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# **What Determines Computer literacy across Indian Household? A State-level Analysis**

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## ***Abstract***

*Modern education is moving towards skill-based learning by adopting technology-enhanced learning system. Various attempts are made at policy level to improve the education system and curriculum by introducing different technologies. In this context, the paper examines the extent of computer use and its determinants across Indian households. To analyse this, the paper relies on 71<sup>st</sup> round of National Sample Survey. To understand the extent of computer, use across Indian states, the paper adopted descriptive statistics and to find out the determinants of computer use; the study uses logistic regression. The paper found that, there is a wide disparity in terms of access and use of computer across states. The result on determinants of computer literacy shows that, education of the head of the household increases the probability of computer use among the households. Social status and location also turned as one of the major determinants of computer use. If the households belong to urban areas, then the probability of computer increases.*

*Key Words: Technology enhanced learning; Computer literacy.*

## **1. Introduction**

Economy is moving towards technology driven and it is mostly driven by information and communication technologies (ICTs). As a general-purpose technology, ICTs are not only capable of reducing transaction costs through faster communication but also capable of enhancing productivity of different sectors and welfare of different segments of the society (Das, 2014). Due to its ubiquitous nature, every sector and segments are now dependent on computer and internet. Attempts are being made to understand the use and impact of ICTs across different sectors of the economy. In India the success in ICT production and export has already attracted world attention and has been well documented. Given the contributions of IT sector to the Indian economy, a number of studies have probed into the direct contributions by analysing at the impact of ICT/IT as a sector of economic growth (Bhatnagar and Schware, 2000; Kumar, 2001; Joseph & Harilal, 2001; Arora and Athreye, 2002; Singh, 2003; Chandrasekhar, 2005; Chandrasekhar, 2006). However, when it comes to the indirect implication of ICTs- impact of ICTs adoption on other sectors, very few studies have analysed that aspect (Lal, 2001; Joseph and Abraham, 2007; Sharma and Singh, 2013; Basant and Sharma, 2014). That apart, attempts have also been made to assess the impact of ICTs on developmental outcome by analysing its role in poverty reduction, rural development, access to market and empowering women (Singh, 2004; Arunachalam, 2004; Abraham, 2007; Pillai and Shanta, 2008). In spite of remarkable performance of ICT sector, scholars (Joseph, 2002) and multilateral organisations (UNCTAD, 2012) have been much concerned about the limited domestic use of ICTs in India. Though the importance of ICTs is well documented, however, there are also evidences of existence of digital divide across the sectors of the economy and segments of the society. Hence it is important to understand different causes that lead to digital divide. In this context, the present study is an attempt to examine all the factors that determine computer literacy across Indian households.

The remainder of this paper is organised as follows. Following introduction, section 2 briefly discusses the existing literature. Section 3 presents data sources and methodology. Section 4 presents findings followed by some concluding remarks in section 5.

## **2. Review of Literature**

The study is based on the theoretical literature of innovation-diffusion. Adoption or diffusion of any technology mostly depends on factors like adopters' characteristics, continuity of innovation and learning and communication (Das, 2020). A number of studies have been carried out to understand the factors that affect the adoption of computer. Studies have found out different sets of factors that determine the adoption of computer. Kiesler et al. (1997), in their study found that mostly socio-economic factors determine the adoption of computer and internet by households. A similar study is done by Mukoko (2012) through a household survey in Cameroon. The paper explores different factors that determine the adoption and use of computer in Cameroon and found out that levels of education, age are some of the socio-economic factors determine the adoption of computer. Other than socio-economic factors, life-style, perceived utility and perceived difficulty are some of psycho-sociological factors that determine the adoption of computer in Cameroon. Norris in the year 2001 did a cross-country analysis on internet penetration for 179 countries. She found GDP per capita one of the important determinants for using internet. Caselli and Coleman (2001) mentioned that average level of education is the key variable for the diffusion of computer.

In Indian context, the diffusion of ICTs is generally confined to different sectors like diffusion of ICTs in agriculture (Das, 2010; Das, 2010; Das, 2014) and its impact on farm households (Das, 2018), diffusion of ICTs and its impact on productivity of manufacturing sector (Joseph and Abraham, 2007). Though there are some studies on ICTs diffusion across different sectors in India, when it comes to segments of the society, studies are far and few between. In this context, the present study analyses two major issues- first the extent and use of computer among households across different states. Second the study analyses different characteristics of households that are associated with computer use.

## **3. Data Sources and Methodology**

To analyse the issue at hand, the study has used NSSO 71<sup>st</sup> round. The round is on Social Consumption on Education and data are collected for the year 2014 from January to June. The round covers total 65926 households with 36479 rural and

29447 urban households. The round presents different indicators like literacy rates, current attendance, participation in education, educational expenditure, drops out and discontinuance, access and ability to operate computer. In this study, access and ability to operate computer indicator has been used.

To understand the extent and use of computer, the study adopted descriptive statistics and to find out different characteristics of households that are associated with computer use, regression analysis is done. Since the outcome variable is whether the household has a computer or not, the study has used logistic regression for the analysis.

$$Y_i = \beta_1 + \beta_2 \ln MPCE + \beta_3 Access_{Computer} + \beta_4 Education + \beta_5 Age \\ + \beta_6 Caste + \beta_7 Distance + \beta_8 HHS_{Size} + \beta_9 Sector + U_i$$

Here  $Y_i$  represents whether the member of the household is capable of operating computer or not. The variable MPCE is the monthly per capita consumption expenditure. The variable is considered as proxy variable for households' income. As the data set does not have direct variable income, we have taken consumption expenditure as the proxy variable for income. The second variable is access to computer. The study hypothesises that if a household is having computer, then their chance of operating computer will be higher than the households who don't have households. The variable education refers to education of the head of the households. Other than these variables, household head's age, social group of the households, distance to nearest school, household size and location, i.e. whether the households belong to rural or urban areas are some other independent variables used in the study.

#### **4. Results and Discussions of the Study**

This Section deals with findings of the study. First, we have discussed use of computer across Indian states and across social category. Second, the paper has discussed different characteristics of households that are associated with computer use.

Table 1 discusses state wise percentage of households that have access to computer and percentage of households, where a member of the households can operate computer.

<b>Table 1: State wise Percentage of Households with Computer Access and Computer Use</b>		
States	Percentage of Households with Access to Computer	Percentage of Households with Computer Use
Andhra Pradesh	17.12	43.42
Arunachal Pradesh	18.85	40.42
Assam	14.67	27.39
Bihar	14.34	28.54
Chhattisgarh	12.95	31.12
Goa	59.90	70.83
Gujarat	24.25	50.09
Haryana	25.21	50.84
Himachal Pradesh	24.11	51.79
Jammu & Kashmir	18.67	39.84
Jharkhand	13.76	30.83
Karnataka	20.31	49.24
Kerala	37.77	73.77
Madhya Pradesh	17.25	36.47
Maharashtra	30.34	53.28
Manipur	19.89	31.82
Meghalaya	18.63	41.47
Mizoram	39.90	49.54
Nagaland	36.81	70.31
Odisha	11.17	30.05
Punjab	32.11	56.25
Rajasthan	22.21	40.04
Sikkim	41.21	53.13
Tamil Nadu	29.61	52.57
Telangana	29.61	44.47
Tripura	13.57	24.36
Uttar Pradesh	16.82	32.05
Uttaranchal	22.65	46.80

West Bengal	19.22	38.65
All India	<b>22.18</b>	<b>42.90</b>
Source: NSSO Unit level Data, 2014		

The result shows that Goa stands first in the row in terms of access to computer followed by Sikkim and Mizoram. In comparison to these states, Odisha is lagging behind in the row backed by Chhattisgarh. It is evident that only 14 states- Uttaranchal, Telengana, Tamil Nadu, Sikkim, Punjab, Nagaland, Mizoram, Maharashtra, Kerala, Karnataka, Himachal Pradesh, Haryana, Gujarat and Goa are above national average. Against access to computer, if we will analyse use of computer, we can find that Kerala stands first in the row followed by Goa and Nagaland. Comparison to these states, Tripura stands last in the row backed by Assam and Bihar. In comparison to access to computer, we can see that percentage of households who are able to operate computer is relatively higher across states.

Having discussed state wise scenario, in table 2 we have discussed access and use of computer across different social groups.

<b>Table 2: Access and Use of Computer across Social Groups</b>		
Social Group	Access to Computer	Use of Computer
Other	32.90	55.13
ST	17.10	33.63
SC	12.68	31.68
OBC	19.06	40.65
Source: NSSO Unit level Data, 2014		

It is evident that among social groups, households belonging to scheduled caste (SC) are lagging in both access and use of computer backed by scheduled tribe (ST) and other backward class (OBC).

The descriptive results discussed in table1 and table 2 show prevalence of disparity across the regions and social groups in terms of both access and use of computer. In table 3, we have discussed what the factors that affect the use of computer are.

<b>Table 3: Factors Influencing the Use of Computer</b>				
Independent Variable		Dependent Variable: Use of Computer: Yes =1 , No=0		
		Coefficient	Odd Ratio	P Value
Constant		-9.093	.000	0.000
lnMPCE***		1.422	4.145	0.000
Access to Computer***		-3.545	.029	0.000
Education	Primary***	-1.610	.200	0.000
	Secondary***	-1.214	.297	0.000
	Higher***	-.908	.403	0.000
Sector	Rural***	-.135	.874	0.000
Caste	OBC	-.011	.989	0.718
	SC ***	-.110	.896	0.002
	ST	-.022	.979	.402
Distance	Less than 5	.064	1.066	0.146
	More than 5	.021	1.022	0.651
Age		.025	1.026	0.000
HHS Size		.215	1.240	0.000
Log Likelihood		54143.641		
LR $\chi^2_{(13)}$		35880.239		
Pseudo R <sup>2</sup>		0.564		
Total Observation		65926		

It is evident that income of the households' income is the decisive factor. If the income of the households is higher, then the chance of using computer will be 3.14 times (which is 314%) than the households whose income is lower. The study also found that use of computer across SC households is less in comparison to



other category. If the households belong to SC, then the chance of using computer is 11% less than other category. Similarly, households belonging to rural area, chances of using computer are less than the urban households.

## **5. Conclusion**

This paper addresses two specific objectives: first use of computer across Indian states and second the paper tries to find out the factors that are associated with computer use. The first objective has been addressed by using descriptive statistics and to find out different factors, we have used logistic regression.

The study observed that income, access to computer, education and location are some of the important factors that affect the use of computer.

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