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Do Information and Communication Technologies Further or Hinder Gross National Happiness?

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Abstract

This chapter focuses on the relationship between information and communication technologies and Gross National Happiness, the philosophy that has guided development within Bhutan. Whilst a series of challenges are identified, the focus is on that between availability and affordability of the technologies and the need to ensure that access is equitable. It is argued that the gap between the 'haves' and 'have nots' can be reduced but entirely overcome.

Introduction

Over the course of the last 25 years or so, there has been unprecedented growth in the diversity and capabilities of information and communication technologies (ICT). These technologies, such as mobile telecommunications and the Internet, are now found throughout society and the economy. In the information driven economy that has emerged, ICT binds together individuals, companies and organisations irrespective of their geographical location. The enhanced capabilities and near ubiquity of some ICT have engendered new forms of economic activity, encouraged the more efficient delivery of existing services as well as the development of new services and products.

Notwithstanding the many benefits that ICT advances have brought, it is clear that not everyone has been able to enjoy these

benefits to the same extent. In some cases the ICT is simply not available, whilst in other cases affordability or the lack of appropriate skills may be the barrier to adoption. Regardless of the reason why the benefits of ICT cannot be enjoyed, the result is the same, namely, some have access to ICT and others do not. The divisions that result are of concern to many governments, but are particularly problematic in Bhutan due to the unique approach to development that has been adopted. Since its articulation by the fourth King, Gross National Happiness (GNH) has guided development within Bhutan. GNH places the individual at the centre of development efforts, which are to be sustainable and equitable socio-economically. In other words, the gap between those who have access to ICT and those that do not, the so-called 'haves' and 'haves not', runs counter to GNH.

This paper focuses on the tension between ICT and GNH. Access to, and use of, ICT is characterised by its unevenness. In contrast, GNH aims to reduce, if not completely negate, the differences that exist. With this in mind, the remainder of this paper is divided into four sections. The following section provides an overview, albeit brief, of Bhutan and some of its key socio-economic characteristics. The focus then shifts onto ICT within Bhutan, highlighting milestones in their development and recounting the structure of the industry. In section four, the relationship between ICT and GNH is explored with the main focus being on the relationship between availability and affordability of ICT. Conclusions are drawn in the final section of the paper.

Bhutan

Rather than providing a detailed overview of Bhutan, this section is contextual in nature and introduces issues that are referred to later on in the chapter.[1] Bhutan is a mountainous and sparsely populated country that is bordered by China to the north and India to the south, east and west. At 38,394 square kilometres, Bhutan is roughly the size of Switzerland but with a population of 634,982 its

population density is among the lowest in Asia.[2] If only cultivated land is taken into account, the population density rises to 129 people per square kilometre (Royal Government of Bhutan, 2005a).

Bhutan's self-imposed isolation was ended in 1961 by the third King Jigme Dorji Wangchuck. Bhutan is now a member of many international organisations including the United Nations, International Monetary Fund and World Intellectual Property Organisation. In 1999 Bhutan applied to join the World Trade Organisation, though at present, accession discussions are ongoing.

Although Bhutan is a monarchy, the monarch is no longer head of the government. The Constitution of Bhutan that was adopted in 2008 turned Bhutan into a constitutional monarchy, clearly defining the roles and remit of its components (Royal Government of Bhutan, 2008a). The Constitution divides Bhutan into 20 Dzongkhags (districts), which in turn are sub-divided into a series of Gewogs and Thromdes (Royal Government of Bhutan, 2008a). The Dzongkhags and Gewogs have played an increasing role in both the administration and development of Bhutan.

Bhutan is perhaps best known internationally for its unique development philosophy of GNH. As articulated by King Jigme Singye Wangchuck, "Gross National Happiness is more important than Gross National Product. The ultimate purpose of the government is to promote the happiness of its people" (Royal Government of Bhutan, 2005a). GNH is the overarching development philosophy of Bhutan (Royal Government of Bhutan, 2002) and places the individual at the centre of all development efforts. It is pursued through the four broad platforms of sustainable and equitable socio-economic development, conservation of environment, preservation and promotion of culture, and enhancement of good governance.[3] These four dimensions shape development within Bhutan, for instance, a 1999 report suggested changes to the structure of the government so that transparency, efficiency and good governance were enhanced (Royal Government

of Bhutan, 1999). This was further reviewed in 2005 and published as the Good Governance Plus Report 2005 (Royal Government of Bhutan, 2005b).

Starting in 1961 the Bhutanese economy has been modernised. The first five-year plan focused on the provision of basic infrastructures like road and telecommunications. Subsequent five-year plans have widened the development remit, with, for example, the Ninth Five-Year Plan highlighting a diverse array of issues including devolution, public services management and the encouragement of the private sector (Royal Government of Bhutan, 2002).

Table 1: Ninth Five-Year Plan Budget Expenditures (in Million Nu)

	02/03	**03/04**	**04/05**	**05/06**	**06/071**	**07/081**
Revenue	4785	5055	6066	6093	10038	11129
External grants	2269	5367	5033	5478	7156	5183
Revenues + External Grant	7054	10423	11099	11571	17194	16312
Current	4581	5149	6506	6888	8756	9471
Capital	5310	4653	9056	7764	9461	9703
Total expenditure[2]	9890	9802	15562	14652	18217	19174
Lending (net)	-48	-6	39	49	-1103	-1283
Overall surplus / deficit	-2891	580	-4106	-3745	80	-1539
Budget surplus/deficit as % of GDP	-10%	-1.75%	-11%	-8%	0%	-3%

Notes: Projected without Drukair Planes

Source: GNH Commission (2008: 8)

The most recent five-year plan will cover the period 2008 to 2013 with the overarching objective being poverty reduction (GNH Commission, 2008). Although poverty reduction has been tackled

through elements of previous five-year plans, its adoption as the overarching objective of the tenth five year plan reflects the fact that substantial socio-economic inequalities remain across Bhutan notwithstanding the progress that has been made to date. The objective of reducing poverty will be facilitated through encouraging economic development, with the plan focusing on five specific areas: national spatial planning, integrated urban-rural development, strategic infrastructure, the development of human capital and enhancing the enabling environment (GNH Commission, 2008).

Foreign aid has played a role in these five-year plans. India, for instance, has contributed to the development of Bhutan's road and telecommunication infrastructure over the years. Having said this, Bhutan's reliance on foreign aid to fund its development has been declining in recent years (GNH Commission, 2008), in part, due to the economic growth generating more resources indigenously. Even so, as can be seen from Table 1, the Ninth Five-Year Plan saw three large deficits (GNH Commission, 2008). One possible explanation for these deficits is the substantial capital expenditure that has occurred during the Ninth Five-Year Plan, that is, the country is investing today to reap the benefits of these investments in the future. A similar explanation could also explain the substantial increase in national debt that rose to $691 million by September 2006 (GNH Commission, 2008).

Through successive five-year plans, the Bhutanese economy has changed. The economy grew on average by 6.7 % between 1980 and 1998. In the 1980s GDP growth was higher at 7.3%, resulting in income almost doubling over the course of the decade. Economic growth slowed between 1990 and 1998, averaging 5.9% per annum. In contrast, growth accelerated once more to average over 9% between 2002 and 2006. Over the period of the Ninth Five-Year Plan, inflation averaged 2.5% (GNH Commission, 2008).

Conditions today for most Bhutanese are very different from what they were in 1961. Adult literacy has increased to 54% and the primary school completion rate to 87% by the end of the Ninth Five-Year Plan and more than 80% of the population has access to improved sanitation and drinking water (GNH Commission, 2008). Health coverage has increased, with more doctors and hospital beds in 2006 than 2002 (GNH Commission, 2008).

Information and communication technologies

As can be seen from Table 2 (below), ICT were first introduced into Bhutan at the start of the 1960s. Telecommunication services were the first to be launched, following by the introduction of print media in 1965 and radio in 1973. After a significant gap, TV broadcasting and the Internet commenced in 1999 and cellular mobile services in 2003.

Table 2: Milestones in the development of the Bhutanese ICT industry

Year	Development
1963	First rudimentary telephone system launched
1972	Three separate physical wire routes (Thimphu–Phuentsholing, Trongsa–Gelephu, and Trashigang–Samdrup Jongkhar)
1973	Amateur radio broadcasts commence
1981	First analogue network established
1984	First link to outside world launched (from Thimphu to Hasimara in India)
1986	Bhutan Broadcasting Service radio services launched
1989	UNDP and ITU funded implementation of the Bhutan Telecommunications Development Master Plan
1990	International gateway in the capital city (Thimphu) allowing direct international links for the first time
1991	Japanese grant aid that made possible Bhutan Telecommunications Development Master Plan received
1994	International, domestic and local calling possible
1998	Bhutan Telecommunications Development Master Plan implemented
1999	Bhutan Telecommunications Act enacted by the National Assembly Internet and national television introduced Commercial cable television regularized
2000	Bhutan Telecommunications Authority established

	Bhutan Telecom established
2001	IP-based rural access pilot project implemented
2002	First cellular mobile licence issued to Bhutan Telecom
2003	Ministry of Information & Communications established Cellular mobile services launched
2004	Internet Service Provider licenses issued to two private companies Bhutan ICT Policy & Strategies formulated
2005	Bhutan Telecom's exclusive privilege for fixed-line telephony abolished
2006	Bhutan Information, Communications & Media Act enacted by the National Assembly; Nationwide television broadcast launched; Second cellular mobile licence awarded to Tashi InfoComm Ltd; Sector-specific Bhutan Telecommunications Authority evolves into a converged Bhutan InfoComm & Media Authority Private newspapers licensed
2007	Bhutan InfoComm & Media Authority becomes autonomous Local Area Networks in all 20 Dzongkhags implemented Thimphu Wide Area Network project implemented
2008	Bhutan InfoComm & Media Appellate Tribunal established Second cellular mobile operator launches GSM/GPRS service Bhutan Telecom launches ADSL and 3G services

Source: Updated from Kezang & Whalley (2007: 73)

The government initiated the first telephone network in Bhutan in 1963 to assist with the construction of the national highway. This coincided with the adoption of a more planned approach to development. The telephone infrastructure then consisted of three separate networks. The first network linked the capital Thimphu in western Bhutan to the commercial hub in the south, Phuentsholing. The second network connected Trongsa, a town in central Bhutan with Gelephu, another commercial town in the south. The eastern network connected Trashigang in the east to Samdrup Jongkhar in the south. It was not until 1984 that Bhutan's first link with the outside world was established, with an analogue microwave link from Thimphu to Hasimara in West Bengal, India.

The former Ministry of Communications, with the assistance of the International Telecommunications Union and United Nations Development Programme, initiated the Bhutan Telecommunications

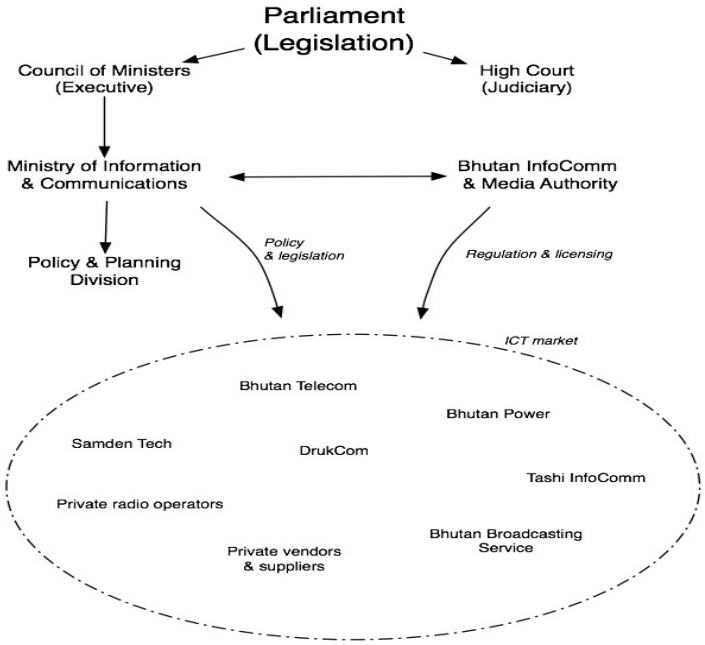
Development Master Plan in 1989. From 1991 onwards, the Master Plan was funded by Japanese grant aid. The modernisation plan was implemented in four phases over a 7-year period with the priority being to provide services to those areas that did not already enjoy basic telecommunication facilities. In addition, the plan was also to improve cross-country telecommunications links through establishing an east-west link between Thimphu, the capital city, and Trashigang.

The east – west microwave link was established in September 1993 and by June 1998 the modernisation plan was completed. This completed the expansion of the national network to major towns that previously had no service. As a consequence, Bhutan had for the first time a national digital telecommunications infrastructure that linked together the head offices of all twenty districts. A dedicated switch in Thimphu serves as the international gateway allowing Bhutan direct international access to over 100 countries.

Since 1998 there have been considerable changes to the Bhutanese ICT market, with some of the main ones being:

- Increased rural coverage
- The establishment of local area networks in most Dzongkhags
- An increase in the number of Internet Points of Presence (PoP) across the country
- Increasing ICT literacy and awareness
- Improving customer service and reductions in prices

Figure 1: Structure of the Bhutanese ICT industry



Source: Updated from Kezang & Whalley (2004: 791)

As more ICT have been launched and they have been brought to an ever-larger proportion of the country, the structure of the ICT industry has also changed. Figure 1 shows the structure of the ICT industry. From this it can be seen that there are both institutions and companies present in the Bhutanese ICT industry. The most significant institutions are the Ministry of Information and Communications (MoIC) and the Bhutan InfoComm & Media Authority, BICMA.[4] Bhutan Power Corporation Ltd (BPC), Bhutan Telecom Ltd. (BTL), Tashi InfoComm Ltd. (TICL), Samden Tech Pvt. Ltd. and DrukCom Private Enterprise are the licensed suppliers of telecommunications and ICT services. BTL is a 100% state-owned commercial corporation.

Government policies that affect the ICT industry are developed by the MoIC. The Ministry's policies and plans cover results-oriented resource allocation, issues relating to radio spectrum management and use, and investment co-ordination. MoIC did partially engage in the regulation of the telecommunications industry, but with the passage of the Bhutan Telecommunications Act in July 1999 by the National Assembly, it lost this role. As a consequence, planning and policy was separated from both the regulation and operation of the industry.

Regulation passed to the Bhutan Telecommunications Authority, which was established in January 2000 to "regulate and promote the development of the Bhutanese telecommunications sector". The roles of the ministry and the regulator have further been clarified with the enactment of the Bhutan Information, Communications and Media Act 2006. The BICMA is a separate agency delinked from MoIC, and funded by the government through the Ministry of Finance. The regulator is to implement the Bhutan Information, Communications and Media Act (2006), managing the process of liberalising the market so that it is opened up to competition. This liberalisation has resulted in new players entering the Internet and mobile telecommunication markets, reduced prices and improvements to the quality of services. It is worth noting that further changes in the ICT market are likely, not least due to continued liberalisation on the one hand and the possible accession of Bhutan to the World Trade Organisation.

Table 3: Basic market characteristics

	1996	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
Main lines	6,100	23,657	30,285	33,200	33,500	33,000	30,000
Mobile lines	-	4,383	18,995	37,500	78,185	125,200	250,000
Number of PCs	1,500	7,000	9,000	11,500	12,000	12,500	13,500
Cable TV	-	13,000	18,000	20,000	20,500	21,500	25,000

subscribers							
Number of TV channels	-	45	45	35	35	35	35
Internet subscribers	-	1,700	3,000	4,000	5,000	7,000	10,000

Source: updated from Kezang & Whalley (2007: 75)

Table 3 (above) offers basic descriptive information on the Bhutanese ICT market. BTL remains the sole provider of main (fixed) lines, whilst B-Mobile and Tashi InfoComm compete against one another in the mobile market. BTL also has an Internet Service Provider (ISP) subsidiary, namely, DrukNet. Samden Tech and DrukCom offer VSAT-based Internet services. Numerous private companies are also involved in the provision of cable TV services across the country.

Discussion

A useful starting point to understand the relationship between ICT and GNH is Kezang & Whalley (2007). They argue that the diffusion of ICT is determined by the interaction between available resources, the services being delivered and the geography of Bhutan. Although the focus here is on the interplay between services and GNH, it is necessary to briefly recount the other two as they do contribute to how this relationship manifests itself in practice through shaping the availability and affordability of the underlying ICT.

According to Kezang & Whalley (2007), the geography of Bhutan raises three barriers to improving access to ICT and the services that they bring. Firstly, Bhutan is a sparsely populated country with a low population density. Having said this, urbanisation is occurring with Thimphu accounting for around 15% of the country's official population. Secondly, the mountainous nature of the terrain ensures that travelling from one side of the country to the other results in a difficult and often protracted journey. Finally, several languages are spoken across Bhutan with the consequences that it does not follow than everyone speaks either English or Dzongkha. The combined

effect of these barriers is relatively straight forward yet profound, namely, to fragment Bhutan into a series of smaller markets.

Bhutan also lacks resources. As can be seen from the table above, Bhutan's reliance on external grants has declined over the years though they continue to play a significant role in funding development initiatives. Assistance has come from a variety of countries and international organisations, with Danida (2003: 9) identifying the following major donors: the Asian Development Bank, Austria, Denmark, The Netherlands, India, Japan, Switzerland, UN and the World Bank. Three of these donors – India, Japan and Denmark – have provided substantial assistance over the years to develop the ICT sector. The assistance provided by both India and Denmark has largely focused on the telecommunications industry, whilst Japanese assistance has tended to include the broadcasting sector as well.

The recent agreement between the World Bank and Bhutan draws attention to another type of resources, that is, human. The need to develop human capital in its broadest sense is identified as one of the objectives of the Tenth Five Year Plan. In contrast a narrower focus is taken by the World Bank (2007), which highlights the need to improve Bhutan's information technology skills and expertise. As part of a US$8 million package, $2 million will be spent on skills development initiatives in three areas: generic IT skills for graduates, the use of distance learning to develop IT professionals and a programme to develop IT entrepreneurship skills (World Bank, 2007: 9f). The aim of these initiatives is to develop the country's skill base to such a point that the existing ICT infrastructure, as well as the IT park at Wangchhutaba that the World Bank is also supporting, can be used productively to generate economic benefits. One such benefit is increased economic activity, whilst another is the resulting slower growth in, or even reduction of, unemployment that would occur as a consequence.[5] The Tenth Five Year Plan (GNH Commission, 2008: 74-78) draws attention to the increase in unemployment that Bhutan has experienced in recent

years, from 1.4% in 1999 to 3.7% in 2007. Two areas of concern are explicitly identified, namely, youth and urban female unemployment.

The World Bank's (2007) recognition of the need to develop entrepreneurial skills within Bhutan echoes Kezang & Whalley (2007). This cannot be considered as surprising when the emergent nature of the private sector in Bhutan is taken into account. Through an extensive range of state-owned enterprises, the government has long played a significant role in the economy[6] In addition, the civil service has recruited many graduates into it ranks over the years, reducing in the process the degree level educated workforce available to the private sector.[7] Although the number of graduates in general and ICT-related graduates in particular has increased in recent years, it is not clear how far this has resolved the competition for graduates between the government and other sectors in the economy that exists in Bhutan.[8]

Now that the pertinent geographical and resource issues have been outlined, attention can turn towards exploring the relationship between services and GNH. From Table 3 (above) it can be seen that the ICT services available within Bhutan has increased. Through the development of the ICT industry in Bhutan, a familiar set of ICT services are now available: radio, TV, cable-TV, fixed and mobile telephony and Internet access. Significantly not only are each of these an industry in their own right, but they also facilitate broader economic activity on the one hand and the delivery of government services on the other.

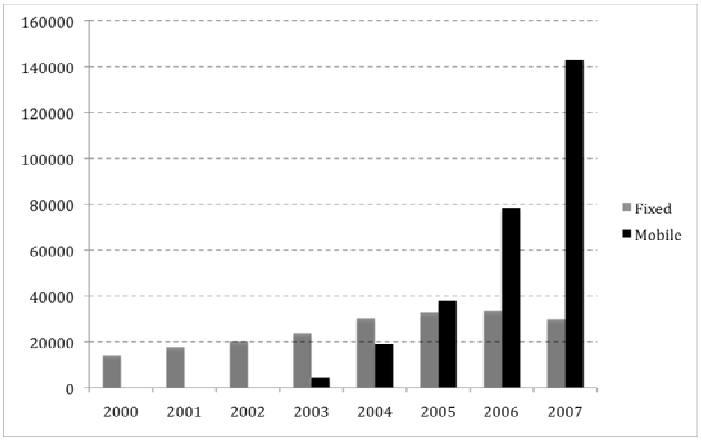
Pek (2003) provides an overview of the media within Bhutan. From this it can be seen that radio is the most effective media in Bhutan as it reaches the most people of any ICT service.[9] It is estimated that around 60% of the population listen to the radio, with shortwave transmitters covering more of the country than FM (Pek, 2003: 18). It is arguably the case that the low entry barriers to radio have encouraged its diffusion across Bhutan.[10] The geographical coverage

of the TV services offered by Bhutan Broadcasting Services (BBS) has increased in recent years. Kezang & Whalley (2007: 77) state that TV production was limited with only five hours per day being broadcast, with the broadcasting of services outside Thimphu delayed by a lack of a national broadcasting transmission network. This has, however, changed – more hours are now broadcast, at around ten per day, and satellite used to deliver services to 44 towns across Bhutan (People's Project Research, 2007: 96). It is worth noting that the financial assistance that India has provided to enable this satellite coverage ends in 2009, with the cost of $120,000 per annum then becoming the responsibility of BBS.

Since its introduction in 1999, cable-TV has grown so that more than 40 operators can now be found in Bhutan.[11] They provide customers with the mandatory BBS channel along with up to 35 foreign channels (People's Project Research, 2007: 97). The impact of the content delivered by cable-TV on Bhutanese culture has been debated,[12] with some arguing that the impact has been detrimental and others that the limited number of subscribers served by cable-TV operators minimises any impact that it might have. It seems reasonable to assume that the introduction and dissemination of foreign culture through cable-TV has affected Bhutanese culture, and as a consequence that one of the tenets of GNH has been challenged in the process. The difficulty, however, is determining the extent to which Bhutanese culture has been affected. The small number of subscribers ensured that the direct impact of the foreign content delivered through cable-TV is likely to be minimal, but the subsequent debate brought the availability of foreign content to a wider audience. The debate would highlight the differences in content between BBS and foreign programmes, with the latter arguably being more salacious and less educational than the former. Moreover, the debate elicited a policy response within Bhutan that changed the range of content that cable-TV operators could deliver and questioned the role of BBS as a public service broadcaster (People's Research Project, 2007).

The telecommunications market can be divided into three sub-markets: fixed, mobile and Internet access. The longest established of these three sub-markets is fixed, with Bhutan Telecom Ltd (BTL) being the sole licensed provider of fixed voice telephony with 30,000 subscribers at the end of 2007 (Royal Government of Bhutan, 2008b). The trunk network of BTL can be viewed as being in transition, from a series of unconnected point-to-point transmission lines to one where connections between these lines occurs on the one hand and increased (national) coverage is achieved on the other. In conjunction with Bhutan Power Corporation, BTL has installed optical ground wire (OGPW) in the west of Bhutan and an east-west route is under development as well (Royal Government of Bhutan, 2008b: 3).[13]

Figure 2: Comparative growth rates of mobile and fixed telephony



Note: only B-Mobile subscribers are included in the mobile total for 2007.

Source: Ministry of Information & Communications (2007: 5); Royal Government of Bhutan, 2008b) Global Mobile, 2008)

There are substantially more mobile than fixed subscribers in Bhutan. In contrast to the 30,000 fixed subscribers at the end of 2007, there are 143,000 mobile subscribers (Royal Government of Bhutan, 2008b: 6). B-Mobile has more than 50 base stations across Bhutan,

and is present to a lesser or greater extent in all Dzongkhags. A second GSM operator was licensed in 2007, and had 70,000 by the second half of 2008 (Global Mobile, 2008).[14] Included within its license conditions was the requirement to cover all Dzongkhags within five years, and all Gewog headquarters within the following five years after that (Royal Government of Bhutan, 2008b: 7).

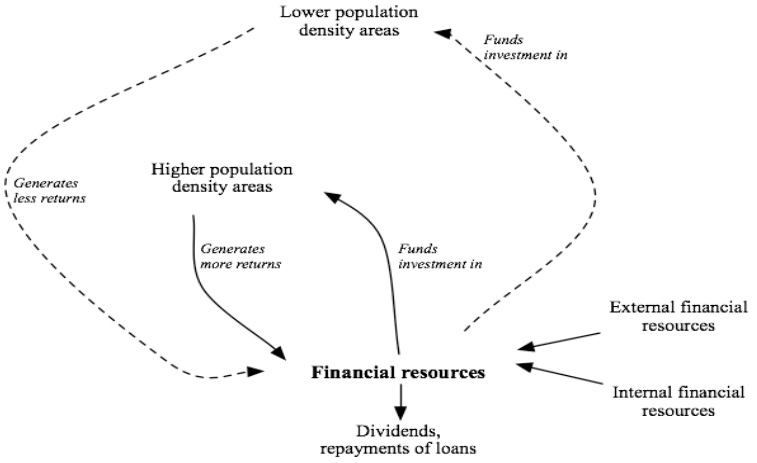
Given the relative economics of fixed and mobile telecommunication networks, it is no surprise that there are more mobile than fixed subscribers. What may be surprising, however, is the rapid growth of mobile and the recent decline in the number of fixed subscribers shown in Figure 2.

Given the relative growth rates of mobile and fixed voice telephony, as well as their economic characteristics, it is arguably the case that GNH is best served through the expansion of mobile coverage. The notion of inclusiveness runs throughout GNH, which when 'translated' into the ICT sector becomes the minimisation of the 'digital divides' that inevitably occur as technologies diffuse in a society and economy. Drawing on internal and external resources, the expansion of the mobile network would generate revenues that in turn fund the further expansion of network coverage. At the same time, the generated revenues would fund the payment of dividends and the repayment of loans. Due to differences in population densities, rates of return will differ between urban and more sparsely populated areas being higher in the former than the latter. This set of relationships is shown diagrammatically below. This would also be true for fixed telecommunications as well, though the rate of expansion would be less in comparison.

The above set of relationships is, however, idealised in that two related factors are not taken into account. No account is made of the effects of competition on the ability to generate sufficient revenues, nor on the 'substitution' that may occur between fixed and mobile telecommunications services. The rapid rise in the number of mobile subscribers compared to the largely stagnant number of fixed

subscribers suggests that something more substantial than 'substitution' is occurring, fuelled by both availability and greater affordability. Substitution in itself is not a problem as it simply means that mobile rather than fixed is the means through which telecommunication services are delivered.

Figure 3: Inter-relationship between higher and lower population density areas



Source: adapted from Kezang & Whalley (2007: 79)

Problems do emerge, however, when competition is introduced into the market. Moves to liberalise the telecommunications market began in 2005, and are most evident in the mobile market with the awarding of a second mobile licence in 2006 and the number of subscribers that it has been able to attract is such a short period of time. Competition reduces margins and thus the surplus within the system that can be used to expand geographical coverage, develop new services and so forth. As the more densely populated areas are also the more attractive markets, those parts of Bhutan that will not receive investment are characterised by lower population densities. In other words, as the feedback loops in Figure 3 are undermined, mobile network expansion slows. The widening gap that results

between those with and those without access to telecommunication services that results, directly contradicts GNH.

One benefit of competition, however, is a decline in the prices charged for telecommunication services. As prices decline, demand should increase with the consequence that revenue levels are maintained or even increased. Whilst this will provide operators with the necessary resources to expand their coverage, it will also require them to invest in enhancing the capacity that is available within their existing footprint. According to People's Research Project, (2007: 6) B-Mobile had 143,000 subscribers at the end of 2007 but capacity for only another 7,000. In other words, if the company wishes to continue to add subscribers at anything approaching the rate it has been doing so in the past, it will need to invest in additional capacity. This will divert some of the revenue generated from lowering prices away from network expansion into, for want of a better term, network deepening.

The imposition of coverage obligations on operators is one way to minimise this gap, but those placed on TICL, the second operator, is only a partial answer due to the relatively small footprint that these obligations impose on it. Establishing a universal service fund has been discussed in Bhutan[15] and would provide a way to fund investment in those parts of the country that are less attractive economically. In doing so, the digital divides evident within Bhutan would be reduced. Such a reduction would be in keeping with GNH.[16] This reduction, however, will only ever be partial. Differences will remain, reflecting both the economics of ICT investment as well as the development of new services. Whilst it is likely that most new services will be developed and launched in urban areas, this does not mean that such innovation will happen solely in urban areas. Services will be developed that reflect the circumstances and demand of rural areas. As a consequence, new digital divides may emerge where rural areas are better served than urban areas.

Finally, it is worth commenting on the role that could be played by IT parks. It is self-evident that establishing an IT park is a costly affair, requiring investments to be made in both ICT but also physical infrastructure such as buildings. Given the amount of investment that they consume, it is reasonable to expect that only a handful of IT parks are feasible within Bhutan. It is also reasonable to expect that as a consequence, some parts of Bhutan will be closer to an IT park than others. In other words, the inequities that GNH is endeavouring to overcome will be exacerbated.

However, this does not take into account the opportunity for revenue growth that IT parks bring about. Through accessing the facilities provided by the IT park, Bhutanese companies could move up the value chain into more lucrative parts of, say, the outsourcing market. Alternatively, they could enter completely new markets that were previously excluded to Bhutanese companies due to a lack of facilities or human capital. As the IT parks develop and their occupants are successful, it is also likely that external economic growth will be generated. Both the occupants of the IT parks as well as those new companies that have been established as a consequence will generate taxable economic activity. That is, they will generate resources capable of funding further investment in the IT park itself or elsewhere in Bhutan.

Conclusion

There are innumerable benefits associated with ICT. They facilitate access to information, which allows informed decision making to occur, as well as services such as tele-medicine and tele-education. Markets are no longer isolated but instead part of a national, if not global, economy. Not everyone, however, has access to ICT. Moreover, even where ICT are available access may be too expensive or the quality unsatisfactory. The unequal access to ICT that results is a direct challenge to GNH.

To counter this challenge a series of initiatives have been undertaken to expand the geographical scope of ICT in Bhutan.

Significant successes have been achieved, with perhaps the most dramatic being the rapid growth in mobile telecommunications subscribers. Through the licensing of mobile telecommunications, more people are able to communicate with one another than was previously the case. Having said this, the limited resources that are available within Bhutan restrict the extent to which initiatives can be undertaken to overcome the unequal access to ICT that clearly occurs across the country. Improving access to ICT in the coming years will be complicated by the decision to liberalise many ICT markets, not least because companies will, more often than not, prefer to concentrate their efforts on the more lucrative (urban) markets. Conversely, liberalisation should result in innovation, price reduction and improved quality of service.

Acknowledgement

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Endnotes

[1] For a detailed history of Bhutan see, for example, Schickgruber & Pommaret (1997).
[2] The official population estimate is based on the Bhutan Population and Housing Census conducted during May 30-31, 2005. However, others have suggested a much higher population figure is appropriate – both the The CIA Factbook and the UNDP suggest a population of more than 2 million people.
[3] It is worth noting that Faris (2006), among others, have noted that in some official documents, five dimensions are mentioned, namely: economic development, human development, environment, culture & heritage and good governance. As socio-economic development encompasses both economic and human development, the practical differences between the two lists of GNH components is minimal.
[4] Formerly Bhutan Telecommunications Authority (BTA).
[5] The Tenth Five Year Plan (GNH Commission, 2008: 74-78) draws attention to the increase in unemployment that Bhutan has experienced in recent years, from 1.4% in 1999 to 3.7% in 2007. Two areas of concern are explicitly identified, namely, youth and urban female unemployment.
[6] It is worth noting, however, that the government has announced its intention to scale back its presence in the economy.
[7] Interestingly the number of graduate level vacancies in the government sector is more than other sectors (corporate, private, and international) for each of the following three years, 2002-2003, 2003-2004 and 2004-2005 (People's Research Project, 2007: 26).
[8] The number of graduates increased from just below 300 in 2001 to almost 800 in 2006 (People's Research Project, 2007: 27). In 2004 the number of ICT-related graduates numbered approximately 45 in 2001, growing to 53 in 2006 (People's Research Project, 2007: 27).

[9] Through a series of transmitters, Bhutan Broadcasting Service provides radio services across Bhutan including 75% of the national highway (People's Research Project, 2007: 96).
[10] The two main barriers to radio adoption are the cost of the radio and its power source. The radio may be powered through batteries, which require 'frequent' replacement, or through the household electricity supply that has, of course, its own costs associated with it.
[11] There are 44 cable-TV operators in Bhutan, with 36 of these registered with the Association of Private Cable Operators (People's Research Project, 2007: 97).
[12] See, for instance, Scott-Clark & Levy (2003) or The Economist (2004).
[13] Interestingly, nine OPGW routes have been proposed over the years by a range of interested parties that have not resulted in their actual development (Royal Government of Bhutan, 2008b: 5).
[14] A comparable figure for B-Mobile was 189400 GSM subscribers and 120 WCDMA subscribers (Global Mobile, 2008).
[15] See, for instance, People's Research Project (2007: 54-61) for one such discussion.
[16] This, of course, does not address who should contribute to the universal service fund. One method would be to place the burden disproportionately on the incumbent operator, recognising the fact that they are likely to benefit the most from any increase in coverage, and thus use, that results. Alternatively a flat percentage contribution could be levied on all operators, regardless of their size.