ICT and development: east is east and west is west and never the twain shall meet?

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Abstract

Huge amount of investment in information and communication technologies (ICTs) in developing countries, mainly through aid and assistance from donor agencies, have failed to realise the dream of helping these countries achieve national development. We argue that this is attributable to two main reasons: flawed conceptualisation of basic concepts of ICT, development, and the interrelationship between the two, and ill-formulated development intervention strategies. In this paper, we suggest alternative conceptualisations of these concepts and examine a policy document of a specific donor agency – Norway's NORAD - to illustrate our contentions. In light of our analysis, we offer some insights for ICT and national development.

1. Introduction

Developing countries are rapidly adopting information and communication technologies (ICTs) in the hope of achieving accelerated economic growth. This hope is expressed in even a relatively well-balanced document as the most recent Human Development Report (UNDP 2001). However, studies have shown only limited correlation between investment in ICT and traditional economic growth indices (Wellenius et al. 2000, Yang 2001). The findings of general failure in such studies have led others to question whether ICTs have any real effect on national development (Heeks 1999). The question of whether ICT is a silver bullet or an enticing siren is a key one facing us today.

We take the stance that ICT can play a key role in national development, if applied appropriately. We believe that the model of development that has been used by the key stakeholders in this area – chiefly donor agencies – is flawed and incomplete because of two main reasons. First, such agencies have a constrained and flawed conceptualisation of basic concepts, mainly, ICT and how they work, development, and the interrelationship between the two. Specifically, echoing the critiques of post-development theorists, we believe that

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development, conceptualised mainly through the modernisation perspective, but also aspects of the dependency perspective, assumes the developing countries to be homogeneous entities leading to a "one-size-fits-all" view of development intervention. This ignores vital local and contextual factors. Second, and following from the first reason, donor agencies do not follow a well-formulated strategy to guide their development aid activities. This thinking is embodied in the policy documents of such agencies. A prime example is one produced by the Norwegian Agency for Development Co-operation (NORAD).

We do not subscribe to the prevalent view on what development is, nor the way ICT is conceptualised. We argue that ICT comes out of a western intellectual and scientific tradition, and cannot be applied as is to non-Western settings. The assumptions underlying these propositions are in important ways incorrect. In this paper, we critique this "western view" of development and the role of ICTs in it, and propose enhancements by incorporating alternative views of development and concepts from areas such as social informatics and social science.

The paper is organised as follows: In section 2 we discuss the prevailing conceptualisations of ICT and development and their interrelationship. In section 3 we present alternative conceptualisations of these factors. In section 4 we examine a policy document produced by NORAD and critique it using as lens the traditional as well as the alternative conceptualisations. We conclude the paper in section 5 by discussing our contentions and offering some recommendations related to the role of ICTs and development.

2. ICT and Development: Prevalent views

Conceptualising development

The notion that development in some form or another leads to a better quality of life is universally accepted. The debate is on what constitutes "better quality of life". Much of the thinking has been linked to Westernisation, that is, nations in the third world aspire to be like nations in the west including, for example, consumerism and adoption of western culture. This is in line with the modernisation perspective of development theory. [3/]

According to this perspective, the root cause of underdevelopment is that developing countries are mired in traditional modes of production, and lack the know-how, skills, tradition, and impetus to break out of this cycle. Developed countries have successfully escaped this, by dint of research and exploiting technology that resulted from these research efforts. The prime example is the industrial revolution, which brought a basic discontinuity and thus propelled these countries out of the "traditional" mode. Much of this thinking is embodied in Rostow's stage theory (Rostow 1971).

Therefore, it is argued, to become developed, poor countries need to emulate the developed countries. In turn, the developed countries have the moral duty to help poorer countries achieve this growth. This creates a trusteeship relationship between the two worlds (Nustad 2001). Many developed countries, including the OECD group collectively, take this seriously and in good conscience. Norway is a prime example, spending close to 1% of its GNP on development assistance (UNDP 2001). [4/] The key intervention strategy under this perspective is to create capital and a capitalist class that will be the catalyst for such modernisation. Seen in this perspective, ICTs can help developing countries to get to at least Rostow's take-off stage of development. Although Rostow has become passé, such thinking still underlies much of the models and strategies adopted by western donor agencies.

[3/] A critique and discussion of development theories is beyond the scope of this paper. Several excellent reviews and critiques are provided in many texts, e.g., Nederveen Pieterse (2000). For a brief discussion germane to ICT and national development, see Sein and Ahmad (2001).

[4/] It has declined from 1.17% to around 0.91% over the last decade.

Conceptualising ICT

A prime example of the traditional conceptualisation of ICTs in the context of development is:

> *ICTs encompass all those technologies that enable the handling of information and facilitate different forms of communication among human actors, between human beings and electronic systems, and among electronic systems. These technologies can be sub-divided into: capturing technologies, storage technologies, processing technologies, communication technologies and display technologies.* (Hamelink 2001:2)

In addition, the literature also considers networks that use these technologies to be part of ICT. Chief among the last is of course the Internet. Currently, in the context of development, the emphasis is mainly on such communication technologies. Hamelink's conceptualisation of ICT is narrow, one that Orlikowski and Iacono (2001) term the "tool view". In essence, ICT is treated as a black box, and the specific aspect of ICT that may have differential impact on development is neglected.

The relationship between ICT and development

The exact impact of ICTs on national development is much debated. The literature is sharply divided into two camps. One camp paints a very rosy picture and is given names such as the "utopian view" (Hamelink 2001) and "silver bullet" (Sein and Ahmad 2001). ICT is seen as a catalyst for national development by being the vehicle of transformation. The rationale behind this optimism is "leapfrogging": by being late adopters of ICT, developing nations benefit from declining costs, advances in technology and bypassing the teething problems associated with new technologies. ICTs are also viewed as tools of empowerment and enabling for common citizens. Open information flow is theorised to lead to more open government, broad citizen participation, and entrepreneurship. This argument is in line with the western view of development, and is in the core of optimistic views. It is articulated in donor agency documents (e.g., OECD 1997) and is a central argument in UNDP's recent human development report (UNDP 2001).

One specific and direct impact that this optimistic view professes is viewing ICT as a commodity (Sein and Ahmad 2001). By successfully leveraging their low-cost producer advantage over the developed countries, developing nations can earn foreign exchange by manufacturing computer and related products, through performing high skilled jobs (e.g., offshore software development) and even low-skilled job (e.g., offshore data entry and data processing functions).

This picture needs to be examined critically. To do so, we look at the dependency perspective of development. This perspective lays the blame of underdevelopment on the very process that made developed countries developed. Richer nations developed themselves at the cost of poorer countries – through colonialism and dominance of trade and politics. The poorer countries manufacture products, even organise their economies, solely to benefit the richer countries. Offshore computing and manufacturing ICT commodities are done mainly to feed the consumerism of the richer nations, and not for the developing countries. The rise in such "global" ICT industries hardly indicates transfer of technology and, more importantly, transfer of knowledge. In this context, ICTs result in helping richer countries advance further, while the poorer countries remain poor.

Another problem with this view is that the potential for the entire developing world, taken as a whole, is limited. As Sein and Ahmad (2001) reasoned, not all countries can become chip manufacturers or software producers. Even where it has proved to be a success, the impact on the economy is questionable. India's software industry, mainly centred on Bangalore, is held out as the model success story. We agree that it is a remarkable achievement. Its impact has been studied quite substantially (e.g., Madon 1997). UNDP's report also highlights this

achievement. Yet, a telling statistic is that India is still listed as "Dynamic Adopter", the third of four levels, in their Technology Achievement Index. India ranks fairly low because, in other indices, the statistics are not as impressive.

These are the very arguments made by the second camp: the pessimistic school. They are variously termed as "dystopian" (Hamelink 2001) and "doom and gloom" (Sein and Ahmad 2001). This camp argues that, as of today, there are few links between ICT and national development (Heeks 1999). Statistics show increased investment in ICT in developing countries and a corresponding decrease in all economic growth indicators (Yang 2001, Harindranath and Liebenau 1998). In contrast to the benefits espoused by the optimist camp, this camp argues that ICT can actually lead to more repression by authoritarian governments who now have a more powerful tool to control its citizens.

ICT also magnifies the digital divide, the difference between knowledge and technological capabilities of the developed and the developing world. Sirimanne (1996) argues that the information gap leads to a competitive gap and the result is the development gap. As Sein and Ahmad (2001) pointed out, ICTs can even push developing countries deeper into poverty by streamlining and improving design and manufacture of goods and thereby reducing the demand of raw materials, energy and even low-skilled labour – longstanding comparative advantages of developing countries. Thus leapfrogging is seriously questioned (e.g., Davison et al. 2000).

We take the view that both camps take extreme positions and that, if appropriately deployed and used, ICTs can have an impact on development. Taken at a macro level, the fact that investments in ICTs have not shown a positive impact on national productivity is hardly surprising. This mirrors the much discussed "IT and productivity paradox" (Brynjolfsson 1993) at the firm level.

We also argue, echoing Heeks (2001), that much of the statistics used to support various viewpoints hide key aspects. For example, donor agencies are more preoccupied with numbers and the supply side of ICT. Thus such indicators as "number of phones" or "percentage of population with access to Internet" are taken to indicate ICT diffusion. While these are necessary conditions to study the impact of ICTs on national development, they are far from being sufficient conditions. These statistics only represent the first and second order effects of technology diffusion in society (Malone and Rockart 1991).

The first order or primary effect is simple substitution of old technology by the new (e.g., mobile phones replacing traditional communication modes such as letters and even land phones); the second order or secondary effect is an increase in the phenomenon enabled by the technology (people communicating more). We believe that impact can truly be studied through the third order or tertiary effect, which is generation of new related businesses and societal change (virtual organisations, empowerment of women, etc.).

3. ICT and Development: Alternative views

Alternative conceptualisation of development

Development as we understand it goes beyond mere statistical indicators or economic theory. This is a view from the top. As seen from the local level, development is about reducing poverty, increasing the standard of living, increasing educational and health levels, and building a democratic society marked by involvement, participation, and transparency. Accordingly, development involves a better management of, among others, behaviour and customs, based on a better understanding of culture (Courier 1998). Basic to our understanding of development are three key and interlinked observations:

1. There is too much of the colonial era approach of 'we' vs. 'them' built into the way we think about and address problems of development. Development co-operation needs to focus much more on local people and local development,
2. Following from the above, we should understand ourselves – indeed all stakeholders active in development co-operation – as positioned within, and as bearers of, unique knowledge systems (Worsley 1997), and,
3. Following from this, whatever its overt technological appearance, ICT in the context of development is a form of communication. We understand communication to be, essentially and at its most fundamental, a relationship between *people* (Courier 1998).

A more appropriate conceptualisation of development accordingly is through a human development perspective. Human development views national development as "the enlargement of people's choices" and takes the stance that development is enabling (Nederveen Pieterse 2001). An extensive discussion of this perspective is beyond the scope of this paper. We refer the readers to UNDP's human development reports (e.g., UNDP 2001) for both a comprehensive review and explanations and rationale behind the various indices used to calculate Human Development achievement by various countries:

- Human Development Index (HDI): life expectancy at birth, level of education, and GNP per capita,
- Gender Development Index (GDI): uses the same factors as the HDI, but looks at the differences between men and women,
- Gender Equity Measure (GEM): Looks at the possibilities for women to be part of the decision-making in economics and politics,
- Human Poverty Index (HPI): HPI-1 for developing countries, and HPI-2 for industrialised countries, and
- Life expectancy index.

Other factors implicit in the development index are income distribution and social mobility. It is evident that the human development paradigm emphasises non-economic factors over economic or growth factors. There is not a necessary relationship between HDI and economic indicators, but HDI is arguably a better indicator of how far a country has raised itself from the impacts of poverty. To take an example, it is interesting to note that Costa Rica has about the same level of Human Development as South Korea with far lower GDP (UNDP 2001).

Alternative conceptualisation of ICT

The larger context for assessing and understanding ICT is culture and variations in culture. Viewed from this perspective, ICT is a means of communication. Communication is, essentially, a relationship *between people*. The medium of communication was traditionally oral. The content was complex, rich, and many-layered. Modern communication is also complex, but in different ways. It takes place between many more stakeholders, which often are located on different levels. The medium of communication is more and more written, and increasingly in electronic form. Modern-day communication is often asymmetrical in one way or another, the content is often instrumental, and increasingly contains data without a contextual frame of reference (Courier 1998, Soeftestad 2001).

In order to maintain the content and human-created functionality of communication, the methods used to transmit knowledge, information, and data effectively must be chosen with care. This is, in particular, the case where the aim is to mobilise populations to make them aware of what is involved in promoting their well-being and to further development. The following requirements should be fulfilled: information, education, and communication (Courier 1998).

Within this context, what is "ICT"? In a narrow sense (or tool view), it refers to the various communication technologies available, including TV, Internet, email, phones, and cellular phones. We subscribe to a broader view and understand ICT also as an issue, a process, as content and goals, and as a theory of the relationship between technology and development. This understanding follows from the larger context of communication presented earlier.

Alternative conceptualisation of the relationship between ICT and development

Intellectual roots for a relevant alternative conceptualisation of the relationship between ICT and development can be found in the work of Appropriate Technology (AT) theorists and activists. Stretching back to Schumacher's credo "Small is beautiful" (Schumacher 1974), AT supports the development and use of sustainable approaches to meeting human and ecological needs through the appropriate use of technology. Today's complex problems cannot be solved by using technology independent of its context. To be appropriate, technology must be connected to the place, resources, economics, culture, and impacts of its use. This necessitates a strong human and culture-centred approach to applying ICT in a development context. It is fundamental to the AT movement that the impact of ICT is emergent and dependant upon its social context.

ICT impacts development, but what does this mean? To make it manageable, we can break this question down, and ask: What is the level at which there is an impact? Who is being impacted? What is being impacted?

- The level of impact. According to a traditional understanding of development, ICT may or may not operate at the level of the state or nation, but it is at this level that it has a development impact. To simplify, this can be juxtaposed against impact on the local level. Again, independent upon at which level ICT operates, the impact is found at this level. In its turn, impacts at the local level accumulate and aggregate to macro-level impacts.
- Impact on whom. Depending on the level on which we focus, different people or stakeholders will be impacted. Can/should ICTs impact everybody? Should ICTs impact the poor only, which, it is argued, is the focus for ICT-in-development? Connected with this: can ICTs impact the poor *directly*, and/or will this impact (also) be *indirectly*? Does 'impact' imply that the affected people in question are actually using ICT? Alternatively, is this not a necessary precondition?
- Impact on what. In section 2 we proposed that the impact of ICTs on development be best studied through tertiary effects as conceived by Malone and Rockart (1991). The question remains, though, about the type of tertiary effects that we should focus on to link ICTs to development. Following Sein and Ahmad (2001), we propose that human development indices represent an appropriate avenue to establish this link. We take the view that if applied appropriately and focused on deploying ICT at factors influencing human development factors, ICTs have a vital role in being a catalyst for national development.

Summarising alternative conceptualisations

Taken together, these observations have the implication of a more egalitarian approach to understanding the relations between key concepts and between the key stakeholders. In particular, both donors and recipients can begin to understand themselves as equal, and as bearers of cultures that both affect and are impacted along a two-way causal connection. In more practical terms, these conceptualisations would lead to a better-formulated and well thought-out strategy to guide donor agencies in planning their intervention strategies. In the next section, we examine an existing policy document, namely, NORAD's ICT report. We demonstrate that its flawed conceptualisations lead to an ill-structured strategy.

4. Norway and ICT: The NORAD ICT Report [5/]

Background

Development co-operation – very broadly understood, and whether public sector, private sector or civil society/NGO directed – has a special and important place in Norwegian society. Likewise, Norwegian development cooperation has a similar standing within the context of international development aid. Norway has become recognised for promoting broad equality-for-all values and participatory approaches in its various development cooperation activities. In the changes that current development cooperation is undergoing, these are values that Norway are keen to continue supporting, and also expanding. This should be the context for how to understand and assess the growing emphasis on ICT in Norway, and, more particularly, within NORAD.

In 1999 NORAD arranged a brainstorming meeting that, among others, focused on the relationship between ICT and development co-operation. As a direct implication of this, NORAD began working on an internal report on ICT and development. The report, titled "Bridging the digital divide. Information and communication technologies. Challenges and opportunities to NORAD and its development partners" was ready in the summer of 2000 (NORAD 2000). Because of its avowed focus on presenting a broad overview and of establishing links between a diverse set issues and stakeholders, internally in NORAD it is referred to as the "Bridging Report".

Description and Process

The report is organised as a very brief summary more than anything else (it is actually sub-titled "Report for busy people"). The report itself is only around 10 pages, with a number of arguments and conclusions presented in a type of logical framework in tabular form. Several lengthy annexes to the report include detailed information. The report is divided in four parts: (1) Main ICT tendencies, (2) Potential uses of ICT in development, (3) The Norwegian resource base, and (4) Institutional implications - NORAD. The report consists of the following columns: (1) key findings & conclusions, and (2) recommendations. The recommendations are again divided in three: (1) goal, (2) approach, and (3) actions.

This is an internal document, and although it has been made available on NORAD's website, it has not been actively publicised, presented or discussed, either internally or externally. While the starting point for this emerging discussion within NORAD on ICT is clear, it is less clear what the intention with the report was. A parallel and connected event is that NORAD has created an advisory position on ICT. The ICT Advisor is presently charged with the responsibility of preparing a draft ICT strategy for NORAD. The Bridging Report will clearly be an important working document in this process.

Assessment

Some caveats, before we embark: (1) the brevity of the report makes it difficult to understand what lies behind many of the arguments presented, and to assess the report correctly, (2) it is not stated why the report was prepared, (3) it is a working document, and not a strategy (on the other hand it is presumably an important background document for preparing the strategy), and (4) it has not been discussed or reviewed by anybody outside NORAD.

The following framework will be used for assessing the report: (1) rationale for preparing it, (2) target groups, and (3) conceptualisation of issues and concepts. [6/]

[5/] This section is based partly on Soeftestad (2001) and partly on interviews conducted by Soeftestad with key NORAD ICT staff in September 2001.

[6/] For further arguments and criticisms of the report, cf. Soeftestad (2001).

(a) Rationale

The first main finding and conclusion in the report states that: "The rapid, pervasive ICT development creates digital divides". In detailing this statement, both apparently neutral statements, like "The ICT revolution penetrates and transforms almost all areas of society, and consequently most areas of development co-operation", as well as positive effects, like "Costs of ICT are falling rapidly", to negative effects, like "This, largely market-driven transition to a knowledge based and ICT driven economy in the developed world causes a rapidly growing 'digital divide' between developed and developing and within developing countries between rich and poor individuals and regions, particularly in Africa" appear.

Based on this, it is tempting to conclude that the buzz around the growing so-called digital divide has been a main point of departure for NORAD. Such an argument would present some problems. For one thing, what this amount to is to address the problem of the digital divide – that is, a result of the West's application of ICT – through increasing the use of, and reliance on, ICT. For another, and following from the above, this amounts to a defensive and not necessarily constructive approach. As we see it, arguments about closing the digital divide by applying more ICT is based upon a misreading of the situation, and will not work. Bridging the digital divide may or may not address "… the overarching goals of poverty eradication through sustainable development," and there are other means that (also) should be pursued. One could, for example, start with the resources available in developing countries, be they human, physical or social, and consider how ICT could be applied to harness, better utilise and co-ordinate them. Other than this mention of the digital divide, the report takes the optimistic view of ICT and national development.

(b) Target groups

Like elsewhere in the West, ICT in Norway is within the domain of the private sector, in a close proximity and relationship with academic and research communities. It accordingly should not come as a surprise that this report, as so many others, appear to abound with references to the views and needs of the private sector. To wit, one of the main findings and conclusions deals with how ICT provides new opportunities for private sector development. There is, at the same time, for example, an emphasis on how ICT supports good governance and democracy through transparency. However, while this, in the conceptualisation of the report, would aid and benefit civil society and NGOs, they are listed as beneficiaries only of these processes that are operating on the national level. This is in keeping with the modernisation perspective of development. Local people are not mentioned explicitly as an active party to the process. The trusteeship aspect of the donor-recipient relationship is evident. We would have liked to see, for example, a specific focus on how ICT can aid civil society and NGOs in developing own cultures and local communities.

(c) Conceptualisation of ICT

Reading between the lines, we can once again see the modernisation and take-off approach present. Technology, especially of an advanced nature as here, will help developing nations "take off". At the same time, ICT may be understood in a too simplistic manner: in the range of ICTs available, and in the application (more is not necessarily better). The concept of culture is totally absent from the report. There is no acknowledgement of the complexities emanating from the fact of ICT amounting to communication between people with different cultural and language backgrounds, as well as between people with similar or identical cultures but of very different socio-economic standing. We conclude that ICT is being viewed as a "tool" (Orlikowski and Iacono 2001) and not seen in context.

Summary of assessment

The report presumably follows the key principles that govern NORAD's work, which include: combating poverty, all human rights are equal, emphasis on recipient responsibility,

partnership involving all stakeholders, and sustainability (NORAD 1999). However, we detect a change in emphasis when the focus is on technology and the private sector. The general theme running through the report echoes other mainstream, public, and private sector reviews of the role of ICT in development co-operation. It would seem that discussions of ICT are prone to focus squarely on the technical side of things, and to overemphasise the potential inherent in ICT. It is often forgotten that both IT and ICT are subjective and value laden, steeped as they are in a Western ethos and discourse. The crucial appropriate technology aspect of ICT is all but absent. Also absent are specific mention of whom ICTs will impact and what it will impact. Nor is there a discussion on how specifically ICTs will be focused. The report is important partly for what it says, and partly because it presents clearly NORAD's position on the cultural, societal, value, and technical contexts for Norway's present application of ICT to development co-operation.

5. Discussion

The traditional emphasis on disseminating aid, as it were, in the form of data, funding, and technology, more often than not leads to conflicts, the causes, implications, and solutions of which are hard to grasp. As an alternative to this we posit the approach of 'studying up', that is, starting at the local level. This is the starting point for assessing needs, and for devising developmental goals and the appropriate means, including technology, to achieve them.

The extent to which an existing view of development, such as this "western perspective" can be reformed may be limited. As Nustad (2001) argues in his insightful essay, the critique of post-development has a valid point when they construe, following Foucault, that the inherent assumptions and structure in any system constrain any reforming effort. Nustad, however, goes beyond this seeming impasse by suggesting that the manner in which development interventions actually play out in the field and in interaction with the context of the field, may offer valuable lessons for development efforts. He discusses examples of how existing norms almost always mediate and often drastically changes the intended effects of the intervention.

This insight is particularly relevant for ICTs. If there is anything we have learnt about effects of ICT, it is that it is contextual (e.g., Avegerou and Walsham 2000, Braa et al. 1995). This viewpoint is a hallmark of social informatics, which views ICT as a socio-technical network (Kling 2000). In the specific area of ICT and development, Madon (1997) and Avegerou and Walsham (2000) have repeatedly emphasised the importance of the context. The focus should be on how a piece of technology, be it a computer or a plough, is used in the specific social, political and cultural context. Our enhancement of development thinking also stresses this.

If we combine the two aspects – applying ICTs in context, and the mediating effect of the existing norms, structures, and beliefs – we come to a troubling issue. What will prevent the use of ICTs to perpetuate existing imbalances?

One aspect of the answer lies in the unforeseen effects of ICTs and the discontinuities they represent. The unforeseen consequences of technologies have been a hallmark of the diffusion of computers (Markus 2000). Perhaps the best example of this is electronic mail, which was an add-on to ARPANET, but became the "killer application" of the Internet.

Another aspect of the answer can be found in the debate relating to the Appropriate Technology and the Indigenous Knowledge (IK) movements. AT argues that there is a distinct divide or dichotomy between the North and the South, in terms of the culturally specific and determined view on the role of technology. Blunt and Warren (1996) articulate the IK view that IK systems constitute "… an important bridge to mutual understanding and communication … between the local communities and the development practitioners" (Blunt

and Warren 1996:xiii). Thus, while, not denying the existence of a dichotomy between IK systems in developing countries and the Western value system guiding development activities, they argue that the very same IK systems can bridge this divide.

Agrawal (1995) critiques the idea of IK as currently applied to development. He argues that, initially, instead of seeking a bridging between North and South, it is necessary to go beyond the dichotomy of indigenous vs. scientific, and work towards greater autonomy for indigenous peoples.

By integrating the seemingly disparate views, we postulate that ICT facilitates the development of indigenous knowledge, and thus foster autonomy for local peoples. This can lead to bridging the dichotomy inherent in the AT and IK thinking. In order for this to happen, these "localised" movements and the largely macro-level oriented development activities (such as western donor agencies) need to join hands and communicate. There is an urgent need to develop such micro-macro communication links for addressing the needs for, and use of, appropriate ICT technology (Soeftestad 1998).

In summary, our conclusions are:

- ICTs should be deployed on focused and specific areas,
- The emphasis should be based on how it is used, rather than on the supply side,
- The impact should be assessed in terms of human development factors,
- We should accept that the actual impact of ICT intervention is most likely to be different than what was intended. Local modalities will mediate its impacts, and
- We should accept that ICTs have unforeseen impact and that a comprehensive forecast is not possible.

The 2001 version of UNDP's human development report (UNDP 2001) concludes by emphasising that what is needed for development is policy and not charity. We cannot agree more. We hope that by analysing a policy document and offering suggestions to create appropriate policies, we have lent our voice to UNDP. For a broad and solid basis for application of ICT in development aid in case of NORAD, it is important that: (1) the stakeholders outside the narrow academic and research/evaluation milieus take an active part, and, (2) all stakeholders come together to help shape the ICT-in-development agenda in Norway. [7/]

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References

Agrawal, A. (1995). Dismantling the divide between indigenous and scientific knowledge. *Development and Change*, 26, pp. 413-439.

Avegerou, C. and Walsham, G. W. (2000). *Information technology in context: Studies from the perspective of developing countries.* Aldershot: Ashgate.

Blunt, Peter and Warren, D. M. (1996). *Indigenous organizations and development*. London: Intermediate Technology Publications.

[7/] A Norwegian network on ICT and development, funded by the Norwegian Research Council, was established in January 2002.

Braa J., Monteiro, E. and Reinert, E. S. (1995). Technology transfer vs. technological learning: IT-infrastructure and health care in developing countries. *IT for Development*, 6, pp.15 - 23.

Brynjolfsson, E. (1993). The productivity paradox of information technology. *Communications of the ACM*, 36, pp. 67-77.

Courier. (1998). Dossier: "Communication for development". *Courier*, no. 170.

Davison**,** R. M., Vogel, D. R., Harris, R. W., and Jones, N. (2000). Technology leapfrogging in developing countries: An inevitable luxury? *Electronic Journal of Information Systems in Developing Countries*, 1, pp. 1-10.

Hamelink, C. J. (1997). New information and communication technologies, social development and cultural change. Discussion paper no. 86. UNRISD. (http://www.unrisd.org/engindex/publ/list/dp/dp86/dp86.htm)

Harindranath, G. and Liebenau, J. L. (1998). National information infrastructure policies in international perspective. *UNIDO Emerging Technology Series*. Vienna: UNIDO.

Heeks, R. (2001). ICT and development. Presentation at Development Studies Association Conference, Manchester, UK, September 2001.

Heeks, R. (1999). *Information and communication technologies, poverty and development*. IDPM Publications, Development Informatics: Working Papers, 5/1999.

Kling, R. (2000). Learning about information technologies and social change: The contribution of social informatics. *The Information Society*, 16.

Madon, S. (1997). Information-based global economy and socio-economic development: The case of Bangalore. *The Information Society*, 13.

Malone, T. W. and Rockart, J. F. (1991). Computers, networks, and the corporation. *Scientific American*, 265, September, pp. 128-136.

Markus, M. L. (2000). Toward an integrated theory of IT-related risk control. In R. Baskerville, J. Stage, and J. I. DeGross (eds.). *Organizational and social perspectives on information technology*. Dordrecht: Kluwer/Plenum, pp. 167-178.

Nederveen Pieterse, J. (2001). *Development theory: Deconstructions/reconstructions*. London: Sage Publications.

NORAD. (1999). NORAD invests in the future. NORAD's strategy for 2000-2005. Oslo: NORAD.

NORAD. (2000). "Bridging the digital divide. Information and communication technologies. Challenges and opportunities to NORAD and its development partners". Report by the NORAD Working Group on ICT in Development Co-operation. Oslo: NORAD. (http://www.norad.no)

Nustad, K. G. (2001). Development: The devil we know? *Third World Quarterly*, 22, pp. 479-490.

Organisation for Economic Co-operation and Development (OECD). (1997). The emerging information economy. In OECD's *Global Information Infrastructure-Global Information Society (GII-GIS): Policy Requirements*, 97, pp. 12-25.

Orlikowski, W. and Iacono, C. S. (2001). Research commentary: Desperately seeking "IT" in IT research – A call to theorizing the IT artifact. *Information Systems Research*, 12, pp. 121-134.

Rostow, W. W. (1971). *The stages of economic growth: A non-communist manifesto*, 2nd ed. Cambridge, UK: Cambridge University Press.

Schumacher, E. F. (1974). *Small is beautiful. Economics as if people mattered*. London: ABACUS.

Sein, M. K. and Ahmad, I. U. (2001). "A framework to study the impact of information and communication technologies on developing countries: The case of cellular phones in Bangladesh", *Proceedings of BITWORLD2001*, Cairo, Egypt.

Sirimanne, S. (1996). The information technology revolution: What about developing countries? Express No. 04 1996, IDIC, CIDA.

Soeftestad, L. T. (1998). Book review essay. *Journal of Political Ecology*, 5, pp. 23-30. (http://dizzy.library.arizona.edu/ej/jpe/jpeweb.html).

Soeftestad, L. T. (2001). Aligning needs and means: On culture, ICT and knowledge in development co-operation. *Proceedings of the 24th Information Systems Research Seminar in Scandinavia*, Ulvik, Norway, pp. 47-60. (http://www.ifi.uib.no/konf/iris24/)

United Nations Development Program (UNDP). (2001). *Human Development Report 2001: Making new technologies work for human development*. Oxford University Press, New York.

Wellenius, B., Braga, C. A. and Qiang, C. (2000). Current statistics: Investment and growth of the information infrastructure: Summary results of a global survey. *Telecommunications Policy*, 24, pp. 639-643.

Worsley, P. (1997). *Knowledges. What different people make of the world*. London: Profile Books.

Yang, S.C. (2001). *A theory of information Infrastructure and information societies: New evidence on the effects of telecommunication investment*, Unpublished PhD. Dissertation. Claremont Graduate University, USA.