CHAPTER 3

Transformation in Information Society
The meaning of the ‘Knowledge Society’ is derived from geopolitical analyses, which often pick up the globalisation theme. The next meaning is rooted in deeper social and cultural analyses. These range from optimistic – and, perhaps, rather mechanistic – accounts of social change such as Manuel Castells’ trilogy on the Network Societys; to much more sombre accounts, such as that offered by Ulrich Beck in his Risk Society, which emphasise the fragmentation of social meaning and atomisation of individual experience.

Closely allied are the gloomy scenarios offered by environmentalists – and even the violent protests against globalisation. Also linked, although indirectly, are notions of intellectual volatility, verging at times on the excesses of postmodernism – because grand narratives, over-arching conceptualisations, meta-theories have been made redundant by the ‘acceleration’ of knowledge and the ability to manipulate massive data-sets.

The university is implicated in all these different meanings of the Knowledge Society – for example, of the source of the basic science from which highly sophisticated information and communication technologies are derived; as a ‘national’ institution (because, despite their internationalist rhetoric, universities are creatures of the nation state) threatened by the decay of the welfare states that have nourished their development and challenged by market-led globalisation; as critical institutions from which alternative, even oppositional, ideologies emerge. So the university itself may have become a problematic and contested institution.

The idea of the Knowledge Society, accounts of changes in scientific production do not provide with the firm foundations on which we can build secure scenarios about the future development of higher education. Also, as with the Knowledge Society, the university is complexly embroiled – as the producer of (most) basic science; but also as an increasingly aggressive exploiter of intellectual property and as the mediator (or broker) of research results.

The new players in the Knowledge Society are not as easy to identify as is commonly supposed; and that the path the University should follow is far from clear.

There are three major rivals are identified by the ever-increasing number of ‘observatories’ that have been established:

i) The first is the development of so-called ‘borderless education’ institutions. Some of these are based on global consortia of traditional universities, or by mixed consortia of world-class universities (world-class – because the ‘brand’ is all important in this arena) and global corporations, either mass media or IT. Others, of course, are more directly rivals to the traditional universities – and may take the form of on-line ‘universities’ established by such corporations.

The fundamental analysis underlying all these efforts is that the problem is not the development of intellectual concepts and content – which can either be brought off-the-peg or provided by academic entrepreneurs / sub-contractors as part of a supply-chain – but the customisation, delivery and marketing of these intellectual ‘products’ – the potential of which is now massively enhanced by the power of information and communication technologies.
It is rooted in a one-dimensional technology-deterministic account of the Knowledge Society; it ignores the complexities of cultural transfer and of ‘local’ takes on ‘global’ knowledge (and consequently is restricted in its operation to a narrow range of disciplines – overwhelmingly business and management, IT and computer science and some fields of science and engineering); and it fails to understand the synergies and complementarities between traditional face-to-face and ‘virtual’ forms of learning.

ii) The second group of rival institutions are private for-profit ‘universities’. The University of Phoenix is the inevitable totemic example, but there are several other examples. First, these institutions, because they are in the private sector, are – apparently – unencumbered by the burden of state, and public, regulation and, therefore, free to operate more entrepreneurially.

Secondly, private for-profit ‘universities’ like Phoenix, because they are not universities at all in a traditional sense, are also unencumbered by the burden of intellectual, professional and cultural norms which ‘proper’ universities, public or (not-for-profit) private, have to carry. This may be a genuine advantage – or, better, difference. Such institutions are free to unbundle activities such as research and teaching, course design and course delivery; nor do they need to worry about disciplines as communities of intellect, because they are able to concentrate simply on knowledge ‘products’.

But many of the constraints which apply to ‘borderless education’ enterprises also apply to private for-profit universities. In addition the analysis that animates their existence is again rooted in a one-dimensional account of the Knowledge Society, the geopolitical triumph of the market states;

iii) The third ‘threat’ to the traditional university is seen as coming from the proliferation of ‘corporate universities’. Sometimes these take the form of re-badged company training departments, perhaps with some R and D elements thrown in. This kind of development has been encouraged, and legitimised, by the growth of a powerful ‘human resources’ discourse.

At other times the establishment of corporate universities reflect a more concerted approach to workforce development. A good example is the recent formation in Britain of the ‘National Health Service University’. However, although both are important developments.

First, many ‘corporate universities’ are engaged in lower-level training and/or short-course based continuing professional development; they often contract with universities for the provision of more sophisticated courses.

Secondly, their activities are largely complementary to those of existing universities. For example, the NHS University in Britain is not going to set up in competition with University Medical Schools, or even Schools of Nursing.

These new functions – technology transfer and knowledge management – are familiar to all. The nature of teaching and learning, of academic courses, of research programmes has also been transformed. There are now open frontiers between the academy and society, the economy, culture. Work-based learning, the accreditation of
prior experience and similar practices and phenomena are evidence of cross-frontiers flows. So, if we ask who are the new players, the answer is – in part – ourselves; we are the new players;

The second form taken by the hybridisation of higher education is an extension of the first: It is the emergence of new organizational forms within the University that parallel traditional patterns of academic organization such as Faculties and Departments. Of course, that traditional taxonomy has complex origins – some parts are based on academic affiliations and are ‘policed’ by (fairly) endogenous scientific communities; other parts reflect the division of professional labour in wider society (although this division of labour has not been imposed on the University from the outside; law schools and medical schools play a key role in not only the reproduction but also the definition of professions). It is difficult to claim that research institutes or graduate schools are novel forms (especially, of course, in North America). However, the balance is now changing.

More and more organizational units within universities are based on neither principle – academic affiliations or the division of professional (or expert) labour. Instead they have more in common with project teams, think-tanks, task-forces – and, of course, market entities designed to exploit the intellectual property that is generated within the University. These old and new organizational forms coexist, sometimes as rivals but at other times as allies. Again, if we ask where are the new organizations in the Knowledge Society, the answer – in part – is in the University; we are creating many of these new organizations.

The second phenomenon is the potential for growing ‘activist’ knowledge organisations which are in opposition to both traditional universities and to the new ‘market’ universities. They are opposed to traditional universities because they associate them with social elitism (or the reproduction of social hierarchies according to the division of labour in a capitalist society) and with restrictive definitions of knowledge that again are elitist, frequently gendered still (despite the impact of feminism) and generally dismissive of alternative and popular knowledge traditions.

As a result these ‘activist’ knowledge organisations challenge notions of evidence, objectivity, balance, debate which have typically been regarded as fundamental to the University (even if these high ideals have not always been met). However, these organisations are equally opposed to the ‘market’ universities which we take to be the principal rivals of the public university. They reject many of the ‘givens’ which most have been bullied into accepting in this (apparent) twilight of social democracy and the welfare state – the materiality of motivation, the efficacy of incentives, the drive to efficiency, the calculus of cost and benefits (on which, of course, the case for developing ‘market’ universities is based). And, paradoxically, they reject these ‘givens’ taking full advantage of the technologies of mass communication which we take to be typical of the market economy.

These ‘activist’ knowledge organisations take many forms – from local community groups, now with access to global data-bases and communication networks, through fundamentalists of all kinds perhaps even to global terrorist networks (However much
we recoil from the notion that they are knowledge organisations, they employ sophisticated technologies and develop their own ideologies).

These organisations also range from fundamentalists, which fundamentally reject the culture of liberality associated with elite universities and the parallel culture of rationality associated with university science and scholarship, to organisations such as Green Peace which believe with some justice that their rational use of scientific evidence is equal or superior to that of the World Bank or the IMF.

At their best these 'activist' knowledge organisations, in their enthusiasm for a more democratic distribution of knowledge resources and their opposition to the more baleful aspects of globalisation, may be assuming some of the ethical responsibilities which universities willingly accepted a generation ago but from which they have more recently distanced themselves.

In short, a naive and one-dimensional interpretation of the Knowledge Society - which, in fact, is a problematical category with multiple, and contested, interpretations. Furthermore these accounts attach too little weight to the fundamental - but, again, complex and ambiguous - changes that are taking place in knowledge production.

2002 E-Readiness Ranking

Today the e-rankings have become an established benchmark for countries seeking to harness the Internet's potential to spur business efficiency, improve the provision of public services and encourage integration with the global economy. "E-readiness" is shorthand for the extent to which a country's business environment is conducive to Internet-based opportunities.

It is a concept that spans a wide range of factors, from telephone penetration to online security to intellectual property protection. It is an idea that has outlasted the Internet "bubble" that sparked such exuberance - and delivered such disappointment - in the late 1990s. "Despite the dotcom bust, the Internet is still reshaping the way companies do business, and countries' e-readiness will be a vital feature of the global competitive landscape," notes Daniel Franklin, Editorial Director of the Economist Intelligence Unit. Covering the world's 60 largest markets, the rankings provide a useful guide for companies seeking to invest in technology-savvy countries, as well as governments looking to reap the benefits of the digital age.

Both the Economist Intelligence Unit and IBM have engaged in e-business research for many years, so collaborative work on the rankings was a natural fit. The rankings model is a joint undertaking. The Economist Intelligence Unit, however, has sole responsibility for scoring and ranking the 60 countries covered by the e-readiness rankings.

E-business is taking root just about everywhere - but some countries are pioneers, others laggards. In the latest edition of the Economist Intelligence Unit e-readiness rankings, which cover the world's 60 largest markets, North America, northern Europe and Australia take the top ten spots. The new edition of the rankings - the third since
their launch in 2000—shows steady improvement and increasing convergence among the top-tier countries, where heavy investment in Internet technologies is bearing fruit.

Many less-developed countries lag behind, however, their e-readiness hindered by a range of factors, including poor infrastructure, inadequate protection for intellectual property, lack of finance and unfavourable business environments.

The new round of rankings affirms two conclusions suggested by previous editions. First, neither size nor location is destiny. Although the US comes first in the rankings, the rankings place a premium on agility rather than sheer economic might. Many nimble smaller economies in Scandinavia and Europe thus score highly, whereas less innovative giants like Japan rank relatively low.

And although geographic regions tend to fall into one category or another, there are always exceptions: standout countries such as Singapore or Chile, which outshine their neighbours in e-readiness. Second, government policy makes a difference.

Many less-developed countries, such as the Czech Republic and Mexico, are making good progress in e-business thanks in large part to proactive government policies. Indeed, for countries near the bottom of our rankings, improvement in the e-business environment owes much to public policy. Where governments have drawn up clear plans for IT investment and computer literacy, enhanced competition among infrastructure providers and enacted laws to deal with the grey areas created by the Internet, e-business fares better.

The white paper, published by the Economist Intelligence Unit in co-operation with IBM, presents the rankings of the world’s largest 60 economies (which account for 95% of global GDP), explains the methodology used and provides detailed findings for the top ten countries in each ranking category. The next edition of the Economist Intelligence Unit e-readiness rankings is scheduled to appear in January 2003.

The US leads the pack, as it did in the 2000 and 2001 Economist Intelligence Unit e-readiness rankings. However, due partially to changes in our methodology, and mostly to developments in countries’ infrastructure, regulatory environment and economy, there have been significant shifts further down in the rankings.

The Netherlands has moved into second place from tenth in 2001, for example, and northern Europe now claims most of the other top spots, thanks not only to sophisticated IT infrastructure and high mobile-phone penetration, but also to smart government policy and a good overall business environment. Asia, Latin America and Africa trail further behind, but a few standouts in each region have made significant gains.

North America and Western Europe dominate the top ten places in our rankings, with Australia the lonely outsider. These countries score highest both because consumers and businesses have embraced the Internet, and because their economic and political stability and openness to foreign investment make them good bets for all kinds of business, particularly e-business.

Singapore and Hong Kong lead the pack in Asia, taking 11th and 13th place, respectively, while Vietnam and Pakistan languish at the bottom of the heap, in 56th and
57th place. The same is true of Latin America, where advanced Chile ranks 28th, while Ecuador stumbles into 50th place. In the Middle East and Africa, Israel alone ranks among the top 30 countries.

The US may rule the roost, but many of the world's largest economies, including Japan, Germany and France, are outpaced by smaller, more agile, competitors, such as the Netherlands, Switzerland and Sweden. What sets these countries apart is the broad accessibility and affordability of the Internet, thanks to state-of-the-art IT infrastructure and high per capita income.

The US tops the rankings because of the degree to which the Internet has become embedded in commercial culture. Nowhere is so much business conducted over the Internet so routinely. This explains why the US scored highest in the category for e-business supporting services (the consulting and IT services and back-office solutions used to facilitate online business) as well as in the social and cultural category (which considers, among other things, the degree of innovation and entrepreneurship in business).

Singapore and Hong Kong rank as the most competitive telecom markets in the world, and among the best equipped, yet don't figure among the top ten countries. While high-grade infrastructure is important, more important is how people use it. Infrastructure is still evolving.

Even top-ranked countries have not yet satisfied consumer demand for fast, cheap, secure and reliable Internet connectivity. High-speed broadband services are not universally available and Internet-ready mobile phones are still in their infancy - even in mobile-crazed Scandinavia. In emerging markets, meanwhile, monopolistic telecom providers still inhibit the competition that can speed innovation and drive down prices, and tight budgets thwart ambitious development plans.

Internet business thrives when governments are committed to a clear, consistent strategy to develop IT infrastructure. Adequate funding is crucial, but so too is firm political leadership that builds public support.

Successful e-business depends on a strong legal framework that protects private property and encourages entrepreneurship. Increasingly, it also requires Internet-specific legislation. In the crucial category of legal and policy environment, Australia comes first, followed by Sweden, Switzerland, Finland and the UK. Other countries - even those without a strong e-business culture, such as Mexico and Chile - are enacting smart Internet legislation, recognizing that good laws promote industry growth.

Methodology With every year the model for the Economist Intelligence Unit's e-readiness rankings has grown in sophistication. This year, working in association with IBM's Institute for Business Value, the Economist Intelligence Unit adjusted the rankings framework to shift away from the dotcom era's emphasis on websites and e-commerce to the new imperatives of corporate efficiency, security and global connectivity.

Some countries demonstrate strength in all categories, while others stand out in a few categories but lag behind in others. What follows is a category-by-category
assessment of country performance, along with an explanation of the Economist Intelligence Unit’s e-readiness criteria. Pointers are given, as well, to indicate how countries could do more to seize the advantages that the Internet offers.

Connectivity measures the access that individuals and businesses have to basic fixed and mobile telephony services, personal computers and the Internet. The affordability, quality and reliability of service—all functions of the level of competition in the telecom market—also figure as determinants, as does the security of content delivered and transactions conducted via the Internet.

For e-business to take root, countries at a minimum need to ensure secure access to the Internet. Where phone lines are inadequate, computer ownership extremely low and Internet connections prohibitively expensive, e-business has failed to take off. But even in wealthy countries where the infrastructure is reliable and secure, there is tremendous room for improvement. High-speed broadband services are not universally available, and Internet-ready mobile phones are still in their infancy—even in mobile-crazed Scandinavia. No country entirely meets consumer demand for fast, cheap, secure and reliable Internet connectivity.

Deregulation promotes Internet access. Singapore and Hong Kong have the most deregulated telecom markets in the world, followed by northern European countries and the US. At the other end of the spectrum are countries where the state maintains a stranglehold on telecom providers. Turkey’s government, for example, is dragging its feet on selling Turk Telekom, which controls not only the country’s fixed lines but also mobile telephony and Internet service provision. Such fixed-line monopolies hinder e-business in much of the developing world, as they are most often the largest Internet service providers as well.

The two faces of mobile usage. Three out of four Swedes carry a mobile phone. The reasons are clear: the country is tech savvy and gadget loving, and its liberalised telecom market offers lots of choice at low prices. All this bodes well for e-business.

Mobile phone penetration in the Czech Republic is not far behind, at 68%. Yet here the reason for mobile usage is altogether different: the incumbent fixed-line monopoly provides poor service at high prices. In the Czech Republic, as in many developing countries, mobile-phone penetration is high simply because the fixed-line alternative is so unattractive. Mobile usage on its own is not a good indicator of a country’s e-business environment. Uniform standards are important in encouraging mobile usage—and here the US falls far short of Scandinavia.

In evaluating the general business climate, the Economist Intelligence Unit screens 70 indicators covering criteria such as the strength of the economy, political stability, the regulatory environment, taxation, competition policy, the labour market, the quality of infrastructure, and openness to trade and investment. The resulting business environment rankings measure the expected attractiveness of the general business environment over the next five years. Calculated regularly as part of the Economist Intelligence Unit Country Forecasts, these rankings have long offered investors an invaluable comparative index for 60 major economies.
Good for business, good for e-business. Not long ago, the Internet was seen as the engine of a new world of business that would leave "old economy" companies in the dust. The consensus now is that the Internet makes sense only when applied within the framework of traditional business rules. That said, it is clear that all types of companies and every industry can apply e-business solutions to improve efficiency and streamline operations.

Today, business is e-business, and vice versa. For this reason, countries that score highly in the Economist Intelligence Unit’s business environment rankings -those with stable governments, strong economies, developed legal and regulatory systems, and flexible labour markets -are generally also the best places to do e-business. Countries where competition is restricted and legislation is cumbersome are less e-ready.

The Netherlands scores highly in all the categories that the Economist Intelligence Unit considers crucial for doing business. It has a stable political framework. Its economy is characterized by low inflation, steady growth and openness to foreign trade. Competition policy is well developed. Taxes are low by European standards and financing is readily available. Infrastructure, especially telecom infrastructure, is excellent.

The Netherlands is well ahead of its neighbours in labour market deregulation. Thus the Netherlands takes first place in the business environment rankings. Not surprisingly, it is also near the top in the e-readiness rankings. The Netherlands has perhaps the strongest B2B infrastructure in Europe, and Dutch multinationals are using cutting-edge technology to improve everyday business practices. ING Bank, for example, equips its insurance salesforce with wireless Internet access.

Shell, a Dutch oil giant, has developed innovative ways of combining real-world and web-based training. Compare the Netherlands with one of Western Europe’s e-business slowpokes, Italy. Italy places 22nd in both the business environment and e-readiness rankings. It suffers from political instability, huge public debt and an over-regulated labour market. In this environment, e-business takes longer to develop. Only 6% of Italians shop online, and B2B e-commerce accounts for less than 1% of total commerce.

Many of the countries that score highly in the e-readiness rankings also allocate a large portion of public spending to information technology, or enact incentives that encourage private-sector infrastructure investment.

Relatively small economies, such as Austria and the Netherlands, must dedicate a larger share of total spending to IT infrastructure than massive economies, such as the US and Germany, in order to maintain similar levels of infrastructure; their ability to commit these funds indicates a strong commitment to e-business. Even countries further down on the list -including Korea, Portugal and Brazil -are also devoting tremendous resources to IT development, signalling their determination to become e-business leaders.

Logistics and delivery systems play a role. E-business relies on more than phone lines and PCs. It requires electronic payment systems and populations that habitually use credit cards. It also mandates efficient and secure postal, courier and other logistics
systems involved in the delivery of goods purchased online or shipped as part of just-in-time manufacturing systems. Those ranking highly in this category have efficient, expansive, reliable and cost-effective delivery systems. Innovative start-ups need financing.

To move business online, companies need the help of other companies, from website designers, to payment facilitators, to hosting providers. These small, innovative firms depend on start-up capital. In Western Europe, North America and Australia, financing is readily available from a variety of sources and on generally good terms. In many emerging markets, however, banks function poorly, stock markets are embryonic and venture capital is practically unknown. Lack of financing is hampering e-business development throughout much of the world.

E-business development depends both on a country's overall legal framework and specific laws governing Internet use. Governments that support the creation of an Internet-conducive legal environment -both through policy and enforcement -get high scores. Those more concerned with censoring content and controlling the web score lower. There's a role for government. It's easy for governments to declare ambitious Internet-development plans, but such declarations need to be followed by deeds. Even where funds are in short supply, action can be taken to ensure that the legal system supports e-business.

Developing a consistent and predictable legal and regulatory framework to address emerging e-business legal concerns is a good start. This can include ensuring a level playing field in the telecommunications industry, where old monopolists often retain effective control of the market, or passing legislation that extends to the Internet proper measures to protect intellectual property rights, or directing law-enforcement agencies to protect online security.

Putting public services online can help demonstrate the benefits of e-business while saving taxpayers time and money. The UK and Singapore are standouts in shifting paperwork-intensive processes to more streamlined web-based procedures. A good place for governments to start is to simplify the registration of a new business so that it can be accomplished in a single step via the Internet. This frees local entrepreneurs from red tape and makes the country a more attractive investment destination for foreign capital.

Literacy and basic education are preconditions to being able to navigate the web. In addition, the rankings consider a population’s "e-literacy" -its experience using the Internet and its receptivity to it -and the technical skills of the workforce. And because Internet business involves risk-taking, the rankings assess the national proclivity to business innovation and entrepreneurship.

Basic education is not enough. Internet users must have some degree of education. However, basic literacy is not enough. In poor countries where literacy rates are relatively high, such as China, Sri Lanka and Kazakhstan, e-business is often hampered by a shortage of both technically skilled workers and an "e-literate" population that has had exposure to the Internet.
In countries where both literacy and e-literacy rates are high, e-business is thriving. Scandinavians, and northern Europeans in general, are highly educated, tech savvy and multilingual. These factors bring the region nearly even with the US in our rankings. Many countries could do better. France, for example, receives high scores for education and literacy yet earns only an 8.25 in this category. There are several explanations. The French tend to start using the Internet at an older age than the typical American or Scandinavian, and many French cling to Minitel, the country’s long-established proprietary service. Less than one-third of the population speaks English, the lingual franca of international e-business.

No business or industry can function efficiently without intermediaries and ancillary services to support it. For e-business, these include consulting and IT services, and back-office solutions. The rankings also take into account whether there are consistent, industry-wide technology standards for platforms and programming languages.

Israel, a major exporter of software and high-tech products, is one of the few non-Western countries at the forefront of e-services development. The country is tech savvy, with an exceptionally high share of scientists, and entrepreneurial. Moreover, Israel boasts one of the most vibrant venture-capital sectors outside Silicon Valley. The result has been an ever-growing number of e-consultants, e-marketers and technical-support providers to underpin Israel’s high-tech sector.

Governments help set tech standards. An absence of global technology standards is emerging as an inhibitor of e-business growth and efficiency. Although the legend of the Internet is one of self-government, international mediation will be increasingly necessary to reap the benefits of global connectivity.

The US General Accounting Office recently joined the debate over the future of XML, the most widely used mark-up language. The GAO’s brief was to establish whether XML should be used to standardize government data and promote interoperability. But the agency expressed doubts not only about XML, but also about a plethora of competing standards. The report appears to have shaken up the notoriously slow-moving standard-setting bodies, which have promised to address the shortcomings.

In short, the Economist Intelligence Unit’s e-readiness rankings lend themselves naturally to an action plan for governments seeking to capture the benefits of the Internet and the changes it has wrought. Connectivity is a necessary first step.

Although it is consumers who ultimately drive adoption of the Internet, governments can help ensure that the proper infrastructure is in place, and that its reliability and security are protected. Protecting competition in the communications industry helps speed e-business.

E-business cannot thrive where other forms of business fail. So governments aiming to promote Internet usage need to adopt policies that facilitate growth, promote investment and reduce red tape. Measures that encourage entrepreneurship, including the availability of financing for innovative firms, are helpful.
Creating a conducive legal and regulatory environment is crucial as well. This means not only ensuring that traditional legal safeguards, such as protection of intellectual property rights, are extended into the digital world, but also training and funding the police and judicial personnel needed to enforce them. Adopting a coherent and far-reaching government "e-strategy" - particularly one oriented to universal Internet access - provides a vision of the digital future that can inspire both business and civic enthusiasm.

Making public services available online, in a citizen-friendly format, helps sustain that enthusiasm and gives governments an opportunity to lead by example - as well as to save time and money. Adding computer literacy to the basic education curriculum, and technological specialisation to the range of training options, promotes needed skills. Supporting countrywide industry standards helps promote data sharing without stifling competition, as does joining the international dialogue on global standards.

Yet, as the Economist Intelligence Unit e-readiness rankings suggest, savvy policy and creativity can often trump sheer size and power. Wealth is an obvious advantage, but lack of funds is no excuse for ignoring the potential of the Internet.

**Estonian Transition into Information Society**

Societal inclination towards a fast acquisition of modern technologies, willingness to experiment with new solutions and internationally successful promotional campaigns have introduced Estonia on the international arena as a rapidly evolving information society. For example, the issue of technological developments and their impact on society has been analysed by different international analytical reports and Estonia has been ranked highly:

- McConnell International (2001), for example, indicates that in the fields of e-leadership, human capital and overall e-business climate the majority of conditions in Estonia are suitable to the conduct of e-business and e-government.

- The latest (2001) Human Development Report issued by the United Nations Development Programme (UNDP) also ranks countries next to human development index (where Estonia holds 44th position and belongs to the group of high human development countries) also according to the technology achievement index.

Although Estonia was not ranked by the UNDP, according to the provided formula Estonia would be on the 30th position belonging to the group of potential leaders. Indeed, the broad picture seems to confirm this concept, as figures and early growth rates are in some cases remarkable (particularly in the category of consumer goods and exports), and several initiatives that have been undertaken by either government or corporate agents are remarkable, inspiring other countries to imitate Estonian practices.

The early launch of the Estonian information society developments is frequently used as best practice for other countries. Without hesitation, the rapid development of the telecommunications market is a clear success story:

- A reasonable state policy has generated rapid catching-up both in the fields of fixed lines and mobile communications;
Estonia has been one of the first countries amongst the CEE countries to open the telecommunications market for liberalisation, giving a good basis for further development;

Public initiatives in the fields of eLearning (e.g. Estonian Tiger Leap) and eGovernment are also good examples that other (especially Central and Eastern European) countries attempt to imitate. Like other transition economies, Estonia is experiencing very rapid developments in the technical sphere with a number of problems arising at the same time on the social scale, such as the digital divide. Recent developments in the Estonian telecommunication market are characterised by the fast development of both telecommunications market and Estonian information society as a whole:

- Rapid increase in the number of telephone lines;
- Accessibility to modern telecommunication services (GSM, ISDN, DSL) and reduction of the prices;
- Total liberalisation of the telecommunications market (expiration of the exclusive rights granted to Estonian Telephone Company) since January 1, 2001;
- Promotion of technological development by the State through legislation (Cable Distribution Act, Telecommunications Act, Digital Signature Act). In general, the proximity of advanced Scandinavian technology forerunners is a significant driver. The rapid uptake of novel technologies, enhanced wireless communication infrastructure, a high number of conventional telephone lines and Internet hosts has created a moderately favourable platform for building up appropriate forms of applications.

As a well functioning telecommunications sector is considered important for enhancing the competitiveness of an economy and the quality of life, Estonia has paid much attention to the information society developments and directing these after regaining its independence.

Main issue in the beginning of 1990s was insufficient technological infrastructure and in order to support its development a Concession Agreement was signed. This helped to attract significant investments into extension and digitisation of the public telephone network.

During the 1990s the state has adopted also several important legislative acts and established the necessary state structures and has in this way organised the telecommunications The most influential enterprise in the Estonian telecommunications market AS Eesti Telekom was restructured already in 1991-93; in 1997 the state enterprise Eesti Telekom was re-established as AS Eesti Telekom and the decision was adopted to organise an initial public offering (IPO) to sell up to 49% of the shares.

The IPO took place at the beginning of 1999, and institutional and private investors purchased 49% of the shares owned previously by the Republic of Estonia. At the moment AS Eesti Telekom has 100% ownerships in AS Eesti Telefon (Estonian Telephone Company) and in AS Eesti Mobiiltelefon (Estonian Mobile Telephone Company).
Since the beginning of 2001 the number of telecommunications companies increased remarkably and currently the most important companies in the market are AS Eesti Telefon, Levicom BroadBand OÜ (TELE2) and Uninet AS. Estonian mobile telephone communications market has been liberalised from the very beginning and currently there are three operators on the market.

As for year 2000 there are 522 000 conventional main lines in Estonia and 557 000 mobile communication subscribers with the market turnover for carrier services being 259 million Euros. Since its early days telecom sector has shown a constant growth, though conditions for further expansion are somewhat more restrictive nowadays.

On the one hand, the market is reaching saturation point, though it might be just a temporary situation in light of the launch of the next generation mobile services; on the other hand intensive competition in the sector pushes down the prices. The predicted growth rate of the total telecom market was about 10% for 2001.

Access to the Internet is mainly realised through the use of dial-up services in Estonia, although DSL services are available in major cities. There are 8 major Internet Service Providers (ISP) in Estonia. Technology uptake and applications When looking at the ICT manufacturing in Estonia, it follows, that foreign orders are very important for the Estonian ICT sector - 73% of the subcontracting activity originates from abroad.

Typically, subcontracting involves assembly of various communication equipment and software outsourcing. As a result, subcontracting revenues constituted 60–100% of the Estonian turnover of telecommunications equipment production, industrial automation, consumer electronics and components, and about 15% of the computers and office machinery sub-sector in 2000. Due to high foreign demand, the export of the Estonian ICT industry has increased rapidly.

On the downside, most of the rise can be assigned to a single company’s activity - Ecoloteq Ltd provides 83% of the total Estonian ICT exports and 96% of telecommunications equipment exports as the statistics for the year 2000 indicates. Of domestic industries, manufacturing, the telecommunications sector, banking, wholesale and retail trade, and government structures are the important drivers of the emerging Estonian ICT cluster, as they demand most of the production generated by the ICT sector.

On the services side, the most popular application areas of Internet are banking services, but public administration’s efforts in IT sphere have also generated new web-based services in public domain. As 41% of Estonians aged 15 to 74 are identified as Internet users, there seems to be challenge for both public and private sector organisations in introducing innovations in services fields, namely through the use of ICT.

The most popular electronic service in Estonia is Internet banking. Hansapank has indicated 365,000 Internet banking clients and Ühispank 150,000. To some extent the clientele basis is overlapping, but is still reasonable to believe that total number of Internet banking users exceeds 250,000, covering more than 18% of total Estonian population.
Factors that have put Estonia to the position of the leader concerning Internet banking among former Eastern block Countries and outdoes a lot of Western European countries, are simple-to-use software, free of charge transactions during the services’ introducing time to the market and the impact of Nordic countries’ IT culture on Estonia.

Other popular services offered via digital channels are digital taxation board portal and insurance payment systems. Digital taxation board is represented both in the system of Hansapank’s Internet banking interface Hanza.net, Ühisbank’s U-net as well as separately, via Tax Board’s own portal. In the former case personal identification of Hansapank’s and Ühispank’s clients is used for electronic tax-related transactions, in the latter case special security codes are issued to clients upon request.

The number of income tax declarations submitted through Internet banking portals exceeded 36,000 for the declaration period of year 2000. There are other interesting services provided by the private sector, e.g. Mobile parking is another recent innovative initiative launched by the Estonian Mobile Telephone (EMT) and parking surveillance authorities.

In order to use the system, after parking a vehicle a SMS has to be sent to the parking centre, and finished upon further notification, also via SMS. The parking fee is subsequently added to telephone bill or deducted automatically from client’s mobile bank-account.

LocateGSM is a service offered in cooperation with EMT and GIS developer Regio Ltd. This is a web-based mobile positioning system (MPS) enabling to display the location of EMT mobile subscriber on a map. This way the system is offering good bases for further development of different location-based services.

In addition there are also other remarkable initiatives carried out in the public sector. These are mainly dealing with the modernization of the communication within the government, or provision of services to companies and individuals on digital bases (e.g. e-Citizen project under planning, electronic ID card initiative).

In 2000 the first phase of the project of "Information Systems for Government Sessions" was developed and implemented, forming thus a solid basis for Government’s work digitalization, as well as making available Government protocols and information concerned to general public.

The project aims at engaging citizens more actively into policy decision processes, as well as motivating public debates concerning nationwide and important initiatives. The citizen portal encourages submitting ideas, visions, directions etc. as well as comment on bills released by ministries already during the process of bill drafting. Steps towards modernising the governmental information exchange system were taken starting year 2000, at the initiative of the pilot project X-road (cross-road).

The objectives of X-road pilot project are to interconnect state databases, to enable requesting information to authorised user via Internet from any of the databases after authorised accession. This project is especially important as elements of the state
information system were founded technologically independently, but also at different points in time, thus calling for operative modernisation and co-operation.

Parallel to X-road project incentives on bringing several main registries (Business Registry, Real Estate Registry etc) on full-electronic Internet basis are being implemented. The access is guaranteed to all users, and the information obtained has full legal power.

For projects like these governmental structures are important users of telecommunications equipment and services, office machinery, computers and software, whereas the government’s affection for novel technological solutions has had a positive effect on a number of public sector initiatives.

Despite of the rapid spread of Internet connections, relatively high level of users and extensive investments into Internet stores, the turnover of electronic commerce is insignificant. According to Global eCommerce Survey e-commerce penetration is 6% in Estonia. For the USA the relevant figure is 33% and for Finland 17%. Factors impeding the development of e-commerce are sustainability of buying habits, limited product range in Internet stores, inconveniences in paying for goods and deliveries and security risks when using bankcards.

Forming a new electronic commerce culture is a world-wide problem and in this light Estonian developments are comparable to the most successful European countries. One of the strongest Estonian advantages in these developments is the widespread Internet banking (favours the rise of positive attitude towards e-commerce); the most important discouraging factors are the smallness of the potential market and conventional shopping habits.

Consequently, bringing more services onto digital basis is substantially dependent on the potential demand for these services. Presently the demand is derived mainly by the clients of Internet banking, who have their personal banking accounts for conducting electronic-transactions via Internet based web portal.

Evidently, the fast development of the Estonian banking sector and the high-tech solutions elaborated by the banks’ own product development departments have reinforced the need for quality software, and trustworthy and secure products, thus having also positive effects on generating innovative solutions.

Also, collaborative actions undertaken by the banks and telecommunications operators have established strong links between these two sectors, paving the way for future m-commerce related activities. However, in this context the relations with content providers are insufficient, meaning that these relations have to develop towards a more active involvement of external content service providers in order for a large-scale functioning m-business or m-leisure to appear.