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Digital Divide: Have's and Have Not's

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Abstract: ***In the era of internet age each individual has an ample opportunity to access the information. But, the researchers had found inequalities in accessing the internet in terms of access of the devices, skills and tangible outcomes. This research had been carried out to elaborate the concept of the digital divide along with its different levels. It discusses on social and economic development opportunities because the digital divide is evolving from those have access, to use, to outcomes. Some people can use computers, mobile devices, the Internet, and other information and communication technologies (ICTs) and get benefitted from it. The present research will be giving the holistic view of digital divide which will help the researchers to understand the digital divide and encourage them to study on digital divide with respect to the different levels in developed and developing countries.***

Keywords: Digital Divide, Digital Inequalities, ICTs and Internet

I. INTRODUCTION

Information and communication technologies (ICTs) play a vital role as a influencing factors for economic growth and social development [1]. ICTs also help in transforming various aspects of human lives in their workplace and in the homes of people around the world [2], [3]. It has transformed the process of people work, socialise, discover and disseminate information among themselves. The rapid growth of ICT, its access and use are still not uniformly distributed around the globe [4].

The uneven spread and distribution of ICTs makes it impossible for people to gain information and knowledge within or between communities, creating a digital divide that can have an unbalanced impact on economic development and social experience [1].

In the late 20th century a variety of digital divide was significant and identified by government and academic as illustrated in series of reports by National Telecommunications and Information Administration, NTIA, 1995, 1998, 1999, and 2000 as computing had become more widespread. Digital divide refers to difference in not only in access, but also use to information system and technologies by the people, might be the social or the political units in different cities, state and/or nations.

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II. BACKGROUND OF THE STUDY

After the publication of the series of "Falling Through the Net" reports by National Telecommunications and Information Administration, NTIA, in 1995, 1998, 1999, 2000 [5], the digital divide became an important topic for researchers and gained attention across the world. In first-level digital divide research large scale surveys was used which showed a large differences in Internet access between different population in different segments [6].

In the late 1990s and early 2000s, as developed country access to the internet increased which leads in decrease in access gap with respect to race and gender had been mostly closed [7].

III. OBJECTIVE OF THE STUDY

To explore and understand the digital divide and its different levels.

To undertake the empirical analysis based on the findings of the study.

IV. METHODOLOGY

The present study is based on relevant information gathered through of e-survey of the literature and from various libraries. The papers were categorized as per different levels of digital divide and category wise papers were reviewed, analyzed and compiled briefly to generate further researchable issues in the emerging field of digital divide for improving higher education in the country.

V. RESULT AND DISCUSSION

The term digital divide was originated in the middle of the 1990s by an unknown American source and was first used in the official publication by the US Department of Commerce's NTIA in 1999. The origin of digital divide has become a popular in an of interdisciplinary area [1]. The digital divide was considered one of the social phenomena, but it still remains indistinct due to many underpinning factors due to its impact on social and economic development [8], [9]. The digital divide is still recognized as an important research topic [1].

Some researchers define "digital divide" as a gap in access to computer device while others defines it as a divide in access or no access to ICT device or the Internet [10]. In this study, the term "digital divide" is defined as the disparity in ICT equipment and Internet access. It may exist at different social-economic levels between individuals, households, businesses, countries and geographic areas [11], [12].

This above definition was adopted is because the researchers believe that digital divide is gap and divide that exists in both the computer devices and the Internet.

The factors affecting the digital divide are divided into three level (approaches), including the access of technology, multidimensional digital divide, and multi-perspective digital divide [13]. The above influential factor is shown in "Fig. 1"

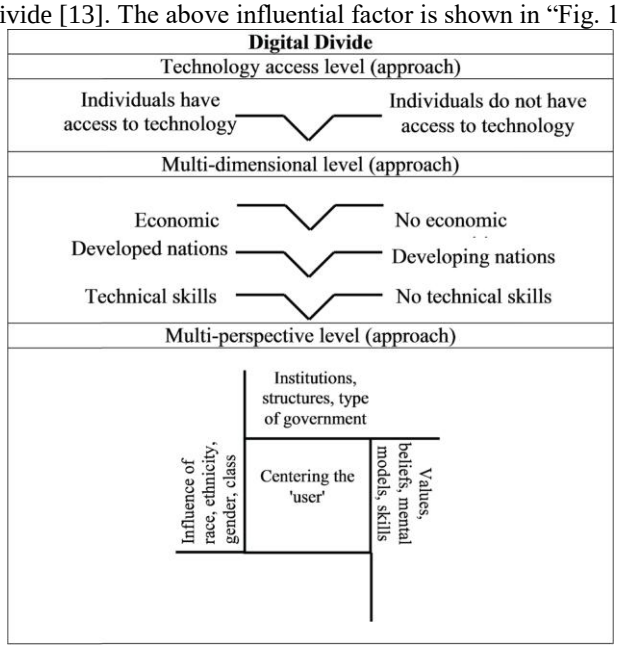

Fig. 1. **Levels of digital divide as in [13]**

The digital divide is referred to "the gap between those who do and those who do not have access to new forms of information technology" [6].

The digital divide is broadly classified into three levels

i) first-level digital divide (Material access)
ii) second-level digital divide (Skills) and
iii) third-level digital divide (Outcomes)

i) First-Level Digital Divide

Traditionally, digital divide research of the first-level digital divide is on studying the inequalities in technology adoption along socioeconomic ground which has been criticized [14]. Napoli and Ober (2014) developed a first-level digital divide theory-based strategy that affects mobile Internet connectivity issues for the mobile Internet if compared to traditional / non-mobile Internet connections with mobile Internet access as the second category of Internet access. It also has physical limitations, such as features like reduce screen size, keyboard availability, and the speed of the Internet, memory, and storage capacity [15].

The second disadvantage of mobile internet access is the limited availability of content where existing websites are not mobile and navigation pages are not mobile-friendly. When a site becomes available on a mobile-friendly site, some information is often posted, but there is no user interface to interact with less information [15]. Therefore, research into the digital divide should systematically access the availability of systems that can be compared with the mobile and non-mobile Internet access and use.

The third disadvantage of mobile internet is to work on open and flexible platforms. The users generally access the Internet through applications that are more manageable and less Internet-based application for mobile phones [15].

ii) Second-Level Digital Divide

Hargittai (2002) coined the term second-level digital divide to differentiate inequalities between internet access from skills and uses (i.e first-level digital divide from second-level digital divide) [16]. This digital divide research has been focus on the necessary skills required for using ICTs. Van Dijk (2006) had studied which show how the digital divide is made by four types of access: motivational, physical, skills, and usage. The van Dijk's model was improved by Hanafizadeh et al., (2014) and which is called "impact of usage access" and changes the route of recursion and achievement to the "next innovation" (the added stage is shown in red in "Fig.2"). This stage has been considered in many studies as a factor of broadening or narrowing the digital divide [17].

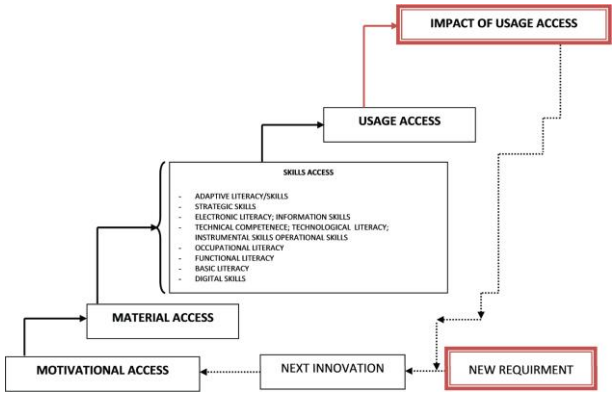

Fig. 2. **Fig. 2. Improved Model of types of usage and impact of digital technologies (Hanafizadeh et al., 2014)**

In the improved model, users need different types of skills to get the most out of ICTs. The various types of skills are basic literacy, functional literacy, professional literacy, technical competence or technical literacy or operational skills, electronic literacy (computer literacy, information literacy, multimedia literacy and computer-mediated communication literacy) or information skills, formal information skills and adequate information skills, strategic skills and adaptive literacy / skills [6], [17], [18] , [19], [20], [21], [22].

In "Fig. 2", leverage is applying (new) technology to a business, organization or society to benefit from its achievements. As a result of our ultimate access, the final goal of the process is to shape special applications through technology grants. At this stage, the use of new technologies affects and especially brings financial and economic returns, thereby encouraging new requirements for emerging technology innovation [17].

People's lives can change with the increase in Internet use and the increase in people's capital in online activities. The background characteristics such as age, gender, education, and skills that determine the digital divide are highlighted, which may be a potential source of digital inequality in the population [13].

The most important predictor of ICT use is increase in finance activities. In order to encourage the spread of ICTs across different population areas, training and knowledge about the Internet should be part of the initiative which enhance the user skills [23].

In the second-level digital divide research has focused on individuals' online activities as per the requirement i.e. for recreational or for work. At the intersection of leisure and business, interdisciplinary research interest is increasing and new perspectives are put forward.

iii) Third-Level Digital Divide

The third-level digital divide is an extended concept of first-level and second-level digital divide. The third-level of the digital divide represents the difference in the benefits of using the Internet, which is almost identical in access and use. Thus, "Third-level divide, relate to the gaps in individuals' capacity to translate their internet access and use into favorable outcomes" [24].

The study of the third-level digital divide aims to examine the practical offline consequences or outcomes of the use of the Internet in economic, social, political and cultural aspects [24]. These outcomes are measured through surveys, where individuals have obtained benefit from using Internet. The individual has found a relevant information online which helped them to improve their health [25], or they are more connected with their family and friends by the use of digital technology [24]. The results are suggested in a more predictable way, as well as actual use and skill of technology, as well as Internet outcomes when compared with demographic or socioeconomic characteristics [25], [26].

The age of the individual is the most pronounced effect as a demographic characteristics and had a positive impact on both benefits and harms [25]. The age of an individual has no effect on benefit, but has a positive effect on satisfaction, depending on the type of outcome [26]. Blank and Lutz (2018) made an important point of the third-level digital divide is that research should determine the benefits as well as the harm of using the Internet. However, the holistic approaches are more difficult on the harms as it differs from the one on benefits.

The research on risks and harms of Internet is compelling among children and in media access with respect to the privacy. The use and gratifications theory, media appropriation and technology acceptance encourage research on benefit [25]. The third-level digital divide research are mainly focused on demographic characteristics, technology attitudes, skills, and differentiated internet and outcomes [27].

Internet requires substantial prerequisites for using technical infrastructure and human capital which creates fear of a growing "technological apartheid" within the developing countries [28].

VI. CONCLUSION

The digital divide refers to gap with regard to access to the ICTs and the Internet and it affecting individuals and nations as ICTs become a critical tool for social economic development. As digital inequality develops from the first-level digital divide to the second- and third-level digital divide, research focus shifts from access, to skills and use, to outcomes of ICTs.

Finally, the digital divide does not only consider the aspects of access, skills, and use but, also consider the multiple outcomes from using ICTs. In the future research this study can be extended by adding other influencing indicators to the first-level, second-level, and third-level of digital divide.

Currently, digital divide is one of the threshold area of digital era due to the Digital India Initiatives. There is an urgent need of the new conceptual research approach to address emerging challenges involving stakeholders, faculty, administration, trainers, and students.

However, existence of an appropriate ICTs infrastructure and the skills to utilize the ICTs infrastructure and to get the maximum benefit from it is in universities is prerequisite to provide support for continuous update of the professional efficiency of teachers and students to cope with the challenges for development in ICT and minimizing the gaps of digital divide within the Higher Education System in the country.

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Tarun Shyam was born in Bhubaneswar, Odisha, India in 1983. Currently he is working as a Deputy Manager Systems at Kalinga Institute of Industrial Technology (KIIT) University. He also perusing his Ph.D. in Management at School of Management at KIIT. He completed his Master in Business Management in Systems from KIIT University and Bachelor in Engineering in Computer Science and Engineering from College of Engineering, Bhubaneswar Utkal University. His research interest includes digital divide, digital transformation, IT technology management and IT Infrastructure Management.

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