration as dependent variable to estimate the effect of various factors on Internet demand (Di) in Saudi Arabia. The used model is constructed by using the famous linear function. In addition to income, the demand for Internet was predicted by employing other socio-economic variables. Different explanatory variables such as educated population, income, employment level, mobile phone line subscriptions and fixed phone line subscriptions and will be used to estimate the demand for internet in Saudi Arabia. The following explanatory variables were used in the model.

$$Di = F(EDP, MP, FP, ITE, TE) \quad (1)$$

where:

Di: Internet demand represented by Internet users per 100 population (independent variable).
EDP: Number of educated people.
MP: Mobile phone line subscriber 100 population
FP: Fixed phone line subscriber per 100 population.
ITE: Annual average of per capita expenses on IT is used as the proxy for income.
TE: Number of employees

$$Di = a_0 + a_1\, EDP + a_2\, ITE + a_3\, TE + a_4\, MP + a_5\, FP + e \quad (2)$$

$$Di = -7.89 + 4.09\, EDP + 1.08\, ITE - .58\, TE + .12\, MP + 60.30\, FP \quad (3)$$
$$(2.45) \quad (13.68) \quad (-1.94) \quad (11.26) \quad (1.8)$$

Equation (3) reports the OLS estimates of the unconditional, linear effect of educated population, annual average per capita expenses on IT, employment level, mobile phone line subscribers and fix phone line subscribers. The regression equation is significant at 1% level by using ANOVAs test, indicating that the linear model is the appropriate one for estimating. It showed that the estimated statistical (F) is 1581.28. This indicated that the equation, in general, is good at the level of statistical significance of 1%, (where n-k, n-1:F.01 < F), which means rejecting the hypothesis of no effects of explanatory variables on the dependent variable.

The figures in the parentheses under each explanatory variable are the t-ratios of the estimated parameters in equation (3), reflecting the importance of explanatory variables. The coefficients of both mobile phone subscribers and annual average per capita expenses on IT variable are positively related to demand for the Internet at 1% level of significant, while, the educated population variable is significant at 5% level with a positive effect. Furthermore, the number of fix phone line subscriber has positively effect on Internet demand at 10% level of significant, meanwhile, total employment affect Internet demand negatively at 10% level of significant, which indicates as the level of employment increase less time is available for Internet use. All variables effects directions are in line with economic theory. The estimated regression explained a high portion (99%) of the variation (adjusted R-squared .99) in Internet demand in Saudi Arabia. These results are consistent with the literature for other countries and all results confirmed the hypothesis that there are relationships between Internet demand and proposed variables.

5. Summary and Conclusions

Previous studies have identified the common factors of Internet demand in developing countries is related to socioeconomic factors, namely income, age and education, employment level and other technological attributes.

In this paper, we have analyzed the demand for Internet demand in Saudi Arabia, using country-level data on different socioeconomic variables. OLS techniques have been applied in order to estimate the impact of various factors such as educated population, annual average per capita expenses on IT, employment level, mobile phone line, and fixed phone subscribers on the demand for the Internet between 1994 and 2014. As the results indicate, the demand for Internet services in Saudi Arabia appears to be socioeconomic variables significantly related Internet service.

The study concludes that income and mobile phone subscribers play a significant part in its influence on mobile Internet access than educated population, employment level and fixed phone subscribers, indicating that affordability is an issue to demand for the Internet access. As it is shown above, the importance of socioeconomic characteristics has been strongly reinforced in this study of Saudi Arabia.

The outcomes of this study provide insight on the current status of Internet demand in Saudi Arabia and present basis for business and government agencies that may be considered in future development and policy formulation.

Due to the lack of data availability, the analysis has not included analysis of more observations for the Internet access in Saudi Arabia. Future research should be conducted in order to identify other factors for the demand for Internet usage for a long period.

References

Al-Shohaib, K., Al-Kandari, A.A.J., and Abdulrahim, M.A., 2009. Internet adoption by Saudi public relations professionals. *Journal of Communication Management,* 13(1), pp.21-36. http://dx.doi.org/10.1108/13632540910931373

Al-Tawil, K.M., 2001. The Internet in Saudi Arabia. *Telecommunications Policy*, 25(8-9), pp.625–632. http://dx.doi.org/10.1016/S0308-5961(01)00036-2

Beilock, R. and Dimitrova, D. V., 2003. An exploratory model of inter-country Internet diffusion. *Telecommunications Policy*, 27(3-4), pp.237-252. http://dx.doi.org/10.1016/S0308-5961(02)00100-3

Cadman, R. and Dineen, C., 2008. *Price and income elasticity of demand for broadband subscriptions: A cross-sectional model of OECD countries.* London: SPC Network.

Cerno, L. and Amaral, T.P., 2005. *Demand internet access and use in Spain*. [online] Available at: <https://core.ac.uk/download/files/153/6306779.pdf> [Accessed 17 January 2016].

Chaudhuri, A., Flamm, K.S., and Horrigan, J., 2005. An analysis of the determinants of internet access. *Telecommunications Policy*, 29(9-10), pp.731-755. http://dx.doi.org/10.1016/j.telpol.2005.07.001

Chinn, M.D. and Fairlie, R.W., 2004. The determinants of the global digital divide: A cross country analysis of computer and internet penetration. *Yale University Centre Discussion Paper*, No. 881.

Communications and Information Technology Commission (CITC), 2014. 2014 Annual report of CITC, Saudi Arabia.

Communications and Information Technology Commission (CITC), 2015. 2015 Annual report of CITC, Saudi Arabia.

Dean, D., DiGrande, S., Field, D., Lundmark, A., O'Day, J., Pineda, J., and Zwillenberg, P., 2012. *The internet economy in the G-20 The $4.2 trillion opportunity.* Boston: The Boston Consulting Group.

Genc, I.H., Sahin, H. and Stone, R.W., 2006. Adults' demand for the Internet use in the USA: An empirical approach. *Journal of Mathematics and Statistics*, 2(1), pp.328-333. http://dx.doi.org/10.3844/jmssp.2006.328.333

GSR, 2008. Best practice guidelines 2008. [online] Available at: <http://www.itu.int/ITU-D/treg/Events/Seminars/GSR/GSR08/PDF/GSRguidelines08_E.pdf> [Accessed 11 January 2016]

Hausman, J., Sidak, G., and Singer, H., 2001. Cable modems and DSL: Broadband Internet access for residential customers'. *American Economic Review*, 91(2), pp. 302-307. http://dx.doi.org/10.1257/aer.91.2.302

Hilbert, M. and Peres, W., 2010. *Information societies in Latin America and the Caribbean: development of technologies and technologies for development.* Santiago: ECLAC Books.

Hilbert, M., 2011. The end justifies the definition: The manifold outlooks on the digital divide and their practical usefulness for policy-making. *Telecommunication Policy*, 35(8), pp.715-736. http://dx.doi.org/10.1016/j.telpol.2011.06.012

Hoffman, D.L., Kalsbeek, W.D., and Novak, T.P. 1996. Internet and web use in the United States: Baselines for commercial development. [online] Available at: < https://www.researchgate.net/publication/234771029_Internet_and_Web_use_in_the_US> [Accessed 9 January 2016]

Horrigan, J., 2009. Home broadband adoption 2009. Washington D.C.: Pew Research Center.

ITU, 2011. *Measuring the information society*. Geneva: International Telecommunication Union.

ITU, 2015. Statistics confirm ICT revolution of the past 15 years. Geneva: International Telecommunication Union

Kholilul, R.I. and Bohlin, E., 2011. An assessment of Mobile Broadband Access in Indonesia: a Demand or Supply Problem? *Internetworking Indonesia Journal*, 3(2), pp.15-22.

Le Guel F. Pénard, T., and Suire, R., 2005. Adoption et usage Marchand de l'Internet: une Etude Econométrique sur les Données Bretonnes (Adoption and Usage of Internet Services). *Economie et Prévision (Economics and Forecast),* 167, pp.67-82. http://dx.doi.org/10.3406/ecop.2005.7399

Madden, G., Savage, S. and Simpson, M., 1996. Information Inequality and Broadband Network Access: An Analysis of Australian Household Survey Data. *Industrial and Corporate Change*, pp.1049-1056. http://dx.doi.org/10.1093/icc/5.4.1049

Mukoko B., 2012. Determinants of computer and internet adoption and use in Cameroon. *African Review of Economics and Finance*, 3(2), pp.96-128.

Neira, M.A., Jiménez, F.J., and Ania, A.R., 2008. Determinants of the Internet use in Africa. [online] Available at: <http://spanisheconomy.weebly.com/uploads/1/7/8/7/178794/determinants_of_the_internet_use_in_africa._alberto_romero.pdf> [Accessed 25 June 2011].

Oyelaran-Oyeyinka, B. and Lal, K., 2005. Internet diffusion in sub-Saharan Africa: A cross-country analysis. *Telecommunications Policy*, 29(7), pp.507-527. http://dx.doi.org/10.1016/j.telpol.2005.05.002

Rappoport, P., Kridel, D., Taylor, L., Duffy-Deno, K., and Alleman, J., 2002. Residential demand for access to the Internet. In: G. Madden, ed. 2002. *The international handbook of telecommunications economics: Volume II*. Cheltenham: Edward Elgar Publishers.

Rosston, G., Savage, S., and Waldman, D., 2010. Household demand for broadband Internet in 2010. *The B.E. Journal of Economic Analysis and Policy,* 10(1), pp.1-45. http://dx.doi.org/10.2202/1935-1682.2541

Simsim, M.T., 2011. Internet usage and user preferences in Saudi Arabia. *Journal of King Saud University – Engineering Sciences,* 23(2), pp.101–107.

Statista, 2016. *Multiple Statistical Data*. [online] Available at: <www.statista.com> [Accessed 17 February 2016]

World Bank, 2009. Information and communication for development report. [online] Available from: <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTINFORMATIONANDCOMMUNICATIONANDTECHNOLOGIES/EXTIC4D/0,,contentMDK:22229759~menuPK:5870649~pagePK:64168445~piPK:64168309~theSitePK:5870636,00.html> [Accessed 15 January 2016].

World Telecommunication, 2010. *ICT indicators*. Geneva: International Telecommunication Union.