ICT SECTOR GROWTH FOR ECONOMIC EXPANSION IN
DEVELOPING COUNTRIES OF PACIFIC ASIA AND
SOUTHERN AFRICA

Paper for presentation at the
Pacific Asia Conference on Information Systems 2008
Suzhou, China.

Andrew Paterson
Senior Researcher
Development Bank of Southern Africa

Abstract

This paper explores how – or whether - economic growth could be achieved through encouraging development of the ICT sector in developing countries. The aim is to build a framework for understanding the links between industrial policy, the ICT sector, the labour market for high level ICT skills, and the education system in these countries. This work is intended to serve as preparation for undertaking international comparative analysis of the economic growth and employment generation potential of developing country ICT sectors. The paper attempts to identify the core factors and conditions that must be considered in assessing the possibility of developing country economic growth through advancing ICT-related economic activity. Alongside core governance, policy, economic and technology factors that will determine growth potential in the ICT sector, particular attention is given to considering the capacity of the national education and training system to produce and reproduce the skilled labour that is essential for ICT sector sustainability and growth. The paper then explores some options for comparative analysis between countries in the Pacific Asia and Southern Africa regions.

Keywords: ICT sector, economic growth, developing country, comparative analysis
1 INTRODUCTION

This paper focuses on the relationship between skills and economic growth in ‘late comer’ or developing countries. It does so with specific reference to the information and communication technology (ICT) sector and to other economic sectors (eg: services) which are intense users of ICT.

The paper explores how:
(a) a developing country may identify a way to leverage economic growth through catalysing the local ICT sector, and how
(b) the demand for high skills driven by growth in local ICT sector activity may be adequately met.

Why would such an exercise be of interest? It engages with two critical challenges currently facing all developing countries and ‘late-comer’ countries. The first is to find ways of maximizing the growth prospects of the national economy through expanding certain sectors, and the second is to devise effective means of meeting the skills needs of growing economic sectors as needed. These two challenges are inextricably interlinked. Reasonable success in stimulating growth in the targeted sector and in generating a sustainable base of appropriate skills is needed. Achieving either one or the other will not be sufficient.

The full impact of information systems in catalyzing resilient organizations, and even more broadly in contributing to sustainable economic growth in a society, can only be achieved if people with the necessary skills and attitudes are involved. Similarly, in any region of the globe, the competitiveness of institutions, of ICT sub-sectors and of each national economy is dependent on the quality of their respective information system infrastructures in combination with human resources of sufficient quality and quantity.

Developing countries are obliged to explicitly recognise the impact of global and regional economic patterns in formulating their industrial strategies. Also, ICT goods and services are increasingly supplied for consumption on regional and especially global markets. Even though they have differing implications for each country, these omnipresent conditions present important opportunities for comparative analysis.

On this basis of this observation, this paper takes the challenge of developing a platform for more detailed analysis of how developing countries in Pacific Asia and Southern Africa have successfully or unsuccessfully attempted to leverage their ICT sectors to improve economic growth, or have begun to formulate strategies towards this goal.

2 APPROACH

This paper attempts to identify the core element that must be considered in assessing the possibility of a developing country achieving enhanced economic growth through advancing ICT-related economic activity.

A framework of understanding these elements will contribute to a more accurate and reliable assessment of the prospects for ICT enabled development in the ICT sector and ICT-user sectors in a country. Such a framework should be able to support international comparative analysis. The motivation for developing this framework for international comparative analysis is based on the premise that the experience of other countries in growing their own ICT sector(s) and supplying skills to the same sector(s) could be of value in other national contexts.

The intention is not to come up with a few isolated examples of so-called ‘best practise’, or to present simplistic suggestions for ‘policy transfer’ from one national environment to another. Further, cognizance is taken of the difficulties associated with international comparative analysis of complex
socio-economic systems. The historical uniqueness of national economic, labour market and education
systems and their interconnectedness is noted.

Nevertheless, there are compelling arguments for pursuing international comparative analysis. Some
researchers and development practitioners would currently argue that it is imperative to explore the
possibility that there are, or that there may be, alternative paths to national economic development.
They are driven by the realization that finding another path is a sheer necessity in the face of the
alternative: which is for developing countries to continue trading their commodities on international
markets at a disadvantage, while differences in economic well being within and between countries
continue to widen rapidly on the global scale.

Indeed economists, social scientists and development theorists argue that there is room for optimism,
that the situation for developing countries is not irremediable. They suggest that, in the period leading
up to and after the millennium, global capitalism has taken on a set of characteristics that could present
opportunities for late-developer or ‘late-comer’ countries to ‘catch-up’ through accelerating their
economic growth. The conditions that may open up the possibility of alternative paths to development
include: rising integration of world markets, speed of capital flows, international integration of product
and service value-chains, improved transport networks, technology based outsourcing, shifts away
from US market dominance over the global economy and the rapid evolution of China and India as
sources of competition but also of market opportunity.

There are two further potent factors that are likely to impact on the global economic order in
unexpected ways. Looming energy shortages drive the intensity of the search for new and,
increasingly, for alternative energy sources. Global warming it likely to impact directly on economic
systems as climate change destabilises agricultural production, and as international enforcement of
carbon emissions impacts especially on the manufacturing and energy sectors creating pressure for
phasing out old technologies.

Under these fluid conditions, for developing countries charting an industrial strategy will have to
account for increased risk, but there may also be opportunities to be seized.

2.1 The structure of this paper

The paper will proceed as follows. It first considers the possible economic growth paths of developing
countries and the way government may influence the direction of growth. Thereafter, the strategic
question of how to identify the most promising ICT sub-sector or cluster for development is addressed.
Next, special attention is given to considering the capacity of the national education and training
system to produce and reproduce the skilled labour that is essential for ICT sector sustainability and
growth and to the way in which demand and supply are mediated in the labour market. In closing, the
paper considers the options for comparative analysis between countries in the Pacific Asia and
Southern Africa regions.

3 THE STRUCTURE OF DEVELOPING COUNTRY ECONOMIES

What are the pathways to growth for developing countries? Many developing countries have resource-
based economies, dependent on producing commodities (eg: mining, forestry, agriculture, fishing)
which are sold on the world market. They are as a consequence subject to price shocks on global
commodity markets. Furthermore, improved efficiency of supply chains, increased global access to
commodity prices, improved flexibility of transport systems, and rising competition drive prices
downwards.

At the same time, such economies are very limited in their capacity to engage in secondary industrial
activities which involves some degree of beneficiation of the commodities produced locally. This
capability is characterized by different levels of sophistication determined largely by technology
factors in the production process. Country economies may be categorized as having invested in low, medium or high technology forms of production. Each increment in the application of technology to the production of goods makes it possible for that production to be more flexible and also to attain higher levels of product quality and complexity. In developing countries, high technology forms of production associated with high quality product market strategies tend to appear in isolated economic sectors rather than as the norm.

Resource-based economies typically have very low services sector development. The emergence of service sector activities in an economy is driven by a number of important conditions, namely: access to local and foreign direct investment (FDI); sound general infrastructure (transport, electricity, wastewater, water, education and health facilities) widely accessible in rural and urban areas; efficient, low-cost and accessible ICT infrastructure; high levels of skills and adaptive capacity in the working population; high productivity in the labour force; and high propensity to innovate among individuals and enterprises (as may be measured by proportions of R&D workers in the population). Clearly, successful development of the tertiary or services sector is dependent on a wide set of conditions being – fully or at least partially – achieved. Also important is the nature of government participation, in creating the conditions for growth through deploying appropriate policy instruments.

3.1 Moving away from a path dependent pattern of economic development

For economies in a resource-based and or low technology ‘trap’, the prospects for quickly improving growth by acquiring capability to compete in high technology manufacturing or services markets appear very remote. A prevalent assumption is that the economic development of a national economy is a linear process inevitably involving a series of steps in which the dominant mode of economic activity is first primary, then moving to secondary/manufacturing and then finally to tertiary/services. This linear model implies that a later stage can only be achieved by taking the path through an antecedent stage. The kinds of conditions that need to be achieved for economic development as implied in this evolutionary ‘stages of growth’ model are long-term and quite daunting.

This teleological view of a single evolutionary economic growth path on which the progress of all nations can be mapped is being tested for reasons that we have noted: turbulent global economic conditions may provide openings and opportunities.

The possibility of adopting a more sophisticated approach to understanding economic development pathways is provided by the concept of ‘path dependency’. This conceptual device can accommodate the likelihood of multiple routes of economic development but emphasizes that such options are nevertheless rooted in the historical past and informed by the opportunities existing in the present.

This paper takes on board the concept of path dependent economic growth to ask how developing countries may move out of a particular path-dependent pattern. It presumes that government and industry within a particular economy may be in a position to ask: ‘How do we migrate our country’s/our industry’s growth pattern?’ This is a very important question to ask, but also a very complex one to answer.

In particular this paper asks what paths that diverge from a path dependent pattern may be crafted through developing the ICT sector. By developing the ICT sector we mean: what are the pathways to growth through mobilizing the ICT sector to support economic growth in an ICT-user sector, and what are the pathways to growth through mobilising economic growth in the three ICT producer sub-sectors, namely electronics, telecommunications and IT services?

4 THE ROLE OF GOVERNMENT

In a developing country, government must engage with the extent of its own involvement in influencing - or directing – the path of national economic development. There are two main elements
to this question: first government must be clear on what level of intervention it would like to make and second, government must have a sound understanding of whether it has the power and resources to successfully achieve the envisaged interventions.

This paper assumes an interventionist state, but a state with limited powers unlike the early developmental states of East Asia (eg: the Asian ‘Tigers’). In those countries, the state could concentrate its substantial power in order to increase internal economic synergies. This included kick-starting industrialization and guaranteeing domestic markets through import substitution economic development strategies. In the current global market circumstances which emphasise reciprocal free trade agreements, such an approach is not possible. Developing countries simply do not have the reserves or resources to adopt such an approach. They have to guarantee current trade transactions in order to address immediate economic and social equity challenges. Typically, resource-based and low technology economies earn low returns on their commodity exports and are characterized by the import of high-end manufactured goods, which creates an unfavourable balance of payments and a cycle of indebtedness. This situation severely constrains the available resources to finance economic development.

This means that mobilizing local industry and capital behind the same strategic vision is essential. This approach implies a form of planning and intervention that involves the creation of appropriate conditions – or steering - through selective use of policy instruments in order to grow the targeted industry sectors. In addition it must be assumed that this is a capable state which has the capacity and resources to properly regulate and enforce the strategy in a transparent way.

4.1 Immediate imperatives and risk

Turning now to the current policy challenges for developing country government. It may be that government’s role in driving industrial development is overshadowed by the immediate imperatives of job creation and education of the workforce. This may strongly affect industrial policy development towards a concentration on labour absorbing economic activities and towards general and vocational education below higher education. Neither policy approach favours an expansion of the ICT sector.

Clearly, the quantum of risk in each ICT sector development programme that is launched will be shared by the partners – private sector, government and labour. But there is an additional risk element which is not allied to the business proposition for sector development per se. It is the specific political risk taken on by a government when investing its support in particular sector development programme is. For example, an economic development programme supported by government may be popular if it generates work opportunities and less so if its aim is to generate economic growth that may not yield short term benefits. Therefore the timescale and timing of industrial strategy interventions in relation to economic and political cycles is important.

In addition there is also the matter of risk appetite for investing in the ICT industry among local and international investors. Government needs to convince the equity partners that it is fully committed to the project over the full term. New opportunities for developing novel products and services are likely but at the same time, the process is difficult, risky and costly, and needs a long-term horizon.

Given the short-term challenges, a critical starting point is to ask whether a developing country government would have the space in its overall industrial policy portfolio for some emphasis on ICT sector development? If so, the next question would be how to select a particular ICT sub-sector for growth. Clearly the selection of such a sub-sector would have to be motivated chiefly by the prospect of achieving economic growth above labour absorption. The expectation would be that government has invested in other sectors where the probability of job creation is greater.
5 SELECTION OF ICT SECTORS FOR DEVELOPMENT

In making such a selection the starting point is to ask about: the size of the sector, how diversified it is, how well is it integrated into international value chains, how regulated or privatised is the sector, how competitive is it internationally and what is its growth performance over time?

However, many developing countries have small or nascent ICT sector developments. In some instances, ICT sector development may be contemplated tabula rasa. Government would then need to ask: What are the job creation and growth characteristics of the ICT sub-sectors - electronics, telecommunications and IT services?

In the high technology field of electronics manufacturing that is globally entrenched and highly competitive, for a developing country, without a history of such activity, to grow a manufacturing capability and successfully compete in these markets is highly improbable. The prospects for local enterprises in a developing country to compete within the telecommunications sector are also strictly limited. There will be some labour absorption as telecommunications systems expand in the host country but this will mainly be limited to supplying the labour needs of international service providers who deliver telecommunications services locally.

Internationally, the IT services subsector has the strongest potential. It has shown growth on the back of continued demand. It has also shown the capacity to absorb labour. In the short term, for a developing country, a growing IT services sector – depending on the scale of the local economy - might not find a domestic market to sustain it, and would have to compete internationally for business.

<table>
<thead>
<tr>
<th>Economic sectors</th>
<th>ICT Producer sector</th>
<th>ICT User sectors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intensive ICT user sectors</td>
<td>Electronics sub-sector</td>
<td>Intensive ICT user sectors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Telecoms sub-sector</td>
</tr>
<tr>
<td>IT sub-sector (including IT services)</td>
<td></td>
<td>Other ICT user sectors</td>
</tr>
<tr>
<td>Banking</td>
<td>Insurance</td>
<td></td>
</tr>
<tr>
<td>Retail</td>
<td>Business services (eg: BPO)</td>
<td></td>
</tr>
<tr>
<td>Manufacturing</td>
<td>Agriculture</td>
<td></td>
</tr>
<tr>
<td>Mining</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 1. Relationship between the ICT ‘producer’ sectors and ICT ‘user’ sectors

Source: (Paterson, 2006)

A notable exception to this observation is the migration of Business Process Outsourcing (BPO) operations into developing country economies, especially those where labour costs are favourable. The paradox is that BPO – though attractive for its labour absorption potential – is not an ICT economic activity but is only an ICT enabled service activity. The technology makes it possible for specific business tasks to be contracted to a remotely based third-party service provider. High level skills are required in the design, development and maintenance of BPO-type systems but the vast majority of labour opportunities in this sector have a restricted skills base. These will be largely for intermediate skills in call-centre operations. The long-term certainty of stable employment in BPO is not high. Demand for such skills is at risk of being replaced by advancements in technology and in cheaper
labour prices elsewhere globally. In addition to these points, the global location and language background of countries is a self-selecting mechanism for BPO industry growth.

From this discussion, we may infer that the best opportunity for ICT sector development in a developing country starting from a low levels of initial activity is likely to be in the IT services sub-sector, or in concentrating on ways in which ICT can enhance other non-ICT sector value chains. The most fertile sectors for using ICT to leverage improvements in cost or quality are business services and manufacturing. Based on manufacturing data between 1980 and 2000, Lall (2004, Table 1) showed how manufacturing output (MVA) and manufacturing exports in developing countries increased substantially with higher technology inputs, and that the developing country performance in these two indicators far outstripped developed countries. For example, in this period, developing countries with medium and high levels of manufacturing technology improved their MVA by 6.8% whereas the developed country increase was 2.6%. Similarly, developing countries with medium and high levels of manufacturing technology increased their exports by 16.5% whereas the developed country increase was 7.3%. These results point strongly towards the importance of technology adoption in developing country manufacturing.

However even the propensity of manufacturing enterprises to adopt technology is not necessarily guaranteed especially where the producer’s product market strategy is based on low precision, low quality production in a low competition environment.

5.1 Feasibility

Of course, research and feasibility studies would have to be undertaken for the identification of the best looking business opportunities. Attention will need to be paid to up and downward linkages with other activities in the value chain that could generate further potential for employment and industrial activity.

In the process of conducting feasibility studies, questions of scale and time are relevant: the investment needed to generate a sufficient critical mass of economic activity that can secure stability in the targeted industry sub-sector or cluster, and the length of time that it will take for a startup sub-sector or cluster to move from a stable state into a sustainable growth state.

The idea of focusing on a ‘niche market’ is common coin in debates about industrial planning. In some ways this is a helpful concept because it emphasizes the strategic importance of targeting. We can take this to imply the necessity to focus on: specific opportunities for technology and business development and on clearly defined and sufficiently tight market opportunities. On the one hand, careful targeting can contain the investment required to commit and can raise the likelihood that the specificity of the industrial activity raises the likelihood of developing unique and valuable skills and knowledge and produces high quality outputs.

But niches markets or products may not necessarily be of the scale to produce substantial dividends in terms of the expansion of both economic growth and employment in the short, medium or long term. Consequently there is a risk involved in niche selection. This begs the question regarding how industrial strategy balances its commitments across a basket of economic development initiatives in order to maximize the chance of contributing to substantial gains in growth and employment over time.

The feasibility of embarking on a particular route of industrial development would of necessity have to take into account current and possible future shifts in trade patterns at the bilateral, regional and global levels. The development of trade policy in respect to tradeable services is an ongoing process.

6 DEMAND FOR SKILLED LABOUR

So far, this paper has addressed the context within which developing countries may judiciously target the ICT producer or user sectors for economic growth and for job creation. The question is how to
target these sectors and with what policy instruments? A raft of policy instruments may be selected in order to create propitious conditions for sector development such as to encourage investment or to regulate competition. The intention in this paper is to focus only on the potential contribution of education and skills development policy to ICT sectoral growth and labour absorption.

Figure 2. Demand for and supply of skilled labour

6.1 Demand for and supply of skilled labour

Government may consider a ‘demand driven’ or ‘supply driven’ approach towards education and training policy for supporting ICT sector development. The first – demand driven – assumes that education and training institutions must respond to skills requirements as they are expressed by industry itself or as shortages in certain skills begin to become visible in the labour market. In this sense skills demand arises from industrial activity drives education supply. On the other hand, the supply driven approach requires education and training institutions to generate graduate supply for the labour market. The expectation is that readily available qualified graduates themselves inject impetus into the business environment, leading to innovation and the exploitation of new business opportunities especially where recent graduates exhibit an entrepreneurial orientation absorbed through their education.

Neither of these approaches are implemented in a ‘pure’ sense. This is because government in most countries supplies public schooling and public higher education as part of its mandate to guarantee the rights of citizens to basic education and to equitable access to higher education. There are obvious pitfalls associated with the demand and the supply driven approaches. The former exposes industrial development to possible skills shortages especially given the long lag time involved in graduate production to fill high skill occupations. Sector growth may be retarded, and opportunities foregone
where there are skills shortages. The latter courts the danger of graduate oversupply, in which case graduate unemployment becomes visible, which represents a waste of public resources.

6.2 Linking industrial policy with labour market policy

The supply of skilled labour does not in any case operate on a ‘plug ‘n play’ basis. Labour markets mediate demand for and supply of ICT skills. In the ideal, the ‘right’ skills in the right quantities must be available, but also at the right time and in the right place. The cumulative graduate output from institutions involved in skilling a high skill ICT workforce may be sufficient. However, the flow of cohorts of skilled workers into employment involves transactions in the labour market. The economic agents involved - namely ICT enterprises and skilled ICT workers – seek to optimize their returns. Their behaviour is influenced by: their access to information, their location, the timing of their entry into the market, their duration in the market and their perception of risk. The labour market does not perfectly mediate this flow, which affects the quantity, location, timing and price of the supply of skills.

The interaction of demand and supply under labour market conditions that are always changing is of central concern. On the one hand, the ICT sector may evolve and require skills that were not anticipated in higher education. On the other hand, higher education institutions will respond not only to the market but also to their subsidies from government. If subsidies for producing ICT graduates decline relative to civil engineering, on balance the institutions may seek to maximize their income and are likely to produce more engineering graduates in line with incentives. This will require close partnership between higher education, government and industry.

Can the co-incidence of demand for and supply of skilled ICT labour be better arranged? This should be possible, though the result will not be perfect. In developing countries national education systems, including higher education, are largely government funded so it should be possible to focus graduate output in a few key ICT fields if the required finances can be made available. At the same time, government which does not have the same influence in the economy, may implement key policies to kick-start and incentivise ICT sub-sectoral or cluster activity subject to the same proviso.

The best chance of success derives from a dual approach where policy provisions influence behaviour in both the ICT sector and in the education system. For instance there can be greater confidence in predicting and producing skills needs and numbers where industrial policy signals the intention to target an ICT subsector, or cluster, or technology field for intervention. In formulating its strategy for labour supply, government will have to take into account global competition for high skilled workers and possible strategies to make local employment attractive to this mobile global workforce.

Finally, there will always be risks in the market mechanism and in the nature of innovation. The concept ‘innovation’ refers to a novel development in or application of technology to business challenges or problems which cannot be predicted and which presents new challenges for higher education institutions to respond.

7 PATHWAYS FROM ICT SKILLS PRODUCTION TO THE LABOUR MARKET

The preceding discussion focused on the interaction between higher education, labour market and the ICT sectoral environment. That should not detract from recognition of fundamentally important antecedent education and training conditions. The pathways between school education, ICT training and employment are quite varied in a developed country education system (Figure 3 below).

The shortages of high skill workers experienced in different economic sectors of developing countries are the outcome of weaknesses in the whole education edifice, which commonly include: low
participation and completion rates; prohibitive private and social costs associated with senior high school and higher education; curriculum gaps at school and in higher education.

![Diagram](image)

**Figure 3. Pathways between education, training and ICT employment**

The universal complaint expressed in discussions about ICT labour markets is skills shortages. ICT labour markets will periodically be exposed to new skills requirements. To a large extent, skills shortages are a natural outcome of innovation in software, hardware and also of technology convergence. New technologies, or even new versions of existing technologies, require training of users to optimize workplace and organizational performance. Since market competition is a continuous driver of innovation, the cycle of technology change will continuously require the learning of new or different skills, or the upgrading old skills. This means that certain skills, especially those that are more technical, can be viewed as having a lifespan that is defined by the speed of the technology cycle or the product innovation cycle.

Typically, the arrival of a new product suite or innovation on the market will be associated with a shortage of skills in the use/application of the new product. Over time, more as workers are trained in the use of the product the shortage of that particular set of skills will pass. Thereafter, only new entrants into the labour market who replace losses will require training. These processes occur in a global context. A powerful technology innovation will originate from Asia or North America or Europe. Uptake will cascade through adopters and through distribution networks across the globe and within countries. The private sector training sector is very important to sustaining skills in the broader
ICT sector of developed countries. By contrast, in developing countries because of their small ICT user and high skills base training is not as accessible – other than online courseware.

Lest skills shortages be viewed merely as an unpleasant by-product of welcome improvements in technology, additional causes are legion. They may be self-inflicted by employers because of ineffective planning, unwillingness to invest in skills upgrading, unsympathetic human resources practises, low wage structures or inhospitable work environments. Developing country labour markets are not immune from such influences. Lastly developing countries frequently lose their skilled ICT workers through international outmigration.

8 APPROACH TO INTERNATIONAL COMPARATIVE ANALYSIS

The bulk of this paper is devoted to developing a framework that attempts to identify the key factors that will impact on a developing country which seeks to expand its economic strategy in favour of competing in the global IT services sector.

The intention is to further develop and refine this framework as part of the process of undertaking comparative research on (a) how developing countries may seek to give some policy emphasis to and allocate some resources to expanding their IT services sectors and (b) how and why certain developing countries succeed – or do not succeed – in such a project.

8.1 Selection of regions

Given its explicit comparative approach, the paper proposes to investigate moves taken by countries towards developing IT services in the region of Pacific Asia and Southern Africa.

This paper has argued that under the expansion of overarching global economic conditions, where developing countries are obliged to explicitly recognise the impact of global and regional economic patterns in formulating their industrial strategies and where ICT goods and services compete on global markets, these omnipresent conditions present important new opportunities for comparative analysis.

The idea of pursuing comparison between countries in two quite different regions may yield unexpected dividends in terms of our understanding of how regional dynamics affect national economic development programmes.

For example, the Asia Pacific region is located favourably close to the powerhouse Asian Tiger economies and perhaps as importantly, they lie in proximity to the Chinese economy. The Southern African region is not as propitiously located. How does the regional configuration in which a developing country is located influence planning and policy for ICT sector growth?

8.2 Selection of countries

The selection of countries for comparative analysis remains a challenge. On the one hand, the assumption is that for comparative methodologies to be valid, there is a need to select comparable units of analysis.

This paper has referred interchangeably to developing countries or to late-comer countries. Yet it is clear that the ‘developing country’ descriptor masks quite wide differences between countries (Table 1). The ten countries selected fall into the World Bank’s ‘low income’ ‘lower middle income’ and ‘upper middle income’ groups according to GDP indicator, but have been split into ‘low income’ consisting of four countries and six ‘middle income’ countries. The exercise of separating the two groups on the basis of gross GDP draws attention to how the scale of an economy is likely to impact on the limits of the possible in terms of ICT sector growth.
Table 1. Comparative data on countries from Southern Africa and Asia Pacific selected for comparison.

<table>
<thead>
<tr>
<th>Region/Country</th>
<th>Total Population</th>
<th>Density (/km²)</th>
<th>Total GDP (US$)</th>
<th>GDP Per Capita (US$)</th>
<th>GDP Growth</th>
<th>Govt Priority to ICT</th>
<th>Digital Opportunity Index</th>
<th>Comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia Pacific</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cambodia</td>
<td>14.35</td>
<td>79</td>
<td>6.3</td>
<td>447</td>
<td>8.9</td>
<td>4.0</td>
<td>0.18</td>
<td>149</td>
</tr>
<tr>
<td>Indonesia</td>
<td>225.46</td>
<td>117</td>
<td>287</td>
<td>1289</td>
<td>4.7</td>
<td>3.6</td>
<td>0.34</td>
<td>116</td>
</tr>
<tr>
<td>Malaysia</td>
<td>25.80</td>
<td>77</td>
<td>137.2</td>
<td>5276</td>
<td>4.8</td>
<td>5.9</td>
<td>0.50</td>
<td>57</td>
</tr>
<tr>
<td>Philippines</td>
<td>84.48</td>
<td>282</td>
<td>98.7</td>
<td>1172</td>
<td>4.7</td>
<td>4.7</td>
<td>0.38</td>
<td>102</td>
</tr>
<tr>
<td>Thailand</td>
<td>64.76</td>
<td>126</td>
<td>176.6</td>
<td>2749</td>
<td>5.4</td>
<td>5.1</td>
<td>0.43</td>
<td>82</td>
</tr>
<tr>
<td>Vietnam</td>
<td>85.34</td>
<td>259</td>
<td>52.8</td>
<td>627</td>
<td>7.5</td>
<td>5.1</td>
<td>0.29</td>
<td>126</td>
</tr>
<tr>
<td>Southern Africa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Angola</td>
<td>15.80</td>
<td>13</td>
<td>28.9</td>
<td>1857</td>
<td>9.9</td>
<td>3.5</td>
<td>0.23</td>
<td>138</td>
</tr>
<tr>
<td>Kenya</td>
<td>35.11</td>
<td>60</td>
<td>19.1</td>
<td>558</td>
<td>3.4</td>
<td>3.9</td>
<td>0.17</td>
<td>153</td>
</tr>
<tr>
<td>South Africa</td>
<td>47.59</td>
<td>40</td>
<td>242.3</td>
<td>5109</td>
<td>3.7</td>
<td>4.9</td>
<td>0.42</td>
<td>86</td>
</tr>
<tr>
<td>Tanzania</td>
<td>39.02</td>
<td>42</td>
<td>9.7</td>
<td>268</td>
<td>5.8</td>
<td>4.6</td>
<td>0.15</td>
<td>162</td>
</tr>
</tbody>
</table>


In the spirit of exploring country-to-country research possibilities, South Africa and Thailand have similar scores on the digital opportunities index and in the interest shown by their respective governments in ICT. Yet their economies differ considerably: Thailand’s key economic activities include tourism agricultural processing, and light manufacturing but is a huge contributor on a global scale in ICT hardware manufacturing. South Africa’s economic strengths lie in mining and manufacturing with recent shifts towards services. How would the different industrial character of each country contribute to a unique ICT sector development path?

On the other hand, there may be good reason to select countries not for their similarity in terms of standard indicators such as GDP, population size etc. A different approach which brings government policy to the fore may prove useful as the basis for further comparative analysis.

For example, of particular interest are two indexes ‘Government priority given to ICT’ and the ‘Digital opportunity index’ which reflect greater sophistication in the measurement of factors that impact on ICT sector development. Setting aside questions about the methodology of the indicators, it could prove interesting to compare the different approaches of government between the high scoring countries or between high and low scoring countries.

8.3 Methodology and next steps

The aim of this paper was primarily to develop an approach to comparative analysis of IT services sector growth in developing countries in two regions. In order to develop as comprehensive a framework as possible, important questions of data collection and analysis could not be addressed. The next steps will involve reworking the ideas presented here and tackling the core methodological aspects and issues.
References

International Telecommunications Union (2007) “Basic Indicators”
Accessed at: http://www.itu.int/ITU-D/icteye/Indicators/Indicators.aspx#
Date accessed: 02 February 2008


Accessed at:
Date accessed: 09 February 2008

Date accessed: 07 February 2008