Information Communication Technologies in Thailand: The influence of social structure and the autonomy of use

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Abstract—: There has never been digital equality as we face social inequality. This paper aims to examine the uses of information communication technologies (ICTs) and the social structure of the digital divide in Thailand to compare the findings with those reported in more developed countries. Multiple correspondence analysis was conducted to form the scales of internet use and autonomy of use. Linear regressions were used to test the scales' effects on the social structure of ICT use in Thailand.

The findings indicate that Internet use can be categorized into the intensity of internet use and commercial and leisure use. The intensity of internet use is positively related to the autonomy of use and social position indicators. However, social positions are mainly associated with the type of use. This study also emphasizes the influence of the autonomy of use and its social structure on internet use and access. Our research contributes further insights into the social production of the digital gap, particularly in developing countries.

Keywords : *Internet use, Social position, Digital divide, Digital Inequality, Social inequality*

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Introduction

The presence of information, communication, and technology (ICT) can be met in different forms, and it has become a prerequisite for human progress. The digital economy has altered the present scenario's economic processes, systems, industries, consumer behavior, business interactions, and business models. The digital economy is also known as the "new economy," "internet economy," or "information economy," representing e-commerce, e-governance, e-payment systems, e-banking, e-learning, mobile banking, and payment wallets.

As the internet has become a part of everyday life, many pieces of research have studied its effects on society and how the internet is adopted and used (Dimaggio et al. 2004; Selwyn 2004; van Dijk 2005; 2020). Three main lines of research have been developed into the use of the internet. The studies have started with indicators of having or not having an internet connection as the first-level digital divide (Attewell 2001). With Internet connection reaching high levels, the studies move to internet skill and usage as the second-level digital divide (Hargittai 2002). More recently, the study focused on the outcomes of Internet use or tangible benefits as the third-level digital divide (van Deursen and Helsper 2018).

Besides the internet connection, differences in social position have been considered. The studies have provided evidence of differences in adopting digital technologies among individuals in underprivileged and those in privileged social positions (Zillien and Hargittai 2009; van Deursen and van Dijk 2014). However, disparities in ICT diffusion are also found among Asian countries. The internet is still unequal among all populations in developed and less developed countries. In some places, a different level of diffusion has prompted interest in understanding second-level digital divides (Wong 2002; Nipo, Bujang, and King 2014).

There have been many individual country analyses of internet use. The studies explored multiple dimensions such as

technological access, the autonomy of use, social support, skills, and types of uses (Gonzales 2016; van Deursen and van Dijk 2019; Hassani 2006).– Some international studies comparing, synthesizing, and interpreting the worldwide digital divide have shown the different gaps and inequality in internet use and access within countries (Chen and Wellman 2004; Chinn and Fairlie 2007). Therefore, studying internet use and access between developed and developing countries is already occurring..

This article concretely examines the social structure of the second digital divide in developing countries, using a sample of the Thai population. This article aims 1) to analyze the uses of the internet. How are these similar or different, especially comparing the findings with those reported in more developed countries? 2) to consider the autonomy of use and the differences in equipment along with socio-demographic variables.

Theoretical background

Social inequality

After the internet spread across homes, researchers were concerned with examining social differences in the digital context, the so-called "digital divide." The division between the individuals connected and those not connected to the internet is a fact that would let the former enjoy the advantages of the internet and reinforce social inequalities (Hargittai 2010). According to Ono and Zavodny (2007), social and economic inequalities would be transformed into unequal access to ICT, and the latter may favor individuals in privileged social positions. This point suggests that the individual who enjoys a better endowment of resources; a better social position will have more opportunities for social advancement.

The studies on the first digital divide have focused their research interest on social differences in access to ICT (Riggins and Dewan 2005). Chinn and Fairlie (2004) found that young males living in affluent regions, with better education, were more likely

to access the internet. Although the discussion around the digital divide was based on access to the internet, when the first digital divide started to close, researchers have shown that there remain differences in internet use that are correlated to social position (Dimaggio et al. 2004; van Deursen and van Dijk 2019; 2014; van Dijk 2020; Tewathia, Kamath, and Ilavarasan 2020). Hassani (2006) found that education and income are the strongest predictors of Internet use. Those with higher education levels do more online banking, e-commerce, and search for health and product information than individuals in families with low income. People with high education use the internet for different purposes—health and transaction, for instance—while people with a lower educated use the internet for playing games or gambling online (Deursen and Dijk, 2014).

Internet use

The interest in explaining social differences in internet use has moved researchers to focus on the causality chain that ends in using the internet. A causality chain may start with differences in equipment, the autonomy of use, social support, skills, and the internet's purposes. Many factors have been linked to access, skills, and internet use inequalities, with demographic characteristics (Dutton and Reisdorf 2019; Reisdorf and Groselj 2017; van Dijk 2020; Hargittai, Piper, and Morris 2019). Hargittai and Hinnant (2008) have proposed the concept of "autonomy of use," meaning freedom to use technology whenever and wherever the users want. They have suggested that the most autonomous users can be considered those individuals with home access to the internet and a fast connection.

To measure, interpret, and compare internet use, a classification of internet uses was needed, which makes possible the reduction of many indicators into a few interpretable ones. There are several ways of reducing the observed indicators. Some are based on a theory, while others use a descriptive and inductive approach to classify the indicators of internet use. On the other hand, most data available on the uses of the internet is not based on theories. However, Researchers are just interested in collecting a battery

of indicators on the uses of the internet. In this case, researchers need to group Internet uses with the help of interdependence models (Livingstone and Helsper 2007; Brandtzæg, Heim, and Karahasanović 2011). Other researchers looked for a relationship between social status and locations that access the Internet (Hassani 2006; Hargittai and Hinnant 2008; van Deursen and van Dijk 2019; Gonzales 2016). Their findings indicate that upper-class individuals have better equipment at home. The relationship between social status and internet use has also been studied by Zillien and Hargittai (2009). These researchers found that social position plays a determining role in different Internet activities. Deursen and Dijk (2014) found that individuals with privileged social positions in the Netherlands are reaping the benefits of their time spent online more than users from lower underprivileged social positions. This finding was similar to Serrano-Cinca, Muñoz-Soro, and Brusca (2018) that the higher levels of education have a higher level of Internet use. The young user is the largest group. Men are more likely to use the internet than women. However, when the researchers controlled the employment and education variables, women use the internet more than men. . The urban environment scores are higher than the rural areas except that the urban area uses the internet more than the rural area. Accordingly, this article proposes the following hypotheses:

Hypothesis 1: For people, the more autonomy of use they have, the more they cooperate with internet use

Hypothesis 2: For people living in privileged positions, the more they cooperate with the internet use

Methodology and Data

Data

The dataset was derived from a study conducted by the National statistic office Thailand in 2017 on information and communication technology. The respondents included individuals aged six years and over from different parts of Thailand. As we

received the raw data, missing values were imputed as necessary from the mean value or the most frequent After we had cleaned and selected appropriate data, Our data consisted of 217,217 individuals. Most were female (52.6 percent). The mean age was 40 years (SD = 22.14). The elementary and lower level of education background represents (59.9 percent). The central region represents (30 percent).

Table 1: The summary of Socio-demographic

Variable	Frequency	Percentage
Gender		
Male	108,300	47.4
Female	108,917	52.6
Education		
University degree	20,789	10.7
Post-secondary	6,557	3.4
Upper secondary	24,096	12.4
Lower Secondary	26,323	13.6
Elementary and lower	116,282	59.9
Region		
Bangkok	11,412	5.3
Central	65,193	30.0
North	45,061	20.7
Northeast	57,477	26.5
South	38,074	17.5

Variable	Mean	SD
Age	40.93	22.14

Scales and measurements

Following the proposed research, the indicators contained the measures of internet use, computer access locations, internet access locations, mobile use, and socio-demographics were selected to analyze. We performed it by using multiple correspondence analyses (MCA)(Greenacre 1993). MCA is a data analysis technique for categorical variables that the scores of individuals form an optimal scale when those scores are far apart, thereby maximizing differences between individuals. Linear regression was used to analyze the relationship between internet use with a set of material access scales (computer access locations, internet access locations, mobile use) and social position indicators. Linear regression looks for the association between two or more variables, from which outcome variables can be predicted.

Findings

1) To analyze the uses of the internet.

The in Figure 1 showed that the internet is used for a variety of reasons, both for business, such as using the internet for offering products or services (Offering), internet banking (Banking), ordering products or services (Ordering), and leisure, such as using the internet for entertainment propose (Entertainment), uploaded or shared online photo (Photo), using the internet for social networking purpose (SocialNetwork).

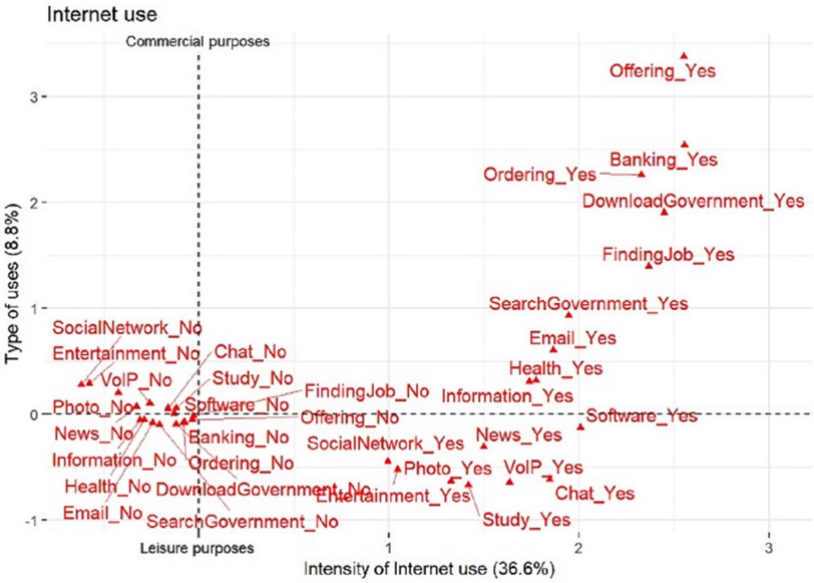

Figure 1: Scale of Internet use

2) To consider the autonomy of use and the differences in equipment along with socio-demographic variables
To compute optimal scales, we used the dimension of MCA, with results as summarized in Table 2, while social categories are those listed in Table 1

Table 2: Multiple correspondence analysis (MCA) results

Scale	Definition	% variance
Computer access locations	The individual accesses a computer in many locations	28.4%
Computer social locations	The individual accesses a computer at Internet Café, Public Service	17%

Internet access locations	The individual connects to the internet in many locations	32.8%
Internet social locations	The individual connects to the internet at Internet Café, Public Service	17.2%
Mobile use	Mobile device diversity	29.1%
Types of mobile and activities	The individual use mobile on better equipment (Smartphone)	14.8%

We performed the linear regression along with the socio-demographic (The details in Table 1) and the differences in equipment (The scale in Table 2). Findings are reported in Table 3. Regarding the type of internet use, several significant differences can be observed. As expected, when individuals have computer access in many locations, their internet use is more frequent (β=0.147). Moreover, It suggests that internet use is largest use among people using a computer in non-social areas (Home or Workplace) as the coefficient is negative (β=-0.135). The previous interpretation is backed by the fact that the influence of accessing the internet in many locations has the same sign is four times as strong (β=0.408). However, accessing the internet in social places negatively correlates (β=-0.057). It means that access to the internet in social locations may have less stable opportunities to access the internet. The influence of mobile phones (β=0.221) and smart phone (β=0.184) on the internet is positive. Still, they have half the importance that accessing the internet in many locations has on the internet uses—the convenience of big screens in comparison with phones outweigh the accessibility of phones. Smartphones, instead, add to mobile phones a higher consumption of the internet. So, one expects that people who have access to the smartphone with a touch screen and high quality use the internet more. Therefore, this finding supports hypothesis 1.

On the other hand, the social indicator of education is related to the intensity (The most frequently of use and the most time consumed), as expected. As people get more educated, their use of the internet increases (lower secondary (β=0.098); upper secondary (β=0.129); post-secondary (β=0.204); university degree (β=0.296)). This relationship is particularly strong and significant for individuals with a university degree. The result suggests that highly educated individuals have more chances of developing the skills and competencies needed to be confident using the internet. Men are the gender that seems to use the internet more for any purpose (β=0.034). These findings suggest that as the internet privatized interactions and transactions for individuals who have been educated, Men may have chosen more online activities. As expected, age is negatively related to the intensity of internet use. The negative correlation to internet use increases as individuals age (β=-0.001). The use of the internet is reduced as individuals age, suggesting that the older a person is, the less its chances of the use of the internet. The context of where individuals live influences the intensity of internet usage. (Central (β=-0.040); North (β=-0.046); North East (β=-0.055); South (β=-0.054) residing in Bangkok, the capital city, increases the chances of using the internet, particularly themost frequently of use and most time consumed. The coefficient estimated for the other areas has a negative sign for the intensity of internet use. Therefore, this finding supports hypothesis 2.

Table 3: Linear Regression analysis to predict the internet use

Coefficients	**Dependent variable: Intensity of internet use**
Computer many locations	0.147***
Computer Social locations	-0.135***
Internet many locations	0.408***

Internet Social locations	-0.057***
Mobile phone use	0.221***
Smartphones	0.184***
Age	-0.001***
Gender (ref = Female)	
Male	0.034***
Education (ref = Elementary and lower)	
Lower Secondary	0.098***
Upper secondary	0.129***
Post-secondary	0.204***
University degree	0.296***
Region (ref = Bangkok)	
Central	-0.040***
North	-0.046***
North East	-0.055***
South	-0.054***
Constant	0.010**
Adjusted R2	0.705

Note: *p<0.1; **p<0.05; ***p<0.01

Discussion and recommendation

Good material conditions are possible when individuals enjoy a good income stream. Material living conditions have been represented by how people access computers, the internet, and mobile phones. These findings support the theories that good material living conditions increase the chances of using the internet and its use intensity. However, the way that material conditions are used depends on other social properties of individuals, such as education, gender, age, and geographical area. This is reflected in the variety of uses in Thailand, that is similar to internet use in developed countries (van Deursen and van

Dijk 2019; Gonzales 2016; Dimaggio et al. 2004).

In line with DiMaggio et al. (2004), the digital divide has gone from unequal access to differentiated use. The results suggested that the locations where individuals use the computer and the internet shape their online pursuits. That is, individuals may access the internet with many alternatives. Some are situated in institutional settings—employees might connect to the internet at work, students at their school, and others might join in public places. As the number of places through which individuals access the internet grows, the intensity of using the internet grows as well.

Consequently, Individuals who can access the internet are most likely to take advantage of Internet technology. The types of use will depend on individuals' chances of accessing computers and the internet, as reported by (Hassani 2006; Hargittai and Hinnant 2008; Mascheroni and Ólafsson 2016). Additionally, we show the influence of mobile phone use on how the internet is used. The future growth in mobile phone internet connections (5G technology) might provide faster and more convenient ways to access the internet from any place, especially for individuals with smartphones (Mascheroni and Ólafsson 2016; van Dijk 2020, p111).

We found that internet use is influenced by social position. That is, online activities vary depending on the social status of individuals, as suggested by (van Dijk 2020; van Deursen and van Dijk 2019; Hargittai, Piper, and Morris 2019; van Deursen and van Dijk 2014; Dutton and Reisdorf 2019). The education, age, gender, and socio-economic context (proxied by the region living in) were relevant in identifying the individuals' internet uses, as shown in previous studies (Hargittai and Hinnant 2008; van Deursen and van Dijk 2014). Findings suggest that education is the most relevant factor associated with using the internet: better-educated individuals use the internet more for many different purposes (Zillien and Hargittai 2009). better-educated individuals might have more chances of having developed the skills and competencies to use the internet. As a result, better-educated individuals might have more confidence in using the internet, as

other pieces of research have shown (Hargittai 2010; Hargittai, Piper, and Morris 2019).

Age is a proxy for many conceptual things: cognitive development, generational differences, and even chances of having developed technological skills. We cannot differentiate between them as the gap in internet use between younger and older is not as wide as twenty years ago. Age seems to influence how the internet is used positively. Even though older people have shown a less use of the internet, they use it more frequently As the behavior has changed, the diffusion of digital media tends to be universal as the elderly generations are adopting it (van Dijk 2020).

The evidence suggests that men may use the internet more than women. Finally, as the socio-economic context is concerned, our findings suggest that living in the capital city increases the chances of using the internet, its general intensity, and the intensity of using the internet for entertainment purposes. The capital city is the center of commercial and technological activities, and individuals may have higher chances of enjoying a higher level of income and education in comparison to other cities. Their inhabitants may even be younger, having more chances of enjoying a higher level of computer skills.

Conclusions

We contribute to research on the digital divide by reporting evidence that the autonomy of using digital technologies is mainly related to the intensity of internet use. Although the autonomy of use is associated with internet use, social position is mainly related to internet use. Our findings have accepted both hypotheses that the more people living in privileged positions, the more they cooperate with internet use and the autonomy of use. We suggest that as countries get more developed in social-economic terms, the uses of the internet become more varied. We conclude that as individuals gain more autonomy in using digital technologies, their uses will become more diversified and differentiated, increasing the gap in the second digital divide.

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