Moderating Effects of Culture on Virtual Social Networks Usage and Human Development

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MODERATING EFFECTS OF CULTURE ON VIRTUAL SOCIAL NETWORKS USAGE AND HUMAN DEVELOPMENT

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Abstract

There is growing interest in the influence of individuals’ usage of virtual social networks (VSNs) for professional and personal communication in a country on the levels of its human development, and how this effect differs across various cultures namely, power distance, individualism, masculinity and uncertainty avoidance. In this paper, we use publicly available archival data to explore the relationships among them. Results substantiate a significant positive relationship between VSN usage in a country and its human development. Further, the findings suggest that while individualism and uncertainty avoidance negatively moderate the positive relationship of VSN usage with human development, the relationship is not contingent on power distance and masculinity. Our findings contribute to the theoretical discourse on “VSN impact and human development” by highlighting the role of culture, and provide indications to practice on enhancing human development by leveraging the effect of individuals’ usage of VSN across cultures.

Keywords: Virtual Social Networks, culture, human development, archival data.

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1 INTRODUCTION

Virtual social networks (VSNs) can be defined as the networks used for creating and maintaining social interactions among geographically dispersed individuals around the globe (Panteli 2009). These networks are multi-user virtual communities meant for social networking or interactive collaborative communications (Sangwan et al. 2009), and represent an innovation that is based on Internet technologies. Examples include Facebook, MySpace, OpenSocial, Second Life, etc. In general, VSNs share three common characteristics (Panteli 2009). First, they are mutlimediated, in which multiple media such as audio, video, text, blogging software and taggable photos can intersect, collide and interact in multiple and even unpredictable ways (Jenkins 2006). Second, they are massive, a feature that relates to membership size of the network (i.e., members’ involvement and commitment). And third, VSNs are multiplayers supporting synchronous interactions among several user-players.

In recent times, VSNs has generated a lot of interest among researchers. Research on VSNs can be classified into three broad areas. While first set of research focus on the design, development and evolution of VSNs (e.g., Burmeister 2009), the second set of research is concerned with the adoption and diffusion of VSNs (e.g., Feldberg et al. 2009; Jones et al. 2009; Sun & Wang 2012). And, the third set of research pertains to the impact of VSNs (e.g., Grassman & Case 2009; Kreps & Pearson 2009). Although research in all the three identified areas is important, researchers, practitioners and policymakers are often intrigued by returns from VSNs. In particular, though VSNs can bring in several benefits to the human society, their interest lies in the question of influence of individuals’ VSN usage (for professional and personal communication) in a country on its human development (comprising of three dimensions, namely, health, education and income). This is because human development is an important public policy issue that signals creating an environment in which people can develop their full potential and lead productive, creative lives in accord with their needs and interests (UNDP 2011); and on the grounds of information and communication technologies for development (ICT4D), VSNs are advocated to play a significant role as an “enabler” of human development by creating the aforementioned environment. Emerging research connecting individuals’ usage of VSNs in a country with its human development remains at best anecdotal, conjectural and descriptive. Adding to this, most extant studies on VSNs are conducted either at individual- or organizational-level (e.g., Hargittai 2008), and there is a paucity of research at cross-country level offering a macro perspective. Motivated by the facts that research on VSN impact is still in a nascent stage, and its relationship with human development of country has not been adequately addressed in previous research, the objective of this study is to link individuals’ usage of VSNs in a country with its human development, and to examine its impact.

While the use of VSNs for professional and personal communication in a country is pervasive, studies indicate that the diffusion of VSNs across countries is uneven. For instance, a recent global survey of 10 countries (Australia, Brazil, France, Germany, Italy, Japan, Spain, Switzerland, US and UK) found that the percentage of online population who actively use VSNs ranged between 59% to 86%, and their usage time ranged between 157 minutes to 387 minutes per month (Heras 2010; Van Grove 2010). It is likely that this disparity of diffusion of VSNs could hamper the efforts of creating an environment for human development as countries where ICTs are less accessible are not as competitive in the global economy, and their people and societies cannot fully benefit from such technologies (Antonelli 2003). Hence, it is imperative to understand what causes such a disparity leading to changes in human development across countries. As national culture, defined as “the collective programming of the mind which distinguishes the members of one group or category of people from another” (Hofstede 1991, p. 5) is an important factor that regulates individuals’ communication behaviour (Singelis & Brown 1995), and has a long-lasting influence on diffusion of VSNs (Sun & Wang 2012), we propose it as a “contingency” that affects the relationship of individuals’ usage of VSNs in a country with its human development. Specifically, by drawing from Hofstede’s typology of culture (Hofstede 1983), we argue that the four dimensions of national culture namely, (1) power distance; (2) individualism/collectivism; (3) masculinity/femininity; and (4)
uncertainty avoidance affects the direction and strength of the aforesaid relationship. In sum, the key research question that we address in this study is:

**RQ:** What are the relationships among individuals’ usage of VSNs, national culture and human development of a country?

The rest of the paper is organized as follows. In the ensuing section, we present our theoretical background and hypotheses. This is followed by a section on research design. Thereafter, using archival data from 91 countries (see Appendix for the list of countries), we test the hypothesized model. We then discuss the results and the implications for future research. The final section provides concluding remarks with a restatement of the value of the work.

## 2 THEORY AND HYPOTHESES

### 2.1 Relating VSN Usage to Human Development

It is acknowledged that ICTs are the catalyst for human development – the process of enlarging people’s choices of leading a long and healthy life, acquiring knowledge, and having access to the resources needed for a decent standard of living (UNDP 2011). VSNs (or ICTs in general) entail a set of capabilities that can be harnessed and fostered to further human development through access to information and increased potentials for communication. VSNs can enhance human development by increasing individuals’ capacity to work as organized networks both within and beyond borders. That is, VSN usage can further human development by creating communication channels that brings about collaboration on common goals. For instance, Mithas et al. (2009) posit that ICTs or Internet-based innovations (such as VSNs) can influence life expectancy (a metric of well-being) through information integration (i.e., merging or consolidation of information from disparate sources with differing conceptual, contextual and typographical representations), workflow coordination (i.e., automated functioning or efficient performance of a sequence of operations), and collaborative planning (i.e., a process where two or more people or entities work together toward common goals). Similarly, it is widely acknowledged that the biggest role of ICTs (and Internet-based technologies) in education is to enhance learning by reforming education systems, increasing access to pedagogical resources, improving the management of education and enhancing pedagogical techniques (Shade et al. 2012). For instance, Grewal and Harris (2009) indicate that virtual technologies such as Facebook and Second Life are capable of enhancing teaching and learning practices (and education in general) by offering new opportunities for the ways in which individuals interact socially with one another, communicate, gather information, and learn. Taken together, what ultimately makes a difference in individuals’ lives is the usage of these technologies and the extent to which they help communities and individuals in a country to reach their development objectives. Our reasoning is in line with the modernization theory, which argues that “technological change is neither additive nor subtractive...it is ecological...it changes everything” (Postman 1992, p. 18). Hence, we posit:

**H1:** VSN usage in a country is positively associated with its human development.

### 2.2 Relating National Culture to VSN Usage and Human Development

Culture is an elusive concept that “consists of several elements of which some are implicit and others are explicit...most often these elements are explained by terms such as behaviour, values, norms, and basic assumptions” (Groeschl & Doherty 2000, p. 14). The theories of national culture centers upon the cultural values, and can be broadly classified into three categories (Morden 1999) namely, (1) single dimension models (e.g., Fukuyama (1995)); (2) multiple dimension models (e.g., Hofstede (1980, 1983)); and (3) historical-social models (e.g., Bloom et al. (1994)). While there are different definitions of national culture, most researchers, regardless of their differences in disciplines, are inclined to rely on Hofstede’s definition (Myers & Tan 2002). Hofstede indicates that people share a collective national character that constitutes their cultural mental programming, which shapes their values, beliefs, assumptions, expectations, perceptions and behaviour. Based on data from IBM’s
employee attitude surveys, Hofstede (1980, 1983) identified four largely independent dimensions of differences between national value systems, namely, (1) power distance (large vs. small); (2) individualism vs. collectivism; (3) masculinity vs. femininity; and (4) uncertainty avoidance (strong vs. weak). Power distance is the extent to which members of a culture expect and accept that power is distributed unequally. Individualism describes cultures in which task prevails over relationship, whereas collectivism describes cultures in which relationship prevails over task. Masculinity describes cultures in which social gender roles are distinct, whereas femininity describes cultures in which social gender roles overlap. Uncertainty avoidance is the extent to which members of a culture feel threatened by uncertain or unknown situations. While these four dimensions of national culture have been the bases for numerous empirical studies in a variety of disciplines (Sondergaard 1990), only a handful of studies have considered the influence of culture in the investigation of technology adoption and usage (Srite & Karahanna 2006).

As national cultural dimensions represents a broad set of contingencies (Getz & Volkema 2001; Smith et al. 2011), and given that they can regulate individuals’ communication behaviour (Singelis & Brown 1995) and can have a long-lasting influence on VSN usage (Sun & Wang 2012), we argue that the aforementioned dimensions of national culture affects the direction and strength of the relationship of VSN usage with human development. In other words, “VSN usage and human development” relationship is moderated by national cultural dimensions.

2.2.1 Moderating Influence of Power Distance

Power distance is the extent to which a society accepts differences and inequalities in power distribution among individuals, organizations and institutions. That is, people in large power distance countries are likely to accept differential social statuses than those in their counterparts. Previous studies in the context of ICT adoption and diffusion have shown that the adoption and diffusion rates are higher in small power distance countries. For instance, Bagchi et al. (2004) indicated that when power distance is small, the adoption and diffusion of PCs and cell phones increased. Similar results were found in the context of Internet access and usage (Gong et al. 2007). As VSNs encourage equality in user rights and obligations to enhance social capital (Ellison et al. 2007), individuals in low power distance cultures are more likely to use VSNs to a greater extent than the individuals in high power distance cultures. Therefore, it is logical to expect that the strength of the positive relationship between VSN usage in a country and its human development will become weaker under the conditions large power distance, and hence, we propose:

H2a: Power distance negatively moderates the relationship of VSN usage with human development.

2.2.2 Moderating Influence of Individualism

In individualistic cultures (i.e., low collectivism), individuals are more concerned with themselves and their direct family members. In contrast, individuals from low individualistic cultures (i.e., high collectivism) show more attachment to their group of adherence (e.g., community or association). That is, while individualism refers to a loosely coupled social network, collectivism refers to a tightly coupled social network where the group feeling is very strong. Although VSNs provides an effective platform for users in individualist cultures to self-express themselves (on current or any issues) gratifyingly, there are strong theoretical grounds towards collectivist view of VSNs. First, as VSNs allows for creation of groups and communities around various issues and events, users in collectivist culture will adopt and use them compared to their counterparts. Second, the crowdsourcing of knowledge, an aspect of collectivist cultures leads to VSN usage that often involves collective participation and communication of users. Results of a recent study by Sun and Wan (2012) in the context of VSN usage found that individualism is negatively related to VSN usage in a country (when the aspect of development was considered). Hence, it is logical to presume that the strength of the positive relationship between VSN usage in a country and its human development will become weaker under the conditions high individualism, and therefore, we posit:

H2b: Individualism negatively moderates the relationship of VSN usage with human development.
2.2.3  Moderating Influence of Masculinity

Masculinity is characterized by competition, ambition, a focus on performance and material values. In contrast, femininity is characterized by solidarity, equality, consensus seeking and concern about social relationships. Gong et al. (2007) established that masculinity is negatively related with access to the Internet and its use. They argue that ICTs such as the Internet are more appropriate in feminine cultures as they facilitate information sharing and communication among individuals and groups. Similarly, Erumban and de Jong (2006) argue that if the major purpose of technology is to facilitate communication, then their diffusion rate will be higher in feminine cultures and if the purpose is to compete, then the diffusion rate will be higher in masculine cultures. Confirming this, Bagchi et al. (2004) found significant relationships between feminine cultural characteristics and the usage of telephones and cell phones. Other studies also found that feminine cultures are more inclined and effective towards using computer-mediated tools than their counterparts (Thelwall 2008; Thelwall et al. 2010). Recently, Sun and Wang (2012) found that masculinity is negatively related to VSN diffusion in a country. Given that a major purpose of the VSNs is to facilitate interactive collaborative communications, and in line with Sun and Wang (2012), it is more likely to expect that masculinity will be negatively associated with VSN usage. Therefore, it is logical to expect that the strength of the positive relationship between VSN usage in a country and its human development will become weaker under the conditions of high masculinity, and hence we propose:

\[ H2c: \text{Masculinity negatively moderates the relationship of VSN usage with human development.} \]

2.2.4  Moderating Influence of Uncertainty Avoidance

Uncertainty avoidance refers to “the extent to which the members of a culture feel threatened by uncertain or unknown situations” (Hofstede 1980, p. 161). Individuals in strong uncertainty avoidance cultures are uncomfortable with uncertainty and show a low tolerance for risk (Moore & et al. 2000). In contrast, people in weak uncertainty avoidance cultures deal well with uncertainty and can be characterized as risk-takers. Hofstede (2001) indicate that weak uncertainty avoidance cultures makes greater use of technological innovations (e.g., Internet), than do strong uncertainty avoidance societies. Another study by Erumban and de Jong (2006) found that the countries scoring high on uncertainty avoidance will show lower ICT adoption and usage rates. Further, Liu et al. (2001) and Veiga et al. (2001) established that the acceptance and usage of new technologies will be quicker in weak uncertainty avoidance cultures than in strong ones. Given that VSN is an Internet-based innovation, individuals in high uncertainty avoidance may be hesitant to use it. Hence, it is logical to presume that the strength of the positive relationship between VSN usage in a country and its human development will become weaker under the conditions of strong uncertainty avoidance, and we posit:

\[ H2d: \text{Uncertainty avoidance negatively moderates the relationship of VSN usage with human development.} \]

3  RESEARCH DESIGN

To test the formulated hypotheses, we gathered archival data (for each of the main constructs) for two reasons. First, collecting large scale primary data spanning several countries is constrained by the amount of resources and time available for conducting such research (Krishnan & Teo 2012). Second, archival data, as suggested by some researchers (e.g., Jarvenpaa 1991) offers several advantages namely, (1) easy reproducibility; (2) ability to generalize the results arising from larger datasets (Kiccolt & Nathan 1985); and (3) robust to the threat of common method bias (Woszczynski & Whitman 2004). Hypotheses were tested via a cross-sectional analysis of 91 countries (see Appendix for the list of countries). According to Hair et al. (2006), 50 is the minimum number required to avoid degrees of freedom and efficiency problems. Further, as this study is associational in nature, we relate the data for our dependent variable (i.e., human development) captured in the year 2011 with that for the independent and moderating variables captured in previous years. The primary sources of data were the United Nations (UN) Human Development Report (UNDP 2011), the World Economic
3.1 Operationalization of Constructs

The dependent construct, human development indicates the achievement in three basic dimensions of development namely, a long and healthy life (i.e., life expectancy at birth), knowledge (i.e., education measured in terms of mean years of schooling and expected years of schooling) and a decent standard of living (i.e., GNI per capita, adjusted for purchasing power parity). This construct was measured by the Human Development Index (HDI), which is the geometric mean of normalized indices measuring achievements in each of the aforesaid dimensions. The values for this construct were obtained from the UN’s Human Development Report (UNDP 2011). The independent construct, VSN usage indicates the extent to which VSNs are used by individuals in a country for professional and personal communication, the scores for which were obtained from the WEF’s Global IT Report (WEFGITR 2010). This construct was measured by asking the respondents, “How widely used are virtual social networks (Facebook, Twitter, LinkedIn, etc.) for professional and personal communication in your country?” and was anchored on a 1-to-7 scale with “1” representing “not at all” and “7” representing “widely.” The moderating cultural variables namely, power distance, individualism/collectivism, masculinity/femininity and uncertainty avoidance were based on Hofstede cultural dimension scores from an earlier multinational study of cultural values (Hofstede et al. 2010). While Hofstede’s measures have been criticized as being less useful over time (Sivakumar & Nakata 2001), several studies (e.g., Brouthers & Brouthers 2001) have upheld the theoretical and empirical value of his constructs and measures. For instance, Sondergaard (1994), in his replication studies on Hofstede’s cultural dimensions, highlighted that “Hofstede’s findings were confirmed in the reviewed replication studies” (p. 452).

Additional control variables consisted of regional difference and governance. We selected these particular control variables, since they are both consistent with prior macro-level studies pertaining to ICT4D (e.g., Krishnan & Teo 2012; Meso et al. 2009), and also makes logical sense in our regression model. Regional difference was operationalized as the country-level difference across various regions of the world. Based on UN’s regional groupings, we coded countries into five groups (i.e., Americas (e.g., United States); Europe (e.g., Denmark); Africa (e.g., Congo); Asia (e.g., India); and Oceania (e.g., Australia)). Another control variable, governance was operationalized using six aggregated measures of governance (with a value running between -2.5 and 2.5, with higher values corresponding to better governance) originally presented in Kaufmann et al. (1999). The six measures are: (1) voice and accountability; (2) political stability and absence of violence; (3) government effectiveness; (4) regulatory quality; (5) rule of law; and (6) control of corruption. These measures have since been adopted by the World Bank and employed as indices of governance quality in the world development reports. Data for these measures (for year 2010) were taken from the World Bank’s Worldwide Governance Indicators database (Kaufmann et al. 2010).

4 ANALYSIS AND RESULTS

4.1 Descriptive Statistics and Correlations

Table 1 presents the descriptive statistics and correlations for all variables in the study. As shown in the table, VSN usage was positively correlated with human development. Among the cultural variables, only power distance and individualism was correlated with both VSN usage and human development. While power distance was negatively correlated with VSN usage and human development, individualism was positively correlated with them. Further, as all correlations among variables were below the threshold value of 0.8, the concern for multicollinearity would be minimal (Gujarati 2003; Gujarati & Porter 2009). Nevertheless, we followed up with collinearity test that measure the variance inflation factor (VIF). VIF assesses the effect that the other independent
variables have on the standard error of a regression coefficient (Hair et al. 2006). The results of these tests revealed that our VIFs ranged from 1.03 to 3.59 (all tolerance levels above 0.28). According to Fox (1991), a VIF of above 4.0, or a tolerance level below 0.25, may indicate the potential for multicollinearity; thus, the concern in our model appeared to be minimal.

<table>
<thead>
<tr>
<th>Variables</th>
<th>M</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Governance</td>
<td>0.29</td>
<td>0.88</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2. Regional Difference</td>
<td>2.55</td>
<td>1.15</td>
<td>-18</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3. VSN Usage</td>
<td>5.21</td>
<td>0.82</td>
<td>69***</td>
<td>-23*</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4. Power Distance</td>
<td>62.85</td>
<td>21.10</td>
<td>-63***</td>
<td>15</td>
<td>-41***</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5. Individualism</td>
<td>39.14</td>
<td>22.29</td>
<td>70***</td>
<td>-08</td>
<td>43***</td>
<td>-67***</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6. Masculinity</td>
<td>49.18</td>
<td>21.71</td>
<td>-05</td>
<td>-31**</td>
<td>-07</td>
<td>17</td>
<td>-16</td>
<td>-01</td>
<td>-</td>
</tr>
<tr>
<td>7. Uncertainty Avoidance</td>
<td>64.91</td>
<td>21.71</td>
<td>-05</td>
<td>-31**</td>
<td>-07</td>
<td>17</td>
<td>-16</td>
<td>-01</td>
<td>-</td>
</tr>
<tr>
<td>8. Human Development</td>
<td>0.74</td>
<td>0.15</td>
<td>78***</td>
<td>-24</td>
<td>73***</td>
<td>-46***</td>
<td>59***</td>
<td>-01</td>
<td>15</td>
</tr>
</tbody>
</table>

Note. N = 91; M = Mean; SD = Standard deviation; Decimal points omitted for correlations; p < 0.05 * p < 0.01 ** p < 0.001 (2-tailed)

Table 1. Descriptive statistics and correlations.

4.2 Reliability and Validity

The reporting agencies (i.e., WEF and UN) followed rigorous procedures for ensuring the reliability and validity of data. The country-level data (for VSN usage) were collected by the WEF through a number of partner institutes, who were given a uniform set of guidelines that were strictly followed. Some of these guidelines included taking responses only from CEOs or equivalent rank company officials, facility for the respondents to answer in their preferred language, etc. In addition, the survey was administered in several forms such as face-to-face interviews with business executives, mailed or telephone interviews, and a version administered online as an alternative. To minimize the chances of perception bias (a systematic positive or negative bias found among all respondents in a given country), the questions were framed in a way that asked the respondents to compare their own country to world standards, rather than thinking in absolute national terms. Individual answers were aggregated at the country-level. Then, sector weighted country averages were obtained for analyses.

UN also followed stringent procedures to compute the HDI scores. Specifically, the computation of HDI values involved a two-step procedure. Step 1 involved creating the dimension indices (i.e., life expectancy index, education index, and GNI index) in which the minimum and maximum values were set in order to transform the indicators into indices between 0 and 1. Having defined the minimum and maximum values, the subindices were then calculated using the formula: Dimension index = (actual value – minimum value) / (maximum value – minimum value). Step 2 involved aggregating the subindices to produce HDI, which is the geometric mean of the three dimension indices. In summary, we used the data directly from these reports as the data collecting agencies are trustworthy and followed rigorous procedures for ensuring the reliability and validity.

4.3 Hypotheses Testing

We used moderated multiple regression, a hierarchical regression analysis technique for testing the research hypotheses as it is an established method for testing the interaction effects (Kankanhalli et al. 2005). We adopted the method recommended by Aiken and West (1991) for examining interactions in regression methods where we first “centered” or “linearly-rescaled” each of the two variables by subtracting the mean from each country’s score for each variable to reduce the effect of multicollinearity between the interacting term and the main effect. All interaction terms were assessed simultaneously so that their effects could be seen in the context of the overall model (i.e., in the presence of other interaction effects) (Kankanhalli et al. 2005). Specifically, as a first step, the control variables namely, governance and regional difference were entered into the regression equation. In steps 2 and 3, we entered VSN usage and cultural variables, and interaction terms respectively into the
regression equation. A summary of our results are presented in Table 2. The $R^2$ value of 0.80 and adjusted $R^2$ value of 0.77 ($F = 28.04$, $p < 0.001$) indicated that the overall model was effective in explaining the variance in human development. The change in $R^2$ value between steps 2 and 3 of regression was 0.06 (change in $F = 7.32$, $p < 0.01$), indicating that the outcome of the third step (i.e., testing of interaction effects) could be interpreted. As shown in Table 2 (step 2), VSN usage was positively related to human development ($\beta = 0.40$, $p < 0.001$). This implies that individuals’ usage of VSNs for professional and personal communication in a country facilitates its human development. Hence, $H1$ was supported. Though not hypothesized explicitly, among cultural variables, individualism ($\beta = 0.18$, $p < 0.05$) and uncertainty avoidance ($\beta = 0.23$, $p < 0.001$) were positively associated with human development.

Turning now to the interaction effects of cultural dimensions on the relationship between VSN usage and human development, of four interaction terms, only two were significant (see Table 2, step 3). While individualism ($\beta = -0.20$, $p < 0.05$) and uncertainty avoidance ($\beta = -0.19$, $p < 0.01$) negatively moderated the relationship of VSN usage with human development, the relationship was not contingent on power distance ($\beta = -0.08$, n.s.) and masculinity ($\beta = -0.06$, n.s.). Hence, hypotheses $H2a$ and $H2c$ were not supported. To determine if the patterns characterizing the significant interactions conform to the directions as proposed in the research hypotheses (i.e., $H2b$ and $H2d$), we graphed the interaction effects (see Figures 1a and 1b). This procedure was recommended by Cohen and Cohen (1983) for all interaction cases. In addition, to examine the consistency of the proposed direction throughout the range of independent variable, we performed simple slope analysis as recommended by Aiken and West (1991), which reflects whether the slopes relating the independent and dependent variables differ from zero.

Table 2. Regression results.

<table>
<thead>
<tr>
<th>Variables and Statistics</th>
<th>$\beta^a$</th>
<th>Hypothesis Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model 1</td>
<td>Model 2</td>
</tr>
<tr>
<td>Step 1: Controls</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Governance</td>
<td>0.76***</td>
<td>0.43***</td>
</tr>
<tr>
<td>Regional Difference</td>
<td>-0.11</td>
<td>0.01</td>
</tr>
<tr>
<td>Step 2: Main Effects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VSN Usage</td>
<td>0.40***</td>
<td>0.29**</td>
</tr>
<tr>
<td>Power Distance (PDI)</td>
<td>0.04</td>
<td>0.01</td>
</tr>
<tr>
<td>Individualism (IDV)</td>
<td>0.18*</td>
<td>0.22*</td>
</tr>
<tr>
<td>Masculinity (MAS)</td>
<td>0.06</td>
<td>0.03</td>
</tr>
<tr>
<td>Uncertainty Avoidance (UAI)</td>
<td>0.23***</td>
<td>0.24***</td>
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<tr>
<td>Step 3: Interaction Effects</td>
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<tr>
<td>VSN Usage $\times$ PDI</td>
<td>-0.08</td>
<td></td>
</tr>
<tr>
<td>VSN Usage $\times$ IDV</td>
<td>-0.20*</td>
<td></td>
</tr>
<tr>
<td>VSN Usage $\times$ MAS</td>
<td>-0.06</td>
<td></td>
</tr>
<tr>
<td>VSN Usage $\times$ UAI</td>
<td>-0.19*</td>
<td></td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.63</td>
<td>0.75</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>0.62</td>
<td>0.73</td>
</tr>
<tr>
<td>$F$</td>
<td>73.88***</td>
<td>35.36***</td>
</tr>
<tr>
<td>$R^2$ Change</td>
<td>-</td>
<td>0.12</td>
</tr>
<tr>
<td>$F$ Change</td>
<td>-</td>
<td>38.52***</td>
</tr>
</tbody>
</table>

Note. $N = 91$; $p < 0.05$ **$p < 0.01$ ***$p < 0.001$ (2-tailed); $^a$The betas reported is based on standardized coefficients;
high levels of individualism in favour of low individualism when VSN usage was low. Confirming this, a simple slope analysis revealed that when individualism was high, the relationship of VSN usage with human development was positive and insignificant (slope = 0.01, t = 0.58, n.s.). And, when individualism was low, VSN usage and human development relationship was positive and significant (slope = 0.10, t = 130.05, p < 0.001). Hence, hypothesis H2b was supported.

**Figure 1.** Moderating influence of individualism on the relationship of VSN usage with human development.

Figure 2 shows the interaction of uncertainty avoidance on the relationship between VSN usage and human development. As shown in the figure, while there was an insignificant positive relationship between VSN usage and human development at strong level of uncertainty avoidance, there was a significant positive relationship at weak level. Further, it is evident from the figure that there was only a negligible difference in human development values between weak and strong levels of uncertainty avoidance when VSN usage was high but there was a substantial difference in human development values between weak and strong levels of uncertainty avoidance in favour of weak uncertainty avoidance when VSN usage was low. Confirming this, a simple slope analysis revealed that when uncertainty avoidance was strong, the relationship of VSN usage with human development was positive and insignificant (slope = 0.01, t = 0.49, n.s.). And, when uncertainty avoidance was weak, VSN usage and human development relationship was positive and significant (slope = 0.10, t = 143.48, p < 0.001). Hence, hypothesis H2d was supported.

**Figure 2.** Moderating influence of uncertainty avoidance on the relationship of VSN usage with human development.
Finally, among the two control variables, while governance ($\beta = 0.41, p < 0.001$) was significantly associated with human development, regional difference ($\beta = 0.01, \text{n.s.}$) had no significant effect. In the following section, we discuss our findings in detail.

5 DISCUSSION

Findings from this study raised several issues that deserved mention. First, individuals’ usage of VSNs in a country was positively related to its human development. This finding indicated that VSN usage in a country can further its human development by creating interactive collaborative communication channels. In addition, usage of virtual technologies by individuals for professional and personal communication can help them to a greater extent in reaching their development objectives such as leading a long and healthy life, acquiring knowledge, and having access to the resources needed for a decent standard of living. Turning now to the moderating influence of national culture, as revealed by the findings, individualism and uncertainty avoidance negatively moderated the positive relationship of VSN usage in a country with its human development. Among the two principal moderators used to explain the impact of VSN usage on human development, individualism slightly had a stronger effect compared to uncertainty avoidance. Taken together, under the conditions of low individualism and weak uncertainty avoidance, individuals’ usage of VSNs for professional and personal communication in a country enhanced human development. Our study did not find support for the interactions of power distance and masculinity on VSN usage in predicting human development. While one possible reason could be due to the fact that their effects might have been masked by stronger predictors with which they were correlated, this would be a potentially fruitful area for further research. However, it is gratifying that our observation of negative moderation effects of power distance and masculinity on the relationship between VSN usage and human development were in the same direction as our initial predictions. In sum, the above findings suggest that our assumptions about impact of VSN usage in a country on its human development are justifiably dependent on national cultural dimensions.

6 IMPLICATIONS, LIMITATIONS AND FUTURE RESEARCH

Our study contributes to the knowledge base of VSNs in three ways. First, in contrast to past studies that has examined the impact of human development on VSN usage (e.g., Sun & Wang 2012), our study, by drawing from the modernization theory, posits that individuals’ usage of VSNs for communication in a country furthers its human development by improving health outcomes, enhancing education, and raising income levels. While this link is rarely investigated, emerging research remains at best anecdotal, conjectural and descriptive. We sought to identify if indeed there is a quantitative merit in their relationship. Second, by drawing from the literature on “ICT and culture,” we derive the theoretical linkages among VSN usage, national culture and human development. Specifically, we propose cultural dimensions as “contingencies,” and examine how the relationship of VSN usage with human development varies across different cultures. In this regard, our study is one of the very few studies to simultaneously examine “hard” (i.e., development) and “soft” (i.e., cultural) variables under a unified theoretical framework. Third, among the limited research undertaken on VSNs, most studies tend to be either at individual- or organizational-level. Motivated by the needs for conducting cross-country level studies, our research is one of the few studies to offer a macro perspective by making innovative use of publicly available reliable secondary sources of data.

From a practical standpoint, this study makes two contributions. First, our study indicates that cultural variables play a critical role in explaining “between-country differences” in VSN usage and human development linkage. That is, given that cultural foundation is hard to change, by guiding user behaviours, practitioners can adapt VSN usage to a particular cultural environment for realizing the objectives of human development. Second, by identifying the cultural contingencies that could affect the relationship of VSN usage with human development, our study not only helps practitioners and policymakers to understand why differing levels of human development continues to prevail, but also
shows the directions to enhance the levels of human development in a country by effectively managing the VSN usage levels. Specifically, the implications from the interaction plots are insightful to policymakers and practitioners as they indicate that they should pay increased attention in managing VSN usage across cultures to realize human development objectives.

This study has two limitations. First, we used secondary data obtained from different sources, and hence, we have to depend on the indices as formulated by the reporting agencies. While primary data might have given us a better control over the definition of variables, it is less feasible for small group of researchers to undertake a large scale cross-country data collection given the limited amount of resources and time. However, taking into consideration that these indices have been formulated by reputable and authorized organizations using several suitable statistical procedures (e.g., use of multiple respondent expert surveys in each nation and correcting the internal consistency before index calculation) for assessing validity and reliability of the instrument, relying upon these secondary sources provides a cost-effective way for conducting our study. Second, we analyzed data only from the countries commonly available in all the primary sources. For instance, we could not include countries like Afghanistan, Cuba, North Korea, Taiwan, etc as these countries were not commonly available in all the data sources. However, given that we have sample size as 91, where 50 is the minimum number; degrees of freedom and efficiency problems would be minimal (Hair et al. 2006). Despite these two potential limitations, our study is one among the few studies with macro-level orientation to examine the impact of VSN usage on human development across cultures.

Future research may focus on several directions. First, future research may consider examining the insignificant interaction terms (i.e., power distance and masculinity) in a greater depth. It is plausible that a third variable such as “ICT laws in country” might affect the interaction of VSN usage and culture on human development. A three-way interaction of this kind would be interesting and may add value to both theory and practice. Second, future studies, apart from including the two new dimensions of Hofstede typology of culture (i.e., long-term/short-term orientation and indulgence/restraint), may consider utilizing other models of national culture (see Myers and Tan (2002) for a list of models on national culture) to examine the impact of VSN usage on human development. Third, researchers may consider extending our cross-sectional study to a longitudinal (panel) study when more data becomes available. Specifically, Dewan et al. (2010) indicate that at least nine years of data is required to support a robust estimation of empirical specifications while performing panel data analysis (especially in the context of cross-country level analysis). This would help to examine the issues of temporal precedence (leads/lags between independent, moderating and dependent variables), as well as the evolution of human development as a function of the levels and trends in VSN usage and cultural variables.

7 CONCLUDING REMARKS

In conclusion, despite an extensive recognition on the influence of VSNs on human development, both research and practitioner communities know relatively little on how individuals’ usage of VSNs for professional and personal communication in a country contributes towards its human development. As an initial step to be taken towards raising awareness for the pivotal role of VSNs in human development, we have constructed a theoretical model by drawing from the modernization theory and from the literature on “ICT and national culture,” and validated it by making innovative use of publicly available archival data. Findings suggest that our assumptions about impact of VSN usage in a country on its human development are justifiably dependent on national cultural dimensions.

References


Appendix: Countries Analyzed

| Albania, Angola, Argentina, Australia, Austria, Bangladesh, Belgium, Brazil, Bulgaria, Burkina Faso, Canada, Cape Verde, Chile, China, Colombia, Costa Rica, Croatia, Czech Republic, Denmark, Dominican Republic, Ecuador, Egypt, El Salvador, Estonia, Ethiopia, Finland, France, Germany, Ghana, Greece, Guatemala, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Iran, Ireland, Israel, Italy, Jamaica, Japan, Jordan, Kenya, Kuwait, Lebanon, Luxembourg, Malawi, Malaysia, Malta, Mexico, Morocco, Namibia, Nepal, Netherlands, New Zealand, Nigeria, Norway, Pakistan, Panama, Peru, Philippines, Poland, Portugal, Romania, Russia, Saudi Arabia, Senegal, Serbia, Singapore, Slovak Republic, Slovenia, South Africa, South Korea, Spain, Sri Lanka, Sweden, Switzerland, Syria, Tanzania, Thailand, Trinidad, Turkey, United Arab Emirates, United Kingdom, United States, Uruguay, Venezuela, Vietnam, Zambia. |

Total number of countries included for data analysis = 91.