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The Impacts of Socio-Economic and Cultural Factors on the Network Readiness of Nations: A Focus on the Regions of Africa

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ABSTRACT

The Network Readiness Index (NRI) was developed to measure the propensity for countries (and regions) to exploit information and communications technology (ICT) for development and growth. Much has been written about the influences of economic and non-economic factors on ICT diffusion in developed societies. Studies examining the impact of relevant factors on Africa's regions' capabilities to exploit ICT for development are scarce. Moreover, where such studies exist, it is not uncommon for the African continent to be taken as a monolith. This paper argues that the NRI scores for countries across the geographical regions of Africa vary by socio-economic and cultural factors. Hypotheses were developed to test this assertion. The data analysis showed that there are differences across Africa's regions with respect to the NRI. The data also found relationships between some socio-economic factors, cross-cultural dimensions, and the NRI. The study's implications for research and policy making are succinctly discussed.

Keywords

Network readiness, e-readiness, national culture, socio-economic factors, Africa, ICT

INTRODUCTION

Information and communication technologies (ICT) are relevant for the development of modern societies (Bui et al., 2003; Ifinedo, 2005; Erunbam and de Jong, 2006). Indeed, ICT is critically important in the policy decisions of developed countries that continue to invest heavily in such products (e.g., Jorgenson, 2001; Erunbam and de Jong, 2006). On the other hand, less developed parts of the world, including Africa, are only beginning to grasp how ICT-enabled services could be used to hasten development (Molla, 2000; G8 DOT Force, 2001; Ifinedo, 2005; 2006). Development reports (e.g. G8 DOT Force, 2001) and studies (e.g. Avgerou, 1998; Bui et al., 2003; Mbarika et al., 2005; Ifinedo, 2005) indicate that several African countries are not fully ready to integrate into the information age. This is a worrisome situation. A recent report on Africa stated "that future socio-economic development will need to embrace the use of ICT" (InfoDev, 2007, p.5). The degree of preparation of a nation or region to participate in and benefit from ICT for socio-development is assessed by the Network Readiness Index (NRI) (WEF, 2007). Other organizations and researchers (e.g. EIU, 2007; Bui et al., 2003; Ifinedo, 2005) have used e-readiness to describe the same concept. For simplicity's sake, we accept that both terms describe the same notion and can be used interchangeably. The EUI (2007, p.1) defines E-readiness as the "state of play of a country's information and communications technology (ICT) infrastructure and the ability of its consumers, businesses and governments to use ICT to their benefit."

Cross-country (and regional) studies regarding the use and adoption of ICT have started to appear (e.g., Caselli and Coleman, 2001; Bui et al., 2003; Comin and Hobijn, 2004; Waarts and van Everdingen, 2005; Erunbam and de Jong, 2006; EIU, 2007). In general, these studies have suggested the existence of significant differences across countries (and regions). Erunbam and de Jong (2006, p. 203) comment: "While some countries are receptive to [technological] changes, other countries appear to be less so." Differences across nations (and regions) have been attributed to influences stemming from both economic and non-economic factors, i.e., "national culture." Comin and Hobijn (2004), Caselli and Coleman (2001), and Gregorio et al. (2005), among others, suggest that national income levels and wealth could explain the differences among countries when it comes to each adopting ICT products and services. On the other hand, other researchers (e.g., Nath and Murthy, 2004; Waarts and van Everdingen, 2005; Erunbam and de Jong, 2006) have shown that the influence of national culture could explain the divergence. Furthermore, other studies have shown that even within one region, visible differences can be noticeable (see e.g. Waarts and van Everdingen, 2005). Our understanding of the factors impacting network readiness among the regions of Africa is limited. Bridges.org (2001) suggests: "… the unique cultural and historical environment of a region must be taken … to truly gauge the country's e-readiness [similar network readiness] for the future." This paper is motivated, in part, by the need to fill this gap in the research.

What do we know about African countries' readiness for the network world? Do all the countries or regions of Africa display similar characteristics for such an indicator? In other words, can the African continent be taken as a monolith with regard to network readiness? Could it be that the various regions of Africa have similar or different scores on such an indicator? Which factors should the continent pay more attention to in order to integrate into the information age? Suffice it to say that answers to the foregoing questions would be welcomed by policy makers on the continent and elsewhere (see G8 DOT Force, 2001).

Other studies have discussed reasons why societies in Africa and in other comparable developing regions of the world lag behind advanced regions on the use of ICT for development, and terms such as "digital divide" have surfaced to underline such differences across nations (see e.g., Avgerou, 1998; Molla, 2000; Mbarika et al., 2005; Ifinedo, 2005; 2006). However, not many studies have investigated the influence arising from the impacts of national culture and socio-economic factors on the network readiness of nations, as this study intends to do. Importantly, national culture and economic factors, which previous studies have noted as being crucial in how nations adopt and use ICT, will be used in this study's model. The selected factors or issues in this study were chosen for illustration purposes, as it would be simplistic and spurious to suggest that African countries' or regions' inability to fully integrate into the information age is attributable only to cultural and socio-economic factors. Regardless, this study seeks to discuss aspects of an issue about which not much has been written. The remainder of the paper is organized as follows: Section 2 discusses the study's background information. The relevant theoretical framework hypotheses are presented in section 3. Section 4 describes the research methodology, and the data analysis is presented in Section 5. Lastly, the discussions and conclusion of the study are given in Section 6.

BACKGROUND

Network readiness of nations

As indicated above, the capability and level of preparation of a nation to participate in and benefit from ICT for socio-development is assessed by the Network Readiness Index (NRI) (WEF, 2007). The measure is developed by the World Economic Forum (WEF), and it accepts that ICT products and services have important roles to play in the advancement of societies and economies. The NRI provides scores for some 122 countries. It consists of three sub measures that assess the following: (a) - the supporting environment for ICT in a country, (b) - the readiness of the country's key stakeholders [individuals, business and governments], and (c) - the usage of ICT among these stakeholders

The focus of this discourse will not be on the development of this tool, as discussions on the strengths and weaknesses of the tool are available elsewhere (see, Ifinedo, 2005). It was briefly noted above that other electronic (e-)readiness measurement tools exist (See e.g., Bui et al., 2003; EUI, 2007). Nevertheless, the WEF NRI index was chosen for its comprehensiveness and scope, and for the fact that the scores for several African nations were included, which may not be case with the other tools. For example, the EUI (2007) e-readiness Index has scores for only 69 countries, of which only 4 came from Africa. In short, several of these e-readiness tools produce comparable results and interpretations (Bui et al., 2003; Ifinedo, 2005), but the NRI is the best index for the purposes of this paper.

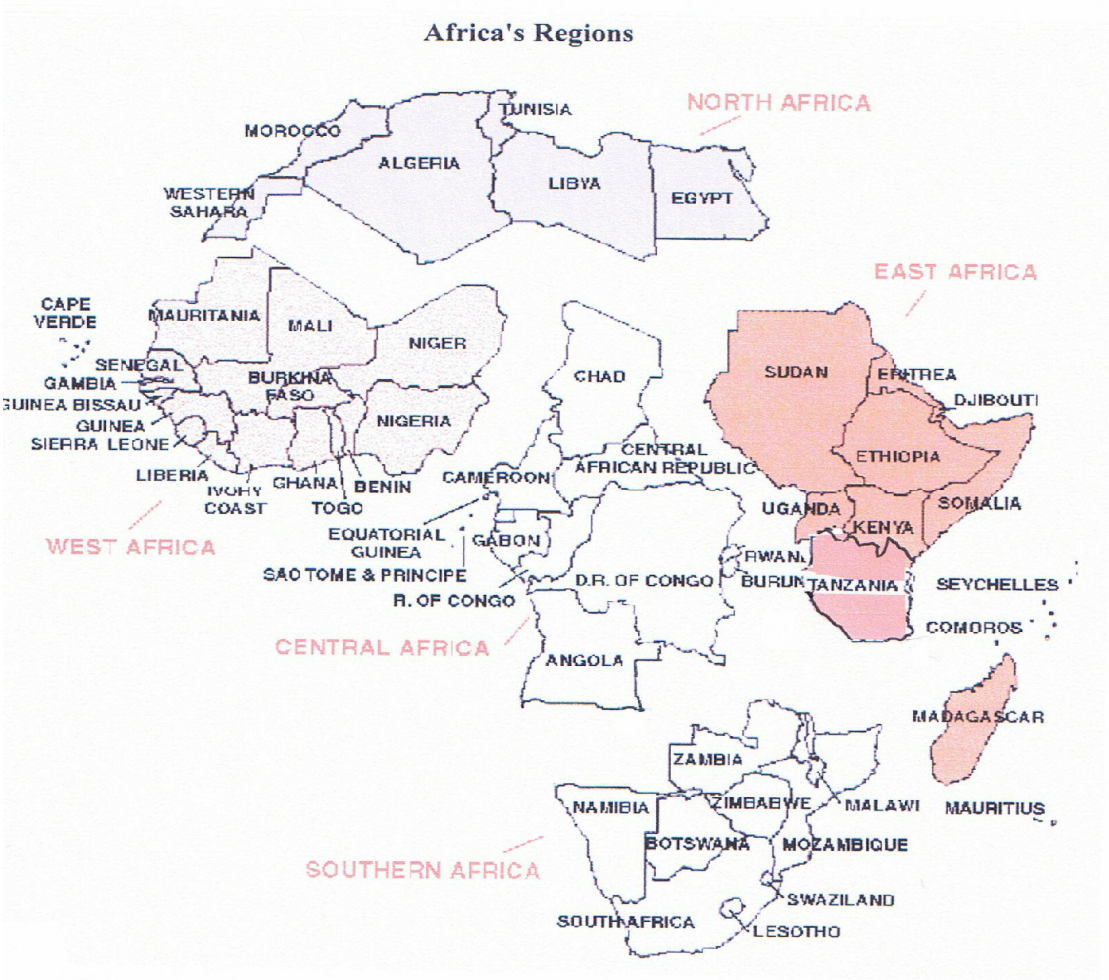
Socio-economic factors and contexts

It has been shown that the use and adoption of ICT across countries and regions differ by the amount of wealth available to any given country (Caselli and Coleman, 2001; Bui et al., 2003; Comin and Hobijn, 2004; Gregorio et al., 2005). The Gross Domestic Product (GDP) per capita is among the most widely used measures for comparing the wealth of nations. It refers to the value of the total goods and services produced within a nation in a given year, divided by the average population for the same year (see the World Bank, 2007). Likewise, the World Bank also makes available data for GDP purchasing power parity (PPP). This measure gauges national wealth or standards of living across countries by adjusting for differences in the cost of living in different countries. Further, Erunbam and de Jong (2006) note that technological innovations, including ICT, tend to diffuse more rapidly in societies with larger pools of human capital. With regard to human capital, this study follows the cue from other researchers (e.g., Gregorio et al., 2005) who used literacy levels in a country to assess this variable. Here, the quality of the educational system in a country was added to enhance insight. Additionally, an effective legal framework and political freedoms in a country were found to be relevant for a nation's capacity to use and benefit from ICT products and services (Oxley and Yeung, 2001). Similarly, evidence suggests that more transparent societies have higher network readiness scores (Transparency International, 2007; CIA World Factbook, 2007).

In general, African countries are less economically endowed than the developed West, the literacy levels across Africa are lower than those of advanced societies (Ifinedo, 2005; World Bank, 2007; CIA World Factbook, 2007), and the quality of the educational system on the continent is not on par with those in the developed world (CIA World Factbook, 2007). Political freedoms and legal frameworks, though improving for African countries, are still low in comparison to those of developed

nations (Freedom House, 2008). Also, the issue of corruption seems to be a major concern in most African countries (Transparency International, 2007). It has to be noted however that the foregoing insights represent the aggregate for the African continent. It is possible that differences may exist across countries (and even regions).

The data for the selected African counties in this paper is presented in Table 1 below. Importantly, the continent Africa can be classified into two main regions - North Africa and Sub Saharan Africa (SSA). The northern part is comparable economically and culturally with the Middle East (World Bank, 2007; ITIM, 2007). The other part is hobbled by a host of socio-economic problems, including poverty, high illiteracy levels, civil strife, corruption, and chronic under-development (Mbarika et al., 2005; Ifinedo, 2006; World Bank, 2007; CIA World Factbook, 2007). For the purposes of this study, the continent will be divided into five geographical regions, i.e., North Africa, West Africa, Central Africa, East Africa, and Southern Africa. Please see the regions' illustration in Figure 1. To some degree, the geographical groupings mirror the regional groupings or blocs on the continent. These include: the Economic Community of West African States (ECOWAS), East African Community (EAC), Southern African Development Community (SADC), Arab Maghreb Union (UMA), and Economic Community of Central African States (ECCAS).



Modified from source: http://www.africaaction.org/bp/regmap.htm

Figure 1. The regions of Africa

National culture (cultural factors)

Hofstede defines culture as the collective programming of the mind which differentiates the members of one group from another (2001). The work of Hofstede (2001) has been widely recognized as the most dominant framework for theory development in cross-cultural studies, and several studies have used it (e.g., Nath and Murthy, 2004; Waarts and van Everdingen, 2005; Erunbam and de Jong, 2006). This paper uses each of the four main cultural dimensions in Hofstede's

typology. The summary for each country is shown in Table 1. Please see the works of Hofstede at: http://www.geert-hofstede.com/geert_hofstede_resources.shtml (ITIM, 2007) for the full discussion. This study extracts the indices for the regions of African nations from the web page.

- Power Distance Index (PDI) – "focuses on the degree of equality, or inequality, between people in the country's society. A high Power Distance ranking indicates that inequalities of power and wealth have been allowed to grow within the society" (ITIM, 2007).
- Individualism (IDV) – "focuses on the degree the society reinforces individual or collective achievement and interpersonal relationships. A high Individualism ranking indicates that individuality and individual rights are paramount within the society. Individuals in these societies may tend to form a larger number of looser relationships. A low Individualism ranking typifies societies of a more collectivist nature with close ties between individuals" (ITIM, 2007).
- Masculinity (MAS) – "focuses on the degree the society reinforces, or does not reinforce, the traditional masculine work role model of male achievement, control, and power. A high Masculinity ranking indicates the country experiences a high degree of gender differentiation. A low Masculinity ranking indicates the country has a low level of differentiation and discrimination between genders" (ITIM, 2007).
- Uncertainty Avoidance Index (UAI) – "focuses on the level of tolerance for uncertainty and ambiguity within the society - i.e. unstructured situations. A high Uncertainty Avoidance ranking indicates the country has a low tolerance for uncertainty and ambiguity. A low Uncertainty Avoidance ranking indicates the country has less concern about ambiguity and uncertainty and has more tolerance for a variety of opinions" (ITIM, 2007).

Region &	Socio-economic indicators						National cultural dimensions					*NR*
Country	*GDP*	*GDP - p*	*LT*	*ED*	*RU*	*PF*	*TP*	*PDI*	*IDV*	*MAS*	*UAI*	
SADC												
South Africa	$10,600	$467.6 bil.	86.4	2.85	5.57	1	5.1	49	65	63	49	4.00
Zambia	$1,400	$15.93 bil.	80.6	3.61	4.00	4	2.6	64	27	41	52	2.75
Namibia*	$5,200	$10.67 bil.	85	2.65	4.56	2	4.5	57	46	52	51	3.28
Botswana*	$14,700	$24.14 bil.	81.2	3.66	4.94	2	5.4	57	46	52	51	3.56
ECOWAS												
Nigeria	$2,200	$294.8 bil.	68	3.28	3.25	4	2.2	77	20	46	54	3.23
Benin*	$1,500	$12.18 bil.	34.7	2.92	3.44	2	2.7	77	20	46	54	2.83
Mali *	$1,200	$14.18 bil.	46.4	2.60	3.34	2	2.7	77	20	46	54	2.96
Burkina Faso*	$1,200	$17.5 bil.	21.8	2.53	3.20	5	2.9	77	20	46	54	2.97
ECCAS												
Cameroon*	$2,300	$40.01 bil	67.9	3.00	2.69	6	2.4	71	24	44	53	2.74
Chad*	$1,600	$15.95 bil.	47.5	2.14	2.18	6	1.8	71	24	44	53	2.16
Angola*	$6,500	$80.95 bil.	67.4	2.23	2.75	6	2.2	71	24	44	53	2.42
Burundi*	$800	$6.389 bil.	59.3	2.66	2.52	3	2.5	71	24	44	53	2.40
UMA												
Egypt	$5,400	$431.9 bil.	71.4	2.66	4.05	6	2.9	80	38	52	68	3.44
Algeria*	$8,100	$268.9 bil	69.9	2.93	4.06	6	3.0	80	38	52	68	3.41
Tunisia*	$7,500	$77.16 bil.	74.3	5.13	4.96	6	4.2	80	38	52	68	4.24

Morocco*	$3,800	$127 bil.	52.3	2.94	4.03	5	3.5	70	46	53	68	3.45
EAC												
Tanzania	$1,100	$43.49 bil.	69.4	3.07	3.67	4	3.2	64	27	41	52	3.13
Kenya	$1,600	$57.65 bil.	85.1	4.20	3.00	3	2.1	64	27	41	52	3.07
Ethiopia	$700	$55.07 bil.	42.7	2.92	2.61	5	2.4	64	27	41	52	2.55
Uganda*	$1,100	$31.47 bil.	66.8	3.42	3.47	5	2.8	64	27	41	52	2.97

Table 1. A summary of the variables used in the study

Legend: GDP = GDP per capita in US (2007 est.); GDP-p = GDP-PPP in US$ (2007 est.); bil. = billion; LT = National literacy level (as total %); ED = Quality of education system; RU = Efficiency of legal framework; PF = Political freedom; * = estimated & manipulated scores based on Hofstede's measures; NR = networked readiness. See the abbreviations for the cultural factors in the main text.

RESEARCH FRAMEWORK AND HYPOTHESES

The study's research framework is illustrated in Figure 2. As discussed above, two main factors, i.e., national culture and socio-economic considerations, will be factored into this discourse. The data for global network readiness indicate that high and middle income countries have more favourable scores than their poorer counterparts (WEF, 2007). Indeed, other studies (e.g., Nath and Murthy, 2004; Gregorio et al., 2005) have shown that wealthier countries tend to have more access to resources to build on the potential of ICT-enabled services such as e-business and e-government, which invariably help to increase their network readiness. Given that Africa regions differ economically, it is likely that a similar pattern will become noticeable.

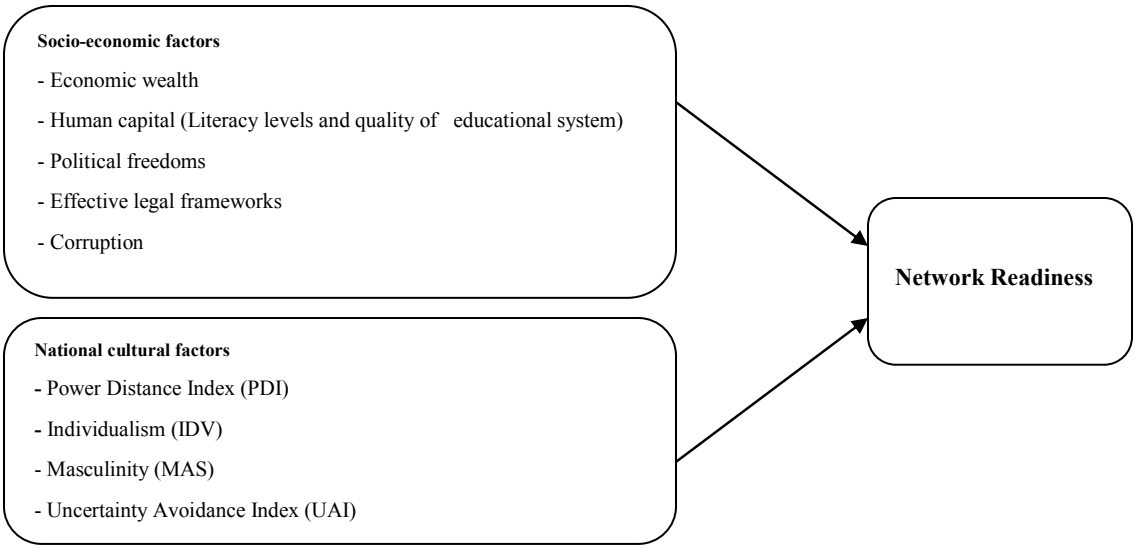


Figure 2. The research model

Needless to say that countries with higher levels of human capital, i.e., higher literacy levels and higher quality education will be in a better position to benefit from the use and adoption of technological innovations. There is evidence to affirm the foregoing (see Jorgenson, 2001; Gregorio et al., 2005; Erunbam and de Jong, 2006). Further, countries and regions with a strong rule of law would ensure strong political institutions and freedoms for both their individuals and businesses. Oxley and Yeung (2001) note that a strong rule of law and effective legal frameworks positively influence transactional integrity in e-business environments (recall that e-business is a major component in the network readiness index). However, Gregorio et al. (2005) did not find support for the relationship in their study. It is reasonable to believe that transactions (business or otherwise) in the information age would benefit immensely where trust issues are not compromised (see e.g., Srinivasan, 2004). Thus, countries lagging behind on key transparency and corruption indicators may find it more difficult to prepare for

a network- or electronic-ready society. The foregoing discussion permits us to believe that the same will hold for the regions of Africa. Thus, we hypothesize that:

H1a: Countries in Africa with higher economic wealth will have higher scores on the network readiness index

H1b: Countries in Africa with higher human capital will have higher scores on the network readiness index

H1c: Countries in Africa with higher political freedom will have higher scores on the network readiness index

H1d: Countries in Africa with more effective legal frameworks will have higher scores on the network readiness index

H1e: Countries in Africa with higher levels of transparency will have higher scores on the network readiness index

It is reasonable to suggest that countries with high Power Distance Index (PDI) scores would have lower network readiness because in such nations the "inequalities of power …. have been allowed to grow within the society" (ITIM, 2007). Waarts and van Everdingen (2005, p. 305) note that "centralized decision structures, authority and the use of formal rules are therefore often the characteristics of organizations in countries with a high degree of power distance." In other words, entities in countries with high PDI scores would expect their governments and other higher authorities to provide leadership roles for most initiatives, including the adoption of ICT products for developmental purposes. In contrast, it is more likely that entities in countries with lower PDI scores would be autonomous in their use of such products. Thus, it is hypothesized that:

H2a: Countries in Africa with higher PDI scores will have lower network readiness index scores

In brief, in more individualistic societies, emphasis tends to be placed on the performance of the individual rather than that of the group (Hofstede, 2001). According to Kovačić (2005, p.147), "time management [issues] would be [considered] important and any technology that could help individuals to perform more efficiently would be highly regarded and quickly accepted." The foregoing may suggest that countries with higher IND scores would be the ones with higher network readiness scores. That is, such countries would not find it difficult to use ICT-based products for development. Thus, it is predicted that:

H2b: Countries in Africa with higher IND scores will have higher network readiness index scores

As was noted above, the MAS dimension describes the extent to which any society reinforces masculine achievement and control. It is to be expected that regions where material success and achievement are valued highly would equally have high network readiness scores. Kovačić (2005, p. 147) notes, "it could be argued equally well that in a country with high masculinity there would also be a positive attitude toward implementing ICTs if these technologies improve performance, increase the chance of success and support competition, which are all key factors of a masculine culture." To some degree, this foregoing assertion could be interpreted to mean that more masculine societies are prepared and ready to use ICT products and services for advancement. It is hypothesized that:

H2c: Countries in Africa with higher MAS scores will have higher network readiness index scores

UAI refers to how a society deals with uncertain and ambiguous situations that it may confront. Countries with strong uncertainty avoidance would be averse to adopting or accepting new technological products and services, including IT-related ones. On the contrary, nations with lower uncertainty avoidance scores would be more likely to adopt ICT-based initiatives for development. Nath and Murthy (2004) found positive relationships between the diffusion of the Internet and UAI. Thus, it is hypothesized that:

H2d: Countries in Africa with higher UAI scores will have lower network readiness index scores

RESEARCH METHODOLOGY

Data for this study came from reputable sources, including the World Bank, the World Economic Forum, The Freedom House, and Transparency International. As mentioned above, we obtained the cultural dimensions of each country from the work of Hofstede (2001). Importantly, Hofstede (2001) provided scores for some world regions, including the Arab World, East Africa and West Africa. Unfortunately, Hofstede did not provide scores for Central Africa. With respect to that region, the mean scores for each index of both East and West Africa will be used as a proxy. To some extent, the socio-cultural parameters and contexts in Sub-Saharan Africa appear comparable (Mbarika et al., 2005; World Bank, 2007; CIA World Factbook, 2007).

Thus, the selected twenty countries from the five regions represent a big chunk of Africa's economy and population. The economic variables used to gauge national wealth included the GDP per capita and the GDP-PPP (purchasing power parity). The GDP and GDP-PPP variables were transformed and normalized with a logarithmic function, i.e., *In*. The study used two

items to represent human capital: a) total literacy levels, b) the quality of educational system. These items came from the CIA World Factbook (2007) and WEF (2007). We used data from Freedom House to assess political freedom, and used a reverse coding system for this item in the analysis. For the corruption variable, we used data from Transparency International (2007). Pearson's correlation and regression analysis were used for data on the SPPS 14.0 software.

DATA ANALYSIS

To begin with, we used a non parametric test, i.e. Kruskal-Wallis H, to assess whether differences exist across the regions of Africa in terms of the study's variables, including the network readiness index. The summary of the results is provided in Table 2. It can be seen that there are differences across the region for such factors as national culture, literacy levels, corruption index, and the network readiness index (the significant variables are the ones that yielded $p < 0.05$).

	InGDP	InGDP-p	ED	LP	PF	TP	PDI	IDV	MAS	UAI	RL	NR
Chi-Square	10.85	5.99	6.12	**11.24**	12.17	11.33	18.60	17.53	13.87	18.60	15.89	**13.67**
Asym. Sig. (p)	**.028**	.200	.191	**.024**	**.016**	**.023**	**.001**	**.002**	**.008**	**.001**	**.003**	**.008**

Table 2. Test statistics for differences across Africa's regions

Having shown that there is diversity across the regions for most of the variables, attention is then focused on providing insights to the formulated hypotheses. The results of the Pearson's correlation coefficients are shown in Table 3. The correlations are significant at the 0.01 and 0.05 levels. Clearly, the two variables used to operationalize national economy or wealth indicates strong positive relationships with network readiness. As such, hypothesis H1a cannot be rejected. Similarly, the two variables used to represent human capital yielded positive results. Thus, H1b is supported. The data analyses found support for the next two hypotheses (H1c and H1d) as well. Support was found for the prediction that more transparent countries (regions) would have higher network readiness scores. With regard to the cultural dimensions, the data found support for two out of four hypotheses: H2b and H2c. No support was found for hypotheses H2a and H2d.

	InGDP	InGDP-p	LP	ED	PF	RL	TP	PDI	IDV	MAS	UAI	NR
InGDP	1	.520(*)	.548(*)	.173	.029	.721(**)	.688(**)	-.126	.756(**)	.798(**)	.359	**.671(**)**
		.019	.012	.466	.904	.000	.001	.598	.000	.000	.120	.001
InGDP-p	.520(*)	1	.340	.119	-.279	.364	.141	.121	.444(*)	.500(*)	.479(*)	**.549(*)**
	.019		.143	.617	.234	.114	.554	.613	.050	.025	.033	.012
	20	20	20	20	20	20	20	20	20	20	20	20
LP	.548(*)	.340	1	.438	.190	.533(*)	.429	-.522(*)	.597(**)	.302	-.042	**.452(*)**
	.012	.143		.053	.422	.016	.059	.018	.005	.196	.861	.046
ED	.173	.119	.438	1	.013	.413	.280	-.033	.154	.009	.216	**.567(**)**
	.466	.617	.053		.956	.070	.233	.890	.517	.969	.360	.009
PF	.029	-.279	.190	.013	1	.374	.468(*)	-.562(**)	.318	.276	-.542(*)	.190
	.904	.234	.422	.956		.104	.037	.010	.171	.239	.014	.422
RL	.721(**)	.364	.533(*)	.413	.374	1	.899(**)	-.315	.839(**)	.787(**)	.244	**.895(**)**
	.000	.114	.016	.070	.104		.000	.177	.000	.000	.300	.000
TP	.688(**)	.141	.429	.280	.468(*)	.899(**)	1	-.469(*)	.847(**)	.764(**)	.044	**.763(**)**
	.001	.554	.059	.233	.037	.000		.037	.000	.000	.855	.000
PDI	-.126	.121	-.522(*)	-.033	-.562(**)	-.315	-.469(*)	1	-.521(*)	-.128	.721(**)	-.059
	.598	.613	.018	.890	.010	.177	.037		.019	.592	.000	.805
IDV	.756(**)	.444(*)	.597(**)	.154	.318	.839(**)	.847(**)	-.521(*)	1	.854(**)	.139	**.714(**)**
	.000	.050	.005	.517	.171	.000	.000	.019		.000	.558	.000

MAS	.798(**)	.500(*)	.302	.009	.276	.787(**)	.764(**)	-.128	.854(**)	1	.341	**.751(**)**
	.000	.025	.196	.969	.239	.000	.000	.592	.000		.141	.000
UAI	.359	.479(*)	-.042	.216	-.542(*)	.244	.044	.721(**)	.139	.341	1	.448(*)
	.120	.033	.861	.360	.014	.300	.855	.000	.558	.141		.048
NR	.671(**)	.549(*)	.452(*)	.567(**)	.190	.895(**)	.763(**)	-.059	.714(**)	.751(**)	.448(*)	1
	.001	.012	.046	.009	.422	.000	.000	.805	.000	.000	.048	

* Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).

Table 3. The correlations among the study's variables

DISCUSSIONS AND CONCLUSION

The purpose of this study was twofold: First, to investigate whether the countries or regions of Africa have similar characteristics with respect to network readiness; and second, to examine the relationships between some socio-economic and cultural factors on network readiness using data from Africa's regions. With respect to the first issue, this study suggested that the regions of Africa cannot be taken as a monolith, at least in the context of network readiness assessment. Although African countries have relatively poor scores on the network readiness index, it may be misleading to lump all the countries on the continent into one pot. This study has shown that there are salient differences that should not be overlooked. For example, the averages of the network readiness index for the regions differ significantly. The data showed that the North African region has the best score in Africa with a mean score of 3.64. Internationally, Denmark has the best score at 5.71 (WEF, 2007). In Africa, the next best region was Southern Africa with an average score of 3.40. This was followed by West Africa and East Africa with mean scores of 3.00 and 2.93, respectively. Central Africa came in last with an average score of 2.43.

Using data from the African continent, we showed that there are strong positive relationships between such exogenous influences as national culture and socio-economic factors and network readiness (or the ability to benefit from ICT use nationally or regionally). The data analysis found support for six out of the nine hypotheses formulated to test the relationships (see Table 4 for a summary).

	Hypothesis	Pearson's correlation & significance	Result
1	H1a	.671 (p = 0.01); 0,.549 (p = 0.12)	Supported
2	H1b	.452 (p = 0.046); 0.567 (p = 0.09)	Supported
3	H1c	.190 (p = .422)	Not supported
4	H1d	.895 (p = 0.000)	Supported
5	H1e	.763 (p = .000)	Supported
6	H2a	-0.059 (p = .805)	Not supported
7	H2b	.714 (p = 0.000)	Supported
8	H2c	.751 (p = 0.000)	Supported
9	H2d	.448 (p =0.048)	Not Supported

Table 4. The summary of the results

As per the variables used to operationalize socio-economic factors, the data showed that wealthier regions like North and Southern Africa are better poised to reap the benefits of the information age. Similarly, regions with higher levels of human capital and related resources have a relatively better showing on the network readiness index score than those with poorer statistics. Our analysis suggested that there is no significant relationship between the amounts of political freedom available in a country and its ability to leverage ICT products and services for development, at least in the context of Africa's regions. This information may be counter-intuitive, given the positive link between political freedoms and economic development

(see Gregorio et al., 2005; Freedom House, 2007; World Bank, 2007). Nonetheless, the data analysis supported the view that African regions with effective legal frameworks tend to have favorable network readiness scores. In the same vein, the more transparent or less corrupt regions tend to have relatively good network readiness scores. To some degree, the foregoing lends credence to the viewpoints in Oxley and Yeung (2001).

Interestingly, the statistical analysis using data for Africa's regions provides support for two out of the four hypotheses that were formulated for the relationships between national culture and the network readiness index. The result showed that there was a negative relationship between PDI and network readiness as predicted; however, the relationship was seen to be insignificant. This result permits us to suggest that stakeholders across African societies might have fully understood the value and import of ICT for development to such an extent that support from a higher authority is no longer considered vital in shaping perceptions. This conclusion may be at variance with conventional wisdom suggesting that strong leadership on the African continent is needed in moving forward technological-related initiatives (G8 DOT Force, 2001; Ifinedo, 2006; InfoDev, 2007). Nonetheless, a prior study in the literature by Nath and Murthy (2004) offered an analogous interpretation to our result; they reported that the PDI may not permit meaningful conclusions with regard to ICT and cultural issues. To the extent that IND is negatively related to network readiness among Africa's regions, this study showed that countries in the regions of Africa might have comprehended the usefulness and benefits of ICT products for developmental purposes equally.

MAS was found to have a significantly impact on Africa's regions' network readiness, confirming the proposition that regions with preferences for material success and achievement would value and use ICT products to their advantage more than their counterparts with lesser inclinations toward such things. In the same vein, countries with higher IND scores tended to outperform those with lower scores on the network readiness index. This may suggest that African countries that encourage the exploitation of technological innovations for the benefit of the individual rather than for the group will continue to fare favourably in their quest to reap the benefit of the information age. Researchers (e.g. Comin and Hobijn, 2004; Waarts and van Everdingen, 2005; Erunbam and de Jong, 2006) have suggested a nexus between the individual use of technological innovations and the advancement of the nation state. Naturally, the Sub-Saharan African society tends to place more emphasis on "the group" than on the individual (Hofstede, 2001). In that regard, the result suggests that countries in the region where attention is paid to the individual would have more capacity for the information age.

The results of this research provide implications for both policy makers and researchers. The study's findings highlight areas where energies could be channelled as Africa and its various region attempt to integrate into the information age. Recently, WEF (2007) noted that some African countries have started to spend heavily on ICT products with a view to redressing their poor network readiness in the global economy. This is an encouraging move; however, external assistance may be required to help the less economically endowed countries on the continent that are unable to marshal resource for such investment. This would ensure that no country is left far behind in the new order. Further, policy makers are provided with information indicating that human capital development, positive political climates, and favorable transparency levels are related to a nation's ability to gain from the information age. Policy makers could investigate why some regions on the continent appear to be faring better than others. Arguably, differing levels in economic resources alone may not explain the differences. In brief, researchers' attention is focused on the import of socio-economic and cultural influences on ICT-related indices such as network readiness or the e-readiness index. Overall, the relevance of such factors is underscored, and may influence others interested in investigating disparities in technological indices or measurements across countries (or regions). Similar efforts to this one in comparable regions of the world could be undertaken to facilitate comparative insights. The impact of other relevant factors such as national technological attitudes and policy not considered here could be examined. As we conclude, it is important to highlight some of the limitations in this study. Some of these relate to the selection of the countries. We are hard-pressed to say that the selected countries unequivocally reflect patterns in their respective regions. Moreover, our choice of twenty countries, though varied and comprehensive, might be limiting. A larger sample of countries might permit a deeper insight. Lastly, there is a fundamental flaw in Hofstede's work wherein "culture" in a nation-state is assumed to be monolithic (e.g., Waarts and van Everdingen, 2005; Erunbam and de Jong, 2006). It is known that even in one single nation there are different cultures.

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