



Usage of ICT in Pakistan: An analysis of the influence of technological gadgets penetration on individuals and businesses

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ABSTRACT

Electronic and technological gadgets play a crucial role in the development of any society as well as the personal nature of individuals in this modern era, they also serve as tools for creating remarkable effects in the modernization of any business or trade globally. Based on this notion, this study analyzed the access to information and communication technology (ICT) in Pakistan and also provided facts and figures about ICT gadgets and how much it stimulates the interests of people towards ICT concerning age and income. Most of the studies centered on ICT have only examined perspectives from developed countries such as the USA, Europe, and Asia. However, in Pakistan, there is a significant research gap in this regard. Therefore, this study examined access to ICT towards how the people in the main cities of Islamabad, Hyderabad, Karachi, Peshawar, Lahore, Rawalpindi, and Quetta of Pakistan were potential business owners and traders. The usage and access of ICT are available mostly in urban areas whereas rural residents are already facing the problem of low access to ICT. In this study, the logit model was used to model the data of HIES 2015-16 obtained from the Pakistan Bureau of Statistics website. According to the empirical analysis, an inverse relationship between the age of individuals and their interests in ICT was observed, which seemed to reveal that usage of ICT and its gadgets was found to be more accessible and penetrable among younger generations towards the management of businesses. In addition, it was also perceived that an increase in the income of an individual, brings an increase in the interest of such individuals towards ICT, both in their personal lives as well as in their businesses and trade.

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Introduction

The world is moving towards virtual environment, people are relying on technology for the purpose of running and promoting, trades, businesses, tourism, economical aspects, growth, entertainment, industries, agriculture, sports, households etc. (Tiwari, 2021). Due to this, a massive interest and demand has been established in this era for technology and technological gadgets, encouraging the people for using it in different aspects of life, jobs and business purposes (Tabusca & Tabusca, 2019). Technology is the key factor for sustainable development and growth of economy as well global trade and business. As is it is widely witnessed that, in the evolution of business, globalization is shaping-up the trade and business with the induction of e-commerce, which creates an increasing effect of demand of learning and education ICT and acquiring the associated gadgets, devices, programs and systems (Zygiaris, 2022). Therefore, the developed countries are continuously growing as they are focusing on technology and its evolution. The trade and business are spreading globally with more efficient way in these developed countries. Furthermore, technology empowers every individual to learn and have benefits of making their practices in more convenient way, smoothing the process and managing the supply chain of product and services. However, information and communication technology (ICT) enhances the flow of sharing information, making communication allowing societies to get socialize and keeping individuals up to date, timely deliveries, information of stock and inventory, structuring centralized or interconnected decentralized business structures (Turvey & Xiong, 2017). ICT allows to monitoring various supply chain flow in any organization very efficiently and effectively. It helps to maintain the sustainability and enhance the performance and growth of business. ICT enable to smooth supply chain of products from supplier to customer. It also structures the correct flow of information internally in the organization as well as to the outsource bodies like logistics forwarder and transpiration etc., and to the customer for order taking, demand and supply plan, production plan, customers' requirements, in order to deliver the rider product, in right time at right place with all confidence (Kumar, 2022). ICT helps to improve the Small Business Enterprise performance and help to access market by having more accessibility on information. However, ICT should be used in efficient and effective manner, so that it could bring competitive advantage with incremental and positive

change to the business and its profits. ICT enhance the business management (Pasape, 2022)

Among various form of ICT, internet is playing very crucial role which may considered as the reason of the globalization and in developing the integrated system which allows flexibility in this rapidly changing world. Due to this, the corporate world has a set of shared knowledge so that they can grow and take advantages mutually and improving performance (Xiao et al; 2018). In contrast, ICT develops a wide path for learning, skill developments and personality growth along with enhancing the performance. Falk (2002) investigated the impact of organizational change on actual labor demand and employment expectations by using (ICT). Their result shows that organizational structure has a significantly positive effect on actual employment growth as well. In another study, the relationship between ICT and economic development and their influence on each other was investigated for Egypt and the Gulf countries. Their empirical analysis showed that Egypt and the Gulf countries were still far behind from the developed countries in terms of ICT demand, supply and spending. However, ICT diffusion was positively correlated with economic growth in both Egypt and the Gulf countries but Egypt was relatively more advance in ICT supply on the basis of number of internet services providers (Nour and Satti 2002). Moreover, use of ICT in transportation for vehicle control, driver assistance, vehicle tracking, GPS, and systems for fee collection, the way of travel, plan and about execution of this plan, infrastructure and systems was studied by (Giannopoulos, 2004). Whereas, ICT is also transforming the tourism globally and empowering the consumers to identify and purchase tourism packages and products and also encourage them to explore tourism (Buhalis & O'Connor, 2005). They used search engines like Google and Yahoo which allows information regarding destination and product. With the help of hardware, software and networking tool tourism enterprises will be able to divert expertise and resources towards the consumers' satisfaction and provide higher value-added transactions. Acar, et al. (2005) also concluded small and medium size enterprises (SMEs) to ICT used in office practices like accounting record keeping etc. Khuong Vu (2006) tried to show a global perception on the propagating of ICT and its support to economic growth in Asia. According to the World Development Indicators (WDI-Online) the dynamics of ICT diffusion and its impact on economic growth China is leading the Asia while India is laggard far behind in this race so as a result. Whereas, analyzing



attitude of school teachers towards ICT for skill development and individual grooming was studied by (Albirini, 2006; Rani and Schmid, 2007).

Problem Statement

The more accessibility and usage of ICT in individuals lives and business tend to increase the learning, and personal and business growth.

It is seen globally that people with good income keen to use more ICT and its devices. Perhaps, in developing countries like Pakistan, most of the people have either have no accessibility of ICT or don't have the correct usage of ICT. The developing countries like Pakistan, is still away from developing the lifestyle, learning, and reaching the global information and technology using ICT. However, aged people here seem to be less interested in using ICT while income has the highest influence of usage of ICT and its devices. There is significant gap yet influential impact of age, income, cities' lifestyle on usage of ICT.

Hypothesis

Null Hypothesis: Income of individual and business, city lifestyle and individual's age have no impact on usage of ICT in developing countries like Pakistan.

Alternative Hypothesis: Income of individual and business, city lifestyle and individual's age have significant impact on usage of ICT in developing countries like Pakistan.

Literature Review

Falk (2002) examined the use of ICT for organizational change in demand of labor in services data for Springer, Berlin, and Heidelberg via multivariate probit model. The findings of the study showed that organizational change had a significant and positive impact on expected employment for all skill groups except for unskilled labor. Moreover, evidence of indirect effect of ICT via organizational changes draws a significant effect on employment. Whereas, the use of ICT for small and medium enterprises SMEs in construction sector was studied (Acar et al, 2005). They used simple random sampling technique and selected sample size of 300 construction firms, only 227 respondents were considered for face-to-face interview. The findings of their study confirm that the large firms had more positive interest towards ICT than that of SMEs. Although, the construction industry in Turkey is facing challenges in diffusion of ICT, but a

significant relationship was found between the size of organization and extent to accept the ICT in SMEs.

Various statistical techniques are used to investigate the importance of ICT in education which is implemented for various purposes. Among them very few are considered here. The use of ICT to examine the attitude towards study the case of Syrian EFL teachers was examined by (Albirini, 2006). Multiple regression analysis was used to determine the variance proportion in teacher's attitude towards ICT. Empirical analysis showed that the participants had favorable attitude toward diffusion of ICT in education as well as using computer as a tool of education. Hameed (2007) tried to identify the value and need of international cooperation for using & promoting ICT for the development and economic growth. After reviewing a number of case studies on use of ICT for different initiatives within Pakistan, the conclusions were drawn on how it supports the socio-economic growth, which may have similar and strong lessons for many developing countries. Therefore, the creation of Digital Opportunities, sharing of knowledge and collaboration will help the country or region in socio-economic development.

Grazzi and Vergera (2008), suggested computer and internet adoption in different households of Paraguay for which the data in econometric section was taken from 2005 National household survey, considering 4413 households. Moreover, youngsters are more familiar with ICT and students have more likely access to computers and internet that depends on the geographical locations like rural and urban. According to another study, the income and education are the core element for accessing ICT in developing countries (Grazzi and Vergara, 2008). A bivariate probit model was used for correlation and biprobit. It was observed that the extent of ICT adoption was higher with the households having higher education and higher income. Though, a significant relationship was found between using internet at work and accessing internet at home. In another paper Waycott, et al. (2010) had investigated the perception of university students and staff towards ICT. NVivo was used as Quantitative Data Analysis Tool for their interview aiming the group's audio-recording and transcribed verbatim for the Australian university. Their findings reflected that there is significant gap between staff and students in using technology to support their learning and also ample gap was found between more technologically skillful younger students and their fewer savvy teachers because of differences in exposure to technology during their lives.



The use of ICT is not limited it is useful for the managerial, economic and organizational activities. Bakay e al; (2011) investigated the factors which explain the diffusion of ICT and its impact on activities following by economy. Ordinary Least Square (OLS) regression was used to conduct the analysis to find the relationship between variables. Their findings concluded that increase in per person income tends to increase in score of network readiness. However, the expenditures of ICT which has the direct impact on GDP and another variable tend to increase too. The younger labor force has more associations with ICT, as they are more towards socializing and creating networks. Therefore, usage of ICT devices and Internet has inverse relationship with age dependency ratio. Along with this, it also seems to have more access and opportunities of ICT for urban citizens. Gathering evidence from firm-level data Haller and Siedschlag (2011) studied the determinants of adoption of ICT. Since the nature of the variable is dichotomous, therefore Plogit models and probit along with OLS models are used to reach some results. The findings highlighted effect of organization’s size, skill intensity, age, proximity and exposure to global market swiftness of ICT adoption. Large organization tends to adopt ICT more easily than small organization while the small organizations use ICT more intensively than medium ones. In addition, it is also concluded that the large and new organizations are more interested in having website. Whereas, (Farhadi et al; 2012) investigated the relationship between the use of information technology and economic growth. The findings of their study, showed a significant relationship between the real GDP and per capita income. With extent of this, the economic growth and GDP rate are increased with the increasingly use of ICT by country and found a positive effect of ICT on economic growth. Moreover, a study was conducted in Iran in which factors affecting the ICT adoption among rural users were investigated by (Moghaddam, & Khatoun-Abadi, 2013). The stratified random sampling method and multiple regression analysis method was applied and found that ICT requires the pre-existing ability of using computer and internet. However, some rural areas are still away from ICT due to poverty, and lack of accesses. But information and communication technology may also help in reducing poverty and increasing progress and development. Analysis shows that the economic situation is not only reason of the lack of ICT adoption; public funded centers can be created to enhance the use of ITC. (Das, Chowdhury and Seaborn, 2018) examined the relationship between per capita economic growth by ICT and financial development. ICT increases the GDP, income and employment opportunities.

Ordinary Least Square (OLS) model was used to check the generalized method of moments (GMM). The study concludes over the set of discussion about growing effect of ICT diffusion and role of financial development in developing countries, which leads to the result that the individual effect of ICT (Internet, telephone and mobile) on economic growth is significantly positive. Furthermore, per capita economic growth in LICs is jointly affected by financial development and ICT diffusion.

ICT and its digital platforms provide a window to business to reach more people, making the transition of funds and material easier, and make business strategically strong (Puspitawati et al., 2021). The research also highlighted the importance of inducting ICT and its platform(s) to develop more market for the product and service.

Subekti et al., (2022) Found in the finding of research that communication strategy using ICT allows to develop the quality of conveying the education and training. The ICT can also highlight the hurdles, strengths and weaknesses in any process, so that the right decision can be taken to solve the problem in effective way

Methodology

Logit Model

The logit model which is also known as Logistic Regression is a binomial regression model. Each object being is assigned a probability between 0 and 1 and the sum adding to one. Logistic regression is a statistical technique that in its basic form uses logistic function to model a binary dependent variable.

Let Y denotes variable to predict and X = (X1, X2 ... Xn) as predictive variables (explanatory variables). In the context of binary logistic regression, the variable Y takes two possible modalities [1, 0]. The variables Xj are exclusively continuous or binary.

In this study P (Y = 1) denotes the probability that the person has ICT access whereas P (Y = 0) represents the probability that the person has not ICT access.

Therefore, the general form of logistic regression of response ‘Y’ is explained as;

$$\ln(P/(1-P))= \beta_0 + \beta_1 X_1+ \beta_2 X_2+ \dots+ \beta_k X_k \tag{1}$$

Where,

P = probability that the event Y occurs, p(Y=1)



$p/(1-p)$ = "odds ratio"

$\ln[p/(1-p)]$ = log odds ratio, or "logit"

This study uses ICT data of Pakistan urban areas therefore the model is defined as;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 \quad (2)$$

Where,

Y= Gender consume ICT

X1= monthly income

X2= Age from 10 years to 90 years

Where income is considered as monthly income and age group is from 10 to 90 years.

However, this study uses ICT data of Urban Areas of Pakistan such as Karachi, Hyderabad, Islamabad, Lahore, Peshawar, Rawalpindi and Quetta, since these cities have comparatively more business influence. The Household Integrated Economic Survey (HIES) and Family Budget Survey (FBS) of 2015-16 data is used which was collected from Pak Bureau of Statistics website www.pbs.gov.pk.

As the HIES contains a lot of variables among them only we selected ICT based variables such as Income,

Results And Discussion

Table No 1:

Overall Output of the logit model of Pakistan.

xx	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
age	-.0533639	.0024739	-21.57	0.000	-.0582127 -.0485152
lincome	1.59932	.0440393	36.32	0.000	1.513004 1.685635
_cons	-14.67034	.3945054	-37.19	0.000	-15.44356 -13.89713

Table 1, shows the output of logit model by considering major cities of Pakistan, represent if age of the person increases by 1 year than interest of the person in ICT decreases by 0.0533% keeping income as constant. Whereas, coefficient of income shows

The logit function is the natural log of the odds that 'Y' equals one of the categories. For mathematical simplicity, we assume 'Y' has only two categories and code them as 0 and 1 already explain in the above paragraph. The parameter of the logistic regression is estimated via Maximum Likelihood Estimation.

Data Analysis

There are various research works which have been done in various place with various variable, but, no work has been done regarding ICT in Pakistan.

Age and ICT questions etc. The required variables are than merged through STATA, which contains the data from entire Pakistan. The data was further truncated to get major cities of Pakistan. After that data are cleaning and managing missing observations. Log is applied on income variable to reduce the digit of the observations and then applied Logit model. The impact of ICT on age and income is analyzed all around the Pakistan. Furthermore, city wise influence with respect to age and income is also observed on ICT.

that increases in income by 1 thousand rupees will consequently increase the access of ICT by 1.59% keeping other variables as constant. Furthermore, the access to ICT is expected to be decreased 14.67% by holding age, and income fix.

Table No 2:

Output of the logit model of Hyderabad

xx	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
age	-.0917939	.0137924	-6.66	0.000	-.1188264 -.0647613
lincome	2.059957	.2402591	8.57	0.000	1.589058 2.530856
_cons	-17.2861	2.013814	-8.58	0.000	-21.23311 -13.3391



Table 2, displays the output of Hyderabad representing when age of the person increases by 1 year than interest of the person in ICT decreases by 0.092% keeping income as constant. Also, the coefficient of income shows increase in income by 1

thousand rupees will consequently increase the access of ICT by 2.06% keeping other variables as constant. Furthermore, the access to ICT is expected to be decreased 17.2861% by holding age, and income fix.

Table No. 3

Tab Output of the logit model of Islamabad

xx	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
age	-.0688015	.0146931	-4.68	0.000	-.0975995	-.0400035
lincome	1.932591	.2872123	6.73	0.000	1.369666	2.495517
_cons	-17.3558	2.611192	-6.65	0.000	-22.47364	-12.23796

Table 3, demonstrates the output of Islamabad which represents when age of the person increases by 1 year than interest of the person in ICT decreases by 0.068% keeping income as constant. The coefficient of income shows that increases in income by 1 thousand rupees will consequently increase the

access of ICT by 1.93% keeping other variables as constant. Furthermore, the access to ICT is expected to be decreased 17.3558% by holding age and income fix. This result shows ICT interest decreases this represent people have more responsibilities which disturb their routine life with growing age.

Table No 4:

Output of the logit model of Karachi

xx	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
age	-.0552482	.0042825	-12.90	0.000	-.0636417	-.0468547
lincome	1.936468	.0806898	24.00	0.000	1.778319	2.094617
_cons	-18.00845	.725638	-24.82	0.000	-19.43068	-16.58623

Table 4 shows the output of Karachi, as the age of person increases by 1 year than interest of the person in ICT decreases by 0.0552% keeping income as constant. Whereas, the coefficient of income shows as the income increases by 1 thousand rupees will

subsequently increase the access of ICT by 1.94% keeping other variables as constant. Furthermore, the access to ICT is expected to be decreased 18.0084% by holding age, and income fix.

Table No 5:

Output of the logit model of Karachi Central.

xx	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
age	-.0590335	.0084314	-7.00	0.000	-.0755588	-.0425082
lincome	2.027311	.1575115	12.87	0.000	1.718595	2.336028
_cons	-18.547	1.417397	-13.09	0.000	-21.32504	-15.76895

From Table 5, it is noted if the age of the person increases by 1 year than interest of the person in ICT

decreases by 0.059% while income is constant for the Karachi Central. Moreover, the coefficient of income



demonstrates an increase in income by 1 thousand rupees result an increase in access of ICT by 2.03%.

Furthermore, the access to ICT is expected to be decreased 18.55% by holding age, and income fix.

Table No 6:

xx	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
age	-.0537997	.0085731	-6.28	0.000	-.0706027 - .0369967
lincome	1.99637	.164518	12.13	0.000	1.673921 2.318819
_cons	-18.80796	1.487652	-12.64	0.000	-21.72371 -15.89222

Table No 6: From Table 5, it is noted if the age of the person increases by 1 year than interest of the person in ICT decreases by 0.059% while income is constant for the Karachi Central. Moreover, the coefficient of income demonstrates an increase in income by 1 thousand rupees result an increase in access of ICT by 2.03%. Furthermore, the access to ICT is expected to be decreased 18.55% by holding age, and income fix.

Output of the logit model of Karachi East.

The output of Karachi East is displayed in Table 6 representing an increase in age of the person by 1 year would decrease the likelihood of ICT by 0.051% keeping income as constant. On contrary the coefficient of income shows that increases in income by 1 thousand rupees thus increase the access of ICT by 2% keeping other variables as constant. Furthermore, the access to ICT is expected to be decreased 18.81% by holding age, and income fix.

Table No 7:

Output of the logit model of Karachi Malir.

xx	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
age	-.0620171	.016148	-3.84	0.000	-.0936666 - .0303677
lincome	2.346819	.3234405	7.26	0.000	1.712887 2.98075
_cons	-21.67979	2.858408	-7.58	0.000	-27.28217 -16.07741

Table 7, shows the output of Karachi Malir, this represents age of the person increases by 1 year than interest of the person in ICT decreases by 0.062%. The coefficient of income shows that increases in income by 1 thousand rupees will consequently

increase the access of ICT by 2.35% keeping other variables as constant. Furthermore, the access to ICT is expected to be decreased 21.68% by holding age, and income fix

Table No 8:

Output of the logit model of Karachi South.

xx	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
age	-.0487609	.0080554	-6.05	0.000	-.0645491 - .0329727
lincome	1.585972	.1405973	11.28	0.000	1.310406 1.861537
_cons	-14.45213	1.271576	-11.37	0.000	-16.94437 -11.95988

In the next Table 8, output of logit model for Karachi South is represented when age of the person increases

by 1 year than interest of the person in ICT decreases by 0.05% keeping income as constant. While the



coefficient of income shows an increase in income by 1 thousand rupees more likely increase the access of ICT by 1.6% keeping other variables as constant.

Furthermore, the access to ICT is expected to be decreased 14.45% by holding age, and income fix

Table No 9:

Output of the logit model of Karachi West

xx	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
age	-.0627738	.0125078	-5.02	0.000	-.0872887	-.0382589
lincome	1.327864	.2689338	4.94	0.000	.8007635	1.854965
_cons	-12.47913	2.398345	-5.20	0.000	-17.1798	-7.778456

It is observed from Table 9 if the age of the person increases by 1 year than interest of the person in ICT decreases by 0.063% keeping income as constant in Karachi West. But the coefficient of income shows

that increase in income by 1 thousand rupees will consequently increase the access of ICT by 1.34% and also decreases the access of ICT by 12.5% holding age, and income fix.

Table No 10:

Output of the logit model of Lahore.

xx	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
age	-.0473914	.0048799	-9.71	0.000	-.0569557	-.037827
lincome	1.381678	.0846516	16.32	0.000	1.215764	1.547592
_cons	-12.77682	.7663208	-16.67	0.000	-14.27878	-11.27486

Table 10 presenting the output of Lahore reflecting when age of person increases by 1-year interest towards ICT decreases by 0.05% keeping income as constant. The coefficient of income shows that increases in income by 1 thousand rupees will

consequently increase the access of ICT by 1.4% keeping other variables as constant. Besides, the access to ICT is expected to be decreased 12.8% by holding age, and income fix.

Table No 11:

Output of the logit model of Peshawar

xx	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
age	-.0487214	.0059899	-8.13	0.000	-.0604615	-.0369814
lincome	1.199495	.0965776	12.42	0.000	1.010206	1.388784
_cons	-10.72037	.8501145	-12.61	0.000	-12.38657	-9.054179

Table 11, displays the output of logit model by considering Peshawar which represents when age of the person increases by 1 year than interest of the

person in ICT decreases by 0.05% keeping income as constant. The coefficient of income shows that increases in income by 1 thousand rupees will



consequently increase the access of ICT by 1.2% keeping other variables as constant. Furthermore, the access to ICT is expected to be decreased 10.72% by holding age, and income fix. This result shows ICT

interest decreases, this represent people have more responsibilities which disturb their routine life with growing age.

Table No 12:

Output of the logit model of Quetta.

xx	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
age	-.0593002	.0082366	-7.20	0.000	-.0754435	-.0431568
lincome	1.647841	.1453905	11.33	0.000	1.362881	1.932801
_cons	-15.23368	1.294006	-11.77	0.000	-17.76988	-12.69747

Table 12 shows the output Quetta, this represent when age of the person increases by 1 year than interest of the person in ICT decreases by 0.06% keeping income as constant. The coefficient of income shows that increases in income by 1 thousand

rupees will consequently increase the access of ICT by 1.65% keeping other variables as constant. Furthermore, the access to ICT is expected to be decreased 15.23% by holding age, and income fix.

Table No 13:

Output of the logit model of Rawalpindi.

xx	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
age	-.0530788	.0098918	-5.37	0.000	-.0724665	-.0336911
lincome	1.700859	.19575	8.69	0.000	1.317196	2.084522
_cons	-15.42836	1.803988	-8.55	0.000	-18.96411	-11.89261

Table, 13 shows the output of logit model by considering Rawalpindi, this represent when age of the person increases by 1 year than interest of the person in ICT decreases by 0.053% keeping income as constant. The coefficient of income shows that increases in income by 1 thousand rupees will consequently increase the access of ICT by 1.7% keeping other variables as constant. Furthermore, the

access to ICT is expected to be decreased 15.43% by holding age, and income fix. From all the empirical analysis it is noted that ICT interest decreases with growing age may be people have more responsibilities which disturb their routine life with growing age. In addition, as the income increase a person motivated towards ITC more

Conclusion

Modern age is the age of technology where information and communication technology is used almost in every aspect of personal life and professional life. Now development of the economy of the country is directly linked with information and communication technology, since the growth of economy is highly correlated with the spread of tourism, domestic manufacturing and services business, and globalization of commerce. In this study we have compared the access of ICT of person with respect to age and income. Although, Pakistan is using information and communication technology but in rural areas, the usage of ICT is still less. That is

why we chose only major cities of Pakistan to conduct this analysis, as these cities have more awareness of ICT and among most businesses located cities. The major cities which included in this analysis are Hyderabad, Islamabad, Karachi, Lahore, Peshawar, Quetta and Rawalpindi. However, since Karachi is the largest city with respect to the population, area and financial capital of Pakistan, the city is further divided into its five districts which are Central, East, Malir, South and West. We have used logit model in order to conduct this analysis because we want to conduct the analysis that either the person has ICT access or not which is binary in nature. In this study, the data was taken from the website of



Pakistan bureau of statistics. From this empirical analysis we observe that when income of the person increases than the person takes more interest in information and communication technology, which increases the demand of ICT devices, software and systems. This also reflects, that increase in business profits tends to increase in learning and integration of updated ICT business models, systems, software and devices, in order to have more effective and reliable business structures, and manage the flow of information, material and funds in very smooth way without any mishaps or complications in streaming or flow. In all cites, with growing age, people take less interest towards ICT because of their daily routine, responsibilities and including fear of learning new technology and they become more religious by their growing age. And they continue to use the traditional practice in the personal and professional lives.

According to the findings, it is found that the income has direct relationship with the interest and usage of the people toward ICT. Statistically, Hyderabad seems to have the highest income percentage, reflecting the highest access or usage of ICT by the residents. In other words, with the increase of every Rs 1000 leads to increase the interest towards ICT by rate of 2.05. Since the people of Hyderabad are less educated, hence they are more curious towards using of these technologies for socializing, communication and entertainment. Moreover, the trend of outing and exposure in Hyderabad is low therefore the statistics of using ICT in Hyderabad is seems to be highest. However, Hyderabad is also considered as one of the most business possessing cities, which also becomes the reason of highest usage of ICT. Karachi seems to have the second highest income percentage, reflecting the second highest access or usage of ICT by the residents, In other words, with the increase of every Rs. 1000 leads to increase the interest towards ICT by rate of 1.936. The reason would be the high population and awareness towards technology. And it is economic hub of Pakistan so people have resources to access these technologies. Karachi is also an industrial city, so the usage of ICT in industry and cooperate sector is high. Karachi is further divided into five districts that is Karachi Central, Karachi East, Karachi Malir, Karachi South and Karachi West. The interest towards ICT tends to increase with highest rate among all districts of Karachi is in Malir. Because the area is still under privilege, so the people are more eager to use ICT. Karachi Central has the second highest rate of increasing interest towards ICT. They have different lifestyle which make them second highest in taking interest in ICT with the increase of their income. Furthermore, mostly upper-middle- and high-class people are found in Karachi East district. The most of the people belongs to the

lower-middle or middle-middle class in, therefore the curiosity for ICT is third highest. The increasing rate of interest towards ICT as income increases, of Karachi South comes at second last, because the majority is involved in business and business activity. They spend more time on their work rather than spending on ICT. Lastly Karachi West has the lowest increasing rate of interest towards ICT with increase of income. Although the areas are under privilege but the people of these areas try to spend on education if there is any increase of income. As Karachi is also the financial capital, it is also shown that businesses are spread all over the city, including corporate offices, industrial units, services operational centers, which reflects the high usage of ICT and its devices. Apart from Karachi, Islamabad has third highest increasing rate of interest towards ICT with increase of income, because of lifestyle of people in Islamabad. The activities of people include outing and traveling as well as usage of ICT. However, Islamabad is the hub of federal government, and its several department offices, which is the reason of making Islamabad the third highest user of ICT As Rawalpindi is closely connected with Islamabad, the increasing interest rate towards ICT is lower than Islamabad which keeps Rawalpindi at the fourth highest rank among all major cities, though Rawalpindi has a great influence of Islamabad.

The people in Quetta are quite educated as compare to Peshawar but still the people are mostly involved in small businesses and labor work. Therefor Quetta has third last increasing rate of interest towards ICT with increase in income. Lahore is also a major city of Pakistan which is far more developed than Quetta and Peshawar. Although the people are more literate but the life over there is quite fast, people seem to spend less time on ICT which keep Lahore on the second last rank in the list of increasing rates of interest towards ICT with increase in income. Although Lahore also has business centers, and corporate offices, however the combined usage of ICT in individual and business is still comparatively less than other five cities. Peshawar seems to have lowest income percentage, reflecting the lowest access or usage of ICT by the residents, In other words, with the increase of every Rs. 1000 leads to increase the interest towards ICT by rate of 1.19. The reason would be the low literacy rate, and majority of male population get involve in small traditional trade and business, or labor work, from the very young age. Whereas, the people over there are more religious, thus the access and usage of ICT among the females is very low as well, since they do not prefer to socialize more via ICT or any associated platform.



With evaluation of the findings, it can be concluded that ICT helps in growth of personal life and well as businesses. It improves the quality of education, accessibility of information, managing the flow of material, funds and information.

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