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Digital divides in Sub-Saharan Africa: Gender issues and evidence from Cameroon

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Abstract

This study aims at answering two questions: Do women have the same determinants of Internet adoption as men? Do they adopt it for the same uses? The answers are mainly positive. However, in the adoption decision, women are different from men mainly due to the negative effects of age and unemployment; these effects being positive for men. Moreover, women have a relatively lesser intensity of use. Age remains a hindering factor while high computer skills and high frequency of computer use improves the intensity of Internet use. This recommends homogeneous policies while especially encouraging young women to use ICT and not to drop out as they grow in age.

Keywords: Gender; Digital divide; Internet adoption; Internet uses

1. Introduction

Information and Communication Technologies (ICT) are important drivers of economic and social development. They offer real opportunities for a better integration in the global economy. However, there is also a high risk for these ICTs to increase the gap between countries. Digital inequalities might add to other inequalities already affecting developing countries (Castells, 1998; Sachs, 2000). Inequalities in the access and use of ICTs are generally known as digital divide, defined in 2001 by the *Digital Opportunity Task Force* of the United States as inequalities in the access and contribution to the information, knowledge and network society, as well as inequalities in benefiting from ICTs.

Digital divide was first measured in a binary manner: Internet access or

not (first level divide). The notion later on advanced to include many other dimensions of digital divide such as quality of devices, degree of autonomy in use, level of contribution in the production and distribution of information on the Internet (Hargittai, 2003).Though it is undeniable that this advancement complements the initial approach, it should be noted that it has been possible only in the context of developed countries. Indeed, because of the scarcity of statistics on developing countries, the issue of the digital divide is still widely studied there in its original angles of access or not, and use or not of the Internet.

The objective of this work is to study these two dimensions of digital divide in Cameroon, a developing country in Sub-Saharan Africa. Specifically, we aim to study the difference between men and women as regards this double divide. As far as this is concerned, the forum on women of the second World knowledge conference, in Kuala Lumpur in 2000, underscored that digital divide does not boil down to the issue of polarization between *information-rich* and *information-poor* but includes every divide between men and women everywhere (Dighe and Reddi, 2006).

Though there continues to be a little but significant gender difference for most users of Internet (Helsper, 2010), in the developed countries, this gender digital divide is highly reduced (Dutton & Helsper, 2007; Fallows, 2005). As noted by Huyer & Mitter (2005), in the USA and Canada, the proportion of women who use the Internet is greater than that of men and stands at 51%, meanwhile in Singapore, Chili, Hong Kong, Island and Thailand, the percentage of female Internet users stands at 49%. Although gender digital divide is not their concern, male/female digital inequalities are more present in developing countries (IUT, 2011).

As observed in all developing countries in Africa, women in Cameroon are the real actors of social cohesion. As daily duty, they take care of children and old people as well as support their husbands. Considering this, improving the access of women to information and knowledge useful for development can rapidly be profitable to their families and the entire community as a whole. Accordingly, a study of the World Bank shows that societies that practice gender discrimination bear a relatively high cost in their development and poverty reduction process (World Bank, 2001).

The proportion of people that have access to the Internet is estimated at 39% in Cameroon and the Internet penetration rate at 13% (Gillwald, 2009), but there is very few data on the distribution of Internet users according to gender in this

country. Nevertheless, the SCAN ICT survey carried out by the *Initiative for the Information Society in Africa* reveals that among Cameroonians who are aware of the existence of Internet, 45% of men have an email account against 42.5% of women (Minpostel, 2006). These figures tend to suggest that Cameroon is part of the large group of developing countries where there is a supremacy of men in the use of ICTs. So, considering the major role of women as development actors, it is important to rigorously identify the determinants of the adoption and uses of the Internet amongst women and men with the aim of enlightening more equitable ICT development policies.

However, if the objective of equity may be easily defined as concerns the adoption of the Internet, it is rather more difficult to be captured as concerns its uses. In fact, in both developing and developed countries, many studies show that women use Internet for different purposes than men (Ono & Zavodny, 2003; Wasserman & Richmond-Abbott, 2005). Wasserman and Richmond-Abbott (2005) observed that in Great Britain, the variety of websites visited by women is greater than that of men; women slightly use e-mailing more than men meanwhile men use chatting services more. Therefore, it is equally important to analyze the factors that explain the uses of the Internet by men and women in Cameroon. If there is no difference in these determinants, it may imply a possible convergence in the rate of use of the Internet if a homogeneous inequality reduction policy is adopted. In the opposite case, men and women would have specific trajectories of adoption and uses of the Internet that can intrinsically lead to different penetration rates and diffusion speeds. Then, it would be necessary to use differentiated policies according to gender.

In short, this study aims to answer two main questions in view of enlightening gender balanced ICT4D policies in Cameroon and in developing countries in general: Do women have the same determinants of Internet adoption as men? Do they adopt it for the same uses as men? To this aim, we consider that an indicator of the willingness to adopt a technology is its frequency of use. So, one adopts the Internet when he or she frequently uses it. We also consider that the Internet services (or single particular uses) such as email, chat, online games, search for information, etc. can be grouped into a few categories of global uses depending on the purpose of the services

The next section of this paper gives a brief background and literature review. Section 3 describes the data. Section 4 deals with the modeling of adoption and uses decisions of the Internet with respect to gender. Section 5 estimates the models built and discusses their results. Section 6 concludes.

2. Background and literature review

The gender studies can be traced from the 1970s. But, as Van Zoonen (1994) pointed it out, the studies on gender and Internet become very present in the 1990s. Noting that the massive diffusion of digital technologies only date as from the end of the 20th century, Jouet (2003) suggested a synthetic genealogical repartition of research movements on the place of women and technology in the society, distinguishing between the universalist, the differentialist and the constructivist thesis.

For the universalist movement, men and women are equal. The gender differences are results of a socialization process which attributes prescription, behaviors and value standards to each sex. Consequently, the social responsibilities assigned to women, their cultural restrictions, their economic capacities and the content of Internet pages for instance are factors that keep women in the margin of computer sciences. Yet, accordingly to the universalists women should get access to any technology equally as men because they have the same rationality and adaptation capacities (Gurumurthy, 2006).

On the contrary, the differentialist movement (also named essentialist movement) assumes that, as adaptation capacity is concern, there is a fundamental difference between men and women that should be preserved. Auray (2002) observed for instance that in France, places of socialization of youth in computer sciences in school and elsewhere are invested by boys and deserted by girls. Postulating that technology is produced by men, this movement defends that technologies belong to the masculine universe marked by competition and domination values unlike the feminine one which is rather led by emotion, intuition and sentimental feelings (Kramarae, 1988).

Developed in the 1980s as a critic to the two preceding movements, the constructivist movement argues that gender and technology are two progressive products of social relations. Consequently, the main preoccupation should be the mutual construction of both of them.

Because we readily assume that men and women have the same capacities in adopting and using the Internet technology, this study is closed to the universalist thesis.

Regarding this Internet technology specifically, the body of studies focusing on African countries is rather narrow. Yet, the articles by Oyelaran-Oyeyinka

and Lal (2005), Roycroft and Anantho (2003), Birba and Diagne (2012), Pénard et al. (2012), Mukoko (2012) and Tamokwe (2013) can be mentioned. Roycroft and Anantho (2003) found that regarding the expansion of Internet accessibility in Africa, the most significant factors were the level of economic development, the country's Anglophone heritage, the capacity of Internet bandwidth, the density of Internet servers and the intensity of competition among network access providers. Oyelaran-Oyeyinka and Lal (2005) indicated that the rate of Internet use in Sub-Saharan countries increased with the country's per capita income, its rate of computer ownership, the density of landline connections, and the number of Internet hosts. From a survey of 200 individuals working in Kenyan and Nigerian universities, Oyelaran-Oyeyinka and Adeya (2004) drew the conclusion that Web users were younger than non-users without any significant differences existing between male and female use patterns. Using a survey covering 17 African countries, Birba and Diagne (2012) showed that both individual characteristics and geographical factors play a major role in Internet use. Pénard et al. (2012) compared the determinants of both Internet and cell phone adoption, using household survey data from Gabon. They showed that the primary factors stimulating Internet use consist of a high level of education, young age and computer skills whereas cell phone use increases with age and income. Similarly, using survey data from Cameroon, Mukoko (2012) showed that education, age, life style, as well as the perceived costs and benefits play an important role in the adoption and use of the computer and the Internet in Cameroon. Using the same database Tamokwe (2013) showed that Cameroonians mainly use Internet services related to communication and information retrieval and that the main factors promoting access to the Internet are: gender (male), age (youth), education level (at least secondary school), English language (read and spoken), social neighborhood (with a large number of Internet users), and computer competences (ability to at least use a word processing software or a spreadsheet).

This paper comes as a complement to the above mentioned papers. In fact, though some of them use gender as an explanatory factor to the digital divide, none of them proceeds to a differentiated analysis of the men and women adoption and use decisions which may be more relevant to gender based ICT4D policy.

3. Data description

This study uses data from a survey on the usage of ICTs by individuals and households in Cameroon. Carried out in 2008 with the methodological and operational support of the National Institute of Statistics of Cameroon, it surveyed residents of the towns of Douala, Buea and Limbe. Identical to that of the third Cameroon Households Survey supported by the World Bank, the sampling method gives a random and representative sample of the households of these three towns (Tamokwe, 2013; Mbondo, 2013; Mukoko, 2012).

The data collected using questionnaires mainly inform on individuals' and households' characteristics and also on lifestyle (ICTs devices owned), social neighborhood, location and ICTs experience. The following figures show some elements of the socio-demographic characteristics of the sample.

Figure 1: distribution per age range

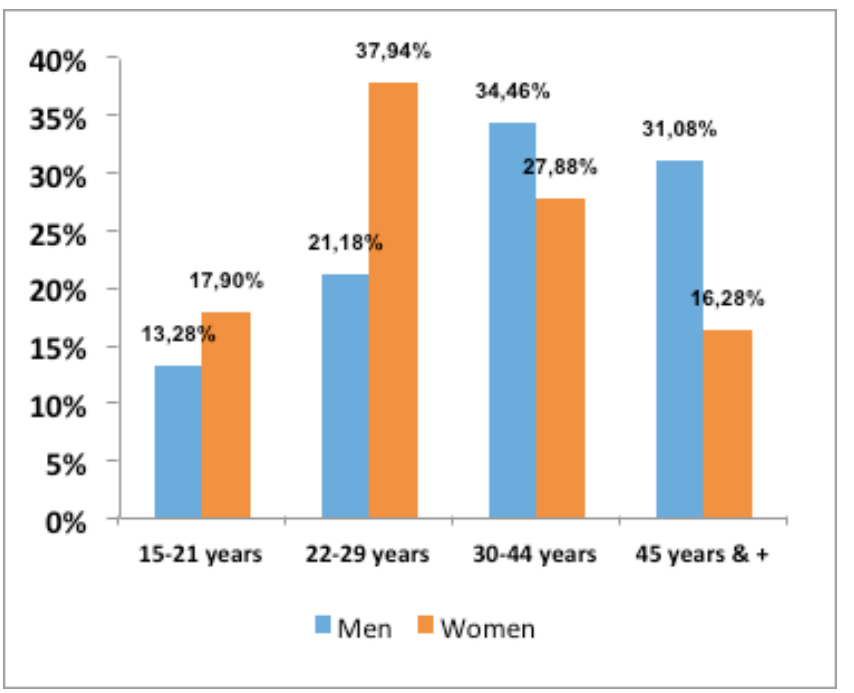
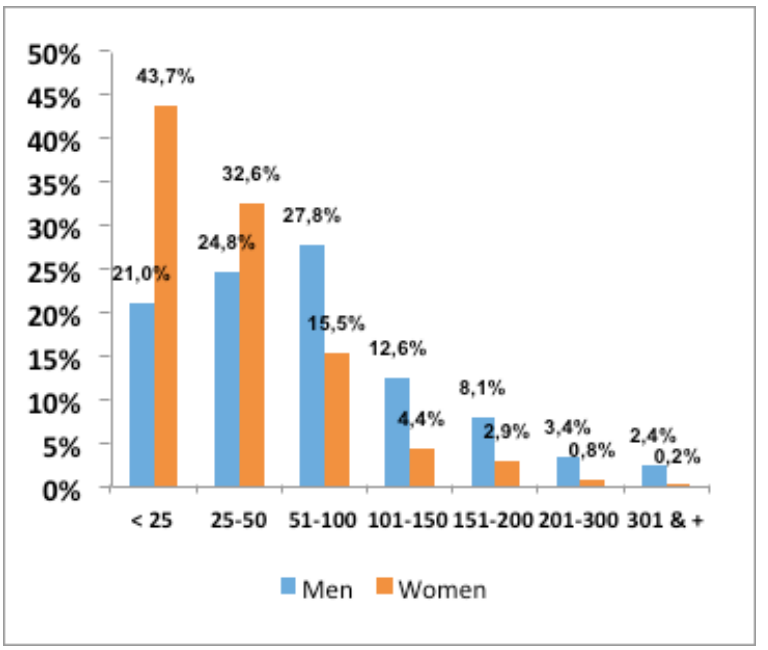
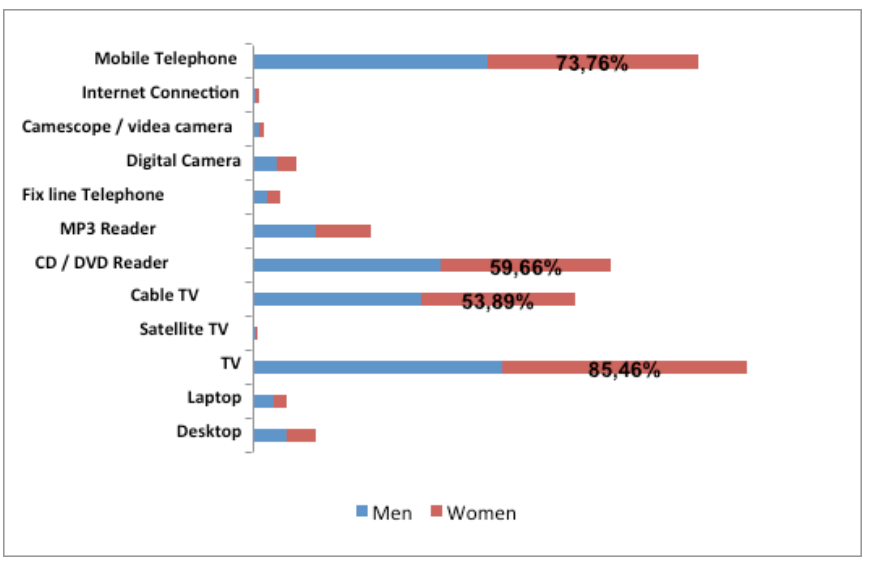


FIGURE 2: DISTRIBUTION PER MONTHLY INCOME RANGE (10^3FCFA)



Although, women are numerous in young age range, they still have lower incomes. Moreover, they are always outclassed by men in the owning of ICT devices (figure 3).

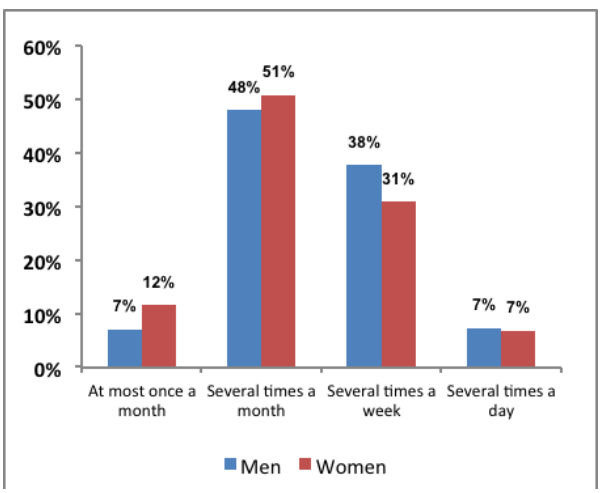
FIGURE 3: DISTRIBUTION PER ICT EQUIPMENT



We notice that mobile phones are highly expanded while the possession of desktop computers is very low (11.90% for men as against 10.03% for women). The figures become lower for the possession of laptop computers (7.13% for men as compared with 4.73% for women). Home Internet connection is almost inexistent.

Despite these figures which are symptomatic of the global digital divide characterizing developing countries, 37.30% of men and 29.67% of women declare having already used the Internet. While, the frequency of use of this technology and of computers implicitly shows that, though they do not have them at home, people manage to use them elsewhere (figures 4 and 5).

FIGURE 4: FREQUENCY OF COMPUTER USE



As concerns computer skills, we observed a gap between men and women to the detriment of the latter; a gap that widens with the complexity of use. As such, 33.6% of men and 27.96% of women know how to use data processing software (MS Word and MS Excel notably); 16.5% of men and 11.09% of women in addition know how to install a software; 11.46% of men interviewed are also capable of programming an application against 7.68% of women.

As regard the usage of the Internet, we observed that the reasons for the use of this technology are not always exactly the same. In fact, while men use it mainly for professional reasons (42.26% against 24.74%), women use it mainly in their personal activities (96.95% against 94.05%) and for training reasons

(20.43% against 17.28%).These figures insinuate that men and women do not always have the same interest in the different services offered by the Internet. Normalized mean scores of these two sub-populations for the different services of the Internet lead to the following classification of the 18 considered[1].

Table 1: classification of usages for men and women

Internet services (Usages)	**Men**		**Women**	
	score	**Rank**	**score**	**Rank**
Electronic mail (e-mail)	48.01	1	40.56	1
Search for international news	32.95	2	19.46	5
Search for information concerning your profession or studies	30.19	3	20.42	4
Search for local and national news	30.06	4	18.79	6
Direct discussion (Instant messaging, MSN, Yahoo, Skype…) with friends/ family out of the country	26.73	5	23.99	2
Search for cultural /leisure/traveling information	24.55	6	18.11	7
Direct discussion (Instant messaging, MSN, Yahoo, Skype…) with friends/ family inside the country	23.46	7	22.45	3
Downloading movies and music	17.24	8	16.38	8
Job search	13.14	9	13.58	9
Search for health information	12.31	10	12.81	10

1 Score normalized over/100 = (score * 100) / (max score). In fact, respondents were asked to indicate the frequency of utilization of each use on a four-point scale: never, less than once a month, several times a month but at most once per week, several times per week. Basic scores: $S_1 = 0$; $S_2 = 1$; $S_3 = 2$; $S_4 = 3$ were respectively assigned to each of these levels. Scores presented here are averages, weighted and normalized to 100, of these elementary scores obtained with the formula: $S = 100 * {}^{1}/_{N} \Sigma^{4}_{j=1} n_j s_j$. Where: N = the total number of respondents by sub-population (N = 520 for men, N = 346 for women); n_j = the number of people who indicated the frequency j for the considered service. On this basis, for a given service, a score of 0/100 would mean that no individual in our sample has ever used it, while a score of 100/100 would mean that all individuals in our sample use it several times per week.

Table 1 continued

Online games	11.54	11	11.18	11
Watching online videos (YouTube, Daily motion, …)	9.94	12	9.73	12
Participation to forums/blogs	9.55	13	7.03	14
Consultation of catalogs of goods and services	8.14	14	8.57	13
Use of online administrative services	5.32	15	2.31	17
Online training	4.74	16	3.47	15
Bank / stock operations	3.33	17	1.83	18
Participation in a social network website (MySpace, Face book, …)	2.95	18	3.47	16

For both men and women, the usage scores of the 18 services above are less than the normalized mean which stands at 50 points. Though their classification is not always identical; for most of these services, the gap with respect to this mean for women is larger than that of men; this is in support of the hypothesis of the existence of a gender digital divide. In fact, men's scores are higher than those of women for 15 uses over 18. The three services for which women have supremacy seem to be less important as they appear in the second half of the table. All these observations sustain the relevance of understanding the determinants of Internet adoption and uses among men and women.

4. Modeling adoption and uses decisions of the internet with respect to gender

The analysis of the relationship between gender and digital divide as concerns the adoption and uses of the Internet is done using probit discrete choice models. The purpose of the modeling is to check over the factors that influence the adoption and uses of the Internet. According to the variables to be explained, we consider two models. The first one, the adoption model, aims at explaining the first level digital divide and the second one, the uses model, the second level digital divide.

4.1. The adoption model

Right away, two specifications are possible for the dependent variable "adoption". The first considers that the adoption decision is revealed by the fact

of having used the Internet recently or not, in the last three months for instance. The dependent variable would therefore be binary and would require the use of a simple probit. However, though intuitive, this approach entails the risk to confuse a mere trial with an effective decision to adopt the Internet. For this reason, we rather opt for a second specification which consists of considering a three-level dependent variable according to the frequency of use of the Internet for diverse purposes.

- The first corresponds to a low level adoption, for individuals who use Internet at most once per month;
- The second corresponds to a medium level adoption, for individuals who use Internet many times per month, but at most once per week on average;
- The third corresponds to a high level adoption, for individuals who use Internet many times per week.

Consequently, we use an ordered probit model, with the dependent variable "adoption" (y_i) taking three values (0, 1 or 2) depending on whether the individual *i* shows a near zero ($y_i = 0$), a hesitant ($y_i = 1$), or a full ($y_i = 2$) adoption of the Internet.

In order to check for a gender digital divide in Cameroon, a first estimation of this model is carried out using the entire data-set with no gender distinction. To do this, the numbers of women and men were weighted using their proportion in the whole population of Cameroon according to the latest census (49.43% men and 50.57% women). Evidence of the existence of this gender digital divide justifies the estimation of this model for the sub-populations of men and women.

4.2. The uses model

The second modeling is that of the uses of the Internet. The Internet offers a multitude of services that can be used for diverse purposes. Table-1 above gives a non-exhaustive list of eighteen possible services of the Internet on which respondents were questioned. This table highlights the similarities and differences in the use of the Internet between men and women:

The least used services are the same for men and women. In fact, though their internal classifications can be different in the table, the services of the second halves of the classifications are the same in both sub-populations.

The most used services, those of the first halves of the classification, can be grouped into three global categories of uses depending on their purpose:

communication, information and entertainment. The category of use named "communication" encompasses electronic mails and the different types of direct discussion. "Information" includes all searches for information while "entertainment" comprises the downloading of music and movies. Looking at the rankings of the constituents of these three global uses, we can notice that women seem to use the Internet mostly for communication meanwhile men use it mainly for information. For the two sub-populations, the use of the Internet as a tool of entertainment is subsidiary. However, the fact that the services of the first halves of the classification are identical for men and women indicates that in Cameroon, the difference between these sub-populations in the use of the Internet lies less in the services used than in their intensity of use.

Consequently, as for the modeling of the adoption decision, instead of considering a binary variable that would take the values 1 or 0 depending on whether the individual uses a service or not, we assume that the second level digital divide could better be seized through the intensity in which the services are used. Consequently, we consider a three-level dependent variable according to the frequency of use of the three global uses identified.

- The first level corresponds to a weak intensity, for individuals who exploit the use at most once per month;
- The second level corresponds to a medium intensity, for individuals who exploit the use, many times per month, but at most once per week on average;
- The third level corresponds to a high intensity, for individuals who exploit the use, many times per week.

Therefore, for each of the three global uses, we use an ordered probit model, with the dependent variable (y_i) taking three values (0, 1 or 2) depending on whether the individual i shows a weak intensity of utilization ($y_i = 0$), a medium intensity of utilization ($y_i = 1$), or a high intensity of utilization ($y_i = 2$). And, depending on the global use considered, y_i will be either communication or information or entertainment.

Now, given that the Internet services have been grouped into three categories of global uses, at least two options are possible for their operationalization in the model. In fact, we can either select one service to represent each category, or construct a synthetic variable for each of them. In that respect, the category named 'entertainment' does not matter as it comprises only one service of the Internet. Yet, both communication and information cover many services. Instead

of choosing any service from each of them according to the first option and with a view to minimizing information loss, we opt for the transformation of these categories into two synthetic uses of the same name. To this aim, considering each category of the global uses (u), a score (S_{ui}) is calculated for each individual i[2].

For communication which includes three basic services, this score takes possible values in a range from 0 to 9, while for information that encompasses 4 basic services, these possible values range from 0 to 12. To match up with the initial ordered discrete variable, each of these two ranges is divided into three strata of equal distances. As such we obtain:

for the dependent variable "communication": $y_i = 0 \ if \ S_{ui} \leq 3, \ y_i = 1 \ if \ 3 < S_{ui} \leq 6$, $y_i = 2 \ if \ 6 < S_{ui} \leq 9$;

for the dependent variable "information": $y_i = 0 \ if \ S_{ui} \leq 4, \ y_i = 1 \ if \ 4 < S_{ui} \leq 8$ $y_i = 2 \ if \ 8 < S_{ui} \leq 12.$

4.3. Independent variables

There are many studies in the literature that consider questions relating to Internet adoption and uses. These studies highlight a certain number of factors explaining the decisions to adopt and use this technology in diverse ways. Most often, those factors are in the form of subsets of variables on: socio-economic characteristics of individuals, their lifestyle, their ICT experience, their geographical location and their social neighborhood. Adding to them a gender perspective, we appropriate all these factors.

4.3.1 Socio-economic variables

Many studies have revealed that prime adopters of the Internet are relatively young males, educated, rather comfortable and technophile (Johnson et *al.* 1999; Le Guel et *al.*, 2005). In line with these works, as socio-economic variables, we will have the age of the individuals, their monthly income, their level of education and their professional situation.

For these variables, we expect similar results to those obtained elsewhere.

2 The process is as follows: for each individual i, we assigned to each service a score of 0 if the intensity of use is low, 1 if the intensity of use is medium and 2 if the intensity of use is high. Then we calculate the average score of the individual on all services in the same category (communication or information) to obtain his score in the concerned synthetic use.

Thus, as in Western Europe (Le Guel et *al.*, 2005; Lethiais and Poussing, 2004) and in The United States (Hargittai and Hinnant, 2008; NTIA, 2004) we should find evidence of a significant difference in the adoption decision to the advantage of the youth, male and female. Contrary to their parents, youth are literally carried along by the information society either by rationality (competitiveness and employment constraints) or by imitation (identification needs), this gap should be bigger in Cameroon where the culture of continuous training is still widely ignored. However, given that this culture is easily shared among highly educated people, we should expect a positive effect of education in the adoption and uses decision. As concerns the income, given the difficulty to obtain reliable values during the survey, this variable is replaced in the estimations by the individual's perception of their daily comfort. We consider three levels of perception of this comfort: low, medium, and high. Logically, we expect that high comfort stimulates adoption and uses. By the same token, employment should positively affect adoption behaviors in both men and women.

On the whole, if some differences may occur in their uses decision according to their interests, we should normally expect to find no major differences between men and women as concerns the direction of the effects of socio-economic variables on the adoption decision.

4.3.2 Lifestyle variables

Life style variables are introduced to capture the possible impact of a technophile way of life. This specific way of life is assumed to be indicated by the possession of ICT equipment such as: computers; television; CD/DVD/MP3 drivers; fixed and mobile phones; digital cameras. It is possible to structure these devices into two sub-groups, distinguishing reference devices from complementary ones, with regard to their technological "continuity" with the Internet. In this view, computers, MP3 drives, fixed phones and cameras would be the complementary devices and the rest the reference devices. Each of these sub-groups becomes an autonomous explanatory variable with values corresponding to the number of different equipment owned by an individual. Mobile phones are considered separately because they are a hybrid to the two sub-groups. Given that there is no use of these devices that are specific to the Cameroonian context, and that none of them can substitute the Internet, we expect to find a positive relationship between them and the decisions to adopt and to use this technology, for both men and women. However, we assume complementary devices have greater chances to be significant.

4.3.3 Location variables

In the literature, the location variable identifies two areas: rural areas and urban areas. The latter have a higher estimated probability for their residents to adopt the Internet (Le Guel et *al.*, 2005). Our database does not allow us to use this distinction because there is a very low representation of rural populations (less than 2%). Consequently, in lieu of this usual distinction, we use a variable "standing of area of residence" that distinguishes low, medium and high standing residential areas. Hence, it takes the form of a score (from 1 to 3) which become higher as we move from low standing to high standing. In the towns of Douala, Limbe and Buea where the survey was carried out, it is customary to do such stratification of the residential areas considering the social status and standard of living of the majority of their dwellers. Thus, high standing residential areas are those, assumed to mostly host senior managers in the public service or in private enterprises. Medium standing residential areas are those assumed to mostly host junior managers meanwhile low standing residential areas, generally either old and highly populated areas or new slums, are those assumed to mostly host the least wealthy residents of the town. However, it is important to point out the fact that in the field, it is not uncommon to find low standing houses in high standing areas and high standing houses in low standing areas. This reality leads us to consider the effect of this variable on the Internet adoption and uses decisions to be theoretically ambiguous.

4.3.4 Social neighborhood variables

These variables are used to capture the influence of social neighborhood on the individual's behavior. It concerns: the number of household members that already use the Internet, the fact of having family abroad (transfer logic), the proportion of friends or acquaintances that use the Internet (social capital logic) and the fact of having travelled abroad. The number of household members that use the Internet is a continuous variable. The proportion of friends or acquaintances that use Internet takes the form of a three level scale (0 to 2) corresponding respectively to: none, few and many. As concerns having family abroad, we distinguish between having family abroad in an African country from having family abroad in a non-African country. The sum of these two binary variables yields the case of individuals that do not have family abroad. As they are defined, all these variables are theoretically susceptible to have a positive effect on the decisions to adopt and use the Internet, no matter the gender of the individuals.

4.3.5 ICT experience variables

These variables are included to capture the impact of the individual's skills in ICTs in general. While it was difficult to theoretically distinguish the impact of the preceding variables on the behavior of men and women relating to the degree of adoption and uses of the Internet, the ICT experience variables should allow this. Sure enough, some studies show that, even when they have equal endowments as concerns the use of ICT, men are usually more confident and exploit their competences better than women (Hargittai and Shafer, 2006; Hargittai and Hinnant, 2008). In this study, the ICT experience is considered through: the duration of ownership of a mobile phone; the fact of having taken computer training; the level of competence in the use of a computer indicated by a score from 1 to 3. By construction, this score is greater as the individual shows higher competences evaluated by the capacity to use data processing software to install a program and to program an application. Another variable here is the frequency of using computer. By construction, it is a three level scale, from 1 to 3, corresponding respectively to: up to once per month, many times per month but at most once per week on average and many times per week. Theoretically, in the use model, these variables are those that should properly shed light on the differences between men and women. However, this does not prevent us from thinking that each of these variables should have a positive effect on the intensity of uses, independently of gender. But since it appears in the exploratory analysis that these two sub-populations do not always privilege the same Internet uses, we are led to assume that their effects remain theoretically undetermined.

5. Results and discussions

Given that a straightforward interpretation of the ordered probit model regression coefficients is rather dubious, after the regressions, we have used the MFX2 routine in STATA to estimate the marginal probability effects for a typical individual.

For the adoption decision, as earlier mentioned, a basic socioeconomic model is firstly estimated. The marginal effects of this basic model, presented in table 2, highlight the presence of a gender digital divide in favor of men.

TABLE 2: MARGINAL EFFECTS OF THE OPROBIT BASIC ADOPTION MODEL WITH NO GENDER DISTINCTION

		Low level adoption	**Medium level adoption**	**High level adoption**
Variables				
Gender *Ref. : Female*	Male: 1 Female: 0	-0.0840**	0.0141*	0.0700***
		(0.0335)	(0.00731)	(0.0271)
Age group *Ref. : 15-21 years*	22-29 years	-0.00118	0.000173	0.00101
		(0.0480)	(0.00699)	(0.0410)
	30-44 years	0.0882	-0.0168	-0.0713
		(0.0614)	(0.0146)	(0.0472)
	45 years and above	0.0761	-0.0156	-0.0605
		(0.0726)	(0.0192)	(0.0537)
perceived daily comfort Ref. : Low	medium	0.0777*	-0.0112*	-0.0665*
		(0.0425)	(0.00660)	(0.0367)
	High	-0.0723	0.00804*	0.0642
		(0.0462)	(0.00456)	(0.0428)
Level of education *Ref. : primary*	secondary	-0.124	0.00454	0.120
		(0.103)	(0.0102)	(0.112)
	High school	-0.226**	0.00852	0.218**
		(0.0975)	(0.0121)	(0.105)
	A levels/ A levels +1	-0.292***	-0.0621	0.355***
		(0.0679)	(0.0491)	(0.115)
	A levels +2	-0.339***	-0.124*	0.463***
		(0.0524)	(0.0639)	(0.113)
	A levels+3 and above	-0.387***	-0.0917*	0.479***
		(0.0612)	(0.0470)	(0.105)
Professional status	employed	-0.104**	0.0163**	0.0879**
		(0.0406)	(0.00761)	(0.0343)
*Standard deviations in parentheses. Levels of significance : *** 1% ; ** 5%; * 10%*				

The marginal effects reveal that relatively to women, men are 8.4% less probable to report a low level adoption, 1.4% more probable to report a medium level adoption and 7% to report a high level adoption. These results underlie the relevance of differentiated estimations in view to ascertain the specificities of each gender. The marginal effects yielded by the differentiated estimations are given in table 3.

TABLE 3: MARGINAL EFFECTS OF THE OPROBIT COMPLETE ADOPTION MODEL WITH GENDER DISTINCTION

		Low level adoption		Medium level adoption		High level adoption	
		(M)	(F)	(M)	(F)	(M)	(F)
variables							
Age group	22-29 years	-0.211***	0.273***	-0.00838	-0.119***	0.219**	-0.154***
Ref. : 15-21 years		(0.0698)	(0.0938)	(0.0273)	(0.0445)	(0.0883)	(0.0585)
	30-44 years	-0.187**	0.524***	0.00827	-0.334***	0.178*	-0.190***
		(0.0892)	(0.108)	(0.0186)	(0.0869)	(0.0972)	(0.0379)
	45 years	-0.0883	0.443***	0.00781	-0.317**	0.0805	-0.127***
	and above	(0.0947)	(0.147)	(0.00786)	(0.133)	(0.0947)	(0.0265)
perceived daily comfort	medium	0.0957	0.122	-0.0155	-0.0560	-0.0802	-0.0656
Ref. : Low		(0.0682)	(0.0865)	(0.0130)	(0.0410)	(0.0581)	(0.0476)
	High	-0.0172	0.0381	0.00276	-0.0186	0.0145	-0.0195
		(0.0775)	(0.102)	(0.0116)	(0.0517)	(0.0660)	(0.0501)
Level of education	secondary	-0.131	-0.153	-0.00423	0.0514	0.135	0.102
Ref. : primary		(0.150)	(0.195)	(0.0440)	(0.0354)	(0.192)	(0.163)
	High school	-0.258**	-0.0422	-0.0246	0.0194	0.282	0.0228
		(0.131)	(0.218)	(0.0596)	(0.0972)	(0.185)	(0.121)
	A levels/	-0.280***	-0.148	-0.118	0.0516	0.398**	0.0966
	A levels +1	(0.0878)	(0.203)	(0.118)	(0.0423)	(0.200)	(0.163)
	A levels +2	-0.241**	-0.297**	-0.0847	0.0220	0.326	0.275
		(0.0986)	(0.140)	(0.116)	(0.0900)	(0.211)	(0.223)
	A levels+3	-0.257**	-0.240	-0.0360	0.0599**	0.293	0.180
	and above	(0.126)	(0.169)	(0.0709)	(0.0265)	(0.192)	(0.179)
Professional status	employed	-0.0667	-0.198***	0.0143	0.0833***	0.0525	0.114**
		(0.0633)	(0.0734)	(0.0170)	(0.0315)	(0.0473)	(0.0489)

Table 3 continued

lifestyle	No. of com.	-0.0278	-0.0330	0.00475	0.0155	0.0230	0.0174
	.devices	(0.0234)	(0.0348)	(0.00470)	(0.0167)	(0.0194)	(0.0184)
	No of refer.	-0.0221	0.120***	0.00378	-0.0565***	0.0183	-0.063***
	devices	(0.0299)	(0.0392)	(0.00542)	(0.0214)	(0.0248)	(0.0218)
	Owns a mobile		0.362***		0.215		-0.577***
	phone		(0.0460)		(0.134)		(0.162)
Location (residence) Ref : Low standing	Medium stand	-0.0773	0.0714	0.00714	-0.0364	0.0702	-0.0350
		(0.0474)	(0.0829)	(0.00689)	(0.0454)	(0.0471)	(0.0381)
	High standing	0.355	0.405	-0.192	-0.29	-0.16	-0.11
		(0.231)	(0.234)	(0.180)	(0.117)	(0.0545)	(0.0473)
Social neighborhood	Internet users	-0.0287*	-0.0254	0.00491	0.0120	0.0238*	0.0134
	in household	(0.0157)	(0.0280)	(0.00363)	(0.0133)	(0.0130)	(0.0149)
	Family abroad	0.0659	-0.0395	-0.0168	0.0175	-0.0491	0.0220
	in Africa	(0.0828)	(0.0852)	(0.0282)	(0.0357)	(0.0551)	(0.0498)
	Family abroad	0.0168	0.0564	-0.00272	-0.0252	-0.0141	-0.0311
	Out of Africa	(0.0473)	(0.0794)	(0.00737)	(0.0339)	(0.0400)	(0.0460)
	Friends/ acqu.	-0.0871**	-0.124**	0.0149	0.0586*	0.0722**	0.0657**
	Internet users	(0.0422)	(0.0589)	(0.0105)	(0.0300)	(0.0349)	(0.0319)
	Has traveled	-0.0777	-0.122	0.00334	0.0408	0.0744	0.0816
	abroad	(0.0696)	(0.134)	(0.0100)	(0.0249)	(0.0766)	(0.113)
Duration ownership of mobile phone Ref : less than 1yr	1 to 3 years	0.0218	-0.0894	-0.00409	0.0390	-0.0177	0.0504
		(0.0718)	(0.101)	(0.0147)	(0.0410)	(0.0572)	(0.0613)
	3 years and	0.0839	-0.215**	-0.0122	0.100**	-0.0717	0.114**
	above	(0.0700)	(0.0992)	(0.0115)	(0.0505)	(0.0610)	(0.0538)
Computer training	undergone	0.0574	-0.21	-0.00538	0.060	-0.0520	0.15
	training	(0.0622)	(0.0750)	(0.00511)	(0.0220)	(0.0619)	(0.0709)
computer competence	Score	-0.0157	-0.0651*	0.00268	0.0307	0.0130	0.0344*
	From 1 to 3	(0.0242)	(0.0378)	(0.00432)	(0.0192)	(0.0201)	(0.0199)
Internet adviser	Has bee an	-0.282***	-0.0738	0.0822***	0.0363	0.199***	0.0375
	adviser	(0.0513)	(0.0705)	(0.0284)	(0.0358)	(0.0334)	(0.0355)
Frequency of using computer Ref : at most once/ month	Several times	-0.216***	-0.234***	0.00760	0.0901***	0.208***	0.144**
	a month	(0.0551)	(0.0853)	(0.0196)	(0.0348)	(0.0592)	(0.0594)
	Several times	-0.474***	-0.503***	0.00769	0.135***	0.466***	0.368***
	a week	(0.0594)	(0.0784)	(0.0375)	(0.0439)	(0.0699)	(0.0801)
					Observations	364	229
Standard deviations in parentheses. Levels of significance : *** 1% ; ** 5% ; * 10%							

Columns marked (M) refer to the male sub-population and (F) the female one

The results show that, in general, as concerns individual's socio-economic characteristics for men, age is a relatively important explanatory factor for the adoption decision and also that men aged from 22 to 29 are those who are more likely to resolutely adopt the Internet. For instance, we find that they are 21.1% less probable to report a low level adoption while they are 21.9% more probable to report a high level of adoption. On the contrary, it clearly appears that, at all age ranges, women are more probable to report a low level adoption (27.3% for women aged between 22 and 29, 52.4% for those between 30 and 44, 44.3% for those of 45 and above) and less probable to report a high level adoption (15.4% for women aged between 22 and 29, 19% for those between 30 and 12.7% for those of 45 and above).

For women, education is rather a relatively limited explanatory factor of the decision to adopt the Internet. In fact, one has to move up to two years of university studies to find that women with that level of education are relatively to other women 29.7% less probable to report a low level adoption. But for men, attending high school already reduces the probability to report a low level adoption while those with an Advanced level are 39.8% more likely to report a high level adoption. Finally as concerns socioeconomic variable, it appears that employment significantly contributes to reduce the digital divide between women and men. In fact, we see while being employed is neutral for men's adoption decision, employed women are 11.4% more probable to report a high level adoption.

Controlling for lifestyle, the results do not ostensibly sustain our hypothesis of technological continuity between the Internet and the subset of complementary devices. In fact, while we expected them to significantly improve the probability to adopt the Internet, they are rather neutral on both men's and women's adoption decision. Yet, it appear that for women, the possession of references devices (television, CD/DVD drivers) and even the possession of a mobile phone are hindrances to the adoption decision. The negative impact of the reference variable may be linked to fact that, since they are mostly fixed devices essentially are used at home, given that only 1.35% households in the sample have Internet at home and that 55.54% of women in the sample are unemployed, using those devices reduces their out of home time and thus their chances to have access to the Internet elsewhere. The negative impact of the possession of mobile phone is more peculiar. Nevertheless, as the results also show that women who own a mobile phone for 03 years and more are 11.4% more probable to report high level Internet adoption, it is possible the negative impact of the possession of a mobile phone we have found simply reveals that there is some gradation in the women's itinerary to adopt new technologies. In this perspective, a woman who just affords a mobile phone would first take the time to master its use before paying attention to another technology like the Internet[3].

3 This explanation rely on the fact that when the survey was carried out in 2008, only few mobile phones

All location variables appear to be neutral. The standing of the residential area does not affect the adoption decision. This is explainable by the hybrid nature of residential areas in Cameroon. It can also be explained by the existence of different modes of Internet access that gives to everyone a chance to access the Internet in one way or another (Tamokwe, 2012). Moreover, it seems important to underline the fact that this result is indicating that, as concerns the adoption decision, the residential area is not an aggravating factor for gender digital divide.

Variables relating to the social neighborhood reveal that the fact of having many Internet users ones friends, colleagues, and relatives has a spillover effect and favors a high level adoption of the Internet for both women and men. The adoption behavior of the latter is also significantly stimulated by an increase in the proportion Internet users in the household. In both cases, the adoption of the Internet tends to respond to a need to comply with a social group of which the individual would like to be a member.

The introduction of control variables relating to ICT experience show that for women, the probability to adopt the Internet increases with computer skills while this variable has no effect on men's decision. However, the fact of having once at least played the role of adviser for Internet uses, as well as a high frequency of computer use are factors that stimulate adoption for both gender.

The table below summarizes all these results.

TABLE 4: THE EFFECTS OF SIGNIFICANT EXPLANATORY FACTORS ON THE INTENSITY OF ADOPTION OF THE INTERNET

	Men	**Women**
Stimulants	Socio-economic : Age : 22-29 years, 30-44 years Level of education : from high school to A levels + 3 and more Lifestyle : High number of complementary devices Social neighborhood: High level of Internet users in the household and among friends, colleagues and acquaintances ICT experience : has been an Internet adviser, high frequency of computer use	Socio-economic : Level of education : A level +2, A level +3 and more Professional status : employed Social neighborhood : high number of Internet users among friends, colleagues and acquaintances, possession of a mobile phone for 03 years and more ICT experience : has high computer competences, has been an Internet adviser, high frequency of computer use
Hindrances		Socio-economic: Age : from 22-29 years and 44 years and above Lifestyle: reference devices, possess a mobile phone

were compatible with the Internet. In fact, no one in the sample reported having access to the Internet via his mobile phone.

The differentiated estimation of the uses model yields the marginal effects presented in table 5.

TABLE 5: MARGINAL EFFECTS OF THE OPROBIT USES MODEL WITH GENDER DISTINCTION

Communication uses		Weak intensity		Medium intensity		High intensity	
		(M)	(F)	(M)	(F)	(M)	(F)
variables							
Age group *Ref. : 15-21 years*	22-29 years	-0.120	-0.0828	0.0606	0.0467	0.0595	0.0361
		(0.114)	(0.117)	(0.0508)	(0.0691)	(0.0647)	(0.0491)
	30-44 years	0.115	0.0933	-0.0671	-0.0571	-0.0478	-0.0362
		(0.146)	(0.171)	(0.0897)	(0.115)	(0.0567)	(0.0567)
	45 years and above	-0.0434	-0.0554	0.0233	0.0265	0.0201	0.0290
		(0.142)	(0.153)	(0.0730)	(0.0620)	(0.0689)	(0.0914)
Perceived daily comfort *Ref. : low*	medium	0.130	-0.133	-0.0725	0.0721	-0.0572	0.0611
		(0.0907)	(0.107)	(0.0531)	(0.0614)	(0.0391)	(0.0488)
	High	-0.105	-0.177*	0.0558	0.0785*	0.0492	0.0981
		(0.0914)	(0.107)	(0.0458)	(0.0425)	(0.0467)	(0.0728)
Level of education *Ref. : secondary*	High school	-0.153	0.229**	0.0746	-0.143*	0.0784	-0.085**
		(0.118)	(0.115)	(0.0505)	(0.0822)	(0.0699)	(0.0389)
	A levels/ A levels +1	-0.154	0.162	0.0702	-0.105	0.0836	-0.0569
		(0.121)	(0.134)	(0.0439)	(0.0999)	(0.0799)	(0.0372)
	A levels +2	-0.231**	-0.0303	0.0796***	0.0158	0.152	0.0145
		(0.110)	(0.135)	(0.0223)	(0.0662)	(0.104)	(0.0692)
	A levels+3 and above	-0.159	0.0484	0.0788	-0.0280	0.0801	-0.0204
		(0.122)	(0.137)	(0.0546)	(0.0837)	(0.0693)	(0.0532)
Professional status	employed	-0.0197	-0.138	0.0111	0.0704	0.00862	0.0674
		(0.0881)	(0.0902)	(0.0499)	(0.0469)	(0.0382)	(0.0475)
lifestyle	No. of com. .devices	0.0177	-0.0402	-0.00987	0.0221	-0.00785	0.0182
		(0.0292)	(0.0396)	(0.0165)	(0.0227)	(0.0129)	(0.0176)
	No of refer. devices	0.0203	-0.0377	-0.0113	0.0207	-0.00898	0.0170
		(0.0400)	(0.0461)	(0.0224)	(0.0257)	(0.0177)	(0.0210)
	Owns a mobile phone	-0.0614	-0.157	0.0368	0.106	0.0246	0.0511
		(0.182)	(0.193)	(0.117)	(0.151)	(0.0651)	(0.0447)
Location (residence) *Ref. :low standing*	Medium stand	-0.129**	-0.0878	0.0648**	0.0422	0.0637*	0.0455
		(0.0611)	(0.0867)	(0.0303)	(0.0360)	(0.0333)	(0.0529)
	High standing	0.239***	-0.0213	-0.169**	0.0111	-0.070***	0.0102
		(0.0849)	(0.131)	(0.0686)	(0.0651)	(0.0209)	(0.0659)
Social neighborhood	Internet users in household	0.00326	0.00722	-0.00182	-0.00395	-0.00144	-0.00326
		(0.0164)	(0.0328)	(0.00916)	(0.0181)	(0.00727)	(0.0148)
	Family abroad in Africa	0.0589	0.0301	-0.0350	-0.0172	-0.0239	-0.0129
		(0.107)	(0.122)	(0.0673)	(0.0727)	(0.0399)	(0.0490)
	Family abroad Out of Africa	0.0317	0.0836	-0.0173	-0.0418	-0.0144	-0.0418
		(0.0664)	(0.0957)	(0.0355)	(0.0434)	(0.0310)	(0.0539)
	Friends/ acqu. Internet users	-0.0656	0.0508	0.0365	-0.0278	0.0291	-0.0230
		(0.0574)	(0.0625)	(0.0328)	(0.0358)	(0.0253)	(0.0274)
	Has traveled abroad	-0.0842	-0.183	0.0417	0.0406	0.0425	0.143
		(0.0826)	(0.124)	(0.0368)	(0.0505)	(0.0467)	(0.165)

Table 5 continued

Computer training	undergone	0.217***	0.237***	-0.0764***	-0.0445	-0.140**	-0.192*
	training	(0.0752)	(0.0748)	(0.0215)	(0.0464)	(0.0670)	(0.102)
Computer competence	Score	-0.079**	-0.0759*	0.0444**	0.0416*	0.0353**	0.0343*
	From 1 to 3	(0.0342)	(0.0416)	(0.0204)	(0.0239)	(0.0154)	(0.0202)
Internet adviser	Has been an	-0.132	-0.115	0.0807	0.0694	0.0518*	0.0457
	adviser	(0.0825)	(0.0855)	(0.0568)	(0.0552)	(0.0273)	(0.0327)
Frequency of use of the computer	Several times	-0.234**	-0.30***	0.114**	0.125***	0.120*	0.182**
	a month	(0.105)	(0.106)	(0.0468)	(0.0475)	(0.0632)	(0.0819)
Ref : at most once a month	Several times	-0.48***	-0.46***	0.261***	0.226***	0.224***	0.234***
	a week	(0.101)	(0.120)	(0.0570)	(0.0682)	(0.0604)	(0.0791)
					Observations	262	144
*Standard deviations in parentheses. Levels of significance : *** 1% ; ** 5% ; * 10%*							

Columns marked (M) refer to the male sub-population and (F) the female one

Information uses		Weak intensity		Medium intensity		High intensity	
		(M)	(F)	(M)	(F)	(M)	(F)
variables							
Age group	22-29 years	-0.229**	0.427***	0.141**	-0.373***	0.0876	-0.0542*
		(0.111)	(0.130)	(0.0574)	(0.110)	(0.0584)	(0.0296)
Ref. : 15-21 years	30-44 years	-0.0881	0.376***	0.0608	-0.356***	0.0273	-0.0204**
		(0.151)	(0.103)	(0.1000)	(0.0996)	(0.0512)	(0.00957)
	45 years	-0.132	0.283**	0.0868	-0.270**	0.0453	-0.0125*
	and above	(0.142)	(0.115)	(0.0844)	(0.113)	(0.0585)	(0.00640)
Perceived daily comfort	medium	-0.0608	-0.117	0.0430	0.107	0.0178	0.00984
		(0.106)	(0.132)	(0.0757)	(0.120)	(0.0311)	(0.0125)
Ref. : low	High	-0.231**	-0.206	0.152**	0.185	0.0790*	0.0217
		(0.102)	(0.148)	(0.0654)	(0.129)	(0.0411)	(0.0213)
Level of education	High school	-0.0719	-0.371**	0.0494	0.320**	0.0225	0.0509
		(0.123)	(0.159)	(0.0815)	(0.126)	(0.0415)	(0.0387)
Réf. : secondary	A levels/	-0.0889	-0.49***	0.0594	0.376***	0.0295	0.118
	A levels +1	(0.122)	(0.150)	(0.0766)	(0.0779)	(0.0459)	(0.0895)
	A levels +2	-0.0148	-0.66***	0.0104	0.369***	0.00439	0.297**
		(0.143)	(0.0924)	(0.0996)	(0.0787)	(0.0436)	(0.139)
	A levels+3	-0.0534	-0.72***	0.0372	0.403***	0.0162	0.324**
	and above	(0.124)	(0.0919)	(0.0850)	(0.0825)	(0.0393)	(0.145)
Professional status	employed	-0.119	-0.0445	0.0867	0.0408	0.0321	0.00373
		(0.0975)	(0.117)	(0.0737)	(0.107)	(0.0250)	(0.0102)
lifestyle	No. of com.	0.0345	0.0366	-0.0245	-0.0336	-0.00997	-0.00300
	.devices	(0.0281)	(0.0429)	(0.0201)	(0.0394)	(0.00834)	(0.00376)
	No of refer.	0.0373	0.0419	-0.0265	-0.0385	-0.0108	-0.00344
	devices	(0.0437)	(0.0556)	(0.0314)	(0.0510)	(0.0126)	(0.00489)
	Owns a mobile	-0.0338	0.182	0.0246	-0.159	0.00916	-0.0230
	phone	(0.179)	(0.195)	(0.134)	(0.160)	(0.0452)	(0.0369)

Table 5 continued

Location(residence)	Medium stand	0.137**	0.305***	-0.102*	-0.286***	-0.0353**	-0.0188**
Ref :low standing		(0.0679)	(0.0851)	(0.0528)	(0.0818)	(0.0174)	(0.00914)
	High standing	0.203**	-0.301	-0.164*	0.246*	-0.0387**	0.0549
		(0.103)	(0.202)	(0.0916)	(0.135)	(0.0151)	(0.0713)
Social neighborhood	Internet users	-0.0290*	-0.0232	0.0206*	0.0213	0.00839*	0.00190
	in household	(0.0149)	(0.0252)	(0.0109)	(0.0231)	(0.00444)	(0.00225)
	Family abroad	-0.0681	-0.0314	0.0456	0.0287	0.0224	0.00273
	in Africa	(0.0906)	(0.159)	(0.0574)	(0.145)	(0.0337)	(0.0148)
	Family abroad	0.0189	-0.0743	-0.0133	0.0686	-0.00555	0.00567
	Out of Africa	(0.0699)	(0.117)	(0.0489)	(0.109)	(0.0210)	(0.00840)
	Friends/ acqu.	-0.00084	0.209**	0.000598	-0.192**	0.000244	-0.0172*
	Internet users	(0.0519)	(0.0970)	(0.0369)	(0.0908)	(0.0150)	(0.00980)
	Has traveled	0.0123	-0.45***	-0.00880	0.327***	-0.00348	0.129
	abroad	(0.108)	(0.138)	(0.0781)	(0.0548)	(0.0298)	(0.110)
Computer	undergone	0.159	-0.274**	-0.0956**	0.259**	-0.0636	0.0148*
training	training	(0.0971)	(0.117)	(0.0448)	(0.114)	(0.0552)	(0.00755)
Computer	Score	-0.15***	-0.16***	0.107***	0.151***	0.0437***	0.0135**
competence	From 1 to 3	(0.0357)	(0.0496)	(0.0288)	(0.0468)	(0.0121)	(0.00660)
Internet adviser	Has been an	-0.0286	-0.0123	0.0206	0.0113	0.00801	0.000994
	adviser	(0.0762)	(0.114)	(0.0558)	(0.105)	(0.0206)	(0.00909)
Frequency of use of the computer	Several times	-0.264**	-0.341*	0.170**	0.301**	0.0941*	0.0403
Ref : at most once a month	a month	(0.123)	(0.177)	(0.0746)	(0.147)	(0.0529)	(0.0341)
	Several times	-0.42***	-0.42***	0.296***	0.383***	0.130***	0.0460
	a week	(0.124)	(0.160)	(0.0878)	(0.135)	(0.0460)	(0.0317)
					Observations	262	144

*Standard deviations in parentheses. Levels of significance : *** 1% ; ** 5% ; * 10%*

Columns marked (M) refer to the male sub-population and (F) the female one

Entertainment uses		Weak intensity		Medium intensity		High intensity	
		(M)	(F)	(M)	(F)	(M)	(F)
variables							
Age group	22-29 years	-0.234**	0.225*	0.173**	-0.219*	0.0611	-0.00624
		(0.106)	(0.134)	(0.0713)	(0.128)	(0.0387)	(0.00822)
Ref. : 15-21 years	30-44 years	0.00354	0.257***	-0.00283	-0.253***	-0.000706	-0.00380
		(0.107)	(0.0641)	(0.0857)	(0.0622)	(0.0213)	(0.00379)
	45 years	0.128	0.174**	-0.105	-0.172**	-0.0230	-0.00196
	and above	(0.0803)	(0.0689)	(0.0678)	(0.0681)	(0.0142)	(0.00206)
Perceived daily comfort	medium	-0.0670	-0.113	0.0534	0.110	0.0136	0.00241
		(0.0711)	(0.120)	(0.0567)	(0.118)	(0.0149)	(0.00332)
Ref. : low	High	-0.160*	-0.245	0.124*	0.237*	0.0361	0.00802
		(0.0859)	(0.150)	(0.0641)	(0.143)	(0.0240)	(0.00960)

Table 5 continued

Level of education	High school	-0.0301	-0.176	0.0239	0.171	0.00619	0.00491
		(0.0786)	(0.163)	(0.0617)	(0.157)	(0.0170)	(0.00734)
	A levels/	0.000734	-0.184	-0.000588	0.178	-0.000147	0.00601
Réf. : secondary	A levels +1	(0.0841)	(0.188)	(0.0673)	(0.180)	(0.0168)	(0.00997)
	A levels +2	-0.136	-0.192	0.102	0.185	0.0337	0.00650
		(0.116)	(0.176)	(0.0815)	(0.167)	(0.0360)	(0.0101)
	A levels+3	0.148**	-0.302	-0.120**	0.289*	-0.0275**	0.0130
	and above	(0.0676)	(0.187)	(0.0572)	(0.173)	(0.0129)	(0.0175)
Professional status	employed	0.0236	-0.0965	-0.0188	0.0943	-0.00479	0.00215
		(0.0728)	(0.0865)	(0.0578)	(0.0841)	(0.0150)	(0.00309)
lifestyle	No. of com.	0.0113	0.00647	-0.00907	-0.00633	-0.00227	-0.000131
	.devices	(0.0235)	(0.0383)	(0.0188)	(0.0375)	(0.00477)	(0.000757)
	No of refer.	0.00654	-0.0492	-0.00523	0.0482	-0.00131	0.000993
	devices	(0.0301)	(0.0688)	(0.0240)	(0.0678)	(0.00609)	(0.00131)
	Owns a mobile	0.0148	-0.0859	-0.0118	0.0846	-0.00304	0.00132
	phone	(0.115)	(0.153)	(0.0907)	(0.151)	(0.0243)	(0.00217)
Location(residence)	Medium stand	0.0583	0.266***	-0.0472	-0.261***	-0.0111	-0.00444
		(0.0513)	(0.0588)	(0.0415)	(0.0580)	(0.0103)	(0.00391)
Ref :low standing	High standing	0.134***	0.00210	-0.115***	-0.00206	-0.019***	-4.22e-05
		(0.0358)	(0.161)	(0.0320)	(0.158)	(0.00709)	(0.00321)
Social neighborhood	Internet users	0.0144	-0.0151	-0.0115	0.0148	-0.00289	0.000306
	in household	(0.0164)	(0.0215)	(0.0132)	(0.0211)	(0.00328)	(0.000494)
	Family abroad	0.00495	0.0693	-0.00397	-0.0681	-0.000982	-0.00118
	in Africa	(0.0733)	(0.110)	(0.0589)	(0.108)	(0.0144)	(0.00160)
	Family abroad	-0.00187	-0.0130	0.00150	0.0127	0.000374	0.000257
	Out of Africa	(0.0490)	(0.106)	(0.0392)	(0.104)	(0.00980)	(0.00200)
	Friends/ acqu.	0.0365	-0.0379	-0.0292	0.0372	-0.00729	0.000767
	Internet users	(0.0430)	(0.0641)	(0.0346)	(0.0629)	(0.00870)	(0.00137)
	Has traveled	-0.103	-0.332	0.0790	0.313*	0.0244	0.0196
	abroad	(0.105)	(0.211)	(0.0772)	(0.187)	(0.0289)	(0.0275)
Computer training	undergone	0.0611	-0.0624	-0.0476	0.0613	-0.0135	0.00107
	training	(0.0748)	(0.107)	(0.0573)	(0.106)	(0.0179)	(0.00199)
Computer competence	Score	-0.08***	-0.13***	0.0675***	0.130***	0.0169**	0.00268
	From 1 to 3	(0.0300)	(0.0377)	(0.0247)	(0.0379)	(0.00713)	(0.00226)
Internet adviser	Has been an	-0.129***	-0.122*	0.106***	0.120*	0.0229**	0.00213
	adviser	(0.0450)	(0.0684)	(0.0384)	(0.0673)	(0.00948)	(0.00224)
Frequency of use of the computer	Several times	0.0997	-0.228	-0.0804	0.222	-0.0193	0.00665
	a month	(0.0779)	(0.161)	(0.0629)	(0.154)	(0.0160)	(0.00929)
Ref : at most once a month	Several times	0.0212	-0.272*	-0.0169	0.265**	-0.00425	0.00727
	a week	(0.0979)	(0.141)	(0.0781)	(0.134)	(0.0198)	(0.00892)
					Observations	262	144
Standard deviations in parentheses. Levels of significance : *** 1% ; ** 5% ; * 10%							

Columns marked (M) refer to the male sub-population and (F) the female on

It appears that for communication uses, men and women share two factors with significant effects namely a high level of computer competence and a high frequency of computer use. Indeed, for men and women, those who have a high level of computer competence are respectively 3.5% and 3.4% more probable to report a high intensity use of the Internet for communication purposes. These figures rise up to 22.4% and 23.4% respectively for men and women who use the computer several times a week. In addition, for men, living in a medium standing area favors the use of the Internet for communication meanwhile this positive effect is inverted for men living in high standing residential areas. Given the possible correlation between high standing residential areas and income level, this result may be suggesting that in high standing residential areas, men do not use the Internet for communication because they easily afford alternative means, mobile phones for instance. One socio-economic variable, education, puts to evidence the difference between men and women as concerns the use of Internet for communication. In fact, while a high level of education increases the probability to use the Internet for communication among men, attending high school appears to have a negative effect on this use among women. Indeed, it appears that having an advanced level + 2 makes men 7.9% more probable to report a medium intensity use of the Internet for communication while attending high school makes women to be 14.3% and 8.5% less probable to report – respectively – a medium and a high intensity use of the Internet for communication. A reason for this negative effect of attending high school on the use of the Internet for communication may be found in the fact that in Cameroon, this level of education is a very challenging one. Students there are called to consecutively write two national examinations which are crucial for entry to university. This explanation could also support the fact that women attending this level of education are 32% more probable to report a medium intensity use of the Internet for information purposes. So female students seems more focus on their studies at that level than their male fellows.

For information uses and also for entertainment uses, the results once more indicate the overall positive effects of ICT experience, for both men and women. Thus a high level of computer competence favors both categories of uses for men and women, a high frequency of computer utilization favors the use of the Internet for information purposes among both subpopulations, having been an Internet adviser stimulates the use of the Internet for entertainment purposes among both subpopulations and finally, having undergone a computer training favors the use of the Internet for information purposes among women while

a high frequency of computer utilization stimulates the use of the Internet for entertainment purposes among them.

As does the fact of having traveled abroad for women and of being aged between 22 and 29 for men, both categories of uses are also stimulated by a high level of education for women and by a high daily comfort perception for men. It also appears that this high daily comfort perception favors the use of the Internet for entertainment purposes among women while the number of Internet users in the household and the fact of living in a high standing area stimulate the use of the Internet for information purposes among men and women, respectively.

Like for the communication uses, living in a high standing residential area hinders the use of the Internet for information and for entertainment purposes among men. This negative effect is also caused on the use of the Internet for information by the fact of living in a medium standing residential area and on the use of the Internet for entertainment among men who have the highest education level in our sample (A level +3 and above). Equally, among women, living in a medium standing residential area and the fact of being 22 years old and more seem both to disfavor the use of the Internet for information and for entertainment purposes.

Consequently, for both information and entertainment uses, the difference between men and women is mainly highlighted by age. In fact, while the age group 22 to 29 years has a positive effect on the probability to use the Internet for information needs for men, the effect is negative for women. Moreover, the upper age groups (30 years and more) equally have a negative effect. We can therefore infer that as women advance in age, they are less inclined to use the Internet for information and entertainment meanwhile it is not the case for men.

As concerns the use of the Internet for entertainment, the opposition between men and women is also supported by the level of education, since it appears that a high level of education (A levels + 3 and more) significantly stimulates this category of use among women meanwhile it is a hindrance among men. This result tends to infer that, unlike their male peers, the more educated women are more likely to have fun on the Internet.

The summary of all these results is given in the table below.

TABLE 6: EFFECTS OF SIGNIFICANT EXPLANATORY FACTORS ON THE USES OF THE INTERNET

		Men	Women
Communication	Stimulants	- Socioeconomic : Level of education : A level + 2 - Location : Medium standing - ICT experience : has high computer competences, high frequency of computer use, has been an Internet adviser	- ICT experience : has high computer competences, high frequency of computer use - Perceived daily comfort: high
	Hindrances	- Location : High standing - ICT experience : has undergone a computer training	- Socioeconomic : Level of education: high school - ICT experience : has undergone a computer training
Information	Stimulants	- Socioeconomic : Age : 22-29 years - Perceived daily comfort: high - Social neighborhood: high number of Internet users in the household - ICT experience : has high computer competences, high frequency of computer use	- Socioeconomic : Level of education : high school to A levels +3 and above - Location : High standing - Social neighborhood: has traveled abroad - ICT experience : has undergone a computer training, has high computer competences, high frequency of computer use
	Hindrances	- Location : medium and high standings	-Socioeconomic : Age : 22-29 years, 30-44 years, 45 years and more - Location : medium standing - Social neighborhood : high number of Internet users among friends, colleagues and acquaintances
Entertainment	Stimulants	- Socioeconomic : Age : 22-29 years Perceived daily comfort: high - ICT experience : has high computer competences, has been an Internet adviser	- Socioeconomic: Perceived relative daily comfort: high Level of education : A levels + 3 and above - Social neighborhood: has traveled abroad - ICT experience : has high computer competences, high frequency of computer use, has been an Internet adviser
	Hindrances	- location : high standing - Socioeconomic : Level of education: A level + 3 and above	- Socioeconomic: Age : 22-29 years, 30-44 years - Location : medium standing

6. Conclusion

In this study, we aimed at identifying and analyzing the determinants of the decisions to adopt and to use the Internet for men and women in order to enlighten gender equitable ICT development policies. To meet this objective, we sought answers to two complementary questions: Do women have the same determinants of Internet adoption as men? Do they adopt it for the same uses?

To answer the first question, we defined a proxy variable for the degree of Internet adoption taking three values: 0 for a low level adoption, 1 for a medium level adoption and 2 for a high level adoption. Subsets of variables concerning socio-economic characteristics, lifestyle, location, and ICT experience are used as explanatory factors in the framework of an ordered probit model. The marginal effects yielded by the estimations show that some significant determinants of the adoption of the Internet are common to both sub-populations, notably: the number of Internet users among friends, colleagues and relatives; the ICT experience and ta high level of education. These results equally put to evidence the existence of some significant differences in the determinants of adoption between men and women. For instance, we notice that being employed favors adoption for women while it is neutral for men. Alike, and contrary to our expectation to find no major differences between men and women as concerns the direction of the effects of socio-economic variables on the adoption decision, age appears to be a stimulating factor for men meanwhile it is a hindrance for women. This finding suggests that, besides common ones, special policies should be put in place to avoid that women drop out as they get older.

In order to answer the second question, a classification of eighteen services of the Internet is done using computed scores evaluating the intensity of use for each of them. As the services of the first half of the classification are identical to both men and women, this classification reveals the non-existence of significant differences as concerns usages for both sub-populations. At the same time, the scores of women always being less than those of men, led to say that the differences would mainly lie in the intensity of uses. Considering three synthetic uses - communication, information and entertainment - the intensity of their use is taken as dependent variable in the uses model. Transformed into a dependent variable with three modalities - 0 for weak, 1 for medium and 2 for high intensity - for each of the synthetic uses, the subsets of explanatory variables for the adoption model are reconsidered in the framework of an ordered probit model. The marginal effects from the estimations indicate that high computer skills and a high frequency of computer use are stimulating factors for both men and women. In the same line, for women, despite the exception in the case of use

for communication where it is neutral, a high level of education is globally a stimulating factor. On the contrary, for women, age has a negative effect on the intensity of uses while it is positive for men.

In sum, the findings tend to suggest that in order to reduce the gender digital divide in its two dimensions, homogenous policies could be considered. These undifferentiated policies would aim at promoting access to computer and promoting trainings in order to improve on computer skills. However, to wipe out the gender digital divide affecting women, specific policies towards this subpopulation should be put in place. These targeted policies should, not only aim at promoting the use the Internet by girls from their tender age (before 22 years), but also incite women to go further in their education (beyond high school), to find a job and to remain connected as they grow in age. Though they could be used as benchmark for other towns with the same characteristics in Cameroon or elsewhere in Africa, all these results mainly pertain to the towns of Douala, Buea and Limbe since the survey used here is representative of their populations.

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References

Auray, N. (2002). 'Sociabilité informatique et différence sexuelle, in Chabaud-Rychter', C., Gardey, D. (eds.) *L'engendrement des choses. Des hommes, des femmes, et des techniques*, Paris, éditions des archives contemporaines.

Birba, O., Diagnes A. (2012). 'Determinants of adoption of Internet in Africa: case of 17 sub-Saharan countries'. *Structural Change and Economic Dynamics*, vol 23(4), pp 463–472.

Dighe A., Reddi U. V. (2006). '*Women's literacy and information and communication technologies: lessons that experience has taught us'*, Commonwealth Educational Media Centre for Asia, New Delhi India.

Dutton, W., Helsper E. J. (2007). '*The Internet in Britain: 2007'*, Oxford, UK: Oxford Internet Institute, University of Oxford.

Fallows, D. (2005). '*How women and men use the Internet'*, Washington, DC: Pew Internet and American Life Project.

Gillwald, A. (2009). 'Towards Evidence-based Policy in Africa: ICT Access and Usage in 17 African countries', *communication at l'Euro CPR*, Seville, March 31, 2009.

Gurumurthy, A. (2006). '*Genre et TIC: Panorama, Bridge development gender'*, Institute of Development Studies.

Hargittai, E., Hinnant, A. (2008). 'Digital Inequality Differences in Young Adults' Use of the Internet. *Communication Research'*, vol 35(5), pp 602-621.

Hargittai, E. (2003). 'The Digital Divide and What to Do About It'*,* in San Diego J. (ed.), *New Economy Handbook*, D.C.: Academic Press.

Hargittai, E., Shafer S. (2006). 'Differences in actual and perceived online skills: The role of gender'. *Social Science Quarterly*, vol 87(2), pp 432-448.

Helsper, E. J. (2010). 'Gendered Internet Use across Generations and Life Stages'. *Communication Research*, vol 37(3), pp 352-374.

Huyer, S., Mitter, S. (2005). '*ICTs, globalization and poverty reduction: Gender dimensions of the knowledge society'*. Available online at : http://gab.wigsat.org/partI.pdf

IUT (2011), *Measuring the Internet society* 2011, IUIT, Geneva.

Jouet, J. (2003). 'Technologies de communication et genre: Des relations en construction'. *Réseaux*, vol 4(120), pp 53-86.

Johnson, E. J., Bellman, S., Lohse, G. L. (1999). 'Predictors of online buying,

findings from the Wharton Virtual Test Market (WVTM)'. *Communication of ACM*, vol 42(12), pp 32-38.

Kramarae, C. (1988). 'Gotta Go Myrtle, Technology's at the door', in C. Kramarae (ed.), *Technology and women's voices*. Keeping in touch, London, Routledge & Kegan Paul Ltd.

Le Guel, F., Pénard ,T., Suire, R. (2005). 'Une double fracture numérique', in Guichard E (ed.), *Mesures de l'Internet : approches croisées*, les Canadiens en Europe.

Lethiais, V., Poussing, N. (2004). 'Adoption, usages d'Internet et apprentissage : une comparaison Bretagne-Luxembourg'. *Cahier de Recherche M@rsouin,* N° 0-2004.

Mbondo, G. D. (2013). 'Social learning through social networks and technological appropriation: the role of peer effects in the adoption and use of the Internet in Cameroonian tontines'. *International Journal of Economic Behavior and Organization*, vol 1 (5), pp 39-49.

Minpostel (2006). '*Enquête nationale sur le niveau de pénétration et d'utilisation des TIC au Cameroun'*, Rapport final projet «SCAN-ICT»

Mukoko, B. (2012). 'Determinants of Computer and Internet Adoption and Use in Cameroon'. *African Review of Economics and Finance*, vol 3(2), pp 96-128.

National Telecommunications and Information Administration (2004). *A nation online: Entering the broadband age*. Washington, DC: Author.

Ono, H., Zavodny, M. (2003), 'Gender and the Internet'. *Social Science Quarterly*, vol 84, pp 111-121.

Oyerlaran-Oyevinka,, B., Adeya, C.N. (2004). 'Dynamics of adoption and usage of ICTs in African universities: a study of Kenya and Nigeria'. *Technovation*, vol 24(10), pp 841-851.

Oyerlaran-Oyevinka, B., Lal, K. (2005). 'Internet diffusion in sub-Saharan Africa: a cross-country analysis'. *Telecommunications Policy*, vol 29(7), pp 507–527.

Pénard, T., Poussing, N., Zomo Yebe, G., Nsi Ella, P. (2012). 'Comparing the determinants of cell phone and Internet use in Africa: evidence from Gabon'. *Communication & Strategies*, N° 6, pp 65-84.

Roycroft, T., Anantho S. (2003). 'Internet subscription in Africa: policy for dual digital divide'. *Telecommunications Policy*, vol 27 (1), pp 61-74.

Tamokwe Piaptie, G. B. (2012). 'Complementarity or substitutability between the different modes of Internet access: a property rights-based analysis on cybercafés offerings with data from Cameroon'. *The Electronic Journal on Information Systems in Developing Countries*, vol 55(5), pp 1-14.

Tamokwe Piaptie, G. B. (2013), 'Les déterminants de l'accès et des usages d'Internet en Afrique Subsaharienne. Analyse des données camerounaises et implications pour une politique de développement des TIC', *Réseaux,* vol 4(180), pp 95-121.

Van Zoonen, L. (1994), *Feminist Media Studies*, London, Sage Publications.

Wasserman, I. M., Richmond-Abbott, M. (2005), 'Gender and the Internet: Causes of variation in access, level, and scope of use'. *Social Science Quarterly*, vol 86, pp 252–27

World Bank (2001), *Engendering Development: Through Gender Equality in Rights, Resources, and Voice*, World Bank Publication.