APPENDIX O
The population effect: advantages of small urban countries or English speaking islands

An overlooked finding of the U.S. digital divide examined across income level, education and geographic location in 1999 was that: "Notably, PC ownership was the greatest for households of the Asian/Pacific Islander heritage – 55 percent of such homes own a PC." (NTIA 1999).

Geographic and ecological barriers to diffusion of technology have been considered as one of the main factors to explain continental differences in the use of technologies (Diamond 1998). However, the results presented in Tables O.1. and O.2. suggest the occurrence of a phenomenon by which small countries or islands are in a different (better?) position regarding the use of information and communication technologies, than other technologies which usually require an underlying transportation infrastructure. Information and communication technologies are powerful tools to overcome geographical barriers specially relevant for islands, landlocked or small countries. Examples include English speaking island-countries such as Australia, New Zealand, Ireland, Singapore, and the Bermudas, or small countries such as Iceland and Cyprus The installation of IT-infrastructure, especially internet service in urban areas in islands and small countries produce very high indicators in these countries, in particular when national indicators are divided by population size.

For example, in Table O.1. we see how an African island such as Seychelles (100,000 hab) displays an impressive high density of number of Internet users compared to South Africa, which is the leader of access, adaptation and use of digital information and communication technologies in the region.

Countries	Internet Users per 10000 hab in 1998	Internet Users per 10000 hab in 2000
IT Leader in Africa		
South Africa	310.95	549.38
African Island		
Seychelles	261.54	621.81

Table O.1. African examples of countries with high levels of internet users

As Table O.2. indicates, IT indicators for countries which are Islands, or have populations less than 10 million habitants are sometimes higher than indicators for leading G7 industrialized countries in the same region.

Country	Internet users/10,000 hab 1998	Internet users/10,000 hab 2000
G7 European Countries		
United Kingdom	1357.17	2576.72
Germany	1279.91	2433.81
France	586.43	1445.58
Italy	523.06	1047.16
Outperforming European countries		
Iceland	3623.19	5978.65
Norway	3598.74	4905.24
Finland	2540.70	4034.00
Denmark	1887.04	3658.52
G7 Asian Country		
Japan	1323.42	3044.36
OutPerforming Asian Countries		
Korea (Rep)	668.32	4025.76
Singapore	2370.79	2986.78
G7 American Countries		
Canada	2479.59	4130.07
United States	2205.40	3465.78
Outperforming American country		
Bermuda	3125.00	3901.37

Table O.2.. Selected countries with high levels of internet users compared to G7 countries by region

In Europe, smaller countries such as Iceland, Norway, Finland, Denmark and Switzerland have higher indicators for internet users than industrial G7 leaders such as United Kingdom, Germany, Italy or France. For example, in Iceland in 1998 there was more than one internet user per 3 habitants. By the year 2000 this had increased to more than one internet user per 2 habitants. In Asia, Japan was outperformed by Singapore in 1999, and by Korea in the year 2000. In America, for example, Caribbean islands such as Bermuda, the Virgin Islands and Antigua have high indicators when compared to G7 industrial leaders such as United States and Canada. Bermuda for example, had 3,125 internet users per 10,000 habitants in 1998, meaning that there was more than one internet user per 3 habitants in Bermuda. By 2000, this value had increased to 3,902 internet users per 10,000 habitants, meaning that there was almost one internet user per 4 habitants of Bermuda.

Owing to lack of data, the relation between high levels of IT-related infrastructure indicators cannot be associated with higher levels of human development reflected by socio-economic indicators published by the UNDP. This is true for: Aruba, Bahamas, Bermuda, Guadelupe, Martinique, the Netherland Antilles, Puerto Rico and the Virgin Islands. We can, however discuss some implications of these results for which we do have data. Islands such as Bermuda *may* owe these high ratios to the high importance of information and telecommunications technologies in the tourism industry, but also to the presence of transnational corporation off-shore operations. An example is Concert, a US $7

billion global telecommunication venture of AT&T and British Telecom "virtually" based in Bermuda. Other service industries such as financial or insurance off-shore operations that rely heavily on information technology may also have an effect on this indicator. Caribbean islands receive benefits from the eastern Caribbean Fibre System, a state of the art submarine fibre optic cable system linking 17 Caribbean countries from the British Virgin Islands to Trinidad and Tobago, installed in 1995. The fibre system is complimented by an upgraded Digital Eastern Caribbean Microwave System recently installed in 2000. This investment, together with a new international gateway switch, is part of an ongoing upgrading program, which provide for high volume transmission of services. There has also been strengthening of regional organization of initiatives such as the Caribbean Telecommunications Union (CTU) funded in 1998 by the World Bank which includes participation of the following countries: Antigua and Barbuda, Montserrat, St. Kitts and Nevis, Dominica, Anguilla, Belize Bahamas, Trinidad and Tobago, Jamaica, Guyana, St. Lucia, Barbados, Grenada, St. Vincent and the Grenadines. The Eastern Caribbean has also been successful in attracting US companies for services such as data entry. In 1994, hourly wages for data entry in the US were between $7 to $8, whereas in Dominica, Grenada, Saint Kitts and Nevis, Saint Lucia and Saint Vicent it was less than $1.50. (UN 1999, p. 61)

All these factors may account for the high levels of IT-related indicators, however, IT indicators in countries with populations less than ten million habitants seem to differ from countries with larger populations. Information technologies are powerful instruments to overcome geographical or isolating barriers, empowering users at individual level. If the "Island and/or Small-Country effect" is coupled with a tradition of off-shore financial and/or insurance services, such as Bermuda's case, then high levels of IT-related indicators are easily explained by operations of transnational corporations. This however, may not be the case for other islands or small countries.

Higher IT-infrastructure indicators divided per population are easier to achieve for small countries with mostly urban populations. Populations in Northern European nations such as Iceland with populations close to 300,000 will reap the benefits of information technologies much faster than other European industrialized countries that have larger populations. Even though this is true, there may be metropolitan areas or regions within a country, such a Bangalore (5 million hab.) in India that are equivalent in size to smaller countries such as Israel or Ireland. When disaggregated at this level would display different results. In sum, the values of the indicators differ significantly if we divide IT-infrastructure values by population.

Appendix N includes the results of an exercise after having estimated all the missing values for the IT-infrastructure for 174 countries and carrying out two types of factor analysis: 1) using values divided per 100,000 habitants, and 2) using normalized values without dividing per population. The results vary widely.