
Analysis of the Purpose of Using Internet in Iraq: A Multinomial Logit Model

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Internet accessibility is positively correlated with infrastructure development and nature of government policies. Though Iraq has shown considerable increase in Internet connectivity, it constitutes only 10 % of its population. In this study, the significant factors determining the use and non-use of Internet have been identified and analyzed. The results revealed that human development, human capital, institutional and legal environment, existing technologies, government policy making and income levels affect the Internet accessibility. The non-Internet users mainly comprised from 12-25 years age group. Similarly, high school and diploma students constituted significant proportion of non-Internet users. Lack of awareness and poor access to Internet facility were quoted as the most significant factors that resulted in the poor Internet accessibility which were supported by the used multinomial logit model. Low income level of the people resulted in non-use of Internet. The use of Internet was found to be highest among those with high level of education. Hence, the measures like provision of ICT based training programs, effective government policy for prioritizing Internet in education sector and

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allowing most advanced Internet technologies in e-governance and increased efforts for enhancing human development and human capital would enhance the rate of Internet accessibility in Iraq.

Keywords: *Multinomial logit, Internet use, Determinants, Purpose of use, Iraq*

Introduction

The phenomenon of globalization and liberalization resulted in significant improvement in information technology and telecommunication sectors in both developed and developing nations. More specifically, Internet access of the people has increased considerably over the last 10 years though it varied from one nation to the other nation (Todaro, 2009). However, it is confirmed that the rate of Internet development in any nation certainly contributes to its socio-economic development and hence it has immense significance (Chacko, 2000). The extent of Internet development and its access in any country is dependent upon the government policies related to the basic infrastructure development and budget allocation made towards the telecommunication sector (Tuomi, 2006).

Hippel (2006) also found that there exists a strong link between the policies of the government related to the telecommunication sector in general and Internet sector in particular and the rate of extent of development of Internet connectivity in any nation. In this context, one must remember that the phenomenon of globalization and liberalization facilitated more flexible policies of governments in both developed and developing nations because of which maximum opening up of the global economies was witnessed. Moreover, the country's geo-political environment affects the growth rate of infrastructure and science and technology and industry which in turn would influence the rate of development of Internet connectivity (Barber and Odean, 2001). This proved to be more significant in cases of developing nations like Iraq.

Iraq had to face a war with USA and other countries of multinational forces in the year 1991 and 2003 and it devastated its economy including health

services significantly (Furber and Johnstone, 2004). This affected the rate of development of basic infrastructure like telecommunication which in turn affected the status of Internet connectivity. Due to the war development in early 1990s, the international contacts of Iraq with several other nations were severely affected resulting in poor inflow of foreign funds and severe shortage of investment capital for its infrastructure like telecommunication which has affected Internet accessibility of the people significantly. The strict policies followed by the military regime of Saddam Hussein also led to poor development of Internet facilities in Iraq. The promotion of Internet was considered as stumbling block for the privacy and confidentiality of the administration and policies of Iraq during this period leading to poor Internet access.

Though Iraq has shown considerable increase in Internet connections from 12,500 in the year 2000 to 2,750,000 in the year 2008, still it constitutes only 10% of the Iraq population which is quite poor compared to the global average. In this study, the significant factors affecting the Internet accessibility and reasons for the low Internet access have been analyzed. There is a necessity for identifying the role of various factors like human development indices, human capital, institutional legal environment, existing technologies and government policy in the Internet accessibility in nations like Iraq. At the same time, the access of Internet is affected by cost, age, education level, and income. In general, nonusers of the Internet are more likely to be older individuals, and are more likely to have less education and lower household income than Internet users. Women also constitute major portion of the non-users of Internet in Iraq and the poor people and rural people have lesser access to Internet compared to rich and urban areas. The lack of access to Internet in rural areas due to the absence of Internet service providers and poor literacy rate in the rural areas also led to low Internet use in Iraq. Hence there is a strong need to analyze the reasons for low rate or non-use of Internet in Iraq.

Research Question and Objectives

Keeping the above points in consideration, the multinomial logit model has been used in the present study for investigating the factors affecting the use and non-use of the Internet in Iraq with the following objectives.

First: To study and analyze the various indicators of Internet usage in Iraq and to identify the reasons preventing the use of Internet, from the user's perspective.

Second: To enlist and interpret the demographic characteristics of users and nonusers of Internet in Iraq?

Research Framework

Various social factors affect the Internet use in Iraq (Figure 1). For example, the family norms, customs and taboos present in the Iraq society would act as limitations for opening Internet cafes for longer duration especially in the night time. Similarly, the elders in Iraq society wouldn't like to have Internet connections at home as they opine that the regulation of Internet utility by their children would be highly difficult. The educational levels, location of the residence and nature of employment also affects the Internet use rate in Iraq. If the educational level is higher i.e. research or academic levels, there is a probability of using Internet at longer and frequent intervals.

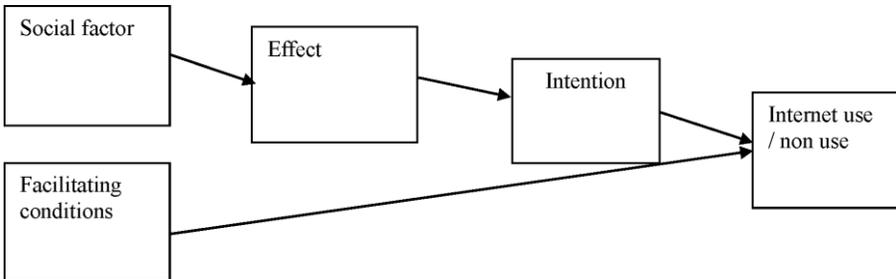


Figure 1. Decision Support Systems for use / non-use of Internet in Iraq. Source:³

In case of lower standards of education like primary education, the schools may not use Internet much and the students or children wouldn't generally indulge in Internet browsing at home also. Similarly, in some jobs,

³ H.C. Triandis, Values, attitudes, and interpersonal behavior, in: M.M. Page, Ed., Nebraska Symposium on Motivation, 1979: Beliefs, Attitudes, and Values, Univ. Nebraska Press, Lincoln, 1980, pp. 195-259

the nature of work requires the use of Internet always compelling the employees to be operative online, where as in case of jobs like transportation, the use of Internet would be minimum leading to limited use or non-use of Internet. Most importantly the place of residence or location play significant role in deciding the extent of use of Internet in Iraq. The rural areas in Iraq in general have less access to Internet connectivity leading to higher rate of non-use of Internet. The facilitating conditions for Internet like higher income level and urban areas and higher level of education would positively influence the extent of Internet use in Iraq by making people interested to use Internet and the intention of people to use Internet would be higher.

Rest of this study is organized as follows. In Section 2 the literature is reviewed with respect to use and non-use of Internet services. The focus is on human development, human capital, testable propositions, consumer law and policy related factors. Section 3 presents the models and methodologies of using Internet and non-using Internet and the underlying data and its management. Section 4 presents the empirical estimation results based on the two internet-use and non-use models. The results from the two models are analyzed in Section 5. Section 6 discusses policy issues in general and factors affecting Internet use in Iraq. Section 7 summarizes and concludes.

Literature Review

Internet connectivity is one of the most important outcomes of information technology evolved after globalization and liberalization (Dewan and Mendelson, 1998). Coffman and Odlyzko (2007) reported that the high growth rate of the Internet connectivity resulted in an upsurge in research, development, and investment in telecommunications. The Internet is correlated with the emergence and development of new technologies like optical fiber telecommunications. The growth of the Internet affects the growth prospects of other communication services also considerably (Litan and Rivlin, 2001). Lee and Heshmati (2006) studied diffusion of internet, while in Heshmati and Peng (2010) the issues of information and communication technologies policies and practices discussed. Al-Mutavakkil et al. (2009) compute infrastructure indices to rank countries by their level of connectivity. Iraq is ranked among the lowest.

Several factors like technological advancement, human capital, economic scenario, policy related factors, nature of domestic law and status of education and research are significantly related to Internet connectivity rate. The literature related to these important factors of Internet connectivity has been reviewed and future researchable issues were identified.

Human Development Index and Human Capital

The Internet connectivity influences the level of education, literacy and health which in turn affect the human development index in both developed and developing nations (UNDP, 2001a). The effect of human development index (HDI) on Internet connectivity was thoroughly investigated according to the UNDP's Human Development Report; HDI uses information on adult literacy rate, education, Gross Domestic Product, and life expectancy to create an index of countries' level of development which there by influences the Internet connectivity. The influence of Internet connectivity on socio-economic development of any nation was also well illustrated. An illustration, the impact of information and communication technology (ICT) on socio-economic development of Venezuela was reported by UNDP (2001b).

Some studies indicated that the Internet sector is becoming highly competitive than was thought before Giovannetti and Ristuccia (2005). Hence the pricing and maintenance costs of Internet connectivity have become real challenges for the Internet operators across the globe. This also demands the government support in the form of subsidized tariffs. Billon et al. (2009) made a cross-country investigation on study on the determinants of information and communication technology (ICT) diffusion using multivariate analysis techniques to capture the relative and multidimensional character of digital divide. This has revealed that the differences were detected between groups of countries both in terms of ICT patterns and also the factors affecting the ICT. Moreover, in countries registering higher levels of ICT adoption, the digitalization pattern is explained by GDP, service sector, education, and governmental effectiveness. One interesting finding was that in developing countries, population age and urban population are positively associated with the ICT

adoption, while Internet costs impact negatively. In some countries like Iraq, political developments like war affected the human development index negatively as it severely influenced the income pattern of the various sections of the society which reduced the scope for development of infrastructure in general and Internet accessibility in particular (UNDP, 2005). This is because of the fact that during the most favorable conditions existed throughout the world for computerization and Internet spread, Iraq had to face war which severely resulted in destruction of telecommunications.

Kelly and Lewis (2001) examined the determinants of Internet connections in Western Australia and some of the regional and socio-economic differences in Internet adoption. It was revealed that the number of Internet Service Providers (ISPs) is correlated to demographic variables, such as household income and other socioeconomic and regional characteristics which are affected by human capital. The estimates provide information on the major factors affecting household Internet connection and, therefore, provide information on how factors such as economic and demographic change impact Internet usage. An investigation was made on comparison of policy history and the development of cable television in South Korea and Israel (Schejter and Lee, 2007) which suggested that the information technology was highly correlated with the market forces and economy of the nation.

Policy Related Factors

Policy makers and policy analysts should recognize that institutional change, rather than more competitors of established types, resulted in dramatic improvements in bandwidth growth and prices in USA and such a development could provide a significant additional impetus to aggregate growth and productivity (Galbi, 2000).

Groves and Lempert (2007) and Lempert et al. (2006) developed a new approach to participatory computer-assisted scenario development called as scenario discovery which assisted policy-makers in identifying policy-relevant scenarios. Hence, information technology's growing power offers a potential revolution in new tools and methods to support and improve human decision-making. The Internet connectivity certainly aided

in better decision support system of the government compared to the traditional system of information.

The security of operating Internet services in any region must be the priority for government policy. If security is ensured through Internet, more people will be interested to operate Internet at their homes and hence the government policy must facilitate this aspect. Roman and Lopez (2009) analyzed the security issues that arise when integrating wireless sensor networks (WSN) and the Internet. They have investigated the possible approaches that can be used to connect a WSN with the Internet, and analyzes the security of their interactions. It was further revealed that through provision of the services of the network through a front-end proxy, a sensor network and the Internet can interact securely which would facilitate higher Internet access.

The strong correlation between the field of agriculture and Internet connectivity and Information and Communication Technologies (ICTs) through facilitating knowledge management was studied by Rao (2006). Based on an evaluation of several ICT initiatives in rural India, a framework to guide policy and implementation of ICTs in Indian agriculture was proposed. In this framework, agricultural development was visualized from two perspectives, rural incomes and livelihoods perspective at the farm level, and a sustainability perspective at the regional level. The implementation of ICTs is proposed in three unique institutional environments: (i) closed vertical supply chain network for agribusiness enterprises, (ii) an open chain network with dynamically evolving partners and supply chain situations for the public, non-governmental and multilateral organizations, and (iii) a spatial data services network to address natural resources management and sustainability concerns. Significant policy, institutional networking and capacity building initiatives will be required at various levels to overcome the constraints and effectively integrate ICTs into the agricultural development process in India. In countries like Iraq, the rigid policies followed by regime of Saddam Hussein affected the Internet accessibility considerably and it was reported that only 25,000 households had Internet accessibility in 2002 which constituted only 0.1% of its total population (Internet World Stats, 2009). Similarly, the war situation also affected the Internet status of Iraq significantly.

Nature of Consumer Law

Despite the Internet's increasing importance, there is little social scientific work that addresses its diffusion (Hargittai, 1999). Our knowledge is especially limited with respect to the conditions that encourage its spread across nations. Hence, the differences in Internet connectivity among OECD countries still exist. After examining the impact of economic indicators, human capital, institutional legal environment, and existing technological infrastructure, the empirical analyses show that economic wealth and telecommunications policy are the most salient predictors of a nation's Internet connectivity.

Consumer laws and policies aid in reducing the fraud transactions and ensure fair commercial transactions and hence help in enhancing confidence among the consumers globally (OECD, 1999). The existing laws still have some loop holes in dealing the cases related to cross border transactions in Internet commerce or ecommerce based on which some people have been misusing the laws for their own benefits. This necessitates the modification and regulation of the present legal provisions for a better Internet connectivity.

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The Models of Non-using and Using Internet

In this study we used the variables “the purpose why people use the Internet” and “reasons why they do not use the Internet” as a dependent variable in the two models used in this study because of the importance to shed lights on these issues. The information can be used in promoting the use and eliminating the barriers to use of Internet.

This variable does not measure the utility of Internet use directly. However because the multinomial logit model is behavioral model, then through this study we could measure the behavior of consumer (Responses), and to know their observed characteristics affecting the Internet use. Yet our study helps to find suitable policy will help in increase Internet diffusion in Iraq.

Heteroscedasticity

Here we did not apply heteroscedasticity for multinomial logit model, because in parametric discrete choice models, variance functions are not identified in principle because variance functions get divided into the mean function and the ratio ($\frac{x'\beta}{e^{z_i\gamma}}$) can be linearly approximated. That is, a “crude” mean function divided by a “crude” variance function cannot be identified from a “detailed”⁴ mean function. For this reason, the final result is based on homoscedasticity.

Model for Non-using Internet in Iraq

The use of Internet in Iraq has not been satisfactory and several factors affect the same. Identification of the factors responsible for non-use of Internet would be useful in developing a strategy for better use of Internet in future. Different factors like gender, age, education, cost, profession and

⁴ Lee, M.L. (2009), “Micro-Econometrics Methods of Moments and Limited Dependent Variables”, Second Edition, Department of Economics, Korea University

location influence the use and non-use of Internet. For example, the non-use of Internet was more witnessed in women and in rural areas. Keeping these aspects in consideration, an attempt has been made to collect the appropriate data that represent these factors.

Let us first analyze the approach followed for collection and analysis of the data related to the factors affecting the non-use of Internet.

First: Data Collection

The primary source for the data used in this paper was the Ministry of Foreign Affairs and Ministry of Communication in Iraq who conducted extensive surveys of Iraqi households during April 2009 related to Internet use in Iraq. In total, 15,816 observations (Gender: male 9,439, female 6,396) were collected under this survey, out of which considerable number of households (4,071 respondents, male was 1,792 and Female was 2,269) without Internet connection were noticed as illustrated in Table 3. The data was collected through questionnaire from five regions i.e. Baghdad the capital city, South, South center, North center and finally middle Euphrates (Figure 2) by collecting responses from a random sample of citizens in different ages, gender and level of education. In total, 11 questions were put to the respondents for the data collection. Data collected in April 2009 on Internet use in Iraq, total observations 15,816, no missing observations, Cities have been surveyed in stratified form by their populations share as shown in Figure 2.

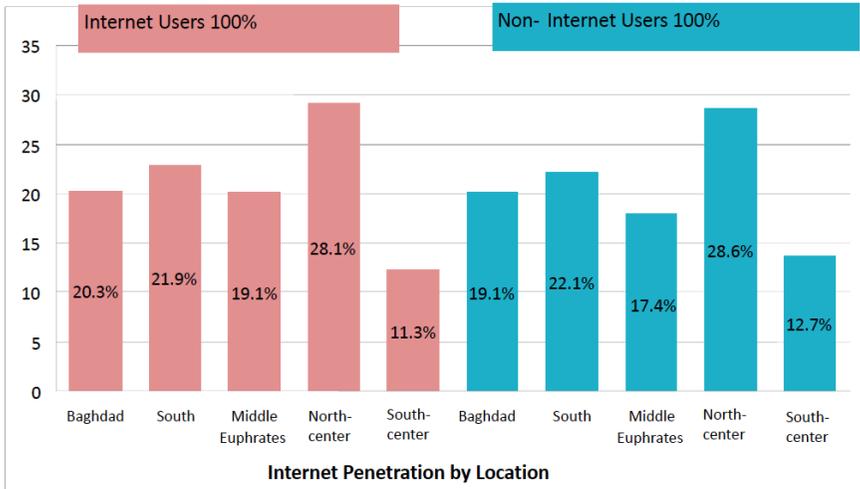


Figure 2: Iraqi random sample observations by provincial location

The stratified sample was collected based on a population registry under the oil for food program of United Nations in 1996 in Iraq. Under this program, UN has made a population census in Iraq and every household had a number (coupon to be used each month to get their share of food). Moreover, UN updated this information on census on regular basis and hence our data collection can be considered as more accurate without giving any scope for the bias.

For a better understanding of the variables we provide a description of some of these variables. For instance the variable Age has been categorized into three group ages (12-25, 25-40, and +40 years). Same rule has been applied to Employment variable which is categorized into four different groups of Employment nature (unemployment, public employee, private employee, and the last group is for the student) (see Figure 3).

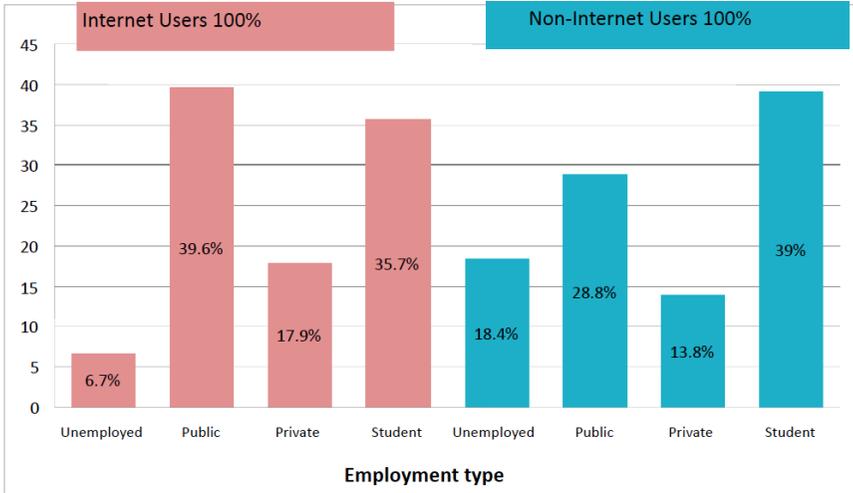


Figure 3: Internet use (non-use) by Employment group

The descriptions of the main factors are in details shown in Table 1.

Variable	Description
Gender	0 for male and 1 for female
Age1	Less than 12 to 25, By years
Age2	25 to 40, By years
Age3	More than 40, By years
Education1	Primary and intermediate
Education2	High school and diploma
Education3	BSc
Education4	High diploma, MSC and PhD
Employment1	Unemployed
Employment2	Public
Employment3	Private

Employment ₄	Student
Internet	0 if he has Internet and 1 do not have Internet
Location ₁	Baghdad
Location ₂	South of Iraq
Location ₃	Region of south-central Iraq
Location ₄	Region of north-central Iraq
Location ₅	Middle Euphrates region
No-Internet ₁	Do not know how to use
No-Internet ₂	Not available
No-Internet ₃	Economic reasons
No-Internet ₄	No answer
Purpos ₁	General search
Purpos ₂	Special purpose
Purpos ₃	Entertainment and Mail and chatting
Purpos ₄	No answer
Modes ₁	Dialup
Modes ₂	Broadband
Modes ₃	Internet cafe
Modes ₄	More than one way
Intensity ₁	Not at all
Intensity ₂	Rarely or sometimes
Intensity ₃	Mostly
Intensity ₄	Always online

Table 1: Description of the main variables

Second: Descriptive Statistics

In the survey performed in this study, it has been seen that non-Internet users are those who never use Internet services. Different reasons are given as explanation to their distanced behavior. Do not know how to use and lack of access are key factors here leading to non-use of Internet. When non-users were asked to identify the greatest barrier that keeps them away from using the Internet, Do not know how to use was the first most often (illiteracy in using this technology) cited barrier with more than 43.7 percent of male and 47.3 percent of female of the sample. Lack of access to the Internet was the second cited barrier with more than 35.5 percent of male and 26.6 percent of female. Cost came third with more than 17 percent for male and 21.7 percent for female. The majority of non-Internet user came from age (less than 12 to 25 category) for male 67.3 percent and 58.3 percent for female, for education the majority of non-Internet user came from (High school and diploma category) for male 50 percent and for female 45 percent, while for employed the majority of non-Internet user came from (student category) 50 percent for male and 30.5 percent for female. Summary of non-users are reported in Table 2.

No Internet Female		No Internet Male	
Gender			
Female	2279	Male	1792
Age %			
Less than 12 to 25	(67.3)	Less than 12 to 25	(58.3)
25 to 40	(23.3)	25 to 40	(28.4)
More than 40	(9.4)	More than 40	(13.3)

Education %			
Primarily and intermediate	(32.4)	Primarily and intermediate	(34.7)
High school and diploma	(49.9)	High school and diploma	(44.8)
BSc	(15.7)	BSc	(17.3)
High diploma, MSC and PhD	(20)	High diploma, MSC and PhD	(3.2)
Employment %			
Unemployed	(19)	Unemployed	(17.7)
Public	(28.2)	Public	(29.4)
Private	(7)	Private	(22.4)
Student	(45.8)	Student	(30.5)
Reason for not using Internet %			
Do not know how to use	(43.7)	Do not know how to use	(47.3)
Not available	(35.5)	Not available	(26.6)
economic reasons	(17)	economic reasons	(21.7)
No answer	(3.9)	No answer	(4.5)
Location %			
Baghdad	(24.6)	Baghdad	(14.3)
Southern Iraq	(20.6)	Southern Iraq	(23.9)

North-central of Iraq	(24.7)	North-central of Iraq	(28.8)
South-central of Iraq	(14.2)	South-central of Iraq	(12.8)
Middle Euphrates	(15.9)	Middle Euphrates	(20.2)

Table 2: Frequency distribution of no Internet use in Iraq by different characteristics

Third: Methodology, specification and estimation

As the non-use of Internet in Iraq is influenced by various types of factors or reasons, the model development was done after thorough investigation of parametric and nonparametric methods and descriptive and factor analyses. Similarly, a multiple logistic regression analysis model has also been developed for determining the actual factors affecting the non-use of Internet in Iraq.

Methodology

The multinomial logit model has been employed here to assess the reasons for not using Internet in Iraq through individual sample collection at different places. It was mainly used to get parametric and discrete choice options in estimating the response of the people in analyzing the reasons for non-use of Internet in Iraq. In this study we utilize a parametric approach to estimate a model of Internet use. As the reasons for non-use of Internet are many, preferences of the respondents among the best alternatives for non-use of Internet were exercised for utility maximization and the following model has been developed:

$$1) \quad U(\text{alternative } J) = \beta_j' X_{ij} + \varepsilon_{ij}$$

where i: index for the observation or individual, j: index for the choices, X: vector of explanatory or conditional variables or indicators of Internet

access, β : the vectors of unknown parameters to be estimated and ε : random error term.

The alternative (Utility) for U_i is preferred if U_i (alternative j) is greater than U_i (alternative k) which can be written as follows:

$$2) \quad \text{Observed } Y_i = \text{choice } j \text{ if } U_i(\text{alternative } j) > U_i(\text{alternative } k) \quad \forall k \neq j$$

The independent variables in this model include a set of individual specific characteristics, such as education, gender, age, employment, etc. which can be regarded as similar for the choices. The individual can exercise her choice among these alternatives based on her judgment on preferred characteristics of the choices which ultimately determines the probable choice. For example, the probability of having j as choice by an individual is possible under circumstances when alternative j is more preferred than another alternative k based on the specific characteristics analyzed by the individual. Hence the choice of probability for j can be written as follows:

$$3) \quad \text{Pr ob}[\text{choice } j] = \text{Pr ob}[U_j > U_k], \forall k \neq j$$

It also implies that the probability of selecting choice j will be considered as same if the probability of the utility of rank j is selected when it is superior to utility rank k , provided that the utilities for j and k are not equal.

Specification

By employing the above theoretical considerations and after analysis of the responses collected from different people of Iraq related to the non-use of Internet, various indicators of non-use of the Internet have been applied to the model below (equation 4). We specify a model to identify the determinants of Internet use and to estimate each impact on the probability of reason for not having Internet. The model is specified as:

$$4) \quad Y_i = f(X_{1i}, X_{2i}, \dots, X_{ji})$$

where X_j are J indicators or vectors of indicators of not using Internet. The indicators here are age, education level, employment, gender, intensity, and location. After appending an error term the model specification is as follows:

$$5) \quad Y_i = \alpha_0 + \beta_{Gen} Gen_i + \sum_{j=1} \beta_j Age_{ji} + \sum_{j=1} \beta_j Edu_{ji} + \sum_{j=1} \beta_j Emp_{ji} + \sum_{j=1} \beta_j Ins_{ji} + \sum_{j=1} \beta_j Loc_{ji} + \varepsilon_i$$

where Edu, Emp, Ins and Loc represent education level, employment nature, intensity rate and regional location of users. The number of categories in each group of variables (J) may differ by the way the variable category is defined.

Estimation

It is now implied that the single econometric equation cannot explain the combined and interrelated effect of several factors affecting the non-use of Internet in Iraq. Hence, binomial logit model will not be suitable for this context and hence multinomial logit model has been developed for its use in discrete choice analysis as follows:

$$6) \quad \text{Pr ob}[choice \ j] = \frac{\exp(\beta'_j X_t)}{\sum_{m=1}^J \exp(\beta'_m X_t)}, \quad J = 0, \dots, J,$$

where Y_j represents the probability for choice j , i.e. observed outcome, β represents the parameters to be estimated, and X represent variables influencing the non-use of the Internet.

Model for Using Internet in Iraq

Several factors influence the use of Internet in Iraq. Identification of the factors responsible for use of Internet would be useful in developing a strategy for better use of Internet in future. Different factors like gender,

age, cost, education, profession and location influence the use and non-use of Internet. For example, the use of Internet was more witnessed in men and in urban areas. Keeping these aspects in consideration, an attempt has been made to collect the appropriate data that represent these factors.

Let us first analyze the approach followed for collection and analysis of the data related to the factors affecting the use of Internet.

First: Data Collection

As mentioned previously, the primary source for the data used in this paper was the Ministry of Foreign Affairs and Ministry of Communication in Iraq who made an extensive survey of Iraqi households during April 2009 related to Internet use in Iraq. This was explained in the section of data collection for non-use of Internet.

Second: Descriptive Statistics

In the survey performed in this study, it has been seen that Baghdad recorded highest number of Internet users (29 percent) compared to other locations of Iraq. Similarly, males have used Internet most frequently than females. General search is the prime reason for using the Internet in Iraq and students use most frequently and the people with age group of 12-25 use the Internet most frequently. Iraqis access the Internet through identifiable procedures. In the survey, it has been seen that there are those who use dial-up connections while others use wireless access. Dialup users reached 10 percent while these who used wireless connection approached 67 percent. The dial-up is connection to Internet is using phone. The majority of users are those who use Internet wireless connection either through Internet cafes or through the delivery line from the nearest Internet cafe to the house for 67 percent. In fact, Internet café are convenient, cheap and an easy way to access the Internet for users with low time use demand. The purpose of use varied among the Internet. A total of 56 percent spend time for general search and 19 percent for entertainment, email and chatting, and another 23 percent of Internet user for special purposes. To understand the data further, the following Table 4.6 shall present the said statistics (Table 3).

Internet Female		Internet Male	
Gender			
Female	4126	Male	7637
Age %			
Less than 12 to 25	(59.9)	Less than 12 to 25	(54.4)
25 to 40	(33.1)	25 to 40	(36.7)
More than 40	(7.0)	More than 40	(7.9)
Education%			
Primarily and intermediate	(12.7)	Primarily and intermediate	(12.4)
High school and diploma	(43.6)	High school and diploma	(46.9)
BSc	(31.4)	BSc	(28.6)
High diploma, MSC and PhD	(12.6)	High diploma, MSC and PhD	(12)
Employment %			
Unemployed	(6.5)	Unemployed	(6.7)
Public	(37.7)	Public	(40.7)
Private	(14.3)	Private	(19.9)
Student	(41.5)	Student	(32.6)
Purpose for use of Internet %			
General search	(54.1)	General search	(58.3)
Special purpose	(26.8)	Special purpose	(21.4)
Entertainment Mail and chatting	(18)	Entertainment Mail and chatting	(19.7)
No answer	(1.1)	No answer	(1.1)
Modes %			
Dialup	(12.4)	Dialup	(9.4)
Broadband	(15.8)	Broadband	(8.7)

Internet cafe	(69.8)	Internet cafe	(79.3)
More than one way	(1.1)	More than one way	(1.6)
No answer	(0.9)	No answer	(0.9)
Intensity rate %			
Not at all	(0.8)	Not at all	(1.1)
Rarely or sometimes	(45.6)	Rarely or sometimes	(45.4)
Mostly	(29.8)	Mostly	(31.6)
Always online	(23.5)	Always online	(21.9)
Location %			
Baghdad	(28.9)	Baghdad	(15.7)
Southern Iraq	(18.8)	Southern Iraq	(25.1)
North-central of Iraq	(22.3)	North-central of Iraq	(27)
South-central of Iraq	(13.4)	South-central of Iraq	(11.7)
Middle Euphrates	(16.7)	Middle Euphrates	(20.5)

Third: Specification and estimation

As the use of Internet in Iraq is influenced by various types of factors or reasons, the model development was done after thorough investigation of parametric and non-parametric methods and descriptive and factor analyses. Similarly, a multiple logistic regression analysis model has also been developed for determining the actual factors affecting the usage of Internet in Iraq.

Specification:

Based on the same methodology and findings in the literature, we specify a model to identify the determinants of Internet use and to estimate each impact on the probability of no connection. The model is specified as:

$$4) \quad Y_i = f(X_{1i}, X_{2i}, \dots, X_{Ji})$$

where X_j are J indicators or vectors of indicators of purpose for using Internet. The indicators here are age, education level, employment, gender, Intensity, and, location as well. After appending an error term the model specification is as follows:

$$5) \quad Y_i = \alpha_0 + \beta_{Gen} Gen_i + \sum_{j=1} \beta_j Age_{ji} + \sum_{j=1} \beta_j Edu_{ji} + \sum_{j=1} \beta_j Emp_{ji} + \sum_{j=1} \beta_j Ins_{ji} + \sum_{j=1} \beta_j Loc_{ji} + \varepsilon_i$$

where Edu, Emp, Ins and Loc represent education level, employment, Intensity rate and regional location of users. The number of categories in each group of variables (J) may differ by the way the variable category is defined.

Researchers commonly use the multinomial logit model in discrete choice analysis. However The Internet diffusion cannot be captured through a single econometric equation. After examining by using a multinomial logit model which is an extension of the basic binomial logit model to estimate the unknown parameters β_j and define the factors that influence Internet use in Iraq. However, since the dependent variable is not a continuous variable, we are not able to use ordinary least squares (OLS) estimation method. Accordingly, the model is written as:

$$6) \quad \Pr ob[choice \ j] = \frac{\exp(\beta'_j X_i)}{\sum_{m=1}^J \exp(\beta'_m X_i)}, J = 0, \dots, J,$$

where β represents the parameters that are estimated, while all X represent variables influencing the decisions to adopt access to the Internet. (Note that, for the i individual, Y_i is the observed outcome and X_i is a vector of explanatory variables).

Table 4 represents the summary results of the Multinomial logit analysis for our model in equation (5).

Variable	Probability (y=1) "Do not know how to use"		Probability (y=2) "Not available"		Probability (y=3) "Economic"	
	Coefficient	t-statistics	Coefficient	t-statistics	Coefficient	t-statistics
Constant	3.659***	25.584	1.804***	13.242	1.703***	12.399
Gender (Male=1)	-0.210***	-3.419	-0.233***	-5.116	0.084***	1.741
Age2	0.075	0.926	0.270***	4.805	0.188***	3.148
Age3	0.433***	3.795	-0.185	-1.903	0.147	1.535
Education2	-0.974***	-12.921	-0.131**	-1.915	-0.115	-1.660
Education3	-1.463***	-14.631	-0.192**	-2.424	-0.076	-0.958
Education4	-1.019***	-7.283	0.150	1.501	-0.104	-0.983
Employment2	-0.498***	-4.803	-0.049	-0.542	-0.553***	-6.060
Employment3	-0.301***	-2.618	0.368***	3.804	-0.011	-0.124
Employment4	-0.429***	-4.381	0.119	1.336	-0.054	-0.626
Intinsty2	-3.812***	-36.955	-2.480***	-24.852	-2.363***	-22.663
Intensity3	-5.263***	-37.781	-3.183***	-30.111	-2.663***	-24.565
Intinsty4	-5.356***	-34.965	-3.388***	-30.579	-2.791***	-24.847
Location2	-0.130	-1.447	-0.040	-0.606	-0.303***	-4.239
Location3	-0.199	-2.054	0.112	1.598	-0.444	-0.609
Location4	-0.107	-1.217	-0.003	-0.046	-0.095	-1.412
Location5	-0.166	-1.577	-0.072	-0.902	0.025	-0.312
RHO (ρ)=	0.148					
LR test	5,979					
Critical value	$\chi^2(nn, p=0.05)=26.30$					

Empirical Analysis for Non-use of Internet Model

Due to the use of maximum likelihood techniques, an R-square measure does not exist for the logit model. However, a chi-square test statistics may be used to measure the significance of models fit.

Variable Specification

Keeping the above views in consideration, different types of variables were included in the Internet service model. The factors affecting non-use of Internet in Iraq like individual socio-demographics, intensity, locations and employment characteristics were considered under this model. The factors like gender, age and educations status were considered under socio-demographic variables. Similarly, employment variables included under the present study were unemployed, public, private and student. The intensity variables included four categories i.e. not at all, rarely or sometimes, mostly and always online. Lastly, four location variables included were Baghdad, south of Iraq, region of south-central Iraq, middle Euphrates region and region of north-central Iraq.

Empirical Results

In this section we discuss the variable effects. According to the result illustrated in the Table 4 the model with the highest RHO ($p=0.148$) indicates the best fitted model with data (McFadden (1974)⁵, furthermore, LR test ($LR=5,979$) and its critical values ($p=0.05$)= 26.30)⁶ indicate that the effect of the model specification is statistically significant (Greene, 2008). In more detail, the calculated LR value in this model was larger than the critical value in 5% level of significance, which indicates that the null hypothesis (the model with only intercept) is rejected and the explanatory variables used in the model are all jointly significant.

⁵ $RHO=1-LL1/LL0$ where $LL1$ = Unrestricted log likelihood and $LL0$ = Restricted log likelihood functions.

⁶ $LR=2(LL1-LL0)$ - where $LL1$ = Unrestricted log likelihood, and $LL0$ = Restricted log likelihood functions.

However the coefficient values of multinomial logit regression discrete choice model for all the three probabilities ($y=1$, $y=2$ and $y=3$) are presented in Table 4. The constant variable and all the 16 variables were included in this model. The second column (probability of $y=1$ which means that the reason for not have Internet is “Don’t know how to use it”), reflects the effect of coefficient estimates for multinomial logit of reasons for not using Internet when the probability $y=1$, The variables like location₁, location₂ and location₃ represented coefficients which are negative and statistically insignificant which reflects that the non-use of Internet was not affected much by the locations in Iraq. When probability $y=1$, the superior coefficient value was recorded with constant variable (3.659) followed by Age₃ (More than 40 years category) (0.433) which was also found to be significant statistically (see Table 4). It also implies that the older people don’t use Internet much relative to the young people. It was also noticed that the variables like gender, education₂, education₃, education₄, employment₂, employment₃, employment₄, intensity₂, intensity₃ and intensity₄ resulted in negative coefficient values with statistical significance. Moreover, the variables like gender, intensity₂, intensity₃ and intensity₄ displayed statistically significant coefficient values even when probability $y=2$ or $y=3$. In case of education, the positive correlation was resulted as the higher level of education in general encouraged the access and use of Internet.

Marginal Effects of Characteristics Category

The values of the coefficient and probability have been presented in Table 5 under marginal effects of multinomial logistic regression, as the direct interpretation of the parameter estimates reported in first, second and third column of Table 4 is not possible given the logit transformation of the outcome (dependent variable) required for model estimation. We, therefore, provide alternative method, which is marginal affect. As can be shown in Table 5 the change in independent variables like age, gender, education, employment and location influenced the dependent variable i.e. Internet non-use significantly which is well reflected through marginal effects. The negative value of coefficient (when probability $y=1$) i.e. -0.013 for male denotes that the female uses Internet less than male when the reason is “Do not know how to use”; in other word this means that the proportion

of illiteracy in the use of Internet is higher for female group compared to male group, similarly, when probability $y=2$ or $y=3$.

Variable	Probability (y=1) "Do not know how to use"		Probability (y=2) "Not available"		Probability (y=3) "Economic reasons"	
	Coefficient	t-statistics	Coefficient	t-statistics	Coefficient	t-statistics
Constant	3.659***	25.584	1.804***	13.242	1.703***	12.399
Gender (Male=1)	-0.210***	-3.419	-0.233***	-5.116	0.084***	1.741
Age2	0.075	0.926	0.270***	4.805	0.188***	3.148
Age3	0.433***	3.795	-0.185	-1.903	0.147	1.535
Education2	-0.974***	-12.921	-0.131**	-1.915	-0.115	-1.660
Education3	-1.463***	-14.631	-0.192**	-2.424	-0.076	-0.958
Education4	-1.019***	-7.283	0.150	1.501	-0.104	-0.983
Employment2	-0.498***	-4.803	-0.049	-0.542	-0.553***	-6.060
Employment3	-0.301***	-2.618	0.368***	3.804	-0.011	-0.124
Employment4	-0.429***	-4.381	0.119	1.336	-0.054	-0.626
Intensity2	-3.812***	-36.955	-2.480***	-24.852	-2.363***	-22.663
Intensity3	-5.263***	-37.781	-3.183***	-30.111	-2.663***	-24.565
Intensity4	-5.356***	-34.965	-3.388***	-30.579	-2.791***	-24.847
Location2	-0.130	-1.447	-0.040	-0.606	-0.303***	-4.239
Location3	-0.199	-2.054	0.112	1.598	-0.444	-0.609
Location4	-0.107	-1.217	-0.003	-0.046	-0.095	-1.412
Location5	-0.166	-1.577	-0.072	-0.902	0.025	-0.312
RHO (ρ)=	0.148					
LR test	5.979					
Critical value	$\chi^2(nn, p=0.05)=2$ 6.30					

Similarly, Age3 recorded coefficient value of 0.037 which reflects that the increase of Age3 by 1 unit results in increase in non-use of Internet by 0.037 times relative to Age1 (treated as the base category) when the probability $y=1$. All other independent variables like educations (Education2, Education3 and Education4), employments (Employment2, Employment3 and Employment4) and location3 (Southern Iraq) registered negative values of coefficients indicating the inverse relation with the non-use of Internet in Iraq, when the probability $y=1$ (do not know how to use).

But when the probability $y=2$ (not available), Age₂ recorded coefficient value of 0.039 which reflects that the increase of Age₂ by 1 unit results in increase in non-use of Internet by 0.039 time relative to Age₁, Age₃ recorded coefficient value of -0.055 which reflects that the increase of Age₃ by 1 unit results in decrease in non-use of Internet by 0.055 relative to Age₁ (base category), Education₂ and Education₄ resulted in positive values of coefficient equal 0.056 and 0.060 respectively, which reflect that the increase of Education₂ or Education₄ by 1 unit results in increase in non-use of Internet by 0.056 or 0.060 times relative to Education₁ (base category). The positive value of coefficient of Employment₂, Employment₃ and Employment₄ equal 0.034, 0.079 and 0.036 which reflects that the increase of Employment₂, Employment₃ and Employment₄ by 1 unit results in increase in non-use Internet by 0.034, 0.079 and 0.036 times relative to Employment₁ (base category). All intensity rate categories (intensity₁, intensity₂ and intensity₃) have negative value of coefficients indicating the inverse relation with the non-use of Internet, location₃ (Southern Iraq) recorded coefficient value of 0.029 which reflects that the increase of locant₃ by 1 unit results in increase in non-use of Internet by 0.029 time relative to locant₁ (Baghdad as base category).

For the probability $y=3$, (economic reason), public sector employee has higher negative marginal effect on non-use of Internet. Some explanatory variables are found to be statistically significant and negative impact at the 0.01 level which is Employment₂, intensity₂, intensity₃, intensity₄ and location₂, they record value of coefficient -0.083, -0.018, -0.166, -0.174 and -0.047 successively, denotes that relative to the Employment₁ (Unemployed "Base Group") Employment₂, has lower probability of non-use Internet ($y=3$), relative to the intensity₁ (not at all "base category") intensity₂, intensity₃ and intensity₄ have lower probability of non-use Internet ($y=3$) and relative to the location₁ (Baghdad "base category"), location₂ has lower probability of non-use Internet ($y=3$). Only one factor, Education₃ found to be statistically significant at the 0.05 level, 0.028, denotes that relative to Education₁ (Primary and intermediate "Base category"), Education₃ has higher probability of non-use Internet ($y=3$).

Empirical Analysis for Use of Internet Model

Variable Specification

Similar to the model used for non-use of Internet, different types of variables were included in the Internet use model like gender, age, intensity, education, locations and employment characteristics. The employment variables included under the present study were unemployed, public, private and student. The intensity variables included four categories i.e. not at all, rarely or sometimes, mostly and always online. Lastly, four location variables included were Baghdad, south, south-central, middle Euphrates and north-central region.

Empirical Results

In this section, we discuss the variable effects. Again according to the result illustrated in the Table 6 the model with the highest RHO ($\rho=0.216$) indicates a best fitted with data. The LR test equal ($LR=8,576.82$) and its critical values ($p=0.05$)= 26.30 indicate that the effect of the model specification is statistically significant. The test result indicates that the null hypothesis (the model with only intercept) is rejected and the explanatory variables used in the model are all jointly significantly different from zero.

Table 6. Maximum likelihood logit model parameter estimates of reasons for using Internet; probabilities

Variable	Probability (y=1) "General search"		Probability (y=2) "Special purpose"		Probability (y=3) "Entertainment Mail and chatting"	
	Coefficient	t-statistics	Coefficient	t-statistics	Coefficient	t-statistics
Constant	-1.495***	-11.325	-3.966***	-20.893	-2.088***	-13.870
Gender (male=1)	0.083	1.134	-0.205***	-2.528	0.185**	2.293
Age2	-0.246**	-2.536	-0.248**	-2.342	-0.182	-1.710
Age3	-0.260	-1.992	-0.403***	-2.703	-0.442***	-2.840

Education2	-0.085	-1.001	0.393***	3.632	-0.626***	-6.654
Education3	0.236	2.033	0.747***	5.462	-0.688***	-5.377
Education4	0.585***	2.914	2.162***	10.117	-0.442	-1.982
Employment2	0.236	2.027	0.678***	4.453	-0.480***	-3.688
Employment3	0.040	0.302	0.891***	5.368	-0.097	-0.680
Employment4	0.855***	7.762	1.616***	11.018	0.630***	5.243
Intensity2	4.194***	44.230	4.806***	37.860	4.663***	40.375
Intensity 3	5.191***	30.217	5.854***	30.498	5.452***	29.190
Intensity4	5.516***	24.785	5.950***	24.857	5.618***	23.817
Location2	0.111	1.032	0.126	1.057	0.201	1.680
Location3	-0.094	-0.830	-0.176	-1.399	-0.144	-1.137
Location4	-0.174	-1.667	-0.215	-1.862	-0.092	-0.790
Location5	-0.287**	-2.314	-0.331**	-2.403	-0.125	-0.910
RHO (p)=	0.216					
LR	8576.82					
Critical value	$\chi^2(nn,p=0.05)=26.30$					

***Denotes statistical significance at the 1% level (two-sided test).

**Denotes statistical significance at the 5%level (two-sided test).

The coefficient values of multinomial logit regression discrete choice model for all the three probabilities ($y=1$, $y=2$ and $y=3$) are presented in column2, column3 and column4 respectively in Table 6. The effect of coefficient estimates for multinomial logit of reasons for using Internet for all the three probabilities ($y=1$ use Internet for general search; $y=2$ use Internet for special purpose; and $y=3$ use Internet for entertainment, mail and chatting) and the constant variable and all the 16 variables were included in this model. The variables like location2, location3 location4 and location5 represented

coefficients which are negative and insignificant which reflects that the use of Internet was not affected much by the locations in Iraq.

Marginal Effects of Characteristics Category

A direct interpretation of the parameter estimates reported in first, second and third column of Table 6 is not possible given the logit transformation of the outcome variable required for model estimation. We, therefore, provide alternative method which is marginal affect. As can be shown in Table 7, the variation in independent variables like age, gender, education, employment and location influenced the dependent variable i.e. Internet use significantly which is well reflected through marginal effects. The value of coefficient (when probability $y=1$) i.e. 0.023 for male implies that the increase in 1 male increases the use of Internet by 0.023 times compared to the female group. Similarly, when probability $y=3$, the increase in 1 male will result in increase in Internet use by 0.025 times relative to female. However, it has inverse relation with Internet use when probability $y=2$. Similarly, Age 3 recorded coefficient value of 0.030 which implies that the increase of Age3 by 1 unit results in increase in use of Internet by 0.030 times relative to Age1 (as base category),

Table 7: Values of the coefficient Marginal effects and probability for use of Internet

Variable's name	y=1 "General search".		y=2 "Special purpose"		y=3 "Entertainment Mail and chatting"	
	Coefficient	t-statistics	Coefficient	t-statistics	Coefficient	t-statistics
Constant	0.307***	13.035	-0.374***	-18.140	-0.012	-0.743
Gender (male)	0.023***	2.707	-0.048***	-7.016	0.025***	3.722
Age2	-0.012	-1.120	-0.004	-0.531	0.007	0.892
Age3	0.030***	1.642	-0.019	-1.292	-0.023	-1.497
Education2	0.001	0.131	0.091***	7.781	-0.097***	-11.392
Education3	0.046***	3.158	0.113***	8.688	-0.154***	-14.283
Education4	-0.054***	-2.698	0.285***	18.924	-0.204***	-11.867
Employment2	0.032	1.797	0.095***	5.605	-0.120***	-9.706
Employment3	-0.080***	-4.235	0.137***	7.788	-0.050***	-3.880
Employment4	-0.042**	-2.433	0.132***	7.939	-0.054***	-4.737
Intensity2	-0.022	-1.297	0.110***	7.309	0.078***	6.274
Intensity3	0.016	0.902	0.132***	8.604	0.052***	3.851
Intensity4	0.067***	3.477	0.105***	6.492	0.040***	2.704

Location2	-0.008	-0.683	-0.001	-0.009	0.0136	1.332
Location3	0.012	0.927	-0.011	-1.110	-0.005	-0.480
Location4	0.008	-0.669	-0.010	-1.089	0.012	1.242
Location5	-0.019	-1.281	-0.014	-1.247	0.023	1.013

***Denotes statistical significance at the 1% level (two-sided test).

**Denotes statistical significance at the 5% level (two-sided test)

Similarly, Education2 has significant positive effect on having Internet ($y=2$) it registered 0.091 times higher probability relative to Education1 (base category) Education3 has significant positive effect on Internet use in Iraq. It registered a coefficient value of 0.046 ($y=1$) i.e. increase in Education3 by 1 unit results in increase in Internet rate by 0.046 times. Relative to Education1, similarly the coefficient value of Education3 ($y=2$) it registered 0.013 i.e. increase in Education3 by 1 unit results in increase in Internet rate by 0.013 times higher probability relative to Education1, but coefficient of Education3 is -0.153 ($y=3$) i.e. increase in Education3 by 1 unit results in decrease in Internet rate by 0.153 times lower probability relative to Education1. The logistic regressions coefficient of Education4 is -0.054 ($y=1$) and -0.204 ($y=3$) respectively, relative to the Education1 (Primary and intermediate “Base Group”) indicating Education4 have 0.054 and 0.204 lower probability of Having Internet successively. But when the probability $y=2$ is considered, the logistic regressions coefficient of Education4 is 0.285 relative to the Education1, Education4 has higher probability of having Internet.

The logistic regressions coefficient of Employment2 (public employee), is 0.095 relative to the Employment1 (base group), Employment2 has 0.095 higher probability of having Internet ($y=2$) but has 0.120 lower probability of having Internet when ($y=3$). The logistic regressions coefficient of Employment3 (student) are -0.080 and -0.050 when the probability is $y=1$ and $y=3$ respectively relative to the Employment1, Employment3 has 0.080 and 0.050 lower probability of having Internet, but Employment3 has 0.137 higher probability relative to Employment1 when the probability $y=2$. Intensity2, Intensity3 and Intensity4 also registered positive values of coefficient and hence they influence the Internet use in Iraq significantly and higher relative to Intensity1 (base category).

Policy and Factors Affecting Internet Access

General Policy Issues

As the present study revealed that the factors like age, geographical location, gender, education and literacy and employment affected the Internet connectivity in Iraq, the government of Iraq must come up with future policies addressing these factors. The government must make efforts to incorporate poverty eradication programs and literacy mission in the future policy guidelines so that the Internet access would be positively influenced. Though some strong initiatives were taken by the Iraqi government for development of telecommunication sector, the Internet connectivity was hardly hit due to the involvement of Iraq in War. Iraq Communications and Media Commission (ICMC) were established in 2004 to promote the telecommunications, to attract more investments and to discourage excessive state interference in the market.

Indicators of ICT Technologies and e-governance in Iraq

Though the security levels are low, Iraq could succeed in developing ICT technology specifically with respect to telecommunications (ESCWA, 2007a). However, Iraq could not make use of ICT technology that aids in innovation, incubation and venture capital investment till now and encouraging Internet connectivity would certainly boost the prospects of ICT technology in this direction (ESCWA, 2007b). The efficient administration in Iraq would require the successful implementation of ICT technology and e-governance mechanism which is further dependent on Internet connectivity. e-governance also facilitates better governance, transparency, accountability and more cost effective utilization of government budget (USAID, 2005). Boost to the telecommunication policy in Iraq would be facilitated by encouraging the foreign direct investments in telecommunication sectors and by having new initiatives for better multilateral international linkages. All the demographic characteristics identified in this paper may be addressed in the future policy making so that the telecommunication sector in general and Internet development in particular would gain strong momentum.

Income a significant factor of Internet Use

As mentioned in the multinomial logit model, several factors like age, gender, location, employment and location affected the use and non-use of Internet in Iraq. In addition, one most important factor that influences the use and non-use of Internet in Iraq is the level of income of the people. If the income level is poor, the people will not have ability to pay for the Internet connectivity and hence results in higher levels of non-use of Internet. The war in Iraq affected its economic condition miserably making the standard of living of its people very poor. The oil for food program helped in provision of basic income and subsidies to the Iraq people (UNDP, 2005). Hence, many after meeting their basic needs don't have convenience to pay for the Internet connectivity resulting in poor use of Internet. The Gini coefficient of Iraq was found to be increased from 0.36 in 2003 to 0.42 in 2004 which represents the income inequality among different households of Iraq.

Other Characteristics affecting Internet in Iraq

People with high diploma, M.Sc. and PhD were found to be quite familiar with the use of the Internet compared to people with lesser levels of education. This might be due to the demand of computers and Internet with the increase in level of education. In general, the people pursuing M.Sc. and PhD require more analytical and review of research work that certainly requires the use of Internet to have the access to the online journals. At the same time, the students recorded highest use of Internet due to their maximum demand for searching the information related to their academic courses. Moreover, students also have highest level of enthusiasm in interacting with others in several fields under several locations that necessitates them to use the Internet frequently. PhD and several employees in beginning of the career who are eager to improve their bio-data come under this group and they need to search the employment options from time to time to get a better job resulting in higher level of Internet use by this group in Iraq.

Summary, Conclusion and Recommendations

Several factors influence the Internet accessibility and use in nations like Iraq. The factors like infrastructure development, level of income of the people, existing Internet technology in the market, nature of government policies and international and national political developments positively influence the rate of Internet technology development. The presence of strong regulatory authority also enhances the rate of development of Internet technology by encouraging the overall telecommunication sector (Gong and Sri Nagesh, 1996). At the same time, the element of competition operates through phenomenon of globalization and liberalization, which also affects the rate of development of Internet. Iraq also witnessed poor Internet development due to these factors mentioned here and in addition, its involvement in war with USA further aggravated the situation.

The results confirmed that human development indices, human capital, institutional legal environment, existing technologies and government policy making affected the Internet accessibility in Iraq considerably. In addition, factors like age, geographical location, gender, education and income level severely influence the Internet use and non-use in Iraq as revealed by the multinomial logit model used in the present study. People with MSc and PhD degrees have considerable level of Internet use in Iraq due to their involvement in academic and research works. Students also recorded highest Internet use rate due to their academic interest and due to higher interest in accessing information through Internet. The non-use of Internet was mainly found among high school and diploma students due to their lack of access to Internet facility compared to students with higher academic levels. Lack of awareness about the Internet use and poor access to Internet facility were also identified as the most significant factors that resulted in the non-use of Internet.

Based on these observations, the Internet use in Iraq can be enhanced through creating higher awareness among the people by conducting series of training programs, effective government policy for better science and technology prioritizing Internet and ICT technology in education sector and allowing most advanced Internet technologies into the domestic field, increased efforts for enhancing human development indices and human capital and facilitating institutional legal environment would certainly

eliminate the problem of low Internet accessibility. The efforts must be made to attract reasonable amount of foreign direct investment through multilateral linkages with other nations to Iraq for its best utilization for communication sector including Internet services. If more people have access to Internet, the policies of the government would reach the higher number of people through e-governance. Hence, strong and sincere initiative is required to maintain the strong linkage among the ICT industry, telecommunications and other key sectors of society affecting the growth of the Internet in Iraq through e-governance.

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