9-2010

ANTECEDENTS OF THE DIGITAL DIVIDE IN LEBANON

Antoine Harfouche
Université de Paris Dauphine, France, antoine.harfouche@dauphine.fr

Alice Robbin
Indiana University Bloomington, USA, arobbin@indiana.edu

ANTECEDENTS OF THE DIGITAL DIVIDE IN LEBANON

Antoine Harfouche, Université de Paris Dauphine, France, antoine.harfouche@dauphine.fr
Alice Robbin, Indiana University Bloomington, USA, arobbin@indiana.edu

Abstract

This paper reports the results of a study to investigate the digital divide in Lebanon based on data collected in August 2008 from 330 potential users of Lebanese public e-services. The study investigated factors that make a difference for e-access and e-skills and how socio-economic, demographic, and cultural factors explain the digital divide. Overall, results show that gender, age, religion, and geographic disparities related to income, to educational attainment, and to occupation influence the e-skills and e-access divides. Income and education have effects on e-skills but no effect on the e-access divide. When educational attainment increases, the e-skills divide decreases. Gender and religion have an impact on the e-skills divide but no significant impact on the e-access divide: men and Christians have more e-skills than women and Muslims. The impact of urban-rural disparities is unambiguous. Age is the only factor that impacts both the e-access and e-skills divide. Young urban males with high income and high educational attainment levels have more advanced e-skills than their less advantaged counterparts; thus, these elite members of the Lebanese society are expected to benefit from the advantages of public online services. That will, however, not be the case of those in the less advantaged segments of the population. Inequalities in Lebanese society will continue.

Keywords:

Digital Divide, e-access divide, e-skills divide, public e-services, Lebanon

1 INTRODUCTION

Public e-services have the potential to improve public administration's relationship with the citizen (Thomas and Streib 2003). A recently published study by the Pew Internet & American Life Project reports that more than 80% of all Americans looked for information or completed a transaction on a government website; use of government websites has been 'data-driven, organized around new online platforms, and participatory' as part of efforts to 'foster greater openness and that have resulted in high levels of satisfaction with e-government services transparency' (Smith 2010, pp. 2-3).

However, this level of public e-services activity has not taken place in many other countries (UNDESA 2008). E-services delivered through the Internet and computers are expensive for most people in developing countries and require technical skills (Singh and Sahu 2008, p. 480), literacy, and knowledge of at least one language. According to the 2008 Global Information Society report, only 23% of the households in developing countries have used the Internet from any location in the last 12 months and only 14% have a computer at home, in contrast to developed countries where more than 63% of citizens have a computer at home and more than 65% were frequent users of Internet in 2008 (UNPAN 2008, p. 34). Studies also suggest that implementation of public e-services may exacerbate the digital divide, leading to a system where the already privileged segments of the population have easier access to public services and resulting in greater social inequality (Basu 2004, Grundén 2009, Thomas and Streib 2003, Weber et al. 2003).

Without access to information and communication technologies (ICTs) and the Internet, citizens may face inequality in access to public services, disparities that have been characterized as the *e-access divide* or the '*first order digital divide*'. Citizens who lack sufficient e-skills, e-competence, may be unsuccessful in their interactions with ICTs and with e-services, a second disparity called the *e-skills divide* or the '*second order digital divide*'. The e-access and e-skills divides are known in the information systems literature as the 'digital divide'.

Although research on digital inequality has been carried out extensively in developed countries, there is far less research in developing countries and very little on countries in the Middle East. This paper contributes to much needed research on digital inequality in one developing country, Lebanon, with an analysis of the socio-economic, demographic, and cultural factors that contribute to the e-access and e-skills divides.

Long periods of occupation and war over several centuries have created continuous political instability that has increased social inequality. Today more than ever Lebanon experiences significant economic and educational disparities that reflect a deep divide in the society. The risk of poverty remains high for significant portions of the Lebanese population, with two-thirds of employees earning less than USD 600 per month (Bylos Bank 2008) and a high and increasing unemployment rate even among the educated elite. Lebanon ranks high in the human capital index (0.87) with one of the highest enrolment ratios of all Arab countries (UNDESA 2008); however, only 88% of the Lebanese are literate. Despite the fact that women's involvement in economic life has been rising, they rarely hold upper-management positions (6%), although Lebanon has a relatively high female participation rate in postsecondary education (about 50% of university students) (Lebanon Ministry of Social Affairs 2006). There is a significant rural-urban disparity in wealth and also an increasing income disparity inside urban and suburban areas; for example, rural regions throughout Lebanon have more than 60% of their residents who live below the poverty line (Laithy et al. 2008). Lebanon is a heterogeneous society composed of 18 religious groups with substantial differences between them; a significant divide separates Christians and Muslims (see McDowell 1996) that is the basis for the political regime.

Our interest is in moving beyond the barriers related to costs of the technology to focus on the antecedents of social and economic disparities that explain the digital divide. We investigate whether and in what ways income, individual occupation, educational, generational, gender disparities, regional (urban/rural), and religious disparities make a difference in the e-access and e-skills in the Lebanese society. The research reported here is based on a survey of 330 Lebanese potential users of e-services conducted in 2008. The paper is organized as follows: Part two provides definitions of the digital divide, e-access, and e-skills and briefly summarizes a very large research literature on antecedents that lead to the digital divide. Part three describes the research design, including the theoretical model, hypotheses, data collection, statistical procedures, and results. Part four briefly summarizes the findings.

2 DIGITAL DIVIDE DEFINITION AND RESEARCH ON THE ANTECEDENTS THAT LEAD TO THIS DIVIDE

ICTs and the Internet are not neutral artefacts; they are embedded in a socio-economic, demographic, cultural, and political context (Barzilai-Nahon 2006, Benbasat and Zmud 2003, Orlikowski and Iacono 2001). This context can help us understand reasons for the digital divide. We begin by defining the digital divide and its antecedents.

2.1 Definitions

Digital divide and e-inclusion (e-exclusion) are widely used by scholars to connote the inequalities of access and use of information and communication technology (ICT), with (somewhat) different definitions and operationalizations (see Cilan et al. 2009, NTIA 2000, Tapscott 1998, Vehovar et al. 2006). Initially, the focus was on access to information and communication technologies (ICTs). Researchers measured inequalities related to ICT ownership, availability, affordability, and its infrastructure (Barzilai-Nahon 2006). As computers and the Internet became more widely available, research evolved beyond technical access by users and the digital divide was reconceptualised as a consequence of varying individual capabilities or digital skills (van Dijk and Hacker 2003).

Today, the digital divide can be defined in several ways depending on how access and user's experiences or skills are defined and measured (DiMaggio et al. 2004). Indeed, Dewan and Riggins's (2005, p. 298) proposed two types of effects of the digital divide: (1) a first order effect, which represents the inequality in the access to ICT (e-access divide), and (2) a second order effect, which represents the inequality in the skills or the digital competence necessary to use ICTs (e-skills divide). The *e-access divide* represents the gap related to the difficulty in accessing ICTs (computer, Internet, and ADSL); access is considered as the first step of the usage and represents the physical contact with ICTs from any location. The *e-skills divide* represents the lack of skills related to ICT usage; having e-skills is considered the second step in using ICTs.

2.2 Summary of research on factors affecting the digital divide at the individual level

Extensive research indicates that the digital divide originates from economic and educational disparities; these are the primary predictors. (For extensive discussion on the nature of these disparities, see, for example, Çilan et al. 2009, Dewan and Riggins 2005, Helbig et al. 2009, Howard et al. 2001, Martin and Robinson 2004, Rogers 1995, Tapscott 1998). Recent studies suggest that social and cultural factors also have significant impact (e.g., Buente and Robbin 2008).

DiMaggio et al. (2004) also found that age and gender are the most important determinants of the digital divide. Notably, although men continue to make greater use of ICTs than women (Vehovar et

al. 2006), this gender-based gap is now lower than at the beginning of the decade and some researchers have even reported that by 2009, the gender gap had vanished in certain countries such as the United States, Sweden, the United Kingdom, and Canada. However, Buente and Robbin (2008, p. 1749) found that more women (56.1% avg.) than men (43.9% avg.) are non-users of the Internet and that the proportion of men to women remained relatively unchanged between 2000 and 2004. According Bélanger and Carter (2005), gender disparities related to income, to occupation, and education are positively related to the e-access divide and to the e-skills divide.

The literature also documents other factors that influence the digital divide, such as: social class, occupation, education, geographic location (urban/rural), ethnicity and race, religiosity, age and generation, and language (e.g., Buente and Robbin 2008, Chen and Wellman 2003, Dewan and Reggins 2005, Foulger 2001, Horrigan 2009, Losh 2004 and 2009, Noce and McKeown 2008, NTIA 1995, 2002, OECD 2004, Singh 2004, Vehovar et al. 2006).

3 MODELING THE FACTORS THAT AFFECT THE DIGITAL DIVIDE IN LEBANON

Part three describes the research design. Section 3.1 presents the research questions and hypotheses; Section 3.2, the theoretical model; Section 3.3, the sampling frame, survey design, and data collection**;** Section 3.4, statistical procedures; and Section 3.5, results and tests of significance. Figure 1 is the theoretical model. Tables 1 and 2 summarize the hypotheses, operationalization of the variables, and statistical results.

3.1 Research questions and hypotheses

Drawing on research findings summarized in the literature review of the antecedents of (factors that contribute to) the digital divide, we address the following research questions.

RQ1: What are the factors that make a difference for e-access and e-skills?

RQ2: In what way do socio-economic, demographic, cultural, and political factors explain the digital divide?

A series of hypotheses was formulated to examine the relationship between the seven independent variables of income, educational attainment, occupational status, gender, religion, region, and age and the two dependent variables of the e-access divide and e-skills divide. Tables 1 (Results of the study) and 2 (Impact of disparities between people on the e-access and e-skills divides) located in section 3.5 below identifies the hypotheses and their operationalization (along with the results in order to adhere to the submission page limits).

3.2 The theoretical model

Figure 1 describes the theoretical model that posits that income, education level, and occupation are negatively related to the e-access divide and to e-skills divide.

All the independent variables are single-item scales (Rossiter 2002). Single-item scales are employed because results of a recent study published by Bergkvist and Rossiter (2007), which compares the predictive validity of single-item and multiple item measures, found no differences in the predictive validity of multiple-item and single-item measures for constructs that consist of a concrete singular object. They concluded that single-items measures should be used for this type of construct.

The single-items composing the scales can be considered as reflexive. The two dependent variables are formative constructs. According to Diamantopoulos and Winklhofer (2001), the indicators cause rather than are caused by the latent variables measured by these indicators. Omitting one of the indicators would be equivalent to excluding a part of the construct (Bollen and Lennox 1991, p. 308).

The model also measures the impact of twelve composite variables on the e-access divide and e-skills divide (ESD). The composite variables are: Gender x Income, Gender x Education, Gender x Occupation, Religion x Income, Religion x Education, Religion x Occupation, Region x Income, Region x Education, Region x Occupation, Age x Income, Age x Education, and Age x Occupation.

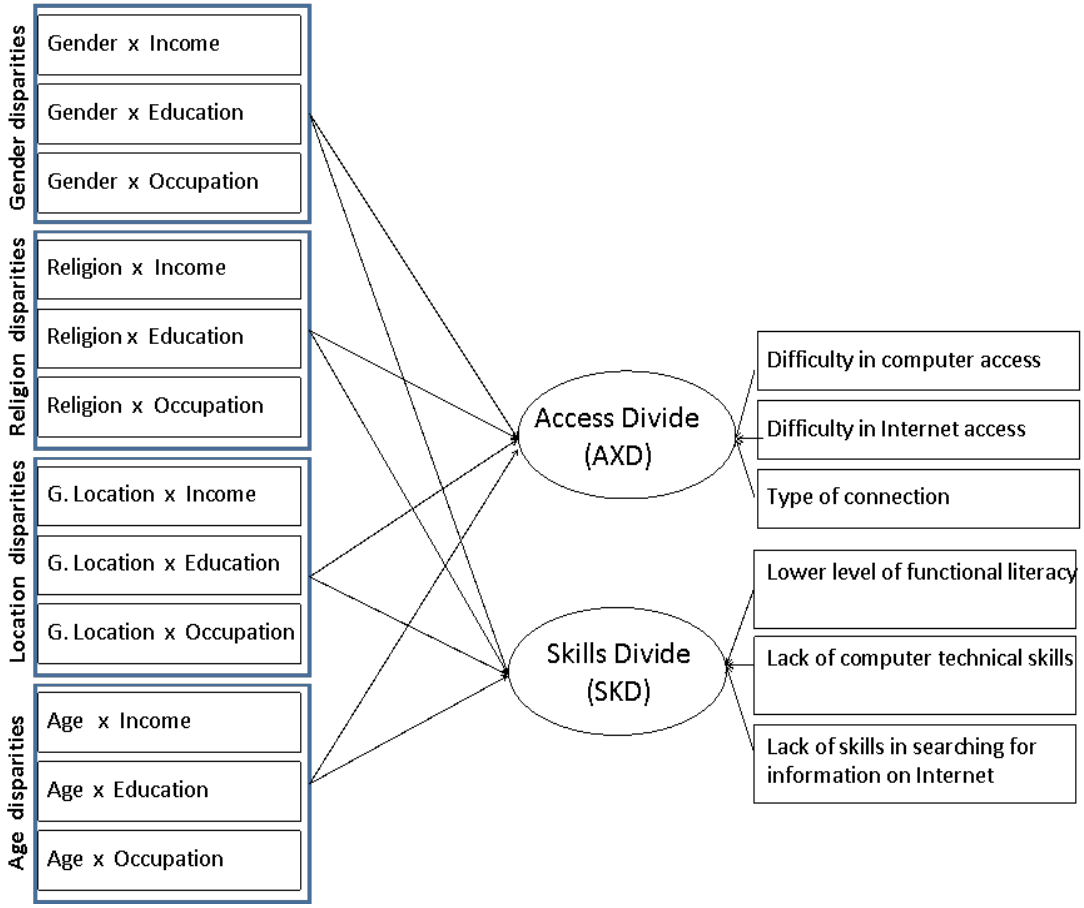

Figure 1 Antecedents of the digital divide

For individual-item scales, composite variables, and formative constructs, "the internal consistency is of minimal importance" (Diamantopoulos and Winklhofer 2001, p. 271, Nunnally and Bernstein 1994, p. 489). There is no need for internal consistency and construct validity for one-item scales such as income, education level, occupation, gender, religion, region, and age,. The same logic can be applied to the composite variables. Indeed, our nine composite variables are a simple multiplication of two single-item scales. And for the formative constructs (AXD and ESD), there is also no need to construct validity because two measures that might even be negatively related can both serve as meaningful indicators of a construct. Indeed, according to Diamantopoulos and Winklhofer (2001) 'conventional procedures used to assess the validity and reliability of scales composed of reflective indicators (e.g., factor analysis and assessment of internal consistency) are not appropriate for composite variables (i.e., indexes) with formative indicators'.

The *e-access divide* (AXD) is measured by three observed indicators: ease/difficulty in computer access (AXD1), ease/difficulty in Internet access (AXD2), ease/difficulty in Internet ADSL quick access (AXD3). The *e-skills divide* (SKD) is measured by three observed indicators: high/ lower level of functional literacy (ease/difficulty to read and write in Arab and in English) (SKD1), lack of computers technical skills (SKD2), lack of skills in finding the right information on the Internet (SKD3). The e-access and the e-skills do not include the user's motivation, willingness, or acceptance of ICTs which is the third and last step in ICT use. Also excluded are ethnicity and race variables because they are not relevant to the Lebanese context (in contrast, these are important variables in the US context; see Hoffman et al. 2000). We also did not include language (Foulger 2001) as an independent variable because it is incorporated in the first measure of the dependent variable 'e-skills divide'. The cost of technology as an independent variable is not included in the model because, according to the OGERO official website, an Internet connection is available in all regions at a very competitive price (30 US dollars).

3.3 Sampling frame, survey design, and data collection

The target population consists of potential users of public e-services in August 2008. We first obtained selected demographic characteristics of the population (gender, age, urban-rural geographic location, and education) from the CIA *FactBook 2008* and UNESCO (2009) reports. Lebanon is divided into 23 primary areas consisting of legislative districts whose elected representatives are either Muslim or Christian. A quota sample was drawn from all these legislative districts to reflect the distribution of the population 18 years of age and older based on the four characteristics in order to produce results that could be reliably projected to the Lebanese population. A comparison of the sample and population characteristics led to applying weights so that the sample was representative of the population on these four characteristics. In August 2008, a total of 330 respondents were interviewed face-to-face, consisting of 183 males and 147 females; 141 Christians and 189 Muslims; 215 urban and 115 rural inhabitants; and 69 less than elementary school completion, 106 secondary school completion, 93 university (license of three years) completion, and 62 university ad professional degrees.

A closed-ended survey was designed to ascertain the difficulty in computer, in Internet, and in ADSL access and the level of functional and digital literacy. Respondents were then invited to complete information related to their socio-economic, demographic, and cultural profile, such as gender, monthly income, age, address, occupation, and other socio-economic and demographic information. Since the respondents were all native Arabic speakers with a high level of literacy in English or French, a triple language instrument was designed to be administered in English, French, and Arabic (questionnaire available upon request).

3.4 Statistical procedures

Second generation statistical techniques were used to analyze the data. The second generation path modeling SmartPLS (partial least squares) offers advantages through the analysis of interrelated research questions by modeling the relationships among multiple independent and dependent constructs (Boudreau et al. 2001).

3.5 Results and tests of significance

The results of the inner path weighting scheme show an R^2 of 0.413 for the e-skills divide and an R^2 of 0.569 for the public e-access divide. In the model, 42% and 57% of the variation in the e-skills divide

and the e-access divide can be explained, respectively, by the explanatory variables. After bootstrap resampling (200 resamples), we found that some structural paths were significant at the 0.05 alpha while many others are not (results are summarized in Table 1):

Income has a negative impact on the e-skills divide (path = - 0.301), but no significant effect on the e-access divide (path = -0.08). As income increases, the e-skills divide decreases (H1b is validated). The access divide follows the e-skills divide, in the sense that those who know how to use ICTs will search for access. Those who do not know how to use ICTs will not make an effort to obtain e-access even if their income is high (H1a is not validated).

Like income, education has an effect on e-skills (path = -0.185), but no effect on the e-access divide (path = -0.08). The high level of education is unrelated to the e-access divide (H2a is not validated), but is negatively related to the e-skills divide. When education increases, the e-skills divide decreases (H2b is validated).

Gender and religion have an impact on the e-skills divide (path = 0.207 and 0.263), but no significant impact on the access divide (path = 0.092 and 0.016). Hypotheses H4a and H5a are not validated. Thus, in Lebanon, men and Christians have more e-skills than women and Muslims, respectively (H4b and H5b are validated).

Occupation and region are not correlated with e-access and e-skills divides. Therefore, Hypotheses H3a, H3b, H6a, and H6b are not validated.

Along with the e-skills divide, age is the only factor that impacts both the e-access and e-skills divides. The relationship is positive: when age increases, both e-access (path = 0.123) and e-skills divides (path= 0.289) increase. Hypotheses H7a and H7b are validated.

Hypotheses and Operationalization	**Path coefficient**	**T-value**	**Supported**
H1a. The higher the income, the lower the e-access divide. *Continuous variable and measured in US dollars*	-0.080	1.69	NO
H1b. The higher the income, the lower the e-skills divide.	-0.301*	5.O83	YES
H2a. High educational attainment is negatively related to the e-access divide. *Coded1=without or with only an elementary school education; 2=post-secondary education*	-0.080	2.19	NO
H2b. High educational attainment is negatively related to the e-skills divide.	-0.185*	4.055	YES
H3a. High individual hierarchical level (occupation) is negatively related to the e-access divide. *Coded 1=low hierarchical level at work; 2=high hierarchical level*	-0.024	0.672	NO
H3b. High individual hierarchical level at work (occupation) is negatively related to the e-skills divide.	-0.012	0.642	NO
H4a. Gender affects the e-access divide. *Coded 1= male; 2=fenale*	0.092	2.320	NO
H4b. Gender affects the e-skills divide.	0.207*	4.355	YES
H5a. Religion has an impact on the e-access divide. *Coded as 1=Muslim; 2=Christian*.	-0.016	0.637	NO
H5b. Religion has an impact on the e-skills divide.	-0.263*	5.855	YES
H6a. Urban/rural geographic location has an impact on the e-access divide. *Coded 1=urban; 2=rural*	0.016	0.642	NO
H6b. Urban/rural geographic location has an impact on the e-skills divide.	0.079	2.000	NO
H7a. The greater the age, the greater the e-access divide. *Continuous variable*	0.123*	2.445	YES
H7b. The greater the age, the greater the e-skills divide.	0.289*	5.063	YES

*significant at $p < 0.05$ ** $p < 0.005$ Bootstrapping employed with a 200 re-sampling procedure to determine T-values

Table 1 Results of the study

Gender, generational, religious, and geographic location (urban-rural) disparities related to income, to education level, and to occupation influence the e-skills and e-access divides (results are summarized in Table 2):

The impact of geographic location disparities on e-access divide is unambiguous. Results show that at the same educational level, geographic location has no effect on the e-access divide (H6e is not validated). But at the same income and occupation levels, geographic location disparities have a direct impact on the e-access divide (H6c and H6g are validated). This finding suggests that rural high income citizens and rural high occupational level citizens have a higher e-access divide. In other words, within an income category and within an occupation category, those living in rural areas are much less likely to have e-access than their urban counterparts.

Geographic disparities related to income, educational, and occupation have important effects on the e-skills divide (0.719, 0.343, and 0.721); we can conclude that Hypotheses H6d, H6f, and H6h are validated. These three factors are the most important predictors of the e-skills divide. Rural residents with higher income, higher educational attainment, and higher occupational status have a higher e-skills divide than their urban counterparts.

The effects of age disparities are visible for the e-access and e-skills divides. Results show that at the same income level and in the same occupational level, the young have greater access than seniors (H7c and H7g are validated). The young educated and wealthy also have greater e-skills than older educated and rich people. In other words, the e-skills divide increases with age at the same education level (H7f is validated) and at the same income level (H7d is validated). Occupation is also an explanatory factor; indeed, within the same occupation level the young are more likely to have more e-skills than seniors with the same occupation (H7h is validated).

Gender disparities also influence the digital divide. Results show that at the same income level, men have more e-skills than women (H4d is validated). But at the same educational level, men do not have greater e-skills than women (H4f is rejected). There are no differences in e-access between men and women at the same income and educational attainment levels. Therefore, H4c and H4e are rejected. However, between people at the same occupational level, men have greater e-access and higher level e-skills than women (H4g and H4h are validated).

Religious disparities have no effects on the e-access divide (H5c, H6e, and H5g are rejected). But results show this to be true only at the same educational attainment and occupation levels. Christians have more e-skills than Muslims (H5f and H5h are validated).

Hypotheses	Path	**T-value**	**Supported**
H4c. Gender disparities related to the income are positively related to the e-access divide.	-0.027	0.205	NO
H4d. Gender disparities related to the income are positively related to the e-skills divide.	-0.323*	1.950	YES
H4e. Gender disparities related to the level of education are positively related to the e-access divide.	0.060	0.465	NO
H4f. Gender disparities related to the level of education are positively related to the e-skills divide.	0.042	0.261	NO
H4g. Gender disparities related to the occupation (individual hierarchical level) are positively related to the e-access divide.	-0.157*	1.963	YES

H4h. Gender disparities related to the occupation (individual hierarchical level) are positively related to the e-skills divide	-0.134*	1.982	YES
H5c. Religious disparities related to income have a positive impact on the e-access divide.	0.010	0.067	NO
H5d. Religious disparities related to income have a positive impact on the e-skills divide.	0.079	0.527	NO
H5e. Religious disparities related to education level have a positive impact on the e-access divide.	-0.010	0.073	NO
H5f. Religious disparities related to education level have a positive impact on the e-skills divide.	0.308*	1.952	YES
H5g. Religious disparities related to the occupation (individual hierarchical level) have a positive impact on the e-access divide.	0.072	0.340	NO
H5h. Religious disparities related to occupation (individual hierarchical level) have a positive impact on the e-skills divide.	0.339*	1.963	YES
H6c. The greater the disparities between urban and rural geographic location related to income, the greater the e-access divide.	0.346*	1.95	YES
H6d. The greater the disparities between urban and rural geographic location related to income, the greater the e-skills divide.	0.719*	2.865	YES
H6e. The greater the disparities related to educational level, the greater the e-access divide.	-0.044	0.353	NO
H6f. The greater the disparities related to educational level, the greater the e-skills divide.	0.343*	1.970	YES
H6g. The greater the disparities between urban and rural geographic location related to occupation (hierarchical level), the greater the e-access divide.	0.263*	1.921	YES
H6h. The greater the disparities between urban and rural geographic location related to occupation (hierarchical level), the higher the e-skills divide.	0.721*	1.997	YES
H7c. The greater the age disparities related to income, the greater the e-access divide.	0.308*	1.971	YES
H7d. The greater the age disparities related to income, the greater the e-skills divide.	-0.154*	2.677	YES
H7e. The greater the age disparities related to educational attainment, the greater the e-access divide.	0.004	1.347	NO
H7f. The greater the age disparities related to educational attaainment, the greater the e-skills divide.	0.620*	1.974	YES
H7g. The greater the age disparities related to occupation (hierarchical level), the greater the e-access divide.	0.529*	2.751	YES
H7h. The greater the age disparities related to occupation (hierarchical level), the greater the e-skills divide.	0.249*	1.952	YES
*significant at $p < 0.05$ ** $p < 0.005$ Bootstrapping with a 200 re-sampling procedure to determine the T-values			

Table 2 Impact of disparities between people on the e-access and e-skills divides

4 CONCLUSION

Findings that address our research questions indicate that:

For the *e-access divide*:

The e-skills divide continues to be one of the main predictors of the e-access divide. People with high e-skills have e-access. Those without e-skills do not seek to have e-access: they will not make any effort to obtain access to ICTs. Age and region are two disparities that predict the e-access divide. Age disparities are the main predictors of the e-access divide: Young people are more favourably disposed toward innovation (Rogers 1995) and have been found to be more receptive to new technologies such as the Internet and computers. Urban residents are more connected than rural people, but neither the existing technical infrastructure and connection prices are the reasons behind this geographic disparity

For the *e-skills divide*:
The e-skills divide is largely explained by income, educational, gender, geographic, religious, and age inequalities. But among these regressors, geographic inequalities most influence the e-skills divide. Indeed, the country suffers from serious unequal wealth distribution. In a certain way, geographic disparities represent the nexus of wealth, politics, and religion in Lebanon. The largest concentrations of wealth are found in Beirut, Mount Lebanon, and the big cities. These same cities also concentrate the largest private and public investments of the country. This has led to considerable economic inequality. Because many Muslims live in rural areas, this adds a religious dimension to the divide. Since religion is at the heart of politics, this geographic divide takes on political meaning. This inequality is evident today and greater than ever.

This study provides additional evidence for the United States Agency for International Development 2005 survey that found that young, educated, and high income urban residents are the most connected to the Internet (USAID 2005). That is expected because e-skills increase with education. Young, rich, urban Christian males have more e-skills than others. This is directly related to the Lebanese education system, where more Christian students, who are wealthier, attend private educational institutions whose curriculum content is more rigorous, including introduction to foreign languages, skilled teachers, and an infrastructure that promotes computers and the Internet. As such, this explains why Internet research and leisure communication has become ubiquitous among young Lebanese Christians. The knowledge gap theory (Tichenor et al. 1970) is more than ever true.

References

Barzilai-Nahon, K. (2006), Gaps and bits: Conceptualizing measurements for digital divides. The Information Society, 22, 269–278.

Basu, S. (2004), E-government and developing countries: An overview. International Review of Law, Computers & Technology, 18 (1), 109-132.

Bélanger, F. and Carter, L. (2005). Trust and risk in e-government adoption. In Proceedings of the Eleventh Americas Conference on Information Systems, Omaha, Nebraska, USA, p. 1955.

Benbasat, I. and Zmud, R. (2003). The identity crisis within the IS discipline: Defining and communicating the discipline's core properties," MIS Quarterly 27 (2), 183-194.

Bergkvist, L., Rossiter, J. (2007). The predictive validity of multiple-item versus single-item measures of the same constructs, Journal of Marketing Research, 64, 175–184.

Bollen, K.A. and Lennox, R. (1991). Conventional wisdom on measurement: A structural equation perspective. Psychological Bulletin, 110, 305–314.

Boudreau, M.-C., Gefen, D., Straub, D.W. (2001). Validation in information systems research: A state-of-the-art assessment. MIS Quarterly, 25 (1), 1–16.

Buente, W., Robbin, A. (2008), Trends in internet information behavior, 2000–2004. Journal of the American Society for Information Science and Technology, 59 (11), 1743–1760.

Chen, W. and Wellman, B. (2003). Charting and bridging digital divides: Comparing socio-economic, gender, life stage, and rural-urban Internet access and use in eight countries. Retrieved September, 2007, from http://www.amd.com/us-en/assets/content_type/DownloadableAssets/FINAL_REPORTCHARTING_DIGI_DIVIDES.pdf

Çilan Ç.A., Bolat, B.A., and Coşkun, E. (2009), Analyzing digital divide within and between member and candidate countries o f European Union, Government Information Quarterly, 26, 98–105.

Dewan, S., Riggins, F.J. (2005). The digital divide: Current and future research directions. Journal of the Association of Information Systems, 6 (12), 298−337.

Diamantopoulos, A., Winklhofer H.M. (2001), Index construction with formative indicators: An alternative to scale development. Journal of Marketing Research, 38 (2), 269-277.

DiMaggio, P., Hargittai, E., Celeste, C., and Shafer, S. (2004), Digital inequality: From unequal access to differentiated use. In Social Inequality, ed. K Neckerman, pp. 355-400. New York: Russell Sage Foundation.

Foulger, D. (2001), Seven bridges over the global digital divide, IAMCR & ICA Symposium on Digital Divide, Austin, TX. Available: http:// evolutionarymedia.com/papers/digitalDivide.htm.

Grundén, K. (2009), A social perspective on Implementation of e-government: A longitudinal study at the country administration of Sweden. Electronic Journal of e-Government, 7 (1), 65-76.

Helbig, N., Gil-García, J.R, and Ferro, E. (2009). Understanding the complexity of electronic government: Implications from the digital divide literature. Government Information Quarterly, 26, 89–97.

Horrigan, J. (2009). Wireless internet use. Pew Internet & American Life Project, Washington, DC. Available: http://pewinternet.org/~/media//Files/Reports/2009/Wireless-Internet-Use.pdf

Howard, P., Rainie, L., and Jones S. (2001). Days and nights on the internet: The impact of a diffusing technology. American Behavioral Scientist, 45 (3), 383-404.

Knudsen, A. (2005), Precarious Peacebuilding: Post-war Lebanon, 1990-2005. CMI Working Paper 2005: 12, Christian Michelsen Institute, Bergen.

Laithy, H., Abou-Ismail, K., and Hamdan, K. (2008). Poverty, growth and income distribution in Lebanon. Country Study No. 13, p. 430. International Poverty Center, United Nations, New York.

Losh, S.C. (2004), Gender, educational, and occupation digital gaps. Social Science Computer Review, 22 (2), 152–166.

Losh, S.C. (2009). Generation versus aging, and education, occupation, gender and ethnicity effects in U.S. digital divides. The Proceedings, Atlanta Conference on Science and Innovation Policy, October 2-3, 2009.

Martin, S.P., and Robinson, J.P. (2004), The income digital divide: An international perspective. IT & Society, 1 (7), 1–20.

Noce, A. and McKeown, L. (2008), A new benchmark for Internet use: A logistic modeling of factors influencing Internet use in Canada in 2005, Government Information Quarterly, 25, 462–476.

NTIA (1995). Falling through the net: A survey of the "have nots" in rural and urban America. Economics and Statistics Administration, and the National Telecommunications and Information Administration, Wawshington, DC.

NTIA (2000). Falling through the net: Towards digital inclusion. Economics and Statistics Administration, and the National Telecommunications and Information Administration, Washington, DC.

NTIA (2002). A nation online: How Americans are expanding their use of the Internet. Economics and Statistics Administration, and the National Telecommunications and Information Administration, Washington, DC.

Nunnally, J.C., and Bernstein, I.H. (1994). Psychometric Theory. 3rd Edition. McGraw-Hill Inc., New York.

Organization for Economic Cooperation and Development. (2004). OECD Information Technology Outlook, 2004. Paris.

Orlikowski, W. and Iacono S. (2001). Research commentary: Desperately seeking the "IT" in IT research – A call to theorizing the IT artefact. Information System Research, 12 (2), 121-134.

Rogers, E.M. (1995), Diffusion of Innovations. 4th Edition. Free Press, New York.

Rossiter, J.R. (2002), The C-OAR-SE procedure for scale development in marketing. International Journal of Research in Marketing, 19, 305–335.

Singh, A.K. and Sahu R. (2008), Integrating internet, telephones, and call centers for delivering better quality e-governance to all citizens. Government Information Quarterly, 25, 477–490.

Singh, V. (2004). Factors associated with household Internet use in Canada, 1998–2000. Agriculture and Rural Working Paper Series No. 21-601-MIE. Statistics Canada, Ottawa.

Smith, A. (2010). Government online: The internet gives citizens new paths to government services and information. Available: http://pewinternet.org/Reports/2010/E-Government.aspx

SRI International. (2005). Patterns of ICT usage in Lebanon. Results of the 2004 ICT user survey. USAID, Washington, DC.

Tapscott, D. (1998). Growing up digital: The rise of the net generation. McGraw-Hill, New York.

Thomas, J. C. and Streib, G. (2003). The new face of government: Citizen-initiated contacts in the era of e-government. Journal of Public Administration Research and Theory, 13 (1), 83-102.

Tichenor, P.J., Olien, C.N., and Donohue, G.A. (1970), Mass media flow and differential growth in knowledge. Public Opinion Quarterly, 34, 159-170.

UNDESA (2008) UN e-government surveys: From e-government to connected governance, Department of Economic and Social Affairs, Division for Public Administration and Development Management, Report: ST/ESA/PAD/SER.E/11, ISBN 978-92-1-123174-8.

UNPAN (2008), The global information society: A statistical view. Partnership on measuring ICT. United Nations, New York. Available at: http://www.eclac.org/SocInfo

Van Dijk, J. and Hacker, K. (2003). The digital divide as a complex and dynamic phenomenon. The Information Society, 19, 315–326.

Vehovar, V., Sicherl, P., Hüsing, T., and Dolnicar, V. (2006). Methodological challenges of digital divide measurements. The Information Society, 22, 279−290.

Weber, L.M., Loumakis, A., Bergman, J. (2003). Who participates and why? An analysis of citizens on the Internet and the mass public. Social Science Computer Review, 21, pp. 26-43.