The type-of-internet-access digital divide and the well-being of ethnic minority and majority consumers: A multi-country investigation

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Abstract:

Wireless technologies and smartphones revolutionize the way consumers use the internet. How do these technological advancements affect consumer well-being or life satisfaction? We hypothesize that mobile- as compared to regular only- internet use enhances consumers' perceptions of personal economic situation, which in turn, enhances life satisfaction. Ethnic status (majority vs. minority) and national wealth (richer vs. poorer countries) set up boundary conditions for these effects. We test our hypotheses using multi-level modeling and a large scale multinational dataset covering responses of > 26,000 consumers from 21 countries. The results show that perceived personal economic situation mediates the relationship between type of internet access (regular vs. mobile) and life satisfaction; the positive effect of mobile internet use is weaker for ethnic minority than for majority consumers and stronger in poorer than in richer countries. We discuss the theoretical and practical implications for marketing and public policy.

Keywords: digital divide | majority and minority consumers | mobile internet | multi-level modeling | well-being

Article:

1. Introduction

By virtue of the internet, consumers can benefit from various digital opportunities, such as a greater breadth and depth of information about brands and prices, and facilitated access to news, entertainment, education, healthcare or governmental services. However, the digital revolution does not empower everybody equally, which creates social inequalities—a phenomenon known as the digital divide (Brown et al., 2016, Hoffman et al., 2001, Mossberger et al., 2012). The differences between those who can fully benefit from digital opportunities and those who cannot create social inequalities because the "different patterns of media usage influence life chances to different degrees depending on the particular activities in which people engage online" (Zillien & Hargittai, 2009, p. 275).

When the term digital divide was coined in the 1990s by Lloyd Morrisett, the former president of the Markle Foundation, it simply referred to the inequality between people who had access to the internet and those who did not (Hoffman et al., 2001). The recent rapid penetration of the mobile internet led many to argue that the digital divide will soon be closed (e.g., Stump, Gong, & Li, 2008). For example, the New York Times titled "Mobile Internet Use Shrinks Digital Divide" (Wortham, 2009). Similarly, IBM suggested that "… the gap between information haves and have-nots will cease to exist due to the advent of mobile technology" (Gahran, 2012). However, the nature and scope of the digital divide has evolved over time and the wealth of people and national economies is increasingly decided by the quality with which the internet can be used. In particular, although smartphones objectively increase digital inclusion and thus narrow the "have-internet-access" digital divide, they cannot fully substitute the comfort and usability of large screen devices with keyboards and higher processing power. A recent World Bank (2016) report on "Digital Dividends" states that "access to the internet from big-screen devices (PCs), with always-on flat-rate access, provides a bigger boost to economic activities than access from small-screen devices (mobile phones)" (p. 208). Hence, smartphones are less appropriate than regular computers to engage in economic value-creating activities (e.g., selling online, applying for a job, or participating in an educational program). As shops, jobs, education, and even healthcare services increasingly move online, those who mainly rely on smartphones to access the internet are disadvantaged creating a new form of the digital divide, the "type-of-internet-access" digital divide that perpetuates segregation in the real world (Brown et al., 2016, Mossberger et al., 2012, World Bank, 2016, Zickuhr and Smith, 2012).

An important but unaddressed research question, therefore, relates to how the type-of-internet-access available affects consumer well-being or life satisfaction. Consumer well-being is a central issue in marketing and consumer research because of the important influence of marketing on consumers' quality of life (Bhardwaj et al., 2011, Burroughs and Rindfleisch, 2002, El Hedhli et al., 2013, Sirgy, 2001). Researchers in this field call for studies that provide additional insights into how material possessions and consumption behaviors affect life satisfaction (Sirgy, 2008, Sirgy et al., 2010), particularly for disadvantaged consumers and in developing countries (Martin and Hill, 2012, Stump et al., 2008). In response, we aim to clarify the psychological process through which type-of-internet-access available (regular vs. mobile) affects life satisfaction and unveil boundary conditions of this process set by ethnic status (ethnic minority vs. majority consumers) at the individual level and economic wealth (richer versus poorer countries) at the country level. For the purpose of the present study, the term "ethnic minority" refers to a group of people whose ethnic origin in terms of race or ethnic affiliation is different from that of the majority population in a specific country. We develop a theoretical framework and test it using a large scale database with responses of > 26,000 consumers from 21 countries, thereby offering comprehensive insights into how the type-of-internet-access digital divide affects well-being on a global scale.

This research contributes to the social marketing and information management literatures in at least three important ways. First, we extend previous research on digital divides (Cruz-Jesus et al., 2016, Hoffman et al., 2001, Stump et al., 2008) by focusing on type-of-internet-access as a new and underexplored form of digital divide. Second, prior research has been silent about if and how digital inequalities impact consumer well-being or life satisfaction. We demonstrate that perceived personal economic situation acts as a key psychological mechanism through which

regular and mobile internet use affect life satisfaction. Third, numerous digital divide studies focus on digital inequalities between ethnic minority and majority consumers in the United States (Brown et al., 2016, Mossberger et al., 2012, Zickuhr and Smith, 2012). Surprisingly little is known about such a divide in other, particularly developing, countries (Stump et al., 2008). Drawing on theories of symbolic consumption (Kumar and Lim, 2008, Levy, 1959, Venkatesh and Davis, 2000) and the desirability of scarce possessions (Verhallen & Robben, 1994), we examine how ethnic status and national economic wealth shape type-of-internet-access effects on life satisfaction. Our results show that perceived personal economic situation mediates the effect of type-of-internet-access on life satisfaction; the positive effect of mobile-, as compared to regular only-, internet use is weaker for ethnic minority than for majority consumers and stronger in poorer than in richer countries. These findings not only advance our understanding of the factors that foster the type-of-internet-access digital divide and the psychological mechanisms that explain how digital divides affect life satisfaction, but also bring seemingly unrelated literatures together to form a new research avenue for future studies on consumers' digital life and social marketing.

We also offer a methodological contribution. Previous digital divide studies have largely neglected the nested structure of multi-country/multi-ethnic data (for an exception see Mossberger et al., 2012). Typically, these studies determine digital divide effects based on measures of the antecedents that are aggregated across groups of study participants (e.g., ethnic minorities vs. majorities). However, such an approach obscures the fact that each person idiosyncratically perceives how internet use affects his or her life; all individual-level information is lost and the statistical analysis loses power (Judge, Scott, & Ilies, 2006). We overcome this problem by employing a multi-level modeling technique in which we separate the individual-level effects from those that are caused by country-level characteristics.

The paper is structured as follows. We first review the study's contextual and conceptual background and then develop a theoretical framework that includes the effects of type-of-internet-access and ethnic status on perceived personal economic situation and life satisfaction at the individual level (level 1), and the effects of country cluster (richer vs. poorer) at the country level (level 2). We next report the multi-level modeling analysis and results. Finally, we discuss the theoretical and practical implications of the findings for marketing and public policy.

2. Contextual and conceptual background

2.1. Ethnic minorities and the type-of-internet-access digital divide

Particularly in the earlier times of the internet, ethnic minorities in the US (e.g., African Americans or Hispanics in the US) were less likely to own computers, less frequently used the internet and more often suffered from slow internet connections than those who belonged to the white majority population (Hoffman et al., 2001). More recent studies conducted in the US reveal significant differences in how differently ethnic minority and majority consumers access and use the internet. Ethnic minority consumers tend to use smartphone applications (e.g., e-mail, social networking, or listening to music) more frequently than majority consumers, and more likely use smartphones for purchasing online (Nielsen, 2012, Zickuhr and Smith, 2012). Brown et al. (2016) report that by the end of 2015, the share of US consumers who

accessed the internet through a home broadband connection was 73% of non-Hispanic whites, but only 55% of African Americans, and only 46% of Hispanics; at the same time the share of consumers who used the mobile internet was 94% of African Americans and Hispanics, but only 85% of non-Hispanic whites. Brown et al. (2016) also note that home broadband subscription rates between 2010 and 2015 continued to rise among non-Hispanic whites but stagnated among African Americans and Hispanics. The common picture that emerges from these and other studies is that majority consumers, as compared to ethnic minority, more likely enjoy broadband internet access via regular computers, whereas ethnic minority consumers more likely use smartphones as their dominant or only mode of internet connection (Brown et al., 2016, Mossberger et al., 2012, Nielsen, 2012, Zickuhr and Smith, 2012).

Such type-of-internet-access differences are important because smartphones, as compared to regular computers, are less suitable for engaging in economic value creating online activities, such as brand- or price-comparisons, applying for a job, or following an educational program (Brown et al., 2016, Mossberger et al., 2012, World Bank, 2016). For example, Donner and Walton (2013) report that consumers prefer regular computers over smartphones for seeking information for school, work, health, jobs or financial decisions. Focusing on screen-size as an important usability differentiator, Dunaway, Sui, and Newly (2015) find that smartphone users, as compared to regular computer users, spend less time on reading and interacting with news content, suggesting a more shallow type of information processing when smartphones are used. Similarly, a longitudinal study by Tossell, Kortum, Shepard, Rahmati, and Zhong (2015) shows that students who used smartphones for learning and accessing academic resources during one year of study evaluated these devices as detrimental to completing their educational goals. Hence, the type-of-internet-access differences between majority and ethnic minority consumers may have far-reaching consequences for economic prosperity and development at both the macro and the individual levels.

2.2. Consumer well-being: antecedents and consequences

Subjective well-being or life satisfaction broadly refers to an individual's cognitive and affective evaluations of life in the country where (s)he lives (Diener, 1994, Diener and Diener, 1995). Life satisfaction is at the heart of social marketing policy for its numerous objective benefits that directly or indirectly enhance prosperity and economic development (Sirgy, 2001). Life satisfaction is positively related to income, productivity, and job satisfaction, as well as to various other social- and consumption-related behaviors (Alegre et al., 2016, Qu and Zhao, 2012, Tay and Diener, 2011), such as the acquisition of status goods (Bhardwaj et al., 2011). Life satisfaction emerges from people's experiences in various life domains which concern quality of life in general (health, economy, infrastructure, etc.), and as a consumer in particular (satisfaction with marketplace experiences along the consumption cycle) (El Hedhli et al., 2013, Sirgy, 2001, Sirgy, 2008). Economic wealth and satisfaction with financial life are among the most commonly considered indicators of life satisfaction (Diener and Diener, 1995, Sirgy, 2001, Sirgy et al., 1995). Although both positive and negative effects of using the internet on life satisfaction are documented in the literature (Pénard, Poussing, & Suire, 2013), surprisingly little is known about how digital inequalities in general, and type-of-internet-access differences in particular, inform life satisfaction.

3. Research model and hypotheses

Drawing on the previously reviewed literature we develop a two-level research framework to examine the individual-level effects of type-of-internet-access and ethnic status, as well as the country-level wealth effects, on consumers' perceived personal economic situation and life satisfaction (Fig. 1). Perceived personal economic situation is the consumer's subjective assessment of his or her economic or financial wealth (Huang, Phau, & Lin, 2010). This construct broadly reflects the concept of economic well-being as commonly considered in research on quality of life (Diener and Diener, 1995, Sirgy, 2001, Sirgy et al., 1995).

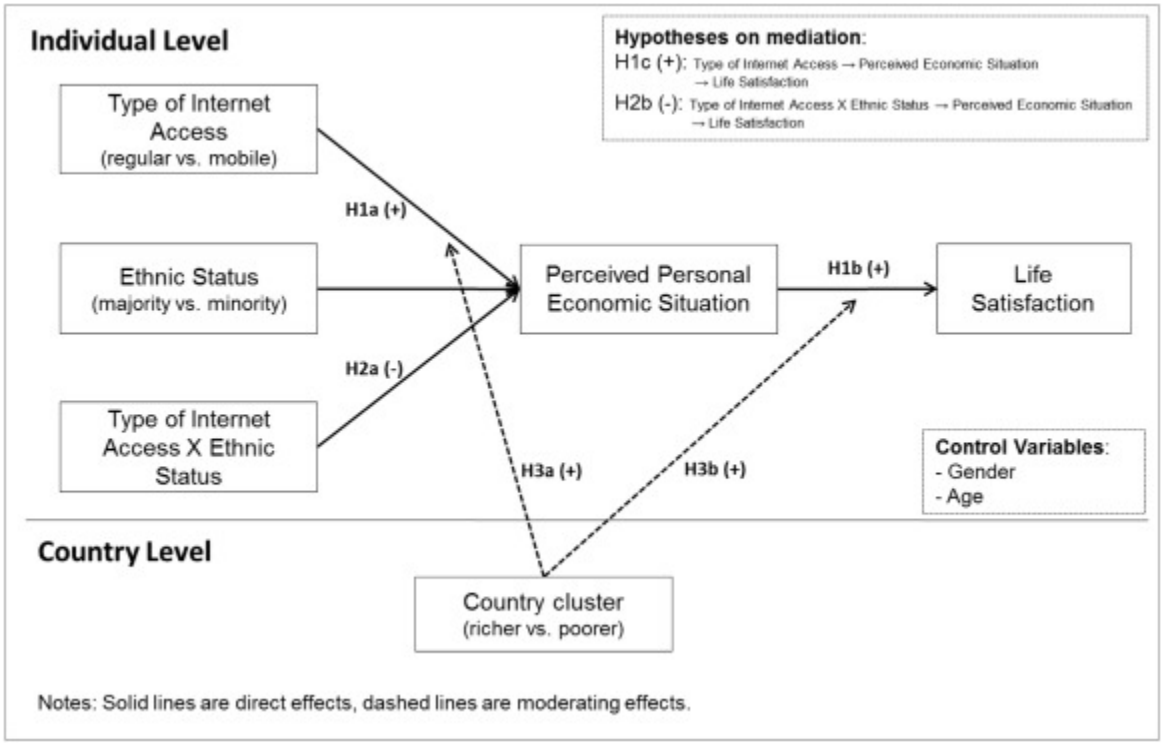

Fig. 1. A multi-level model of type-of-internet-access effects on life satisfaction.

3.1. Individual-level effects

Theories of symbolic consumption account for how differently regular- and mobile-internet use may affect consumers' perception of their personal economic situation. To paraphrase Levy (1959, p. 118), consumers use smartphones not only for what they can do but also for what these possessions mean to them. Consumers regard smartphones and mobile internet use as signs of personal wealth and achievement (Kumar and Lim, 2008, Mishra et al., 2014, Shankar and Balasubramanian, 2009), particularly in countries with lower penetration of mobile technologies (Gao, Rohm, Sultan, & Pagani, 2013). Arguably, such symbolic characteristics are less strongly associated with regular computers, which are normally not used in public and may be perceived as less innovative and, therefore, less apt to signal status (Kim, Briley, & Ocepek, 2015). Venkatesh and Davis (2000) emphasize the important role of prestige and status as motivational drivers of technology innovation adoption and acceptance. Thus, the symbolic outcomes of smartphone ownership and mobile internet use can be interpreted in terms of

prestige and status gains in one's social hierarchy. Consumers may feel that using a smartphone to access the internet helps expressing an image of high status or even superiority vis-à-vis others (Arbore, Soscia, & Bagozzi, 2014). Therefore, those who use smartphones to access the internet, as compared to those who access the internet only via regular computers, may perceive an enhanced status and personal economic situation.

> **H1a.** *Mobile-*, *as compared to regular only-*, *internet use enhances perceived personal economic situation*.

Perceived personal economic situation incorporates an individual's perception of the ability to satisfy material needs and meet financial obligations (Huang et al., 2010). Enhanced personal economic situation may help consumers exercise greater autonomy (Ryan & Deci, 2000), and is widely recognized among the most important precursors of life satisfaction (Martin and Hill, 2012, Sirgy, 2001, Sirgy, 2008, Sirgy et al., 1995), particularly in poorer countries (Diener & Diener, 1995). We accordingly expect a positive link between personal economic situation and life satisfaction.

> **H1b.** *Perceived personal economic situation is positively related to life satisfaction*.

The two preceding hypotheses suggest that perceived economic situation mediates the relationship between the type of internet access available and life satisfaction. Those who use the mobile internet, as compared to those who access the internet only via regular computers, feel more satisfied with life because of their enhanced perceptions of economic or financial wealth. Perceived personal economic situation, therefore, explains the psychological process through which type-of-internet-access affects life satisfaction.

> **H1c.** *Perceived personal economic situation mediates the positive effect of mobile* versus *regular only internet use on life satisfaction*.

Provided that smartphones, as compared to regular computers, are less suitable to engage in economic value creating online activities (Mossberger et al., 2012, World Bank, 2016, Zillien and Hargittai, 2009), and that ethnic minority consumers use smartphones more likely as their dominant or only mode of internet access, whereas majority consumers more likely use smartphones in addition to regular computers (Brown et al., 2016, Lopez et al., 2013, Mossberger et al., 2012, Zickuhr and Smith, 2012), it is conceivable that majority consumers can more efficiently engage in economic value creating online activities and gain greater economic benefits from the internet. Indeed, recent empirical evidence shows that relatively more ethnic minorities than majorities in the US consider being without broadband internet access at home a major disadvantage in key areas of life (job issues, government services, learning things, information and news) (Horrigan, Rainie, & Page, 2015). This suggests that the positive effects of mobile-, as compared to regular only-, internet use on perceived economic situation (and in turn on life satisfaction) are weaker for minority than for majority consumers.

H2. *The positive effects of mobile-, as compared to regular only-, internet use on* (*a*) *perceived personal economic situation and* (*b*) *life satisfaction are weaker for minority than for minority consumers*.

3.2. Country-level effects

In richer and more developed countries, as compared to poorer ones, the internet is more prevalent in daily life, more accessible and more affordable to larger parts of the population. In developed countries, there are more internet based services, more online job offers, and more products being purchased over the internet than in developing countries (World Bank, 2016). About 81.3% of the households in developed countries have internet access, compared with only 34.1% in developing countries and only 6.7% in the least developed countries; moreover, the average monthly broadband price (in purchasing power parity) in developing countries is two to three times higher than that in developed countries (International Telecommunication Union, 2015). Hence, accessing the internet is relatively more expensive and, therefore, less accessible to people in poorer than in richer countries.

Commodity theory (Verhallen & Robben, 1994) predicts a scarcity effect, meaning that the value or the desirability of economic products is enhanced if their availability is limited. This suggests that the status enhancement function of smartphones and mobile internet use on perceived economic situation and life satisfaction (as stated in *H1*) will be stronger in poorer than in richer countries because of increased scarcity of the internet. Indeed, research shows that people in poorer countries base their life satisfaction judgments more heavily on financial and status concerns than people in wealthier countries (Diener & Diener, 1995). Similarly, Batra, Ramaswamy, Alden, Steenkamp, and Ramachander, 2000, p. 85) note that concerns with status displays are of greater importance in developing countries "where, because of economic transition, income disparities and status mobility are high." We accordingly presume that national wealth moderates the effects of type-of-internet-access, such that the positive effect of mobile-, as compared to regular-only, internet use on perceived economic situation (and in turn on life satisfaction) are stronger in poorer than in richer countries.

H3. *The positive effects of mobile-, as compared to regular only-, internet use on* (*a*) *perceived personal economic situation, and* (*b*) *life satisfaction are stronger in poorer than in richer countries*.

4. Study

4.1. Sample and measures

We used data from the 2012 Pew Global Attitudes Survey to test the proposed theoretical framework. This database includes responses from a total of 26,210 consumers from 21 countries. Respondents with incomplete information (e.g., no information about their ethnic background) and inconsistent information (e.g., indicating mobile internet usage in one place but providing an opposite answer in another) were dropped from the analysis, leaving a final sample of $N = 15{,}349$.

Ethnic status was determined by whether respondents belong to a majority or an ethnic minority group, according to their race or ethnic affiliation in the country they resided in. For example, in the US, those who classified themselves as not belonging to the white majority population were classified as ethnic minorities. Similarly, in Russia, those who indicated to hold a different nationality than Russian (e.g., Tatar, Ukrainian or Chuvash) were classified as ethnic minorities. Countries were grouped into richer and poorer based on the Gross Domestic Product Based on Purchasing-Power-Parity Per Capita (GDP) (www.gfmag.com). Countries with a GDP greater than US$20,000 are richer countries, including the USA, Japan, and eight European Union countries. Countries with at GDP smaller than US$20,000 are poorer countries, including Russia, and several Asian-, Middle Eastern, North African- and South American countries. Respondents from richer countries were on average ten years older than those in poorer countries. Gender distribution, the percentage of ethnic minorities, and the percentage of mobile internet users were roughly the same in both country clusters. Detailed sample characteristics appear in Appendix A.

Internet use was measured by the question of "Do you use the internet at least occasionally?" (No/Yes), and mobile internet use was measured by the question of "Do you use your mobile phone to access the internet?" (No/Yes). Perceived personal economic situation was measured by the question of "Thinking about your personal economic situation, how would you describe it?" (1 = Very bad; 2 = Somewhat bad; 3 = Somewhat good; 4 = Very good). Life satisfaction was measured by the question of "Overall, are you satisfied or dissatisfied with the way things are going in our country today?" (0 = Dissatisfied; 1 = Satisfied).[1]

The measures for perceived economic situation and life satisfaction are single-item. Whereas practitioners commonly favor single-item measures for practical reasons, academics widely believe that multi-item measures are in most cases necessary to represent marketing constructs (Diamantopoulos, Sarstedt, Fuchs, Wilczynski, & Kaiser, 2012). However, it has also been argued and empirically proven that single-item measures are appropriate to validly represent a construct if the object being rated is simple and unambiguous to the respondents (Drolet and Morrison, 2001, Rossiter, 2002). For example, Bergkvist and Rossiter (2007) demonstrate empirically that simple single-item measures of non-abstract constructs predict equally well as multi-item measures. Indeed, using single-item measures to assess life satisfaction or well-being with life-domains is a common practice in quality of life research (Sirgy et al., 1995, Sirgy et al., 2010). Presuming that the two psychological constructs used in the present research, perceived personal economic situation and life satisfaction, are non-abstract and unambiguous, we adopt the measures used by Pew Research Center.

4.2. Exploring digital divides

The data provided by the Pew Research Center shows that 62.7% of the respondents use the internet. This number is approximately the same for majorities (62.9%) and ethnic minorities (61.2%), suggesting that internet penetration is not contingent on ethnic status ($\chi^2 = 0.28$, $df = 1$, $p > 0.1$). However, among all internet users, ethnic minority consumers use the mobile internet significantly more frequently (54.9%) than majority consumers (46.0%) and vice versa ($\chi^2 = 18.97$, $df = 1$, $p < 0.01$). There are significantly fewer people with internet access in poorer countries (48.8%) than in richer countries (81.3%; $\chi^2 = 1698.25$, $df = 1$, $p < 0.01$). Hence, the data clearly echoes the findings reported in recent digital divide studies (Brown et al.,

2016, Lopez et al., 2013, Mossberger et al., 2012, Nielsen, 2012, World Bank, 2016, Zickuhr and Smith, 2012) and corroborates the rationales proposed in our theoretical developments: ethnic minority consumers, as compared to majority, are more "smartphone dependent" to access and use the internet, and internet access is scarcer in poorer than in richer countries.

To substantiate the introductory argument that smartphones, as compared to regular computers, are still less appropriate to engage in economic value-creating activities, we collected data from 209 consumers (59.8% female; 79.9% older than 24 years; 67.9% Caucasian ethnicity) in the U.S. through Amazon Mechanical Turk, all of whom owned both a computer and a smartphone. Participants were asked to report how frequently they used a regular computer or a smartphone to engage in a list of common economic value-creating online activities (Table 1) during the past 10 days, using 12-point rating scales (1 = never to 12 = > 40 times a day). The selection of economic value-creating online activities was initially based on an exhaustive list of 143 worldwide most popular online activities (www.infoplease.com/ipa/A0921862.html). In-depth discussions were then performed among the authors, leading to 13 most relevant economic value-creating online activities. As shown in Table 1, the results show that regular computers, as compared to smartphones, are significantly more often used to engage in all 13 economic value-creating online activities, suggesting that there is a general preference for regular computers, and that a usability gap between smartphones and regular computers still exists.

Table 1. Devices used to complete economic value creating online activities.

	Regular computer	**Smart-phone**	**Mean difference**	**Std. deviation**	**t**	**df**	**Sig. (2-tailed)**
… send or read email	6.32	5.04	1.27	3.28	5.61	208	0.00
… use a search engine to find information	7.61	5.38	2.23	3.34	9.68	208	0.00
… research a product or service before buying	4.73	3.34	1.39	2.66	7.58	208	0.00
… buy a product	3.33	2.44	0.89	1.82	7.07	208	0.00
… research for school or training	2.92	2.08	0.84	2.44	4.99	208	0.00
… look for repair information	3.36	2.72	0.65	2.19	4.27	208	0.00
… do any time of research for your job	4.28	2.39	1.89	2.93	9.29	208	0.00
… look online for info about a job	3.29	2.13	1.16	2.18	7.67	208	0.00
… get financial info online	2.74	1.95	0.79	1.78	6.46	208	0.00
… look for info about a place to live	2.35	1.83	0.52	1.94	3.89	208	0.00
… sell something online	2.44	1.93	0.51	1.65	4.48	208	0.00
… buy or sell stocks, bonds, or mutual funds	1.92	1.59	0.33	1.42	3.35	208	0.00
… do any banking online	4.10	3.36	0.74	2.27	4.69	208	0.00

4.3. Hypotheses testing

The proposed model was tested using multilevel modeling through MPlus software, which partitioned individual-level and country-level variances and thus accommodated the nested structure of the data used in this research (Muthén & Muthén, 2007). We attended to variables at two levels of analysis: (1) the level-1 model addressed the question of how type-of-internet-access and ethnic status affect perceived personal economic situation and life satisfaction; and (2) the level-2 model differentiates countries based on their level of economic development (richer vs. poorer). Fig. 2 illustrates the results. Respondents' gender and age served in all analyses as control variables. Gender shows a strong and significant negative effect on perceived

personal economic situation ($B = -0.16$; $p < 0.01$), and age shows a small positive effect ($B = 0.002$; $p < 0.05$) in predicting life satisfaction (suggesting that males tend to perceive their economic situation to be better than females and that life satisfaction slightly increases with age).

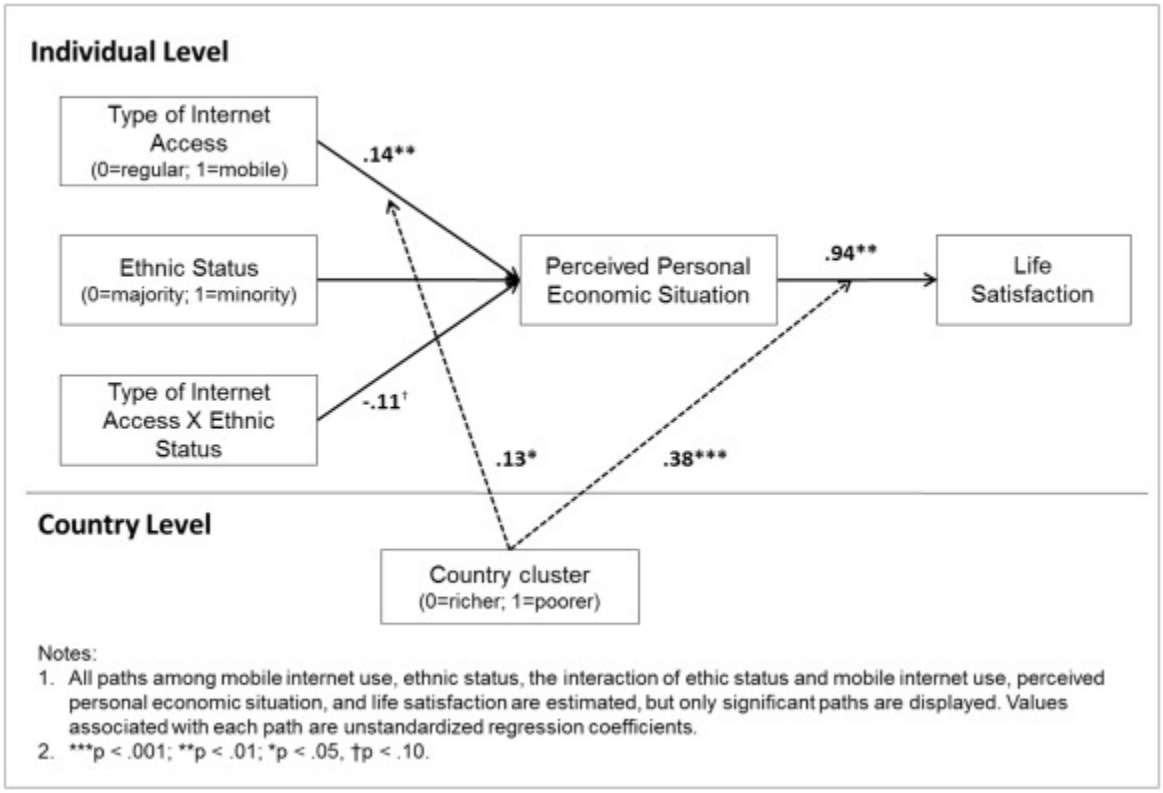

Fig. 2. Results of the multilevel model of mobile internet use.

4.3.1. Testing hypotheses at the individual level

Mobile, as compared to regular-only, internet access has a significant positive effect on perceived economic situation ($B = 0.14$; $p < 0.01$), in support of *H1a*, and perceived economic situation has a significant positive effect on life satisfaction ($B = 0.94$; $p < 0.001$), in support of *H1b*. Follow-up analyses on the effect of mobile, as compared to regular-only, internet use on life satisfaction reveals a significant indirect effect via perceived economic situation ($B = 0.11$; $p < 0.01$), thereby supporting *H1c*.

In *H2*, we predicted that the positive effect of mobile, as compared to regular-only, internet access on (*a*) perceived personal economic situation and (*b*) life satisfaction is weaker for minority than for majority consumers. In support of *H2a*, we find a (marginally) significant negative interactive effect of type-of-internet-access and ethnic status on perceived economic situation ($B = -0.11$; $p < 0.10$). Also, in support of *H2b*, the interaction term shows a (marginally) significant negative indirect effect of type-of-internet-access on life satisfaction through perceived economic situation ($B = -0.10$; $p < 0.10$).

4.3.2. Testing hypotheses at the country level

With *H3* we predicted that the positive effect of mobile, as compared to regular-only, internet access on (*a*) perceived personal economic situation, and (*b*) life satisfaction is stronger in poorer than in richer countries. In support of *H3a*, we find a significant positive interactive effect of type-of-internet-access and country cluster on perceived economic situation ($B = 0.13$; $p < 0.05$). Besides, in support of *H3b*, we find that the positive effect of perceived personal economic situation on life satisfaction is significantly stronger for consumers in poorer than in richer countries ($B = 0.38$, $p < 0.001$).

5. Discussion

In line with the growing research interest in how material possessions and consumption behaviors affect life satisfaction (Martin and Hill, 2012, Sirgy, 2008, Sirgy et al., 2010, Stump et al., 2008), our research goal was to examine how a new form of digital divide, the type-of-internet-access digital divide, affects consumer well-being or life satisfaction. Since the end of the 1990s, the digital divide—defined as the gap between those who have, and those who do not have access to the internet—has been an important concern for marketers and policy makers. Extending this stream of research, we demonstrate that even if internet access per se is not an issue (i.e., the "have-internet-access" digital divide being nearly closed in developed countries), the type-of-internet-access available (regular vs. mobile) manifests as a new form of digital divide with important consequences for economic well-being and life satisfaction.

5.1. Theoretical contributions

We submitted that smartphone ownership and mobile internet use carry symbolic values of prestige and status (e.g., Kim et al., 2015, Kumar and Lim, 2008, Mishra et al., 2014), which affect how consumers perceive their personal economic situation. Accordingly, our multi-level analysis on a large-scale 21-country database shows that mobile, as compared to regular-only, internet users perceive an enhanced personal economic situation which raises their life satisfaction. As a mediator variable, perceived personal economic situation can effectively account for the link between type of internet access available and life satisfaction.

Many, if not most, consumers today use the internet as a means for economic value creation, especially in situations when they compare products and prices, look for job information, and follow an educational program. Ethnic minority consumers depend more on smartphones as their only means to access the internet, whereas majority consumers more likely enjoy the comfort of both regular computers and smartphones to use the internet (e.g. Brown et al., 2016, Mossberger et al., 2012, Zickuhr and Smith, 2012). Provided that smartphones, as compared to regular computers, are less suitable for engaging in economic-value enhancing online activities (Brown et al., 2016, Mossberger et al., 2012, World Bank, 2016), we argued that majority consumers derive greater economic benefits from using the mobile internet, and the positive effects of using the mobile internet on perceived economic situation and life satisfaction should therefore be enhanced for majority consumers. The data confirmed this hypothesis. Hence, a paradox evidenced by our research is the boon and the bane of the increasing availability of the mobile internet. On the one hand, smartphones foster digital inclusion and mobile internet users (as compared to regular-only) may experience status gains; on the other hand, greater smartphone dependency among ethnic minority- as compared to majority consumers creates disadvantages

that result in lower life satisfaction. Finally, our results show that the positive effects of mobile internet use are stronger in poorer than in richer countries. This resonates with the fact that accessing the internet is comparably more expensive and more likely seen as scarce possessions in poorer countries (cf., Verhallen and Robben, 1994, World Bank, 2016); the symbolic value of smartphone ownership may be greater in poorer than in richer countries. In sum, our theoretical framework and empirical findings offer important contributions to both the quality-of-life and digital divide literatures; they offer insights into a new form of digital divide, advance our understanding of how the type-of-internet-access affects life satisfaction and the conditions that promote the type-of-internet-access digital divide.

5.2. Public policy and marketing implications

Governments must guarantee and facilitate access to goods and services that satisfy basic human needs such as food or shelter. The ability to communicate with others is another basic human need that constitutes an important foundation of social organizations. However, the idea that access to the internet is a basic human right, as declared by the United Nations (La Rue, 2011), appears to be not enough to combat situations of digital inequality within and between nations. Our results suggest that those who depend mainly on smartphones to access the internet (foremost ethnic minority consumers) cannot fully benefit from economic value creating online opportunities and turn out to be less satisfied with life than those who can more easily afford both regular and mobile internet access (foremost majority consumers).

There is an important discussion on the potential of wireless network technologies helping developing countries leapfrog essential stages of digital development (World Bank, 2016). In many sectors, such as mobile banking, some poorer countries may even appear to be ahead of richer ones in terms of mobile service adoption and innovation development. For example, in 2015, India's ICICI bank was acquiring some 300,000 customers for mobile banking every month (Metha, 2015). While there is no doubt that wireless networks enable inexpensive and easy access to many digital services, they are not fully substitutable for significantly more expensive fixed networks (using copper or fiber), either in usage or in performance. Developing countries that neglect fixed network development may, therefore, become stuck with a second-class internet provision that fails to deliver the expected long term benefits (World Bank, 2016). Hence, in line with our empirical results, the optimistic narrative about the mobile internet closing the digital divide, as frequently advocated by both the industry and the popular press, seems to be a doubtful truth. More evident appears that substituting regular with mobile internet access promotes the “Matthew Effect,” the idea that for some cause the rich are getting richer whereas the poor are getting poorer.

Hardware producers are challenged to develop innovative solutions that integrate the mobile with the non-mobile world. Cloud computing has the potential to democratize access to computing power and software applications. Moreover, the latest generations of smartphones may be powerful enough to deliver serious desktop computing experiences when coupled with appropriate interface devices. For example, companies such as Andromium, ASUS, Livi Design, or Motorolla have recently started to market so-called desktop replacing solutions—devices that connect smartphones to a screen, a regular keyboard, and a mouse, which can help those with limited access to regular computers to use basic desktop functions such as word processing or

spreadsheet calculations. However, such innovations have not yet gained momentum and one cannot be sure if consumers perceive them offering the same level of functionality and user experiences as with desktop based experiences. Given the important consequences of the type-of-internet-access digital divide, we hope that hardware producers will further innovate in this field, that telecommunication providers integrate such products in their mobile-phone plans, and that governments subsidize such products and their development as a means to provide equal chances for everyone to flourish. The Indian company Ringing Bells has recently, in July 2016, launched an ultra-affordable 3G smartphone at a price of < 4 US$, "hoping to catalyse sales and help bring millions of Indians online" (The Economic Times, 2016). Ringing Bells may hit this goal and even the poorest will soon be connected to the (mobile) internet. However, based on the results provided in this study we believe that initiatives that facilitate access to regular computers, such as the One Laptop per Child (OLPC) program (http://one.laptop.org), will have more beneficial, sustainable and long term effects on economic wealth and the well-being of people.

5.3. Limitations and future research directions

In line with earlier studies that tackled the type-of-internet-access digital divide (e.g., Brown et al., 2016, Lopez et al., 2013, Mossberger et al., 2012, Nielsen, 2012, Zickuhr and Smith, 2012), we differentiated internet users depending on whether they were regular-only or mobile (smartphone) internet users. Further studies should use gradual measures that capture degrees of internet usage intensity on different devices and thus offer a more fine-granulated picture of the effects examined in the present study. Relatedly, the data made available by the Pew Research Center did not allow us to differentiate regular- and mobile- internet users in terms of the concrete type of device used (e.g., desktop PC, laptop PC). Tablet PCs as well as hybrid laptops (detachables or convertibles) may be seen as an intermediate form of computer between a regular PC (desktop or laptop) and a smartphone and should be differentiated in further studies. Given that modern devices (foremost tablet PCs), are increasingly equipped with 4G/LTE (Long Term Evolution) mobile technologies, we expect that particularly socioeconomically disadvantaged consumers will tend to substitute regular (fixed) internet access with (cheaper) mobile-only solutions. To the extent that mobile networks constitute second-class internet (World Bank, 2016), the type-of-internet-access digital divide may therefore even augment within the developed countries, regardless of the type of device used. Further research is needed to examine this development and its consequences. Moreover, given the rapid pace of technological development with the advent of increasingly more powerful smartphones and other mobile devices, another form of digital divide may manifest: the degree to which individuals are able to master new technologies and climb the learning curve to capitalize on mobile technology, something that may be called "mobile computing technology literacy divide". We encourage future researchers to explore this possibility.

Our theoretical developments focused on perceived personal economic situation as a psychological mechanism to explain how the available type-of-internet-access affects life satisfaction. While our results document the mediating role of this construct, it may well be that type-of-internet-access affects life satisfaction also through other paths, as suggested by the life domain concept. Accordingly, life satisfaction is functionally related to satisfaction with various life domains (e.g., satisfaction with community life, family life, work life, and social life); in

turn, satisfaction with a particular life domain (e.g., satisfaction with community life) is influenced by lower levels of life concerns within that domain (e.g., satisfaction with community conditions and services) (Sirgy et al., 2010, p. 297). Using the mobile internet via smartphones may positively affect satisfaction with one particular domain but not with another. Future studies should examine such possibilities.

Appendix A. Sample characteristics

Country cluster	Country	GDP 2013	N	Age mean (*SD*)	% Female	% minorities	% mobile users
Richer countries	USA	51,248	667	50.6 (*18.0*)	55.0	21.1	47.1
	Germany	39,993	832	49.2 (*16.5*)	50.6	2.9	28.1
	Japan	37,525	527	45.5 (*16.3*)	49.7	0.4	54.8
	UK	37,502	687	51.6 (*17.3*)	47.6	8.6	43.1
	France	35,942	761	46.4 (*17.0*)	50.3	9.7	34.4
	Spain	30,620	729	45.7 (*14.8*)	51.2	10.7	35.7
	Italy	30,094	723	46.5 (*16.0*)	54.5	1.2	26.0
	Czech Rep.	27,663	649	47.1 (*16.8*)	47.0	3.4	28.4
	Greece	23,930	410	44.5 (*16.4*)	49.8	6.6	11.7
	Poland	21,005	612	41.0 (*14.5*)	51.3	0.3	31.5
	Total		6597	47.0 (*16.6*)	50.8	6.6	34.4
Poorer countries	Russia	18,671	578	41.4 (*16.1*)	55.0	11.9	35.8
	Lebanon	16,127	606	38.6 (*14.0*)	46.9	0.0	23.8
	Mexico	15,932	574	35.8 (*13.3*)	53.3	20.7	25.4
	Turkey	15,578	685	35.5 (*13.9*)	41.2	12.3	33.1
	Brazil	12,340	634	38.7 (*14.4*)	51.4	17.5	18.9
	Tunisia	10,200	782	37.6 (*14.0*)	48.3	4.0	18.9
	China	10,011	2292	38.3 (*12.1*)	48.8	2.9	36.2
	Egypt	6653	589	37.0 (*12.8*)	48.4	0.0	12.7
	Jordan	6199	661	34.6 (*12.6*)	45.4	0.0	18.9
	India	4060	990	35.0 (*13.1*)	41.0	1.3	19.3
	Pakistan	2970	361	32.7 (*11.6*)	35.2	30.5	2.8
	Total		8752	37.1 (*13.4*)	47.2	6.9	25.4
Total			15,349	41.4 (*15.7*)	48.7	6.8	29.3

Notes: * *GDP = Gross Domestic Product Based on Purchasing-Power-Parity* Per Capita *in US*$ (*source*: www.gfmag.com).

References

Alegre, I., Mas-Machuca, M., & Berbegal-Mirabent, J. (2016). Antecedents of employee job satisfaction: Do they matter? Journal of Business Research, 69(4), 1390–1395.

Arbore, A., Soscia, I., & Bagozzi, R. P. (2014). The role of signaling identity in the adoption of personal technologies. Journal of the Association for Information Systems, 15(2), 86.

Batra, R., Ramaswamy, V., Alden, D. L., Steenkamp, J.-B. E. M., & Ramachander, S. (2000). Effects of brand local and nonlocal origin on consumer attitudes in developing countries. Journal of Consumer Psychology, 9(2), 83–95.

Bergkvist, L., & Rossiter, J. R. (2007). The predictive validity of multiple-item versus single-item measures of the same constructs. Journal of Marketing Research, 44(2), 175–184.

Bhardwaj, V., Park, H., & Kim, Y.-K. (2011). The effect of Indian consumers' life satisfaction on brand behavior toward a US global brand. Journal of International Consumer Marketing, 23(2), 105–116.

Brown, A., López, G., & Lopez, M. H. (2016). Digital divide narrows for Latinos as more Spanish speakers and immigrants go online. Pew Research Center Available from www.pewinternet.org [Accessed 26th July 2016].

Burroughs, J. E., & Rindfleisch, A. (2002). Materialism and well-being: A conflicting values perspective. Journal of Consumer Research, 29(3), 348–370.

Cruz-Jesus, F., Vicente, M. R., Bacao, F., & Oliveira, T. (2016). The education-related digital divide: An analysis for the eu-28. Computers in Human Behavior, 56, 72–82.

Diamantopoulos, A., Sarstedt, M., Fuchs, C., Wilczynski, P., & Kaiser, S. (2012). Guidelines for choosing between multi-item and single-item scales for construct measurement: A predictive validity perspective. Journal of the Academy of Marketing Science, 40(3), 434–449.

Diener, E. (1994). Assessing subjective well-being: Progress and opportunities. Social Indicators Research, 31(2), 103–157.

Diener, E., & Diener, M. (1995). Cross-cultural correlates of life satisfaction and self-esteem. Journal of Personality and Social Psychology, 68(4), 653–663.

Donner, J., & Walton, M. (2013). Your phone has internet-why are you at a library PC? Re-imagining public access in the mobile internet era. In P. Kotzé, G. Marsden, G. Lindgaard, J. Wesson, & M. Winckler (Vol. Eds.), Human-computer interaction – Interact 2013. Vol. 8117. Human-computer interaction – Interact 2013 (pp. 347–364). Heidelberg: Springer.

Drolet, A. L., & Morrison, D. G. (2001). Do we really need multiple-item measures in service research? Journal of Service Research, 3(3), 196–204.

Dunaway, J., Sui, M., & Newly, P. (2015). Does (screen) size matter? News engagement on computers, tablets, and smartphones. Paper presented at the TPRC 43: The 43rd research conference on communication, information and internet policy Available at SSRN: http://ssrn.com/abstract=2579849 [Accessed 26th July 2016].

El Hedhli, K., Chebat, J.-C., & Sirgy, M. J. (2013). Shopping well-being at the mall: Construct, antecedents, and consequences. Journal of Business Research, 66(7), 856–863.

Gahran, A. (2012). Really? IBM predicts the end of the digital divide in 5 years. Available from http://edition.cnn.com, Accessed date: 15 June 2016.

Gao, T. T., Rohm, A. J., Sultan, F., & Pagani, M. (2013). Consumers un-tethered: A three-market empirical study of consumers' mobile marketing acceptance. Journal of Business Research, 66(12), 2536–2544.

Hoffman, D. L., Novak, T. P., & Schlosser, A. E. (2001). Evolution of the digital divide: How gaps in internet access may impact electronic commerce. Journal of Computer-Mediated Communication, 5(3), http://dx.doi.org/10.1111/j.1083-6101.2000.tb00341.x.

Horrigan, J. B., Rainie, L., & Page, D. (2015). Home broadband 2015. Available from www.pewinternet.org, Accessed date: 26 July 2016.

Huang, Y.-A., Phau, I., & Lin, C. (2010). Consumer animosity, economic hardship, and normative influence: How do they affect consumers' purchase intention? European Journal of Marketing, 44(7/8), 909–937.

International Telecommunication Union (2015). ICT facts and figures 2015. Available from www.itu.int, Accessed date: 10 October 2015.

Judge, T. A., Scott, B. A., & Ilies, R. (2006). Hostility, job attitudes, and workplace deviance: Test of a multilevel model. Journal of Applied Psychology, 91(1), 126–138.

Kim, Y., Briley, D. A., & Ocepek, M. G. (2015). Differential innovation of smartphone and application use by sociodemographics and personality. Computers in Human Behavior, 44, 141–147.

Kumar, A., & Lim, H. (2008). Age differences in mobile service perceptions: Comparison of generation Y and baby boomers. Journal of Services Marketing, 22(7), 568–577.

La Rue, F. (2011). Report of the special rapporteur on the promotion and protection of the right to freedom of opinion and expression. Human Rights Council of the United Nations. Available from www2.ohchr.org, Accessed date: 15 July 2016.

Levy, S. J. (1959). Symbols for sale. Harvard Business Review, 37(4), 117–124.

Lopez, M. H., Gonzalez-Barrera, A., & Patten, E. (2013). Closing the digital divide: Latinos and technology adoption. available from www.pewhispanic.org, Accessed date: 1 November 2015.

Martin, K. D., & Hill, R. P. (2012). Life satisfaction, self-determination, and consumption adequacy at the bottom of the pyramid. Journal of Consumer Research, 38(6), 1155–1168.

Metha, S. (2015). ICICI Bank creates a dedicated payment gateway for mobile banking. Available from: http://economictimes.indiatimes.com, Accessed date: 28 April 2017.

Mishra, A., Dash, S. B., & Cyr, D. (2014). Linking user experience and consumer-based brand equity: The moderating role of consumer expertise and lifestyle. Journal of Product and Brand Management, 23(4/5), 333–348.

Mossberger, K., Tolbert, C. J., & Hamilton, A. (2012). Measuring digital citizenship: Mobile access and broadband. International Journal of Communication, 6, 2492–2528.

Muthén, L., & Muthén, B. (2007). Mplus statistical software. Los Angeles, CA: Muthén & Muthén.

Nielsen (2012). State of the Hispanic consumer: The Hispanic market imperative. Available from: www.nielsen.com, Accessed date: 25 August 2015.

Pénard, T., Poussing, N., & Suire, R. (2013). Does the internet make people happier? The Journal of Socio-Economics, 46, 105–116.

Qu, H., & Zhao, X. R. (2012). Employees' work–family conflict moderating life and job satisfaction. Journal of Business Research, 65(1), 22–28.

Rossiter, J. R. (2002). The C-OAR-SE procedure for scale development in marketing. International Journal of Research in Marketing, 19(4), 305–335.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. American Psychologist, 55(1), 68–78.

Shankar, V., & Balasubramanian, S. (2009). Mobile marketing: A synthesis and prognosis. Journal of Interactive Marketing, 23(2), 118–129.

Sirgy, M. J. (2001). Handbook of quality-of-life research: An ethical marketing perspective. Vol. 8. Springer Science & Business Media.

Sirgy, M. J. (2008). Ethics and public policy implications of research on consumer wellbeing. Journal of Public Policy & Marketing, 27(2), 207–212.

Sirgy, M. J., Cole, D., Kosenko, R., Meadow, H. L., Rahtz, D., Cicic, M., et al. (1995). Developing a life satisfaction measure based on need hierarchy theory. In M. J. Sirgy, & A. Samli (Eds.). New dimensions of marketing and quality of life (pp. 1–25). Westport, CT: Greenwood Press.

Sirgy, M. J., Widgery, R. N., Lee, D.-J., & Grace, B. Y. (2010). Developing a measure of community well-being based on perceptions of impact in various life domains. Social Indicators Research, 96(2), 295–311.

Stump, R. L., Gong, W., & Li, Z. (2008). Exploring the digital divide in mobile-phone adoption levels across countries. Journal of Macromarketing, 28(4), 397–412.

Tay, L., & Diener, E. (2011). Needs and subjective well-being around the world. Journal of Personality and Social Psychology, 101(2), 354–365.

The Economic Times (2016). World's cheapest smartphone freedom251 hits India; industry skeptical. Available from http://articles.economictimes.indiatimes.com, Accessed date: 15 August 2016.

Tossell, C. C., Kortum, P., Shepard, C., Rahmati, A., & Zhong, L. (2015). You can lead a horse to water but you cannot make him learn: Smartphone use in higher education. British Journal of Educational Technology, 46(4), 713–724.

Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. Management Science, 46(2), 186–204.

Verhallen, T. M., & Robben, H. S. (1994). Scarcity and preference: An experiment on unavailability and product evaluation. Journal of Economic Psychology, 15(2), 315–331.

World Bank (2016). World development report 2016: Digital dividends. Washington, DC: World Bank.

Wortham, J. (2009). Mobile internet use shrinks digital divide, New York times. Available from www.bits.blogs.nytimes.com, Accessed date: 15 June 2016.

Zickuhr, K., & Smith, A. (2012). Digital differences. Pew Research Center. Available from www.pewinternet.org, Accessed date: 18 October 2015.

Zillien, N., & Hargittai, E. (2009). Digital distinction: Status-specific types of internet usage. Social Science Quarterly, 90(2), 274–291.