mWATCH

A SURVEY ON MOBILE READINESS
IN THE BALTIC SEA REGION
2003

Baltic Development Forum

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Baltic Development Forum

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FOREWORD

The mWatch is the result of a project assigned by the Baltic Development Forum. The forum is a non-profit organisation that envisions the Baltic Sea Region as a global frontrunner. The forum provides a unique platform where the region's decision makers can meet in an informal atmosphere to discuss new business opportunities and develop new regional strategies in a Private-Public Partnership.

The **mWatch** will serve as a basis for discussion between Baltic Sea Region stakeholders in order to promote mobility and mobile services. The survey will also serve as a Master's Thesis for the two authors Kristina Lundevall and Arna Jazic from the Royal Institute of Technology in Stockholm. It has been a pleasure to cooperate with these two talented young authors, who have discovered many new aspects of mobile services during the project.

It is my firm belief that the **mWatch** is here to stay – perhaps as an annual survey – in order to stimulate the Baltic Sea Region as a "Centre of Excellence". It can give the energy for further mushrooming of living labs for mWorkers, mResidents and mVisitors.

Baltic Sea Region, October 2003

Christer Asplund

Senior Adviser to the City of Stockholm
Project coordinator of the mWatch

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GEOGRAPHY OF THE BALTIC SEA REGION

1. INTRODUCTION

There is a constant pressure in society to improve mobility in all aspects of daily life. Mobile services via portable devices are therefore under quick development in all parts of the world.

The **mWatch** studies the potential to implement new mobile services in the Baltic Sea Region (BSR). The overall aim of the survey is to stimulate public and private actors to develop the region into a "Centre of Excellence" in mobility.

There are, of course, many obstacles on the way towards this vision. The obstacles are highlighted in **mWatch** and guidelines to how they might be resolved are also presented.

NEW POSSIBILITIES ON THE GLOBAL MARKET

Mobile solutions – sometimes innovative or even provocative – are mushrooming. Three examples of such services are shown below:

1. Would you not like to watch the latest news on your pocket TV while travelling with the metro or see your favourite TV-show during a coffee break? Mobile Television is a hot topic today, even at governmental level. Investigating opportunities to offer TV services to mobile subscribers using digital TV networks, Finland's government is at forefront of this development. The Finnish Ministry of Transport and Communications is suggesting the launch of the world's first trial-network for mobile TV in early 2005.

2. How would you like to obtain a divorce by simply sending an SMS to your spouse? No time consuming procedures and hearings, a simple electronic message is all it takes! As strange as it might seem to our Western culture, this is something discussed in Malaysia today. Here, only men are allowed SMS divorce, though understandably, Malaysian women are not too happy about this.

3. In the wake of the SARS epidemic, a mobile service was introduced. The user received a warning when passing by a building or

a spot where a case of the disease had been discovered. The mobile operator Sunday Communications in Hong Kong offered this service when the SARS epidemic was at its height.

An embryo to a functioning mobile society already exists in some places. In Japan, for instance, the snowball has started to roll. The country hosts more than 65 million mobile subscribers, including 8 million 3G users. The most prominent mobile services are iMode and J-Sky, both offered by DoCoMo. These ambitious Japanese systems are attracting world-wide attention.

It is a challenge for the BSR to keep up with the development and secure a position as a global frontrunner. In order to assure that the mobile services sector remains on top of the development agenda, the BSR has to benchmark success stories as the ones mentioned above.

BALTIC SEA REGION – A DYNAMIC REGION WITH UNIQUE GROWTH POTENTIAL

The BSR and its ten nations encompass some of the world leaders in mobile services and technology. The region has more than 100 million inhabitants, i.e. potential customers. The overall growth rate is higher than in most other European economies. This, together with the fact that the region has the world's highest mobile and Internet penetration rates, gives the BSR an opportunity to become the foremost mobile cluster in the world. As a "Centre of Excellence" and an icon for the rest of the world, the region could attract even more business and tourists and make the region a dynamic and attractive place for businessmen, residents and visitors.

Several important facts support the idea that the BSR has the potential of becoming a "Smart Region" for telecommunications and specially the mobile industry. First of all, important prerequisites for healthy development are present. High educational and welfare levels are also contributing to the positive environment. Geographic proximity and well-developed infrastructure allow communication to flow smoothly and quickly. Strong industrial traditions and a shared history of trade make collaboration between the countries natural. Therefore, cooperation initiatives are relatively easy to undertake and maintain. Finally, the EU enlargement, which includes the three Baltic countries and Poland, will make intra-community trade even easier. It will open up a completely new world of opportunities for the region.

Consequently, the BSR has a prerequisite to become an attractive growth and trading centre. One key to this development and success is for the region to devote itself to what it is good at – mobile business.

Some of the world's leading telecom clusters are located here; Oulu, Helsinki, Kista, Oeresund region, Aalborg, Fornebu and Tallinn to mention a few. Furthermore, two of the most important companies in the mobile world, Nokia and Ericsson, are based in the region. Many start-ups have also entered the mobile arena. In addition, a deregulated telecom market was introduced on an early stage. There is a high and commercially unexploited source of knowledge in the field of Information and Communication Technology (ICT), mostly in the three Baltic countries, Poland and in the St. Petersburg area. The young public administrations in these countries have also skipped some of the development stages. Since the main telecommunications infrastructure has not yet been developed to support everyone's needs for phones and Internet, these countries are jumping right into the world of mobile services and mobile Internet.

In the countries that have gone through all phases of the telecommunications development, there might be obsolete thoughts and platforms holding back a quick development. Not having such platforms and not having been used to the Internet can of course be a disadvantage. However, there are also signs of the opposite. Not having a predisposed mind can open up new trajectories of thought. Uffe Ellemann-Jensen, chairman of the Baltic Development Forum, in his capacity as Danish Foreign Minister once donated some old computers and other used IT equipments to Estonia. After some time, Mr Ellemann-Jensen received an e-mail from the Estonian organisation that had received the equipment. However, he was unable to read it. It turned out that the software they were using in Estonia was much more sophisticated than the one used in Denmark.

All these facts imply that quite new application hotspots can emerge within the BSR. The absence of ICT traditions in some of the BSR countries can generate surprises in the world of mobility. In the long term, so-called mPlaces can and will emerge.

OBJECTIVES

The first objective of the **mWatch** is to provide insights into the development of mobile services and how they can help the BSR to flourish. By using knowledge on clustering as well as networking experiences, this objective is assessed.

The second objective is to contribute to the networking activities in the region. By presenting a number of mobility cases and initiatives throughout the BSR, this objective is met. The presentation of the cases will also contribute to the overall goal, namely triggering the minds of the developers in the region and thus providing a dynamic environment for development.

Finally, the third objective aims at describing the current situation in the countries of the BSR. This last objective is met by reviewing some key statistical data. The **mWatch** will therefore contribute to the analysis of the future mobile market of the region as well as provide necessary means for assessing the Mobile Readiness.

METHOD

During the **mWatch**, a thorough literature study has been conducted. The literature has been found searching the Internet and by making use of the Royal Institute of Technology Library and the Stockholm University Library.

Cases presented are handpicked to show a wide-ranging picture of the mobile initiatives in the BSR. They have mainly been found via the Internet. However, a large number of phone calls were made and hundreds of e-mails were sent to get in touch with project owners. Interviews have also been undertaken in order to broaden the knowledge about the cases.

DELIMITATIONS

It is natural that some initiatives in the BSR have not been translated into English due to their local character. As a result, the more "well packaged" cases are probably over-represented. Furthermore, the maximum number of cases per country was set to four. Because of these two limitations, some initiatives may not have been found or included. Countries with a higher degree of Mobile Readiness have more

ongoing initiatives and are thus represented with a higher number of cases.

Due to the paucity of comparable data in the countries of the BSR, there is a risk that statistical reviews might suffer from inaccuracies. To overcome this problem, we have only used sources of information that have included all countries in the region. However, only national data have been found why regional statistics are absent.

1.2 "m" IN mWATCH

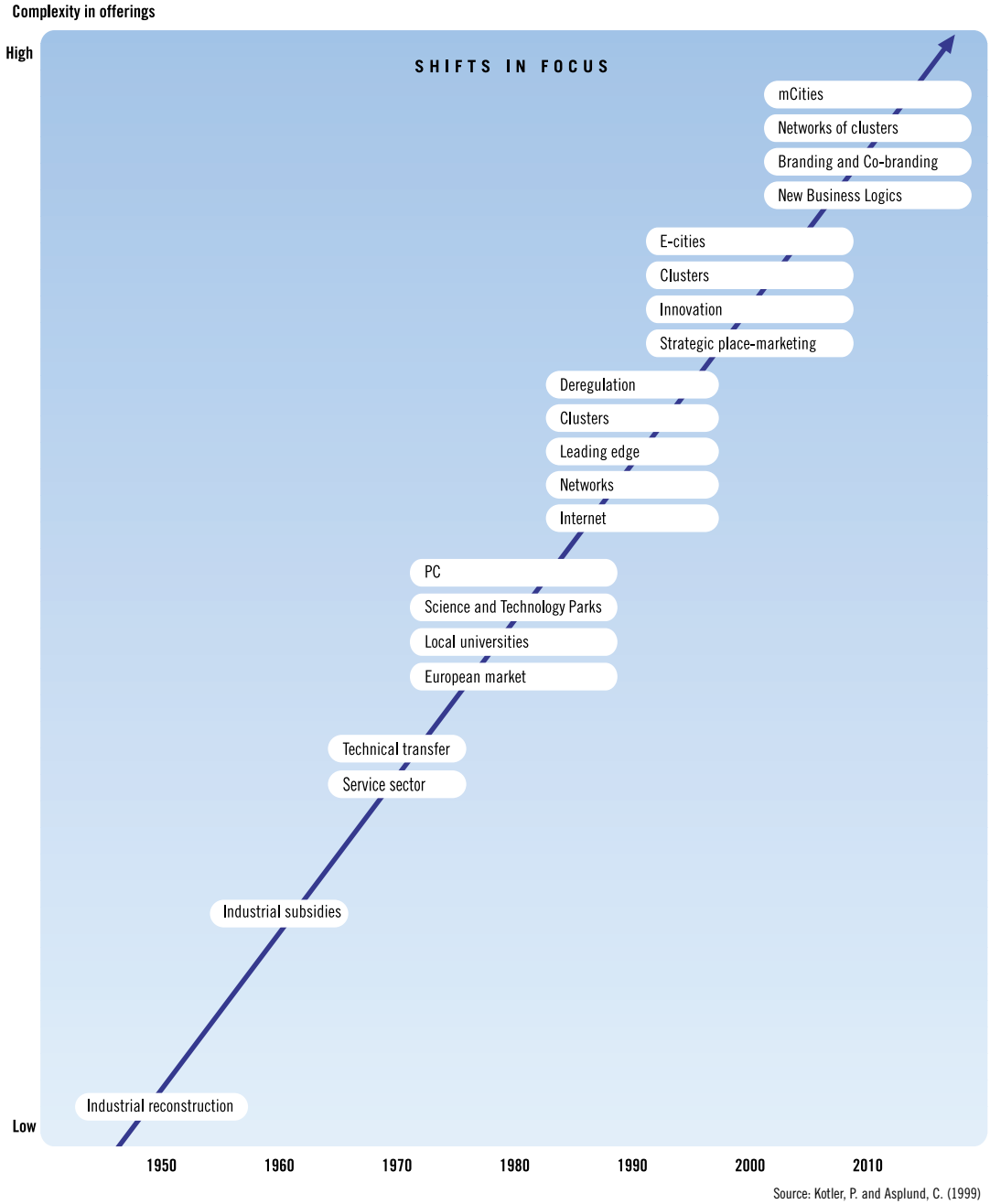
Mobile services of today, and particularly those of tomorrow, correspond exactly to the content of ICT. Mobile phones are mostly considered as the Communication (C) part of the term. However, mobile services used today include an increasing part of information, and are no longer just means of communication. These services represent therefore both I and C part of the term.

We are now entering an era where e-services and e-cities are turning mobile, thus becoming m-services and m-cities. Clusters are developing into networks of clusters that are joining in co-branding activities. The figure on next page shows this change in climate visually. It suggests that every decade has its own specific agenda and that the complexity of offerings is increasing year by year.

To be a leader at an early stage has many positive effects, also from a branding point of view. The BSR has currently a chance to be perceived as an mRegion. With a clear focus on networking between cities and regions in mobile service related areas, the potential to succeed with this is high.

Mobile services are defined and categorised in many different ways. Categorisation can be done by allowing the technologies' hierarchical structure define the term or by drawing on the type of user, individual or business, as definer. One can also let the concept of mobility lead the way as has been done in **mWatch**.

The mobility concept used in **mWatch** focuses not only on mobile phones. Everything that increases the ability to do things on the move and not be bound to one specific place leads to mobility. To be really mobile is to be free to connect whenever you like and wherever you are. The mobility theme has been pronounced in many ways by com-



Source: Kotler, P. and Asplund, C. (1999)

panies in their corporate image: “Connecting People” (Nokia), “Make yourself heard” (Ericsson), “Work where you want” (Canon).

Naturally, services involving wireless technologies are preferred, but even the simplest service enabling mobility can, and will, eventually be supported by wireless technologies. However, the most important objective in **mWatch** is that the services should trigger the imagination of the reader.

1.3 STRUCTURE OF THE SURVEY

The idea behind **mWatch** was born out of the belief that the BSR can become a global hotspot for mobile services. The purpose was thus to exploit the potential for the actors in the region to develop joint visions and actions in order to form an even stronger ICT cluster.

First, **mWatch** presents Porter’s Diamond model, which provides means to display factors that affect cluster-building in the region. BSR as a whole has a great potential to become a successful network of ICT clusters due to the complementary competences.

Second, the Networked Readiness Index (NRI), developed at Harvard University, is presented. Other statistics that are important for understanding the countries’ opportunities in the ICT sector are also provided. Together, this information forms the necessary basis to define Mobile Readiness and also a means to measure it. A Mobile Readiness Index is thus introduced in the third chapter of the survey.

Third, several initiatives in the BSR are highlighted, giving a broad picture of the current situation in mobile services development. Some possible networking activities between cases are also suggested. Therefore, information about contact persons is included in each project description.

Finally, in the last chapter of the survey, the thoughts are summed up. The **mWatch Diamond** that can be used in order to improve Mobile Readiness of the region is presented and recommendations for further development of ICT clusters in the BSR are given.

2. NETWORKING TOWARDS A MOBILE SOCIETY

ICT is something that the BSR is good at. The region has the world's most extensive online public services and is the home location of global leaders in mobile communication technology. ICTs in general, and mobile communication in particular, have great potential to make the region a global "Centre of Excellence" in mobile services. Succeeding in this, the BSR can set positive examples for the rest of Europe showing how East and West can work together in order to achieve the world's leading knowledge driven economy (Rasmussen 2003). Through joint visions and actions, there are tremendous opportunities and synergies to gain. Collaboration is, however, not something that will happen by itself. Joint efforts between regional leaders in politics, business and society are needed.

This chapter introduces the clustering concept and discusses possibilities of the BSR to become one large cluster or "Smart Region" of excellence, as Uffe Ellemann-Jensen puts it.

2.1 CLUSTERING CONCEPT

Mobile services have made it possible to have close relationships regardless of physical distance. When exchanging complicated information, personal contacts and meetings still seem important. Despite all available technology, it is therefore assumed that geographic proximity makes it easier to exchange information and also to interact with and learn from each other. Contacts and network building will however be improved with ICTs in general and mobile services in particular.

A widely used term in this context is the concept of clusters, introduced by Michael E. Porter in the early 1990s. At that time, the concept was used to describe how international competitive advantage might arise in a group of related companies and industries. However,

it was observed that there were not only differences between clusters in different countries, but also between different regions and places within a country. Most clusters were not evenly distributed over the countries, but rather concentrated within a certain region or a city. This has led to confusion when discussing what a cluster really is. On the one hand, it can be seen as a functionally connected industrial system and on the other as a geographically defined agglomeration of related companies and activities.

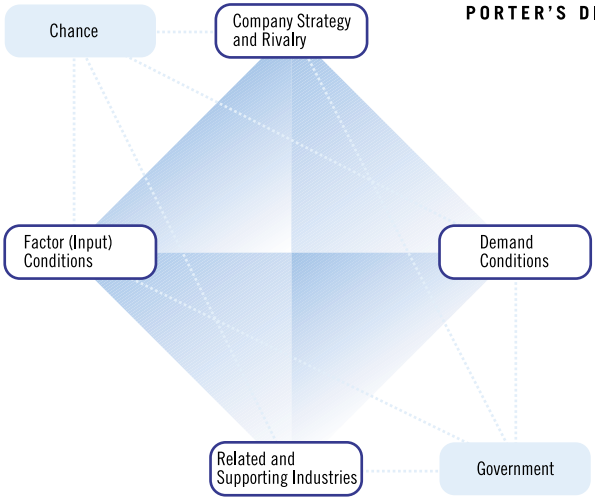
Both definitions are however rooted in the assumption that innovation, renewal and development are results of a tight interaction between different actors. Both of them also have a geographic dimension attached. This geographical scale is adjustable and spans from separate cities to groups of closely situated countries.

Mixed opinions about the definition of clusters do not necessarily have to be a disadvantage or a critique of the clustering concept. On the contrary, it can be seen as an advantage that the definition can be adjusted according to the discussed context. In the case of the BSR both definitions can be used. Today, there are regional clusters within all countries of the BSR. These clusters are, or can be, connected to each other, thus turning the whole region into a large cluster or rather a network of interconnected clusters. One such example is the Internet Bay that connects the region from Umeå in Sweden to Waasa in Finland.

DIAMOND MODEL

A cluster is an industrial system, in which companies and businesses are connected to each other through different relationships. These relationships make it possible to look upon industries as groups of related activities, i.e. clusters, and not as separated single units. The relationships connecting a cluster are: transaction links, competition, spill-over and R&D. Looking at industries' system character is fruitful in many ways. It opens up possibilities to analyse actions and relationships between companies across traditional classifications of trade and business.

The **Diamond Model** describes the factors affecting innovation abilities and dynamics in a cluster. It consists of four basic and two additional factors. There is no single most important factor among the basic ones; it is rather the presence of all four of them that is crucial for regional and national development. (Porter 1998)



Source: Porter, M.E. (1998)

Natural resources, capital and labour are part of the **Factor (Input) Conditions**. However, these general conditions are no longer decisive in the matter of competitive advantage. Today, when most of the countries have well-developed transport and communication systems as well as an educated workforce, general factors are not enough. Access to specialised knowledge and skills, technological know-how and specially designed infrastructures are factors needed in order to create long-lasting advantages that are difficult to imitate in other places.

Market Conditions are also decisive when discussing competitive advantages. It is however, not the size of the market demand but rather the quality of the same that is of importance. Sophisticated customers are important assets. In the case of the BSR, the market demand is both large and of high quality. More than 100 million people live in the region, many of whom are highly educated early adopters. High mobile and Internet penetration rates clearly reflect this.

Related and Supporting Industries and the relationships between them is another important factor determining the competitive power of a region or a country. Sophisticated suppliers can also contribute to innovations and creative thinking if they are included in the value-chain.

Local competitors in the same or in a similar sector tend to stimulate each other. Companies have to stay alert and improve their per-

formance to remain competitive. **Company Strategy and Rivalry** suggests that this kind of competition can lead to faster development in the whole region.

Government and Chance are two additional factors discussed by Porter. A government may have a crucial influence on national competitive advantage in industries, but its role is often overstated according to Porter. Government policy can raise the odds of gaining advantage, but it can work successfully only in industries where the underlying determinants are present. Porter says that government policies can be influenced by the four determinants. Demand by industry for skilled labour can affect choices about educational investment, which is a government concern. "Chance events outside the control of individual firms and even governments also play a role in the process of creating international competitive advantage" (Sölvell, Zander & Porter 1993). Examples of such events are wars, unexpected technological breakthroughs, discontinuities in input costs and so forth. All of these events can affect the conditions of the Diamond, both positively and negatively.

The Diamond shifts focus away from single companies to groups, or clusters, of related companies and businesses as well as innovation processes that occur in the interaction between them. When summarising, it can be said that the Diamond stresses the following things:

- Specialised infrastructure and competence, leading to advantages difficult to copy and imitate elsewhere
- Sophisticated customers with high demands
- Sophisticated suppliers and other actors the company has contacts with
- Local rivalry

CAN REGIONAL POLICIES HELP CREATE NEW CLUSTERS?

Dynamic environments usually grow spontaneously over long periods of time and are rarely results of planned regional development strategies. However, local and regional policies do matter and should not be of subordinate importance. The role of public actors is complex if they are to positively affect this development. There are paradoxical forces behind business dynamics and innovation capabilities (Malmberg 2002). Companies and clusters need both support and challenges in

order to develop. Porter's Diamond stresses local environments that should be both demanding and favourable, which means that competition as well as cooperation between actors is desirable.

Therefore, local and regional policies that strive for innovation and dynamics have to find a balance between these paradoxes. Economic development actors in general have two different responsibilities, namely designing the arena and setting up the playing rules. In other words, they have to improve general conditions and create prerequisites for the development of locally rooted competences and business dynamics, rather than follow the Diamond model trying to achieve positive clustering effects.

Promoting competition and fair play, having legislation that makes demands on security and economic and financial issues, can be one way to support the business climate. Upgrading production-factor conditions and knowledge is another task of regional policies, as it can stimulate entrepreneurial thinking. Having a functioning venture capital market is also of great importance when developing a region. Furthermore, regional policies can build bridges between research and business, by supporting organisations that are spreading knowledge and technology. To build a platform, based on public and private actors, is another important task. In addition, Kotler and Asplund (1999) argue in favour of a regional policy that goes beyond the traditional thinking. Hence, they have elaborated a concept called "attraction policy", where value chains, target groups and uniqueness should be prioritised in the efforts to increase place attractiveness.

A well functioning regional policy, or rather attraction policy, is focused both on inward and outward activities. It supports the development of valuable locally rooted knowledge and characteristics, but it also helps building networks with leading knowledge centres in the world. A balance is however needed, as too much openness can threaten some of the possibilities and too little can lead to problems of introvert ignorance. The best thing to do is to specialise within the fields where local conditions in relation to market demands are particularly favourable, and seek help from elsewhere regarding production of other knowledge.

2.2 BALTIC SEA REGION – A FORTHCOMING NETWORK OF CLUSTERS

There are many examples of regions and organisations that have gained from networking activities; Silicon Valley (microelectronics) and La Jolla (biotechnology) are among the most evident. The SME network in northern Italy is another example. A fourth is the "corporativism" in Japan that has resulted in Just-In-Time and other corporate enhancing concepts adopted all over the world. These regions are also often referred to as clusters.

In a time when global networks and international value chains are becoming necessary for business development, it is natural that clusters are built in a cross-border context. A relevant question is therefore whether the BSR, with its ten member countries, can be considered as one single cluster? Can the innovative ability of a small concentrated cluster, where personal contacts and interactions play a large part in the knowledge exchange, be transferred onto a larger scale? Can we get the same kind of dynamics in the whole BSR as we have within the Oeresund region, Oulu or Telecom City in Karlskrona? Conclusions made in **mWatch** indicate that the BSR does possess such potentials.

Cross-border cooperation is as important as cooperation between different sectors within one country. According to Linnar Viik (2003), ICT expert and professor at the Estonian IT College, the clustering phenomenon of the 1990s is now transforming into a cross-border networking concept. Both national and international networks of different kinds are growing in importance. Concentrated clusters with relationships and cooperation between geographically closely situated actors are no longer the prime environments for creative innovations. This clearly supports the assumption that the BSR can come to be considered as one unit, one network of clusters, where the member countries are united in a common vision and where they act upon joint policies.

The BSR includes some of the most prestigious research institutions, recognised technological universities and world leading companies in the mobile sector. The region is large enough to escape the risk of similar thinking that can lead to lock-ins. Many small clusters can be struck by this phenomenon. Clusters consisting of actors and people with similar backgrounds, interests, cultures and values run the risk of having too homogeneous ideas that can undermine an innovative climate.

The BSR, containing hundreds of subregions, comprises diversified social, economic and political conditions. A common history and relative proximity of the subregions provide a strong platform for cooperation. Relying on similar expectations and values, the BSR countries and regions can work together and complement each other as regards new mobile services. Support from local decision makers is however needed for a successful implementation of joint efforts.

UNIFICATION OF STRATEGIES IN THE BSR

In order for the BSR to grow strong, it is necessary to find common visions and objectives. Knowing that by cooperation, the BSR players can achieve world-leading positions should be an incentive enough to establish mutual visions.

When considering "Clusters of Excellence", the ICT sector stands out as particularly vital. The BSR has a strong competitive position in this field, even in a global context. Some of the countries in the region have the world's highest mobile and Internet penetration rates. In spite of the world-wide recession, many of the BSR countries have lately shown remarkable growth rates in mobile communications. Obviously, there is a high potential within this sector, which is why it should be further elaborated as one of the main growth engines in the region.

The crucial question for the Baltic Sea ICT cluster is whether business enterprises will pursue a regional strategy and define the whole BSR as their home market. An illustrative example is Swedish-Finnish TeliaSonera that is focusing on the entire region in a distinct and consistent way. It is expected that cross-border mergers among the leading IT companies will arise when the Baltic states join the EU (Nissinen 2003). This will be an important step for further development of the Baltic Sea ICT cluster. Many other business sectors tend to consider the BSR as a region constituting their natural home-market. Today, this is most applicable among banks and energy companies.

Looking at Europe, one can distinguish between a "banana" cluster in central Europe, mostly concentrating on information technology, and a "potato" cluster up in the north, focusing mainly on communication technology (Nissinen 2003). This shows that development patterns do not follow national borders, which is yet another reason to continue exploring possibilities of the BSR. "The potential of the region is a fact. Developing and branding it still remains to be done. The lack of common institutions and cooperation is clearly the main

reason why development is lacking." (Nilsson 2003). Organisations like the Baltic Development Forum can in this respect serve as catalyst for further employment of cooperation initiatives in the region.

BRANDING THE BSR

Developing and branding go hand in hand. Where Porter ends his clustering observations, Kotler and Asplund (1999) continue to define branding challenges. They underline the necessity for a region to work out global appeals with the assets it has at its disposal. A region has to be able to create enlightening experience, for example through its leading clusters, interesting companies, its openness, diversity and lifestyle, events and congresses, its culture and museums.

Building a brand is about attitudes and creating an overall concept of what you stand for. It provides excellent possibilities to mobilise energy, but is however a long-term process of tangible activities and milestones that require leadership as well as cooperation. Developing a concept brand for a region, can be achieved by following Kotler and Asplund's (1999) "golden guidelines". The most important and applicable ones for the BSR are described below.

- Establishing a **Strategic Vision** can help the BSR to face the international competitive mobile services market. Elaboration of such a vision should envisage various BSR clusters as complementary and point out strategic values these clusters can add in the value-chain. The BSR hosts a number of unique values within the world of mobile services and businesses.
- Defining clear **Target Groups** can simplify implementation of necessary actions. The three basic target groups are illustrated in the figure below. It is important to develop strategies that are capable of adding value to each one of these target groups.

Source: Kotler, P. and Asplund, C. (1999)

- In order to secure a visible brand, a number of **Unique Selling Propositions** (USPs) must be identified and professionally communicated. The USPs should be based on values that are well represented in the BSR. Further development of a "Region of Excellence" can exploit the following characteristics: trendsetting, modern lifestyle, innovative climate and culture, early adopters, high quality of life, state-of-the-art competences and a tradition of Private-Public Partnerships. Facts and figures must show that the BSR has a competitive position in relation to each one of these characteristics.
- Brand-building energy can also derive from a permanent flow of **"Best Cases"** that will serve as a source of inspiration for actors. **mWatch** is a first step towards accomplishing such a flow.
- The brand of the region must be communicated in such a way that the global market does not forget the message. The BSR as a "Smart Region" or a "Centre of Excellence" may be such a **Visible Message** that can differentiate the region.
- It is necessary to develop an **Organisational and Procedural Mechanism** to maintain the momentum once it has begun. There are many operational activities that must be oriented towards a common vision and a dedicated brand for the region that will assure that the "real reality" comes as close as possible to the "perceived reality". A Baltic Sea ICT secretariat can serve as the coordinator of these operational activities. It can constitute the common platform needed for the support of a strong regional brand. A business plan for an ICT secretariat has recently been elaborated during the Baltic Development Forum's pre-study project for raising the visibility and awareness of ICT in the BSR. Besides being a "midwife" for cross-regional projects, the secretariat's core mission would also be to develop regional identity, arrange ICT network meetings across borders and sectors and stimulate programmes for braincirculation in the region. The secretariat could also create annual market profiles of the BSR for external investors and partners.

COMPLEMENTING ONE ANOTHER – TAKING ADVANTAGE OF EACH OTHER'S STRENGTHS

Each country, region and community has its own strengths and weaknesses. Taking advantage of each other's resources is a way to complement knowledge in various sub-regions of the BSR. It is, for example, possible to take advantage of the unique skills of software developers in Lithuania, manufacturing in Latvia, research in Russia, testbeds in Sweden, Norway, Germany, Denmark and Estonia etc. Combining value-chains of expertise might lead to new products, applications and services difficult to imitate elsewhere. This would result in unique competitive advantages that could secure BSR's position as a global frontrunner in the ICT sector, especially in the area of mobile services.

Finland and Sweden are countries with heavy research and development investments in ICTs. Much of the manufacturing has been concentrated here, at least up to now. The ICT service sector is large in both of the countries and also in Denmark. In the three Baltic countries, mobile communications and related services, e- and m-business applications, call centres and telemarketing are some sectors that today present growth prospects (Liikanen 2003). Among the three, Estonia is most advanced in mobile technologies and solutions, Latvia possesses the largest outsourcing capacity while Lithuania offers best availability of programmers. When it comes to Russia, the area of St. Petersburg is one of the main centres for ICTs. With more than one hundred institutes of higher education, St. Petersburg produces annually almost 6,000 graduates in ICT-related studying fields. The area also has strong industrial traditions in telecommunications (Nissinen 2003). In fact, a study of innovation capacities made recently shows that some of the old communist countries score higher than Western countries in innovative potential (Nilsson 2003).

Ylva Nilsson (2003) has concluded that Estonia, Latvia, Lithuania and Poland have "a highly trained workforce, a large number of IT specialists and no problems convincing students to enrol in mathematical and technical courses, lured by the IT sector's high salaries and good working conditions." Therefore, collaborative activities are needed if the BSR is to take advantage of the great opportunities in the ICT sector. However, "…cooperation on the governmental level, which, for example, aims at letting the 'brains of the east' meet the

'technology of the west', has not taken off yet" (Nilsson 2003). Bridging the gaps between East and West can develop competitiveness strong enough to face the whole world. It is therefore important to jointly face challenges and bottlenecks that might stand in the way.

WEAKNESSES TO LEARN FROM

There are important weaknesses to consider when assuring further development of ICTs in the BSR. For example, in the region of North-Western Russia there are disadvantages manifested in complicated, unpredictable and vague customs procedures. The competitiveness of the ICT cluster is therefore more a potential than a reality at this point, as there is a great need for modernised legislative environments that encourage competition.

Looking at the region as a whole, other weaknesses can be identified as well. A dominance of small and medium sized enterprises in the field of ICTs is one example of such a weakness that makes it difficult to undertake large-scale development projects, especially on a cross-border level. Other disadvantages are the regional composition of small countries with differences in terms of economic development among them. There are also threats that come from the populous low-cost nations, digital divide, both between and within countries, as well as the risk of brain drain. Furthermore, no common identity or uniform brand for the region has been established.

These issues need to be tackled if the BSR wants to take the ICT sector and the concept of mobile society to new heights. Member countries and cities should stay alert, as there is still much to be done. There is however a firm ground to base further development on. Key strengths of the region as a whole lie in a highly skilled workforce, competitive ICT clusters, stable political environment, strong research conditions in relevant technology fields, advanced mobile technologies and fast growing transition economies (Nissinen 2003).

2.3 TWO EXAMPLES OF SUCCESSFULNESS IN MOBILE DEVELOPMENT

The strengths of the BSR can be exemplified in the cases of Finland and Estonia. Statistics shown in the next chapter will illustrate the strong position of both countries in the field of ICTs. Drivers and forces behind the development are however somewhat different in the two cases.

FINLAND – A CASE OF SUCCESSFUL COMBINATION OF POLICIES, MANAGEMENT AND CULTURE

The Research and Development Fund **Tekes** in Finland has a motto for the projects and initiatives it is financing: The more networking there is between large and small and medium sized companies and also universities, the higher is its funding contribution. Networking is consequently strongly rewarded and its importance is often emphasised. **Tekes** uses its knowledge about ongoing research and initiatives in different sectors, institutions and organisations in order to suggest collaborations it finds appropriate.

There are three elements important for a strong, innovative climate. First, universities that provide industry with an educated working force as well as important research. Second, well functioning financial institutions providing investment capital. Last, innovation culture in the society that contributes to the rise of exciting ideas and fruitful initiatives. In Finland, all three elements are present.

Regulatory environment in a country has to be open for innovation at all levels. The Finnish state has addressed this issue. It supports, in a pro-active manner, deregulation and privatisation of different sectors in the country, specifically the telecommunications sector. An active public policy of innovation has been one of the key elements behind the success of the country's innovation system.

According to an OECD study, Finland is ranked second in its country group, in terms of the share of companies that have cooperation with universities or public research institutions. Key people in the Finnish IT cluster are highly networked on a personal level, which contributes to an environment where everybody knows everybody. This networking has created a Silicon Valley effect; people exchange ideas as their knowledge is transferred from one environment to

another. However, the Finnish IT cluster differs from the one in Silicon Valley in one important aspect. While in Silicon Valley "entrepreneurs meet at the famous Walker's Wagon Wheel Bar and Grill; in Finland, the government provides the coffee and muffins so that people can network" (Castells and Himannen 2002).

ESTONIAN ICT SECTOR – RELYING ON INNOVATIVE AND ENTREPRENEURIAL ACTIONS OF ENTERPRISES

There is a remarkable growth in productivity in Estonia, especially in the telecom sector. This can be explained by the catching up model, according to which (Kalvet, Phil and Tiits 2002) developing countries can grow faster than the advanced ones, because they are able to imitate technological knowledge.

Important contributions to the Estonian industrial structure have been privatisation and foreign direct investment (FDI). Relying on FDI can however be risky, as it can decrease without warning. Furthermore, these kinds of investments do not necessarily contribute to the innovative capabilities of the local industry, which is essential for a sustainable development. It is therefore important for the country itself to invest in extensive research and development. This way it can generate innovative products and intellectual capital needed to secure competitive advantage. Besides technological aspects, issues of social capability and public management are important. Strong support from the state is needed in order to create a climate favourable for sustainable development.

Strategic planning and innovation management is necessary in order to improve the scientific and technological quality needed for the development of a strong ICT sector. Kalvet, Phil and Tiits (2002) argue that Estonia alone is unable to reach the critical mass needed to access the international markets. They continue by saying: "International research and technology development cooperation is therefore essential in gaining experience and skills, in adapting innovative solutions to the market needs, and for obtaining market power via strategic alliances".

There is a tendency for companies in Estonia to cooperate between themselves rather than with research institutes. Cooperation between companies and support structures like science parks and public funding bodies remains as a result inefficient. Openness for cooperation is however important as it determines the involvement of other compa-

nies in revenue sharing and developing novel and competitive application solutions. Free market competition in the country has already resulted in a number of interesting services, m-parking and m-payment systems. The initiatives behind such projects come most often from small, entrepreneurial companies while public sector initiatives are still few (Kalvet, Phil and Tiits 2002). Private entrepreneurs, such as Mobi Solutions and Oskando, seem to have put themselves in the driver's seat. Some of their solutions are described in chapter 4.

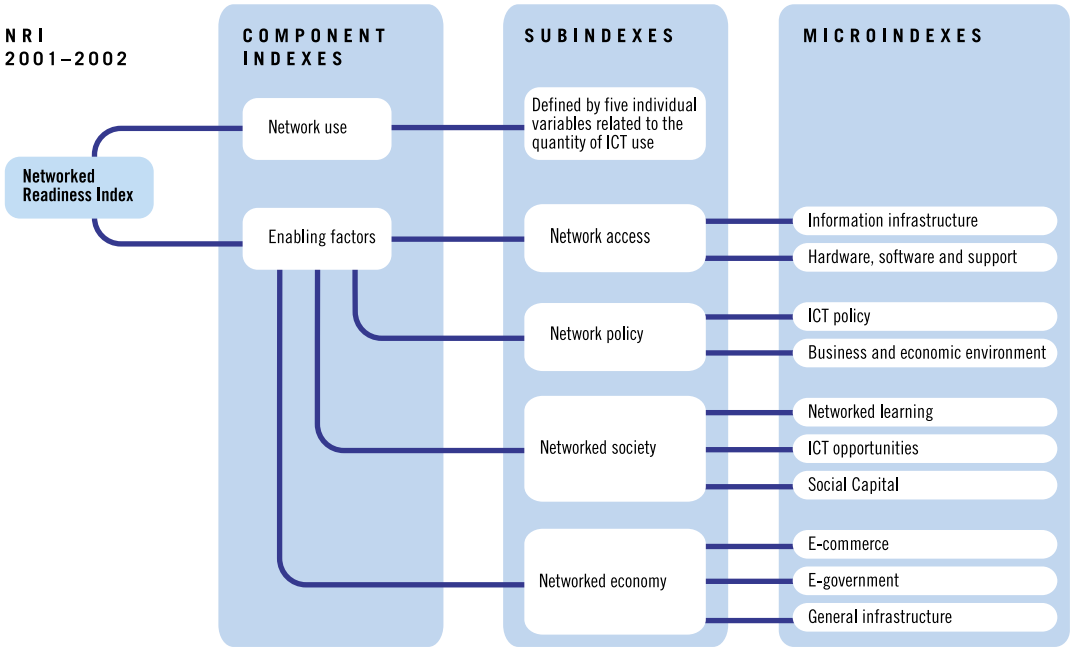
3. ASSESSING THE READINESS OF THE BSR

This chapter of the mWatch discusses the concepts of Networked Readiness and Mobile Readiness, both illustrated with statistical figures. To get a better understanding of the relative situation in the BSR, statistics also cover USA and Japan as reference countries. Mobile Readiness Index, developed during the **mWatch** study, is also introduced.

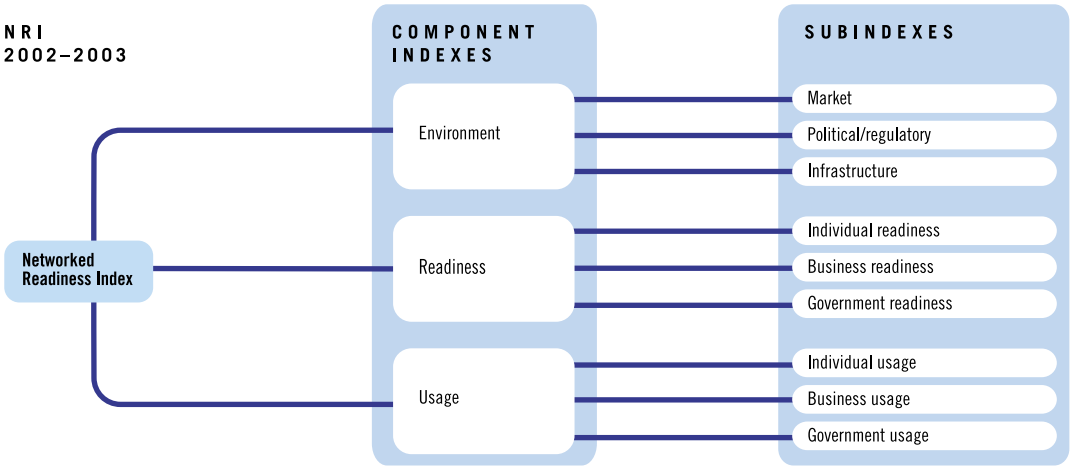
3.1 NETWORKED READINESS

The World Economic Forum has published "The Global Information Technology Report 2001–2002: Readiness for the Networked World" (GITR 2001–2002) in collaboration with the Center for International Development at Harvard University. The report introduces the Networked Readiness Index (NRI). This index is a major international assessment of a country's capacity to exploit the opportunities offered by ICTs. The index tries to fulfil the need of a broad systematic comparison of ICT development around the globe. Used in a pro-active way, the NRI can enhance understanding among business leaders and public policymakers about the factors contributing to ICT advancement.

The concept of Networked Readiness evolved from including only a nation's **preparedness** to participate in the Networked World into also embracing the nation's **potential** to participate in such a world in the future. Now, the NRI has evolved even further. In the 2002–2003 index, the model includes "the degree of preparation of a nation or a community to participate in and benefit from ICT developments." This means that even though the indexes from 2001–2002 and 2002–2003 aim to describe the same thing, they are not entirely comparable. However, they provide an excellent way to pinpoint national strengths and weaknesses. The top-ranked country is not only the one with most developed ICTs but also the one with the greatest potential to exploit this capacity. Both indexes are shown on the opposite page.



Source: GITR 2001-2002 (2002)



Source: GITR 2002-2003 (2003)

The NRI 2001–2002 covers 75 countries; this is almost half of the world's countries with more than one million inhabitants. Even though not all countries are included, more than 80 per cent of the world's population and more than 90 per cent of the total economic output are covered. Just being on the list suggests a better Networked Readiness than the countries not listed. Over-interpretations of the rankings should however be avoided. The NRI does not make a final distinction between countries closely ranked, especially when they are only a few decimals apart. The NRI 2002–2003 has increased the number of countries included to 82. The ten countries of interest in this survey are all represented in both NRIs.

The 2001–2002 index comprises two components, namely Network Use and Enabling Factors. It signals broad trends, flags opportunities and gives an understanding of how nations are performing relative to one another with regard to their participation in the Networked World. The Network Use component index is a measure of the ICT proliferation in a country, while the Enabling Factors reflect the preconditions for high quality network use and future network proliferation.

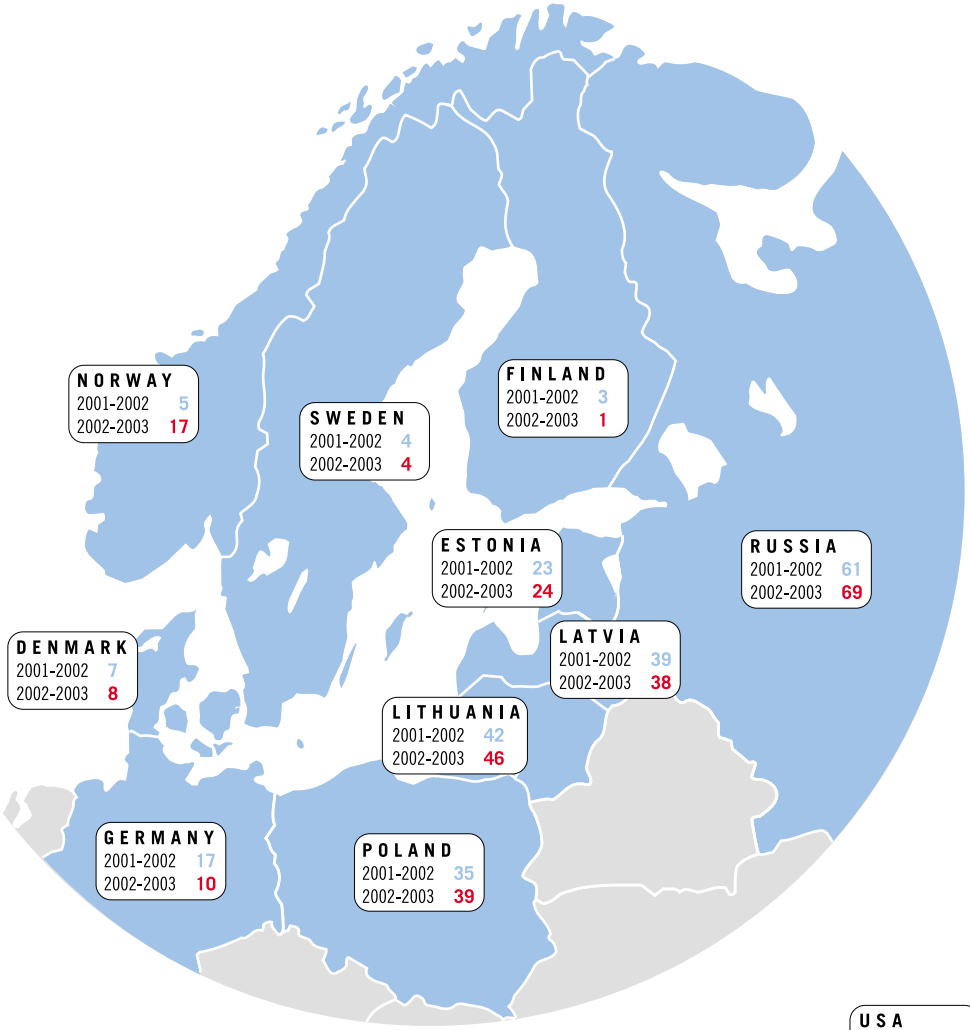
The 2002–2003 index has three altogether new components, namely Environment, Readiness and Usage. These component indexes are highly dependent on three important stakeholders: individuals, business and governments.

NETWORKED READINESS IN THE BSR

The NRI contributes in several ways. First, it provides an understanding of the current ICT situation in the countries. Second, it tells us which areas that need to be improved within each country. Third, it acts as a guide to how countries can help each other by utilising each other's strengths. Looking at a country's relative position across the subindexes provides this insight.

A country can focus on improving the indexes where it is under-performing instead of emphasising on areas where it already has a good performance. The index can even help stakeholders react to their own contribution since some of the subindexes measure just that.

The top country Finland, for instance, never ranks below four in any subindex. This is an extremely good and stable performance. It shows that in order to succeed a country needs to have a clear focus on all levels concerning ICTs. Germany on the other hand, which is



Source: GITR 2001–2002 (2002), GITR 2002–2003 (2003)

10th on the NRI 2002–2003, is top of Business Usage but bottom in Government Readiness. This is a span of 27 rankings between the highest and lowest position.

The Scandinavian countries are highly ranked on the NRI, and are therefore in the forefront with regard to networking capabilities. In the NRI 2001–2002, the four Scandinavian countries considered in this survey were in the top ten. All Baltic countries show positive developments. However, among the Eastern European countries Estonia is considered the leader in ICTs. The country has broadened the understanding of how Networked Readiness of a nation can be increased in a short time.

Estonia's subindexes show how well the country has managed to position itself. It is most obvious in the Government Readiness (ranked 13) and the Government Usage (ranked 8), which is higher than in Denmark (ranked 17 and 9 respectively), Germany (ranked 27 and 20 respectively) and Norway (ranked 16 in Government Usage). In the other subindexes, the country ranks between Latvia, Lithuania, Poland and Russia at the bottom and the Scandinavian countries plus Germany at the top. One can ask where Estonia as a whole is heading when its Government leads the way in such an excellent manner. However, the country needs to increase its involvement in ICT strengthening activities, for instance through Public-Private Partnerships.

According to the Nordic Council of Ministers IT-Policy Group and the Nordic Industrial Fund (2002), the Nordic countries encompass advanced infrastructure, widespread use of IT in society, similar social structure and economies, common democratic values etc. There is also a strong tradition in research cooperation, with already functioning personal networks and a cultural and linguistic proximity that facilitates work. This means that the preconditions for cooperation between these countries are good.

Unfortunately, current institutional settings in the BSR, as well as in the Nordic countries, show that there is an almost complete lack of cross-border actors in the academic world focusing on mobility and mobile applications. Technologies and knowledge areas such as computer science and information technology are well represented. The question is now how to succeed in the emerging world of mobile applications?

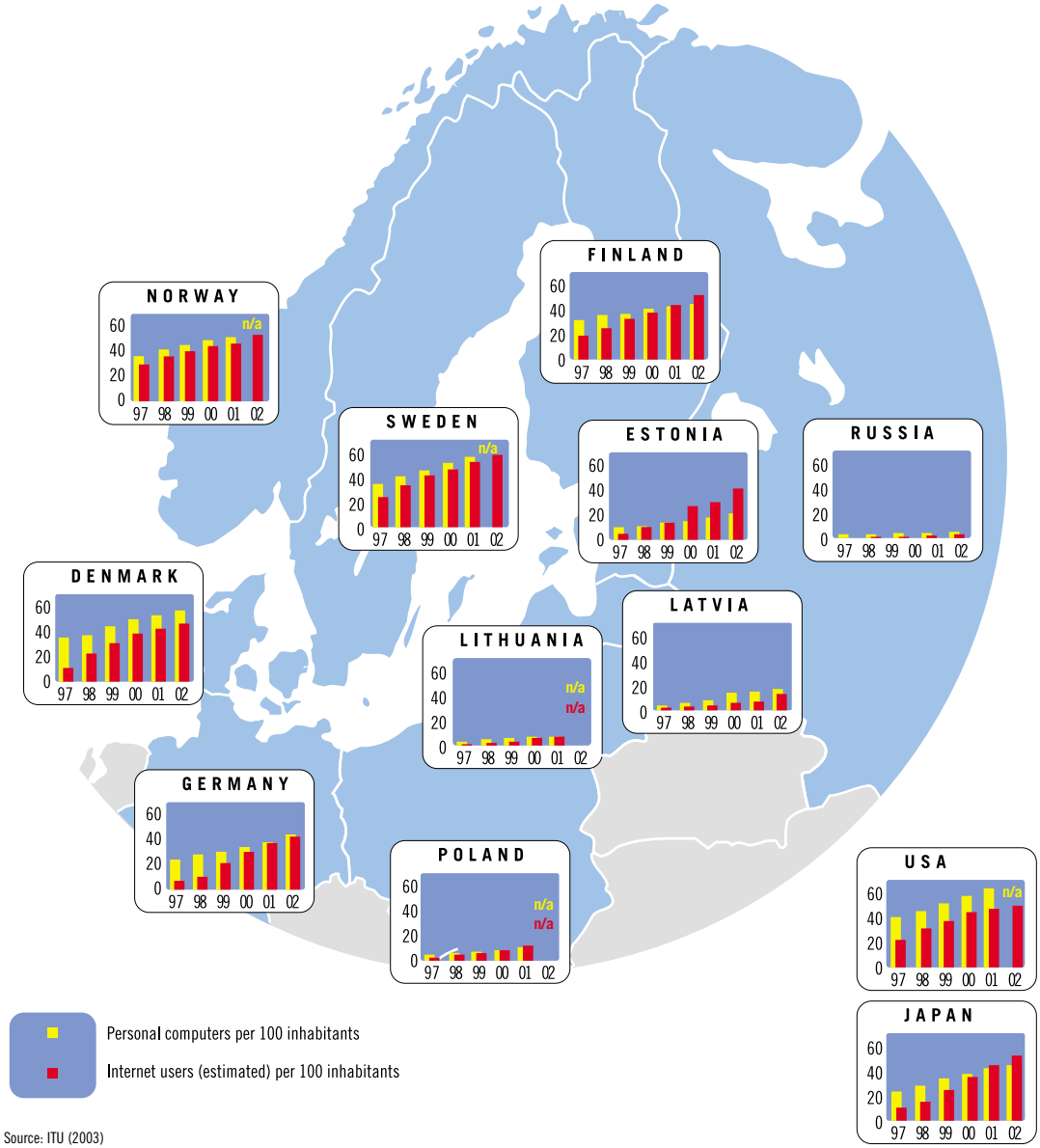
Mitchel Resnick (2003) reminds us of when the Industrial Society in the 1980s transitioned into the Information Society. In the 1990s, this concept continued the evolution into the so-called Knowledge Society. However, Resnick does not think that this is the ultimate stage of development. Focus should according to him shift towards a Creative Society. **mWatch** suggests that this Creative Society is no more than a Mobile Society, i.e. an mSociety.

The countries of Northern Europe began developing information societies based on fixed telephone lines, stationary PCs and fixed Internet connections. Now they are moving on to mobile telephones, portable PCs and Mobile Internet. The Baltic countries and Russia are today catching up with their neighbours. Instead of investing only in the extension of fixed telephone lines, investments are more and more turning towards mobile networks and services.

In Europe, there is a market with stable operators, a well-established standard (GSM) and high usage of mobile phones. Conditions for development towards an mSociety and wide use of future mobile solutions are good in general. Mobile Readiness can therefore be considered as quite high, especially in the BSR.

According to statistics presented, the Nordic countries and Germany are currently ahead of their neighbours Latvia, Lithuania, Estonia, Poland and North-Western Russia regarding penetration of ICTs. This gap was however wider few years ago. Today, the Eastern BSR countries are taking this issue seriously. They are setting up ambitious goals and working hard to achieve them. With national policies, the countries hope to facilitate development. **Principles of Information Policy** in Estonia, **National Programme "Informatics"** and the **Socio-Economic Concept eLatvia** in Latvia, and the **National Concept of Information Society Development** in Lithuania are examples of such initiatives. All these policies support modernisation of public administrations using ICTs, the provision of public online services to citizens as well as the creation of favourable conditions for e-business. They also counteract the digital divide (Liikanen 2003).

Not only the three Baltic countries have defined policies for development of the Information Society and the ICT sector. Despite a negative global climate within this sector, the BSR countries have managed to perform well and have achieved some remarkable results.



Source: ITU (2003)

Erkki Liikanen (2003) says that all ten countries are attaining a competitive edge on their way towards developing an Information Society, which is a common goal at EU level. By 2005, Europe should have modern online public services; e-government, e-learning, e-health, and a dynamic e-business environment and thus become an eEurope. Huge EU funding is supporting these ambitious goals.

The map to the left showing the status and development of computer and Internet penetration is interesting in this respect: it shows that all countries in the region have an increase in both. However, the level is fluctuating throughout the BSR. The Nordic countries and Germany have a higher maturity; the number of users corresponds more or less to the number of computers and penetration is above 40 per 100 inhabitants. In the three Baltic countries, Poland and Russia, penetration levels are lower but increasing.

Even though this survey assesses Mobile Readiness, the Information Society and different e-concepts are also discussed. E-services work as a launching pad for m-services. E-initiatives are therefore highly relevant for the future rise of the mSociety. Economic growth and technological development over the last two decades were partly dependent on and driven by the Internet and mobile communications. The mSociety, which combines the two, could push the growth even further.

DIGITAL DIVIDE MIGHT BE DIMINISHED BY AN M-SOCIETY

Several actors have pointed out the inherent risks of a digital divide in the Information Society. The term digital divide refers to inequalities in access and use of ICTs that are occurring primarily between urban and rural areas in the world.

Information Societies promise new digital opportunities for inclusion but they also constitute a threat of exclusion. Telecommunications networks can compensate for some disadvantages caused by distance in peripheral regions. However, small market volumes and low population density cause higher costs for infrastructure investments and bring competitive disadvantages. mSocieties promise an even greater potential for inclusion since the infrastructure costs for mobile telecommunications networks are much lower than for fixed ones.

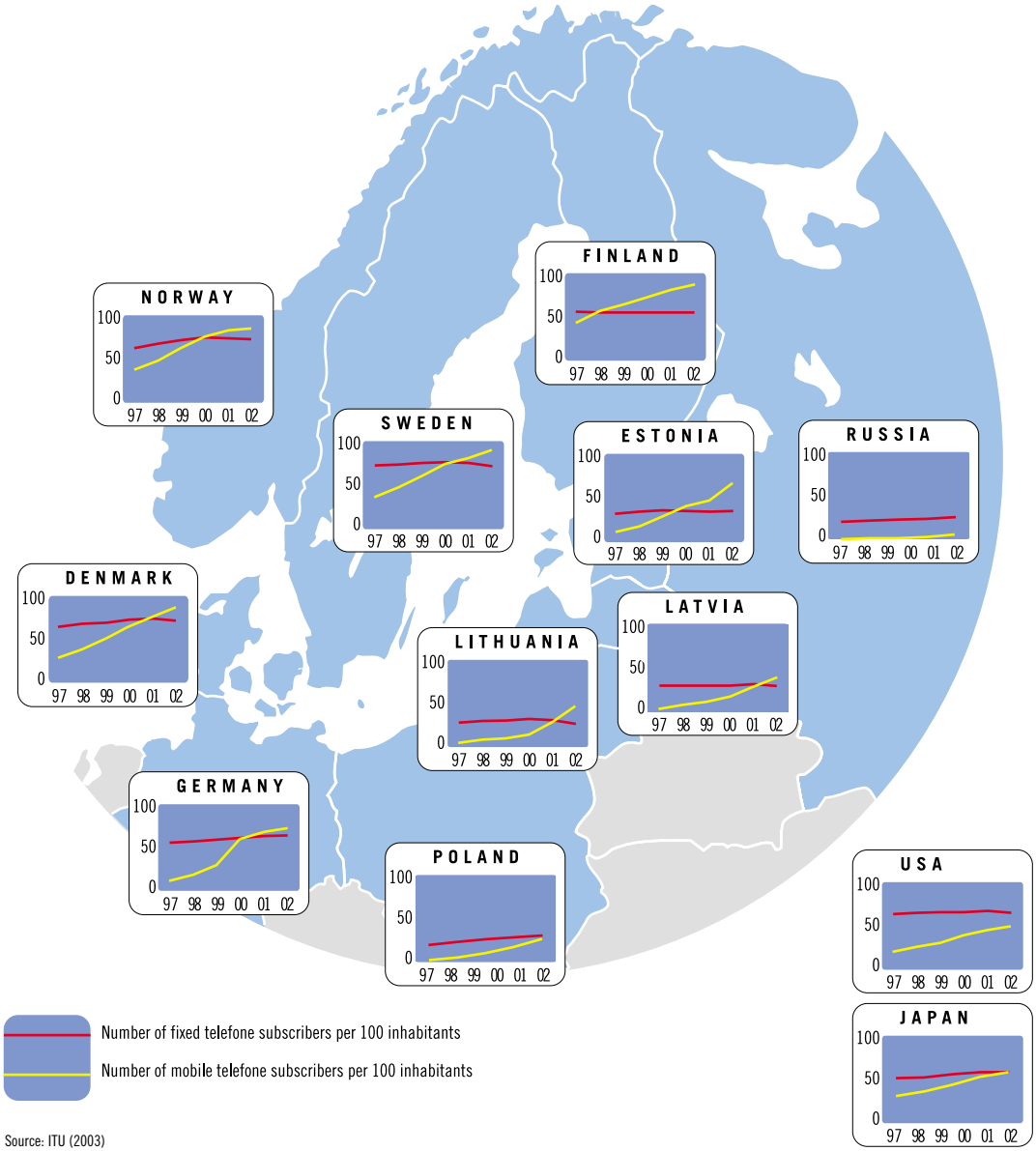
Today, it is considered that higher access to computers diminishes the digital divide. However, to be able to participate meaningfully in the society, access is not enough. Neither is basic computer knowledge. In analogy with the learning of a language, digital fluency is the prerequisite for real computer use (Resnick 2003). When talking about m-services and mobile device use, mobile fluency is the prerequisite. Experiences throughout the BSR in the field of mobile services might inspire actors to increase their efforts when developing mSocieties and combat the risks of a digital divide.

3.2 MOBILE READINESS

McKinsey & Company Inc. (2002) have shown components of the NRI 2001–2002 that are directly influenced by fixed and mobile telecommunications. They say that it is evident that these telecommunications essentially define the component Network Use and influence subindexes Network Access and Network Policy.

Telecommunications services can be divided into two subgroups; basic communication services (voice and fax) and advanced services (access to data services and Internet). The latter group is the one primarily in charge of the proliferation of the Internet and consequently Networked Readiness. Fixed telecommunications are still more important than mobile services when considering how they affect Networked Readiness. The main reasons are that mobile services are not significant Internet enablers and that they do not have an immediate effect on penetration rates (McKinsey & Company Inc. 2002). Both these motives can however be questioned today. As mobile services become more digitalised and wireless enablers of Internet, such as WLANs, become more common, they will start contributing to a higher degree to Networked Readiness. This **mWatch** survey, foresees therefore a transition of Network Readiness into Mobile Readiness.

As can be seen in the diagrams, the number of mobile telephone subscribers is growing fast in the BSR. In many cases, they have even outgrown the number of fixed telephone subscribers. This might be the beginning of a truly mobile era.



Source: ITU (2003)

There are some important issues to be resolved before Mobile Readiness of a country, a region or a city is secured. National statistics must go further and beyond the old traditional borders. Tomorrow, when we discuss Mobile Readiness, disaggregated statistics should focus on the real world made of regions and clusters across national borders. It is on the local level, in cities and places, that we will see true regional advantage. It is also on the local level that decision makers will be able to work out unique advantages.

To rank high on a Mobile Readiness Index, there are at least three basic challenges to tackle. Firstly, investment requirements are very high. At the same time, there is a "chicken and egg" problem. Investors want to see proof that there is a market for mobile Internet services and operators cannot deliver that proof until they build the networks (ITU 2002). It is important to overcome this problem since the rapid deployment of high-speed 3G networks is one of the crucial factors deciding the future of mobile services and mSocieties. There is evidence that individual cities in the BSR could be helpful to resolve these issues. Local testbeds can prove that there is a market. Living labs are therefore crucial as catalysts.

Secondly, availability of adequate and attractive handsets is important. Absence of affordable and convenient Internet-enabled devices will lead to hesitation among end-users and considerably delay new applications.

Thirdly, simple and transparent billing models are also required from the users' point of view as well as unrestricted access to services from all providers. Commercial restrictions and "walled garden" models, frequently used as a source for competitive advantage by operators in the early days of mobile communications, are not recommended.

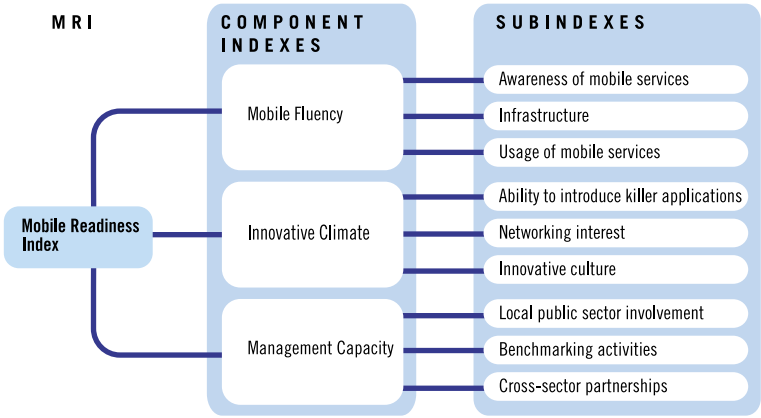
Fourthly, useful, advantageous, interesting and creative content is what is ultimately going to make the difference between the scenarios of the mobile future. If many actors on the market succeed in delivering content that end-users really want and find so attractive that they are willing to pay premium prices for it, then we are looking at a truly mobile society. Without appropriate content, the use of mobile services will remain low and the take off is most unlikely to happen. In this respect, the three Baltic countries are on the right track.

MOBILE READINESS INDEX

Based on the experiences and knowledge acquired during this study, **mWatch** introduces a Mobile Readiness Index (MRI). The index is an extension of the Networked Readiness Index. It is adapted to the specific requirements influencing the ongoing transition towards mobile societies. The MRI should be used, just as its predecessor NRI, as a means to pinpoint relevant strengths and weaknesses in the mobile evolution. It will also increase decision makers' understanding of the factors contributing to the mobile society.

An important aspect of the MRI is the emphasis on local and regional statistics, contrary to the national focus of NRI. It is the climate and pulse of a city or a region that is of interest, not agglomerated national figures. Dynamics and activities that take place in local and regional living labs are important in this respect.

As can be seen in the schematic presentation below, the index consists of three main components, each one divided into several subindexes. In order to quantify those, measurable micro-indexes are needed. The suggested MRI subindexes are therefore formulated having the measurability aspect in thought. Exact micro-indexes are however not included in the presented model as a detailed investigation is required. **mWatch** suggests some components that ought to be included and proposes a continuation study of the MRI. The Baltic Sea ICT Secretariat, discussed in the previous chapter, should take on the responsibility for its implementation in the Baltic Sea Region.



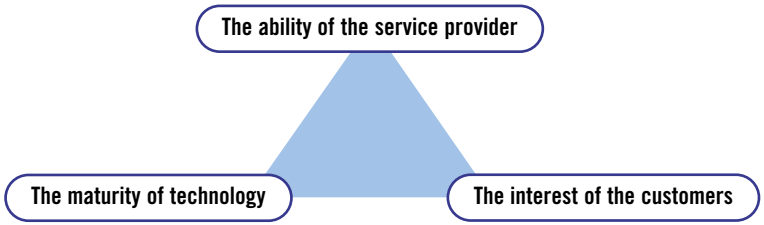
Source: mWatch

Mobile Fluency covers the actual usage of mobile services in the daily lives of mResidents, mWorkers and mVisitors. To be able to connect is a prerequisite for mobile usage. Infrastructure is therefore included. Mobile maturity can be indicated by the usage degree, i.e. the extent to which the services are being used. Minute costs for end-users and billing rates are influencing this subindex. Awareness of available mobile services and satisfaction among end-users is also important since it shows to which degree mobile services are considered as a part of everyday life.

Innovative Climate is based on subindexes describing the existence of innovativeness in the region. Innovative culture is an integral part of the "Regions of Exellence" and should therefore also be indicated and included in this MRI component. However, it is not the developers' daring attitudes that are of sole interest, rather the innovativeness of the whole society. Creativity and open thinking are needed in order to be able to introduce novel ideas that might become killer applications. The networking interest is also important as it establishes a foundation for more effective value-adding processes. The ability to introduce killer applications is specifically identified as important. One effort to identify such applications has been done by the Boston Consulting Group (2000). Ranking innovative capabilities might not seem trivial or even possible. This has however been done throughout Europe by the European Commission in the promotion of "Regions of Excellence".

Management Capacity is a crucial factor of a region's Mobile Readiness. Involvement in the management process can be reflected by the initiatives taken in order to promote mSocieties. The mCases described in **mWatch** are without exception generated via high involvement of local actors. As always, the degree of passion affects the possible outcomes. Existence of local Private-Public Partnerships is another crucial factor. Furthermore, a well-developed feeling for international benchmarking can also increase the management capacity. Exploiting best practice is needed in order for a place or a region to become a "Centre of Excellence".

When developing markets and services, there is a need to understand the underlying aspects that affect them. To a great extent, technological perspectives have played a dominant role when penetrating a new market. A more balanced market approach can be illustrated by the triangle below. The corners of the triangle represent different aspects that drive forward the development of the market. In order for services to develop harmoniously, these three aspects need to be considered.



Enspiro (2003)

The maturity of technology is much more important than usually acknowledged. It takes time for people to adopt and get used to new technologies and services. They need to learn what the services are good for and how to use them. In this respect, the interface is essential. Even the newest technology can gain widespread use if the user feels comfortable with it. One way to achieve this is by using familiar interfaces. Edison did so when he introduced the electrical light. Computer manufacturers continued using the QWERTY (first five letters on the top row) keyboard even though there were better alternatives available at that time.

Similarly, to realise the potential created by mobile technologies, users need to be introduced to their potential if they are to be interested in paying for them. "Technology is easy. People are hard." is one of John Gage's (2002) two laws of technological change. To be able to defy this law, technologies must be matched with the needs of the users.

Development towards a mobile future is not likely to be hindered by technology per se. Östen Mäkitalo says: "Don't worry about the technology. The day we need it, it will be there." The critical factor is instead the user. Mental obstacles are the ones needed to be overcome.

"The road to the mobile future is the use by many people of easy-to-use services that provide added value. These services must be good enough in terms of quality, coverage, network speed, accessibility, security, availability of terminals, and price," continues Mäkitalo. (Gustafsson and Sandén 2003)

The interest of the consumer is essential when trying to proliferate new services. One of the new and interesting characteristics of ICT services is that sales processes are conducted without direct human interaction. Development processes need therefore a higher degree of consumer focus instead of product focus. What to produce is more important than how to produce it. In order to succeed on the complex mobile market of tomorrow it is necessary to offer customers the services that they need and want.

These end-user needs have much to do with feelings and life styles. We are no longer buying things we can weigh and measure. Nowadays, we purchase feelings and experiences. The feeling of security, luxury, beauty, uniqueness is what matters and what should be kept in mind when discussing mobile services of tomorrow. Individualisation of identity and personal ways of expressing oneself are large components as well.

The ability of the service provider is important since the providers are the ones defining and developing new services. In this context, one can question telecom operators as service developers and providers. The core competence of operators is the infrastructure and the communication they provide. Service development could and should be offered by professionals, operators or others.

According to Ossi Kuittinen, Head of the Technology Team at TeliaSonera in Finland, cooperation is essential on all levels of the value-chain because telecom operators will no longer vertically control it. Vertical value-chains of today will fall apart and companies will have to operate within the limits of their core competences, which will form new horizontal value-chains. Partner cooperation and open interfaces enable rapid adaptation to new ways of doing business and the development of new services. (Kuittinen 2003) When implementing more advanced mobile service projects, various stakeholders must therefore be included. System integrators, software developers, terminal developers, application developers as well as mobile operators should be involved.

There is an ownership network between the telecom operators in the BSR, as the Nordic operators have acquired stakes throughout the region (Porter 2001). This can make it easier to establish cooperation and joint research projects that all involved parties would benefit from. Furthermore, Nordic telecom hardware producers have started extending clusters across the region and start-ups in hardware and telecom services exist in the whole region. Governments have also initiated IT/Telecom-related projects. Correctly taking advantage of the current situation could lead to great benefits for the separate countries, but also for the region as a whole.

DIFFERENT APPROACHES IN MOBILE DEVELOPMENT

It is a complex world we live in. As an individual you need to adopt several different roles in your everyday life. You have to perform well both in your professional role and as a part of the family at home. You should be an intelligent consumer and a conscious citizen who plays an active part in societal issues. As a result, at the end of the day, there is a risk that you might not feel satisfied with your contribution in any of those fields – your enormous efforts are simply not enough.

Pervasive wireless technologies have the potential to help individuals optimise their performance across multiple life roles. They can merge different environments and enable the kind of mobility that simplifies people's everyday tasks and makes it possible for them to find a balance between professional and private lives.

The EU project MIE/SIE (Mobile Individuals in Europe Supporting Individualisation of Environments) is focusing on the ability to personalise living and working environments according to individual, lifestyle and situation based needs. The "ongoing paradigm shift towards individualisation, mobility and technological convergence in all aspects of the society" is one of the most important issues behind MIE/SIE. The project aims at developing wireless technologies and services that will enable individuality and mobility of citizens and promote well-being, work-life balance and community interaction.

The **mWatch** shows that the BSR has embarked on a road towards more useful services that citizens and companies can benefit from in other ways than just killing time and having fun. Helping citizens in their everyday lives, making their work more efficient and increasing the well-being of society, the BSR seems to be applying the **citizen**

approach when developing new mobile services. Its welfare systems and ICT clusters are two of the regions major strengths. The region is recognised for its public services, its mobile and Internet usage. Combining these strengths would make it possible for the BSR to develop a unique competitive advantage and add new meaning to mobile services and the mSociety concept.

In Japan, the main driver behind mobile penetration has been related to entertainment. Downloads of pictures and ring tones as well as different games and entertainment represent almost 80 per cent of the mobile data content in Korea (ITU 2002). Young people are the main adopters of these services. However, these youngsters do not always have the purchasing power that operators are seeking. An **entertainment approach** might therefore be risky.

As stated above, there is more to the mobile future than just games and entertainment. It is important for the BSR to distinguish itself from the entertainment hype. The region should therefore not compete with Japan and iMode on their terms, but instead turn the usage of mobile Internet and services into something truly unique and valuable. The question is thus whether the BSR can define new development approaches? According to Asplund and Gad (2003), the way to create reputation and awareness, and thus a strong brand, is by being different and dramatising this difference. Enhancing the natural uniqueness of the region is an important tool for effective regional branding also according to Kotler and Asplund (1999).

The optimal way to promote mobile services is perhaps a combination of the citizen and the entertainment approach. End-users should be in focus. Mobile services should both simplify everyday life and bring some joy into it.

4. KALEIDOSCOPE OF MOBILE PROJECTS AND CASES

This section of the mWatch survey provides a kaleidoscope of the mobile competences within each of the ten countries in the BSR. A wide range of initiatives and mobile services are described. The focus has been on describing cases that are crossing new innovative borders. To be able to show the complexity and width of mobile applications and services under development in the region, both public and private initiatives are highlighted. The countries follow in alphabetical order.

4.1 DENMARK

Despite falling from 7th to 8th place on the NRI ranking, Denmark is among the top ten in the world. The country was ranked 3 in the Individual Usage subindex of the NRI, while the lowest ranking was in Government Readiness, at 17. Besides this, Denmark would benefit from increasing the Market Environment (ranked 15) and Business Readiness (ranked 13).

Highly developed telecommunications and broadband infrastructure offer most Danes network access. People that do not have a computer at home can turn to the public libraries that are required to provide Internet access to the citizens. Several regional organisations and clusters also enable high development rates for new products. Oerestad and the Digital North Denmark are two such examples. Some of the projects described below are part of these networks and clusters.

4.1.1 BLUE WIRELESS HEART MONITOR PROJECT – INCREASING LIFE-QUALITY FOR CARDIAC PATIENTS

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An intelligent mobile telemedicine system for cardiac patients is being designed, developed and tested within the scope of The Blue Wireless Heart Monitor Project. Today, when arrhythmia patients seek help they are hospitalised for one or several days. Using the cellular network and a wireless telemedicine system it is possible to monitor patients while they are at home, this way reducing costs and ensuring long term effectiveness of the treatment.

The number of patients hospitalised with heart rhythm disturbances is growing rapidly in most parts of the world. At Aalborg Hospital in Denmark, about 2,400 people are admitted each year for this kind of

heart disturbance. Today, patients are hospitalised to be constantly monitored by short-range telemetry for one or several days. In addition to being very expensive, the current procedure is also in many ways not optimal from the patient's point of view.

First of all, nobody likes spending time in hospitals unless it is necessary. Second, when it comes to monitoring the patients in hospitals, the milieu they are observed in is not their natural, why the gathered data might not always be correct. Patients are much less physically active during their stay in hospital which often leads to a situation where medication used in the treatment shows better performance than it actually has. It is therefore important for the patients to be monitored in their natural environments, performing tasks of their everyday life.

Due to scarce resources, arrhythmia patients are often released from the hospital sooner than desirable, which can have negative effects on their health. When using a telemedicine system for remote monitoring, it is possible to evaluate the effect of the medication the patient is taking without hospitalisation. A patient can stay at home while his or her condition is constantly reported to and monitored by the medical staff at the hospital.

How does the system work? Small monitors that register the patient's heart beat are placed on his or her chest. Using Bluetooth technology, information about the heart rhythm is transferred to a GPRS enabled device that then forwards information via a GPRS network to a server at the hospital. Nurses and doctors can monitor blood pressure and oxygen level as well as heart rhythm of the patient. This results in a more truthful picture of the patient's real condition and also a more comprehensive and better documented evaluation. Enabling observation of the patients during longer periods of time, the system is able to ensure long term effectiveness of the treatment.

The aim of the project is to establish new treatment methods, using telemedicine technology in order to achieve more reliable and cost-effective diagnosis and treatment. The project is planned to be a pilot project that is testing, designing and developing an intelligent mobile tele-electrocardiography system, using GPRS and Bluetooth technology. It is also supposed to define a generic MedCom Bluetooth profile, suitable for telemedicine systems. With few modifications, the system can be used for many other purposes within health services. Telecardiology can for example be used to transfer ECG data from ambulances to cardiology departments, speeding up treatment decisions and ensuring that patients are referred to the appropriate hospital right away.

Blue Wireless Heart Monitor that started in November 2001 is a cooperation project between five partners. It is driven by Ericsson in close cooperation with Sonofon (Danish tele-operator), Danica Biomedical (provider of EKG equipment), Aalborg Hospital and Aalborg University. The project has also won "The Digital Northern Jutland" competition organized by the municipal IT promotion programme.

4.1.2 CROSSROADS COPENHAGEN – CONTEXT-DEPENDENT MOBILE COMMUNICATION IN OERESTAD

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Establishing a large-scale Location- and Context-Dependent Mobile Communication Laboratory, where development projects across traditional boundaries will be carried out, is one of the main undertakings within the scope of Crossroads Copenhagen's activities. The organisation is a professional network of private and public enterprises and serves as an umbrella for several subprojects in the areas of communication technology, culture and media.

Belonging to some kind of community is something that we all, consciously or not, strive for during our whole lives. Forming ad hoc micro-societies with others is something that will enter a whole new dimension with the development of mobile technology. It will transcend the physical space and create a feeling of being in touch, regardless of distance. Location- and Context-Dependent Mobile Communication is a step towards a society of truly distributed mobile computing of new variety.

The idea of the project LaCoMoCo, one of the initiatives under the Crossroads Copenhagen umbrella, is to establish a large-scale laboratory where it will be possible to study how to provide and make use of Location-Dependent information. The hope is to develop and implement a three-dimensional network capable of locating and pinpointing mobile electronic units. Already today a WLAN based location system is available. It can show the accurate architectural drawing of the building you are in and update the drawing as you walk around.

The living laboratory will be placed in Oerestad, a new district that is being built between the city of Copenhagen and the airport. The idea is to make the north part of the area, Oerestad Nord, into a European power centre for developing the networking community, taking advantage of the unique blend of residents' backgrounds in this district. Interacting alternative ways of living with the use of technology in a network society, the hope is that Oerestad Nord will become

an international meeting place, living quarter and centre for education, research and innovation.

It is argued that the planned laboratory in Oerestad Nord will be the first of its kind in the world. It will organise a collection of private-public collaborations that will span a value-chain from mathematical foundations and device manufacturing to large-scale experiments on the cultural and communicative aspects of the Context-Dependent Mobile Communication. With its expected 20,000 daily users, the laboratory can become a test site for new technology and thus come to have an important influence on future mobile communications. Crossroads Copenhagen will act as an umbrella for development and research projects that will take place here. Besides the above mentioned LaCoMoCo project there are two other projects that the Crossroads organisation is currently running.

One of these projects is Situation-Based Mobile Services. The idea is to develop and establish a standardised platform for services that will allow information to find the right person at the right time instead of the other way around. The platform will combine standard Internet with wireless terminals in mobile radio networks. Within the scope of the project, there is a concept of an m-service engine. It includes personal profiles of users and governs the kind of services and information automatically available to the user. The prototype for the engine has already been developed and is to be integrated into the operator network. The first m-services have been defined and will be tested during this year.

The third project, Mobile E-learning, will combine knowledge and technology into useful concepts and products focusing on advanced educational solutions for several different target markets. Flexible virtual courses and electronic encyclopaedias are some examples of sub-projects that will be undertaken. A mobile encyclopaedia has already been developed and a demo showing opportunities offered by mobile e-learning has been launched.

The Danish Ministry of Science, Technology and Innovation will fund the running of the Crossroads Copenhagen secretariat for four years, with a total 1.4 million Euro. Each project itself is however responsible for its own funding and partners are expected to contribute with their own resources. Current partners to the organisation are: The Danish Broadcast Corporation (DR), the IT University of

Copenhagen, the Copenhagen Business School, Nokia, CSC, The Royal Library, the Faculty of Humanities at the University of Copenhagen, Hewlett-Packard, TDC, Skanska, the Danish Consumer Information and the Danish business daily Boersen. Crossroads Copenhagen hopes that the number of partners will increase further in the future and that its work will make a major contribution to the development of the Oeresund region. The group is open for collaboration with other regional, national and international organisations and is particularly interested in exploring possibilities of cooperation with other countries in the BSR.

4.1.3 DIET DIARY – KEEPING TRACK OF FOOD

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The Diet Diary is a handheld computer equipped with a barcode reader that can keep track of the type and the amount of food eaten. This gives an opportunity to plan and follow customised diets, which can be of great help for diabetics and people with weight problems. The idea behind the project was conceived by three students back in 1999.

In the Western world, there has been an increase in the number of people who are diagnosed with lifestyle diseases such as overweight and diabetes. The treatment of such ailments depends to a high degree on self-treatment and self-care. Therefore, tools and procedures that can help when treating these nutrition related problems are of great importance.

The **Diet Diary** is a handheld computer, a PDA equipped with a barcode reader. The PDA can assess food simply by recording its barcodes. Keeping track of the type and the amount of food eaten makes it easier to plan the daily-allowed intake. It also enables other means of interaction as not all food is equipped with barcodes. The Diet Diary is related to the field of pervasive computing since it is a mobile device enabling situated use.

Three students attending a design course at Information- and Media Studies, Aarhus University, conceived the idea back in 1999. The intention was to create a tool that could assist people with food related problems. Today, the project has evolved to include continu-

ous questionings of the technology as a part of the product design process. This line of thought is inspired by understandings coined in the field of Science and Technology Studies (STS), where technology is considered as more than just a tool to be designed, implemented and controlled by humans. Instead, technology should be actively forming our understandings and needs. The Diet Diary project is an empirical beginning of studies in the field of mobile and pervasive computing as well as medical ideas about self-care and autonomy.

Type 2 diabetics tested the **Diet Diary** as a food assessment tool during autumn 2001. The quantitative results of these tests showed that the **Diet Diary** was equally good at capturing data as traditional practice, namely hand-written assessment. The qualitative investigation showed, as expected, that the opinions on using the device were diverse, ranging from the very positive to people that could not manage the use of the device and the ones that did not experience a need for such a device at all. For the health care professional, the **Diet Diary** offers a great potential because the data is digitalised instead of hand-written. This enables dieticians to look for patterns in the person's food habits as well as connect the patterns to the person's health status.

The Alexandra Institute and The Danish National Center for IT Research support and supervise the project. Symbol has sponsored the PDA's and the Aarhus County Hospital has participated in testing the prototype. Currently, the project is in need of research capital in order to evolve.

4.2 ESTONIA

Estonia is the leading Eastern European country in terms of ICTs. The country went from 23rd to 24th place on the NRI ranking. As stated in the previous chapter, Estonia ranks 13 in Government Readiness and 8 in Government Usage. However, improvements are needed in Business Usage and Political/Regulatory Environment were the country ranks 31 and 30 respectively.

Mobile development has come relatively far in Estonia. The citizens are quite confident in their use of mobile services and the country has large capabilities when it comes to mobile solutions. This can also be seen from the provided cases.

4.2.1 EVERYONE'S M-BUSINESS – PORTAL FOR CUSTOMER DEVELOPED SERVICES

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Everyone's M-business is a portal offering customers the ability to develop their own services and also earn money on them. Mobi Solutions, the company behind the portal, has introduced a whole new concept of service creation that can be exploited in many ways. A collective city billboard could be one example.

Everyone's M-business is a unique portal offering customers the ability to provide the services themselves. This is not all; customers can earn real money from these services! As can be seen on Mobi Solutions' website, Veiko Sepp, head of Ericsson Estonia, says: "Mobi has managed to transform a youthful flow of ideas into real working products. This is more than mere dreaming".

Five students from Tartu University founded Mobi Solutions, the company behind the portal, in October 2000. In order to develop

value-added mobile applications and services, Mobi Solutions is working together with telecommunications operators and technology companies. It was the first company to test mobile advertising in Estonia in late 2000.

It costs EEK 5 (Euro 0.3) for a user to submit a service and as much a month to maintain it. Hopefully, the service is interesting enough to attract other users and thus generate revenues. The user that develops the service receives 40 per cent of the user-fee. The rest is divided between the mobile operator and Mobi Solutions with 40 respectively 20 per cent. When a user collects EEK 500, the only thing needed is to press a button at the website and the money will be transferred to the person's account.

There are four types of services available for users to buy or submit on the website. The different types of services are:

Info message. This service enables users to get information messages from other users. Such messages could contain information about meetings, films or anything that might be of interest. The user who wants to have the information sends a premium priced SMS to a short code. The SMS has to include a keyword that is specified by the user selling the service. The user providing the info message can specify the price that can range from EEK 2.50 (Euro 0.15) and up to EEK 25 (Euro 1.5).

SMS to e-mail. SMS to e-mail enables users to send an SMS that will be forwarded to an e-mail address defined by the provider. This service is often used to organise priced games. Just like the service above, the user providing the service defines the end user price and keyword.

SMS to web frame. This service enables an SMS to be sent to a web frame and is used, among other things, to set up chat rooms on websites. The provider needs to define the specific "URL address" to the website as well as the end-user price and keyword.

SMS payment. SMS payment enables the owner of a service to receive money as the users pay EEK 10 or EEK 25 (Euro 0.6 or Euro 1.5) for each SMS. This service is mainly used to sell logins to priced websites.

There is one unfortunate downside of this portal. It only supports the Estonian language and clients of Estonian mobile operators are the only ones able to use the services. However, the portal has introduced a completely new concept of service creation, and can be exploited for instance as a collective city billboard.

4.2.2 EMT – AN INNOVATIVE MOBILE OPERATOR

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The leading Estonian mobile operator, EMT, is offering a range of innovative mobile services. Some of them have quickly found their way to users even outside the country's borders. Mobile parking is one of those. Another service available to EMT's customers is the possibility to feed the baby elephant Fien, by means of a simple text message.

EMT is the leading Estonian mobile operator, owned by AS Eesti Telekom. The company offers ordinary mobile services, but also some additional more innovative ones. The additional services are divided into the following groupings: m-Info, m-Internet, m-Commerce, m-Office, m-Security, m-Comfort and m-Games.

One of the most successful services offered by the company is the Mobile Parking Payment System (MPPS). It allows a user to pay the parking ticket by sending an SMS. Instead of adjusting to the amount of parking-time bought in advance, the user can decide how long to be away from the car without worrying about getting a parking fine. Simply by sending an SMS when parking the car and another one when driving away, the MPPS charges for the time in-between.

EMT introduced the parking service on 1 July 2000. In 2001, MPPS was a nominee for the GSM Association's Most Innovative GSM Wireless Service for Customers. In 2002, the service was rewarded with the finalist award of Stockholm Challenge Award in the "e-business" category. The service has also been exported to Norway. It has therefore been a huge success for EMT.

To be able to use m-commerce services offered by EMT the customer needs to have an M-account. This is a joint service offered by EMT, Hansapank and Ühispank. It allows transferring money from the EMT credit and personal bank account to the mobile account. This could be seen as a virtual prepayment for mobile services since the transactions are carried out with a phone call.

EMT has also introduced a charity service. The company is a godparent to a female baby elephant named Fien. By sending an SMS with a special keyword, users can help to feed the elephant by con-

tributing to her baby food. The SMS is charged at EEK 5 (Euro 0.3), excluding the actual EMT package price. The reason why this can be called a service is that the donor receives a cute message from the baby elephant in return for the money spent.

Besides all the innovative services, EMT is also involved in cooperation activities. The company has signed a collaboration agreement with the leading Latvian and Lithuanian mobile network operators LMT and Omnitel. The partnership is called the Baltic Sea Alliance. Customers of the included operators are not charged for incoming calls in the partners' networks. Such cooperation is important when considering small markets such as Estonia, Latvia and Lithuania.

4.2.3 HOME CONTROLLER – REMOTE SURVEILLANCE OF PROPERTIES VIA SMS AND WAP

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Based on GSM technology, the Home Controller HC1 enables remote surveillance and control of homes, summerhouses or industrial systems. The solution, developed by the Estonian company Oskando, makes it possible to control the electrical systems of a building using very simple means of communication. Informational notices from HC1, configuration and operation control are all conducted via SMS messages.

Have you ever turned back just after leaving the house because you could not remember whether you left the oven on? Having the house burgled while on holiday is another fear. Now, these issues no longer need to be a source of concern. Oskando's GSM-based controllers enable people to control electrical systems in their homes and receive SMS notifications in case of emergency. The company has developed a complete service platform that allows users to access their homes using a GSM phone via SMS or WAP.

The home controller HC1 is an ideal device to use in situations that require remote surveillance and control of different places, for exam-

ple homes, summerhouses and offices. The system offers the ability to retrieve information from various electrical and home appliances. It also enables control of their operations. Four sensor circuits and four different devices can be monitored and controlled in this way. All the communication and notices are managed via SMS messages. The service enables a completely wireless "machine to machine" and "man to machine" communication.

Devices that can be controlled are for example electric heating, sauna, internal and external lighting and security devices. The owner of the system administers the controller and receives status reports from all sensors thereby controlling all outputs. Besides the owner, there can be three other users of the system. They can also receive messages from desired sensors and devices and also receive answers to their informational queries. It is however the administrator that has the overriding control.

The control functions are as follows:

- Simple on/off switching of the controlled devices
- Switching on for a predefined time period
- Blocking and enabling the reception of SMSs from alarm sensors. The surveillance functions include:
- Status report for the current state of sensors, outputs, voltage and alarm mode
- SMS alert in case of a change in the state of a sensor
- Voltage monitoring of HC1 and switch to backup battery if needed.

The functionality of the device allows it to be used for surveillance of industrial applications as well. Controlling can also be carried out using a web interface available for both owners of the controller and service providers.

Oskando is one of the successful SMEs driving development of mobile services and applications in Estonia. Their mission is to deliver more value to public wireless networks by creating new mobile solutions and simplifying their integration.

4.3 FINLAND

Today, Finland is one of the highest ranked countries in the networked world. In fact, the country has risen from third to first place on the NRI ranking list. As previously stated, Finland does not rank below 4 in any subindex. This shows that the Finnish position as one of the world leaders is stable.

Finland's economy is highly intertwined with ICTs. For example, its high-technology export exceeds its import. This is mostly due to the success of the mobile communications giant Nokia. However, Finland has managed to build and maintain a number of successful clusters, many of which focus on mobile communications. These clusters are also widely spread across the country, thus providing a solid ground for further development.

Mobile communications are therefore considered more than well-developed in Finland. Already in 1998, the number of mobile telephone subscribers exceeded the number of fixed subscribers (ITU 2003). This maturity is reflected in the projects described below. They often combine research and product development.

CLOTHING+

1.3.1 CLOTHING+ – WEARABLE TECHNOLOGY

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Wearable Technology is a research field that combines clothes and technology, taking both concepts a step further than we are used to. Integrating mobile technology into clothing is not just a way to make it easier for people to bring along their computers when being on the move. It is rather a way to help people in need and make it easier for them to deal with, for example, extreme working conditions or health problems.

Clothing+ is an enterprise producing and supplying components and systems of wearable technology. They are developing wearable devices with easy and logical interfaces. After a successful implementation of the Cyberia Survival Suit project, Clothing+ went from being a government-funded research institute to a profit-seeking company, well known all over the world for its wearable solutions.

Back in 1998, Reima Smart Clothing, the parent company of **Clothing+**, joined a start-up research project focusing on intelligent clothing in combination with wearable technology and computing. Besides Reima, the University of Lapland, in the north, and Tampere University of Technology, in the south of Finland also participated in the Cyberia Survival Suit project. The project took two years from concept-building to presentation of a fully functional research prototype. It was partly funded by the three initial players but mostly by the Finnish Ministry of Education and the EU.

Although it was only meant to be a research project resulting in a few prototypes, the project turned out to become much more. As people at **Clothing+**, who were part of the project from the outset, say: "things almost got out of hand after the prototype was launched in March 2000". Interested buyers from all over the world approached the team and wanted to know more about the Survival Suit.

The suit was mainly designed for professionals working in cold arctic conditions far away from civilisation. It monitors the user through 4 different sensors, temperature- and humidity-sensors, accelerometer and a heart-rate monitor. The suit generates conclusions from the gathered data and can autonomously send for help if an accident

occurs. The emergency message containing positioning co-ordinates, last readings from the sensors and the time it was sent is delivered by an integrated GSM-module. Having the information about condition and whereabouts of the person in need, the emergency team can prepare a tailored rescue, considerably increasing the chances of survival.

Following the success of the Cyberia project, Reima established a research centre of wearable technology, **Clothing+**. The research centre evolved into Clothing+ Ltd., which today employs industrial and clothing designers, hardware, software and textile engineers, production designers and marketing specialists. A step-by-step process has been undertaken in order to produce small parts of the Cyberia suit at a time, thus making several different wearable products for leisure and work available on the market. One sector of development is wearable mobile communication, where there are now five concepts available. Some of **Clothing+**'s completed concepts are their Wearaphone 20 and a textile heart rate monitor.

Clothing+ hopes to be able to create an awareness for wearable products and in this way build a market. Mikko Malmivaara, the Technical Clothing Designer at the company, says that most of the bigger clothing manufacturers of the world are "just dying to get something wearable for sale", but they are afraid to invest in the development process. Ordinary people, on the other hand, would love to see products like the Cyberia suit in the shops. They are, however, still reluctant to buy anything that is too sophisticated, which is why it is necessary to start low and only offer very simple wearable items in order to show the benefits and get people used to the idea. There is a great interest and potential for wearable technology and Malmivaara says: "In the future we'll go from the simpler accessories on to the more advanced products, so keep your eyes open...".

4.3.2 MOBIART – DEVELOPING DIGITAL CONTENT PRODUCTS USING MULTI-CHANNEL FEATURES AND MOBILITY

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MobiArt is an umbrella project implemented by the degree program in communications at Oulu Polytechnic. Focusing on mobile contents, the project is bringing together business experience and research know-how in several subprojects. The goal is to develop various mobile and fixed-line services for ordinary people.

There are numerous actors in the area of mobile content business and technology. Technology providers, mobile operators, application developers, content providers – they are all part of complex value-chains and each one of them possesses unique knowledge. Combining this knowledge with research know-how is essential for bringing real, useful mobile content to life.

MobiArt gathers small and large companies together with researchers in order to develop enterprise-led content product projects, that focus on multimedia applications in multi-channel environments. The projects deal with mobility-centred content as well as services and technological applications for wireless terminals.

The main goal of the MobiArt project is to help achieving an open content production community. The community comprises content

and media sectors and technology companies developing products and services that utilise mobility. MobiArt is seeking ways to allow people to benefit from various telecommunication services using different media like mobile phones, Internet, or digital TV.

The network is open to all interested actors and the knowledge acquired working on the different pilot projects is shared during meetings of the community. The idea is to present content product pilots to the financiers and distribution channels during the autumn of 2003. There are intentions to expand the network from Northern Finland to the rest of the country as well. The goal, in the long term, is for MobiArt to become international in the continuation phase and stimulate an international networking cooperation by including R&D activities in a number of different countries.

The project started in October 2002 and will run until March 2004. The Northern Movie, Media Center POEM and Mobile Forum in Oulu are responsible for the implementation, while the main financiers are Oulu Polytechnic, the City of Oulu and the Provincial Federations of Northern Ostrobothnia and Lapland.

Genimap LOCATING POSSIBILITIES

4.3.3 MOBILE CITIES GUIDE – TOURIST INFORMATION IN A MOBILE DEVICE

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The Economist.com Cities Guide is a new mobile service for Finnair's frequent business travellers. It provides tailor-made information on local restaurants, sightseeing, shopping, hotels and nightlife for destinations in more than 30 countries throughout the world. Users get information directly in the mobile device via Multimedia Messaging.

Tourists as well as business travellers have less and less time for planning trips. Therefore, immediate access to relevant information is needed. "The Cities Guide service can help a user find fine dining when in Brussels, how to spend an extra hour in Singapore, where to shop for gulf clubs in New York or where to find the genuine South Sea pearls when in Sydney" (Press release 2003a). Using multimedia capabilities of mobile phones, this WAP service provides reviews, con-

tact information, maps and weather reports for wanted locations. Information is sent to users' mobile phones via MMS.

Genimap, a pioneer in location based mobile services, completed the innovation for the service in the later part of 2002. The application was made available through collaboration between several parties. The Economist.com was responsible for the content, Genimap and Starhome for the application model, and Foreca Ltd for the weather forecast. Finnair is the marketing and distribution partner in Finland. The service was launched in March 2003. According to Finnair's Mikko Knuuttila, it has been well received by the users. Revenue generated by the project is shared between the partners and the mobile operators TeliaSonera and Radiolinja, which have made the service available to their customers.

"With picture messaging gaining in popularity and more quality content being made available on mobile phones, our partnership with Genimap is a great way to bring information to life for the consumer", says Alon Barnea, Starhome VP of Business Development (Press release 2003b). All partners are satisfied with the solution, which is considered to be a needed extension of their offered services. Finnair considers the service as a value added offering to their e-services, which make it possible for customers to handle their electronic check-in and find-flight schedules.

Bringing their content to mobile media is also a way for the Economist.com to give their Cities Guide offering a new dimension. As for Genimap, this service is one of their most important mobile solutions utilising Multimedia Messaging. Putting the ease of use, and not the feature itself, in focus is what makes this particular city guide special. A user experience that is yet not available with any other city guide is created this way, according to Genimap, whose corporate brand-message is "Location is not absolute. Location is subjective.".

The Mobile Cities Guide solution effectively completes the missing link in location-based services on mobile handsets which is why the future goal is to distribute this and other travel related guide services to operators throughout the world.

4.3.4 MOBTV – MOBILE TELEVISION IN FOURTH GENERATION NETWORKS

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Mobile Television applications through multiple delivery networks were studied and developed in a two-year project carried out by the VTT Technical Research Centre of Finland and the University of Tampere. During the project, a prototype system was developed and tested by 81 test-pilots who were able to use mobile television services for one month. The results showed that the test-pilots were very positive to the idea of "TV everywhere and anytime".

In principle, it is possible already today to read news in your mobile phone, check the weather, pay parking fees, buy a coke from the vending machine or be reminded about your dentist appointment. Mobile devices have voice, messaging, Internet browsing, radio, camera and video included. However, there is one thing they do not have, namely TV.

Would you not like to watch the news on your pocketTV while travelling with the metro or see your favourite TV show during a coffee break? All those annoying, boring times when you are waiting for someone and you are desperately looking for something to do, why not watch the TV?

MobTV was a two-year pilot project aimed at studying, developing and testing Mobile Television applications that use multiple delivery networks. The main idea of Mobile Television is to enable use of television wherever and whenever. In the future, this will be possible by using digital television, wireless local area networks (WLAN) and cellular networks (GSM, GPRS, UMTS) combined in a single hybrid network, a 4G network.

This idea has already been tested in a first-of-a-kind pilot test; by using existing networks in several different environments a future network where the different technologies interact seamlessly was simulated. In the pilot phase of the MobTV project, 81 test-pilots were able to use two different mobile devices – pocket sized PDAs and tablet PCs – in order to watch a selection of television broadcasts. The users

were given the opportunity to watch both public and commercial television channels and an archive of week's programmes.

The Human Centred Design approach was used, which means that the users were in focus throughout the whole project. They participated in the development and evaluation from the very beginning. The project was divided into several parts, starting with a theoretical study, followed by an observation period. Assumptions and conclusions that the observation study resulted in were confirmed during a series of interviews, conducted in different places, for example trains, railway stations and schools.

The results showed that the test-pilots were very positive to the idea: TV everywhere and anytime. They believed however that mobile TV should be integrated into some other device or service and that payments should be part of some other billing system that they are already paying, Internet or mobile subscription for example. The study also showed that the TV programmes need to be adjusted to the small screens used when watching mobile television. In addition to wanting the whole range of regular television channels in their portable devices, users also expressed desires for additional features and applications, designed specifically for mobile TV usage.

MobTV was carried out as a part of the National Technology Agency Tekes' NETS technology programme and was funded by Tekes, VTT, Alma Media, Digita, Elisa Communications, Malibu Telecom, Nokia, Sonera and Swelcom. The project study was carried out in cooperation between the VTT Technical Research Centre and the University of Tampere. According to project manager, Kaj Södergård, interest in the project was so great that plans are already being drawn for further development and continuation projects.

4.4 GERMANY

The country is one of the largest telecommunications markets but has had trouble increasing Internet penetration in the past. In 2002 just above 40 per cent of the population were Internet users (ITU 2003). Mobile subscribers exceeded fixed telephone subscribers in 2001. However, the growth curve seems to be flattening at just above 70 subscriptions per 100 inhabitants.

Germany has risen from 17th position to 10th on the NRI ranking. As stated above, the country is number one in Business Usage and its lowest position is in Government Readiness (27th). The maturity of the German mobility market is high, which can be seen in the cases. They are combining research and service development in useful innovative applications.

Fraunhofer Institut Graphische Datenverarbeitung

4.4.1 STEPMAN – WORK OUT TO THE BEAT OF MUSIC

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Everything is easier with music. In several studies, it has been shown that working out to your favourite music leads to better performance and gives better training results. However, finding the music that matches your jogging style is not easy. After a year of hard studies, the Fraunhofer Institute for Computer Graphics Research IGD in Rostock has managed to solve this problem. They have developed a mobile device that adapts the rhythm of the music to your own step frequency.

Music adds fun to a sometimes grey everyday life and often makes it somewhat easier. It has been shown in various studies that jogging and working out is more efficient if done listening to music. Performance

gets better as the breathing is deeper and more even, which results in muscles getting more oxygen. Joggers can keep the right rhythm with the help of music and are more relaxed when running. Their motivation is also increased.

Finding the right music is however not easy. Your favourite tones rarely fit an your jogging style which is why the search for suitable music is to some joggers as important as the search for the right jogging shoes. Would it not be great if you could listen to whatever music you want and be able to adapt it to your own running rhythm?

Today this is possible, using a solution developed by the Fraunhofer Institute for Computer Graphics Research IGD in Rostock. Mobile devices that allow real time transformation of audio and video signals are combined with different sensors in IGD's StepMan solution. The solution has been designed as an add-on application and an extension of portable audio devices, PDAs and SmartPhones.

Joggers wear sensors that measure their pulse, blood pressure and speed while they are running. The information is delivered to a software program that continuously adapts the music to the runner using information about speed and body stress. This is done without distorting the pitch. If wanted, the procedure can be reversed so that the runner can program performance peaks and phases of rest. Altering the beat and setting the pace of the music to a desired level during certain periods of time, the user can design individual training programs.

There is already a functioning stationary version of StepMan in use in fitness centres. Here additional biosensor data is used in order to support therapeutic exercises and workout to music. The next challenge is to adjust the system to the weaker computing power of portable devices so that it can be used when the user is mobile and is exercising outdoors as well.

Technology used in this application can be slightly adapted and used in a number of different areas. Researchers at the Institution for Occupational and Community Medicine at the University of Rostock are interested in developing a medical application using the technology. Nervous patients would be calmed using a solution based on biofeedback.

Another area of research connected to the transformation of audio signals in real time is related to speech comprehension. A message on an answering machine or a voice mailbox can be slowed down to become more intelligible to the listener. This so-called acoustic magnifying glass can be used when the listener wants to take down a number or an address included in the message he is listening to. This field of research can also be used when considering security aspects in public buildings, according to the project manager Gerald Bieber. He says that one interesting topic is the recording of warning announcements in case of an airport fire for example. The speed of announcements must be adapted so that they can be properly understood in each language.

4.4.2 XMOTION – MOBILE TESTBED FOR INTEROPERABILITY OF NETWORKS IN E-LOGISTICS

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Using new mobile networks and technologies it is possible to improve and optimise many areas within health, emergency and transport management. In order to show this potential, T-Systems is carrying out the xMotion project in cooperation with 13 other partners. Three different trials are being run in a UMTS testbed set up in Bremen. Demonstrating the need for and the performance of these new systems, the project team is hoping to contribute to increased safety and security for citizens.

The development of mobile networks offers new services and higher bandwidths. New wireless technologies enable reorganisation and optimisation of processes within safety and emergency related areas. Combining new technologies and services gives unique opportunities to significantly improve health, emergency and transport management.

The idea behind the xMotion project is to show the potential of communication technologies used and evaluated during the project. The overall objective is to enhance citizen safety and security by demonstrating the interoperability of diverse wireless technologies. The belief is that their mutual support can lead to a better response in

emergency cases. xMotion is a trial action that will use three scenario set-ups in a UMTS testbed in Bremen. The three trials – Teleambulance, Emergency management and Transport Surveillance – will be carried out in the testbed set up by the involved project partners: T-Mobile (network provisioning), BEN (network provisioning) and Siemens (UMTS equipment).

The **Teleambulance** case offers a bridge between intensive care units at hospitals and ambulance vehicles. Providing a monitoring link between a patient and the medical care team at the hospital will enable monitoring of life supporting devices in the ambulance. The system will also make it possible to hold multimedia conferences between hospital and ambulance personnel. This will save valuable time on arrival at the hospital, which might ultimately make the difference between life and death. In cases when patients need to be transferred between hospitals, the supervising possibilities might make the transportation phase much easier and safer, as doctors or paramedics can monitor the situation all the time.

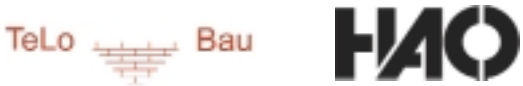
The goal of the **Emergency Management** trial is to show how advanced mobile communication can facilitate emergency management processes, especially fire-fighting. Using 3G and a system based on Web Services in combination with Microsoft .NET technology, the hope is to develop software applications that will improve management of emergency systems. It is stated that the exchange of voice and facsimile messages is not sufficient for proper emergency management. High resolution aerial pictures, thematic maps, measurement results, video-taped scenes, electronic databases etc would considerably improve quality and overall security of rescue management. The need for reliable and descriptive information is high as many emergency operations require high-risk decisions. Information has also to be exchanged between many different parties, such as staff from the search-, rescue-, medical- and police forces. This makes even greater demands on the information sharing systems.

The aim of the **Transport Surveillance** project is to increase the safety during transportation of dangerous and valuable goods. This is done using audio-visual monitoring in 2.5G and 3G environments. The results of this trial can stimulate or support the development of other products and services, for example new sensors for surveillance and identification, active safety systems and services for mobile applica-

tions as well as more comprehensive transport surveillance and fleet management applications.

All three trials are using Location Based Services, Mobile Middleware, Multimedia Streaming and Mobile Application Backbone. The resulting conclusions and empirical data gathered during the trials will contribute to an integrated view on the suitability of mobile technology in safety and security related application fields. Sharing know-how and finding synergies will be some other results.

The xMotion project is funded by the European Commission. It started in July 2002 and will continue until December 2003. Preparation of the project proposal was organised and implemented by T-Systems. A consortium of 14 partners is now working together to achieve the goals.



4.4.3 TELO-BAU – TELEMATIC AND LOGISTIC FOR CONSTRUCTION COMPANIES

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There is a substantial need for seamless information flows between various interfaces in the construction industry. Staff on construction sites, in the offices and supervising managers need to communicate with each other on a regular basis. TeLo-Bau project is developing a system designed for workflow that includes mobile usage. The hope is that the system will simplify information processing and make it more efficient.

The construction industry is an environment that requires a high level of information exchange, both among the workers within a construction site and between workers and supervisors in the office. In order to keep track of working hours, materials needed and alterations in plans, information needs to be entered, stored and exchanged in a fast and smooth way.

TeLo-Bau is a project aimed at helping the construction sector to solve problems with inefficient handling of information. The idea is to develop a wireless solution that can improve speed and quality of information handling in internal business processes. A system has been developed and is in use since August 2003. Shortly after the

introduction, about 80 workers began using it on a daily basis. Initially, the system was able to register working hours. It is however constantly advancing as new solutions are being added. Some future functions of the system are:

- Online exchange of photos – wireless discussion between site supervision and workers
- Registration of tools – keeping track of their whereabouts and responsible persons
- Function control – control expiry dates for legally determined examination of tools
- Online ordering of working materials

TeLo-Bau's IT solutions and organisational development system are designed for a workflow that includes mobile use. Functions used outside the home office can be accessed with mobile PCs and PDAs. To reduce technical efforts in the companies implementing the system, browser-based and centralised services for the applications are used. If the company has Internet access, no additional installations are necessary.

Developed solutions are easily usable in other countries. There are no problems adding further clients because the applications are centralised. However, due to the complex time-management in the construction industry, different circumstances in other countries have to be determined. Cooperation is therefore necessary in order to adapt the solution to the conditions in each country.

The project started on 1 January 2002 and will end on 31 December 2003 and is a cooperation between 6 small-sized companies in the construction business. It is being run by the Institut HAO and financed by the partner companies, the country Schleswig-Holstein and the EU.

4.5 LATVIA

Latvia is a country seeking to become the leading software provider in Eastern Europe and has substantial outsourcing capabilities. The country ranks just above Poland on the NRI, in 38th place, one position higher than the 2001–2002 index. However, the two countries are not alike in the subindexes. Latvia has its lowest ranking in Business Usage where it is ranked 50. Its best ranking is 34 in Individual Readiness. The spread between subindexes is therefore not as wide in Latvia as in Poland.

Today, Latvia is seeing an almost exponential increase in the number of its mobile subscribers. The importance of mobile communications in the country is evident as it represents 2.8 per cent of its total GDP in 2001. (ITU 2003)

Hansabanka

4.5.1 MOBILE BANK – REMOTE BANKING SERVICES

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In order to take advantage of the opportunities offered by new technologies, Hansabanka has initiated research programmes and implementation of mobile services. Remote banking services are becoming increasingly important; both the Internet Bank and the Mobile Bank are supporting this trend. In the future, customers will be able to carry out necessary transactions using only these solutions.

The Mobile Bank targets all mobile phone users within Latvia. Customers can receive information from the bank through an SMS message or they can send an SMS and request information. They can even carry out transactions using text messages. The Mobile Bank makes it easier for customers to have an impact on their monthly and daily

payments. The service operates in several modes; notifications can be sent on a regular bases, in case of changes or following a customer request. Each customer may choose the most convenient or suitable type of service.

The Mobile Bank was introduced in cooperation with LMT (Latvijas Mobilais Telefons) in April 2000. It has become widely used and is also generating revenue for Hansabanka. During the first half of 2003, the customer base increased by 8 per cent a month and the average increase in the number of SMS messages sent is currently 6 per cent a month. This makes the Mobile Bank one of the most profitable and promising services offered by Hansabanka.

Since its introduction, the Mobile Bank has continuously been improved and developed. The latest novelty is a "single SMS payment". With the help of this service, customers may now recharge their Okarte, the prepaid telephone card of Latvijas Mobilais Telefons, by SMS.

The future for the Mobile Bank seems promising and inspiring. Lithuanian Hansabanka has also adopted the current solution. The most important cooperation partners for Hansabanka are Latvia's two mobile telephone operators LMT and Tele2.

4.6 LITHUANIA

The country has fallen from 42nd to 46th place on the NRI ranking. Despite this relatively low ranking, Lithuania has a high growth in the ICT sector. The Government Readiness subindex is the country's highest, ranking 35. The subindexes requiring most effort are the Political/Regulatory Environment (ranked 59), the Business Readiness (ranked 53) and in particular the Business Usage (ranked 78).

The country has the same, or higher, increase in mobile telephones as the other Baltic countries. The number of mobile subscribers has almost reached 48 subscribers per 100 inhabitants and is growing exponentially (ITU 2003). Lithuania has also a strategically important geographical position. It offers a bridge between the other two Baltic countries as well as North-Western Russia and the European continent.

4.6.1 BLUE BRIDGE – M-PARTNER AND M-PATROL MOBILE SYSTEMS

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Blue Bridge is an IT solution company that back in 2001 established the Mobile Technology Centre in cooperation with mobile solutions enterprise Sidabrinis Tinklas. One of the joint achievements is a mobile system, m-partner, which helps mobile personnel in their everyday work by providing "anytime-anywhere access" to corporate databases and the Internet.

Mobility enables businesses to function independently of place and time. Moving activities to distant sites and managing them remotely extends traditional understandings of mobility. Wireless transfer of data and its efficient processing opens up a completely new world of

possibilities. Blue Bridge's mobile business information system, m-partner, brings us one step closer to the new, mobile world.

In companies where large numbers of employees work outside the office, it is vital to ensure that every mobile worker has "anytime-anywhere access" to corporate databases and the Internet. Therefore, the m-partner solution is primarily designed for wholesalers and other organisations distributing goods through networks of mobile sales agents. The system automates all operations of the sales chain, from daily assignments and sales agents' routes to different orders. All information is directly entered into the central accounting system of the company. Sales agents perform their tasks using Pocket PCs, while their managers plan and control their work from any computer that has a web browser and access to the enterprise's local area network.

At the start of the working day, managers draw up daily routes, allocate tasks and transfer them to the pocket PCs of sales agents. This way the agent has all the necessary information about previous payments and debt history of the customers they are visiting. They can access information about product prices, discounts and availability as well as questionnaires needed at the moment. When visiting a customer, a wireless connection may be established from the pocket PC to the enterprise's central information system. This makes it possible to continuously update the stored information and send orders whenever needed.

Another of Blue Bridge's mobile solutions is m-patrol. It is a tracking and information system for mobile vehicles used in law enforce-

ment and emergency services. Police, fire departments, security- and ambulance management can all benefit from a system that enables users to get the most recent information from different data sources. The operator can quickly send tasks and receive the latest information in return. Exchanged information can be accompanied with textual, graphical and location-based features, making the information flow more useful. The solution requires that a mobile vehicle has a car computer with the m-patrol system installed, a GPS receiver and a GPRS data transmission module. This makes it possible for mobile users to run queries and get up-to-date textual and graphical information from different data sources.

Both of the described solutions were developed in the Mobile Technology Center (MTC) that was established in 2001 by Blue Bridge and Sidabrinis Tinklas, another Lithuanian company involved in mobile solutions. Sidabrinis Tinklas became a part of Blue Bridge in July 2003. MTC is now one department of the enlarged Blue Bridge. Its main objective is to develop and implement wireless solutions and the company is aiming at becoming a mobile solutions leader. Microsoft has recognised the importance of Blue Bridge solutions for customers in the entire Baltic market and has therefore included information about the m-partner in their Baltic Solutions Portfolio for 2003.

4.7 NORWAY

Norway is one of the few countries in the region that has had trouble keeping its position on the NRI ranking. Between the 2001–2002 and 2002–2003 index, its ranking fell from 5 to 17. This could be a reaction to the adjustments made in the index itself, but should also serve as a warning. Being ranked 29 in Government Readiness, 26 in Political/Regulatory Environment and with a highest 12th position in Individual Usage, does not suggest a strong Networked Readiness.

Just like the other Scandinavian countries, Norway has well-developed communications infrastructures and the number of cellular subscriptions exceeded fixed telephony subscriptions in 2000 (ITU 2003). However, the country lacks a strong ICT industry. According to GITR 2001–2002, this may be a result of the low number of students taking ICT related courses or that the working force is less skilled in this area than in the rest of the region.

4.7.1 PATS – PROGRAM FOR ADVANCED TELECOM SERVICES

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PATS is a foundation that aims to be a catalyst for new, advanced telecom services by operating in a triangular and mutually beneficial collaboration between industry, telecom operators and universities. One of the achievements so far is the establishment of a Teleservice Lab with access to a telecom network that allows researchers and students to test their mobile applications live.

In order to compete on the fast growing and deregulated telecom service market it is important to be able to undertake rapid innovation and implement new scalable and dependable telecom services. Triangular

collaboration between industry, telecom operators and universities is used by the PATS organisation to achieve this. The vision is to create a virtual centre focusing on advanced heterogeneous services and fast service development and in this way serve as a catalyst for development.

One of the projects within the scope of PATS is AVANTEL – Advanced Telecom services, carried out and funded in cooperation between Telenor, Ericsson and the Norwegian University of Science and Technology (NTNU). This project started early in 2001 and will end in 2003. One of the results of the project is the Teleservice Lab that is one of the driving forces in the cooperation. The lab is unique with its access to "live" telecom network services and interfaces based on open architectures. This has given researchers and students the opportunity to test their mobile applications live. The lab is co-located at NTNU and Telenor R&D in Trondheim and connected with high-capacity links to Ericsson NorARC in Asker. Additional links to other partner labs are possible, in total creating a virtual "Centre of Excellence".

Teleservice Lab is not operating commercial services, but acts as a testbed for research, development and testing. It provides a simulation facility for creation of new innovative and advanced telecom services that are location and content aware. Combining influences from traditional telecommunications, multimedia, web information and messaging as well as personalised services is intended to result in innovative solutions with short development times and controlled quality. The lab is considered as a cool and attractive environment for students interested in new technology, since the project is not only contributing with technological solutions but also securing access to expert personnel through educational programmes.

Besides the established Teleservice Lab there are other evident results of the project. A platform, AMIGOS, used for a generic service where users will be able to create meeting places with customised access management and miscellaneous functionality, is in process of being set up. Several M.Sc. projects are dealing with the implementation of functional blocks relevant for the AMIGOS service and are also completing ready-to-run telecom services. One of the projects run in the lab is **For rent**. The aim of this project is to develop a service that will help students in their search for an apartment. The service stores housing and rental information in a database and uses the GSM location of the user to find an appropriate housing in the nearby area.

The rental information can be entered by SMS or MMS. Another project carried out in the lab deals with issues of a mentor system. The service enables the students to register with a mentor group through a simple SMS and thereafter they can receive group messages from the mentor.

The objective of the second research project, ARTS – Arena for Research on advanced Telecom Services, is to heighten the national competence level with regard to advanced telecom services. The project will have two distinct parts. The first will study methods and tools for incremental development, testing, deployment and operation of advanced telecom services, while the second one will deal with a Teleservice Innovation Centre, where the major actors in the Norwegian telecom field will work together improving methods to develop new services.

The PATS foundation was established in April 2001 and has partially been founded by the Norwegian Research Council. Its partners are the NTNU department of Telematics, Ericsson, Telenor and Hewlett-Packard.

4.7.2 KNOWMOBILE – KNOWLEDGE ANYTIME AND ANYWHERE

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First, there was eLearning and now the time has come for a new concept: mLearning. Imagine being able to access knowledge anytime and anywhere, whenever you really need it. Just-In-Time (JIT) knowledge is an important concept. Here, knowledge means information and materials that are important to the learner in relation to the given problem or task.

The KNOWMOBILE project explored JIT functionality of Internet based educational resources on mobile equipment. During one semester, the project followed medical students in Oslo in order to study their usage of the net, searching for relevant knowledge sources and building collaborative support structures. The hope was that experiences acquired during the study could contribute to life long learning in a variety of health professions.

In order to study user experiences of PDAs in search of knowledge, the project included a field test trial in various communities of practice, namely **Co-located**, **Partially co-located** and the **Distributed Community of Learners**. Students' behaviour was observed and their opinions about the use of technology and PDAs was recorded, analysed and evaluated with a multidisciplinary approach.

The research showed that students made only limited use of the PDAs. The belief is that the non-use is related to complexities of infrastructure. A student that participated in the study says that he used the PDA less than expected due to its lack of relevant information. Furthermore, properties like speed, disk space and battery capacity are areas that should be improved in order for the PDA to gain a broader audience. The student believes that the PDA does have a potential and says that with improved content, reliability and capacity, he could imagine himself carrying it as an everyday tool in his work and life. Assuming there is a wireless connection at every corner, a PDA could be used for communication, accessing journals, handbooks, x-rays, dictaphones, ordering tests, getting test results, making notes and organising appointments.

An interesting conclusion of the KNOWMOBILE project is that PDAs should no longer be regarded as Personal Digital Assistants for individuals, but rather as potential gateways in complicated webs of interdependent technical and social networks. The PDAs should therefore be considered as digital assistants for larger groups of people. Understanding the use of mobile equipment within communities of practice is not something unique for the KNOWMOBILE project. Similar thoughts exist within the research field of Wearable Technology. The undertaken studies investigate how mobile phones and PDAs will affect the way people interact and form communities in the future.

KNOWMOBILE is a project under Nordunet 2, an Internet research programme financed by the Nordic Council of Ministers and by the Nordic Governments. The project ran between 2000 and 2002 as a partnership between the Faculty of Medicine, Department of Informatics and InterMedia, University of Oslo, Telenor R&D, Ericsson, Hewlett-Packard and Umeå University. A reference process with medical schools in other Nordic countries was also part of the project.

4.8 POLAND

Poland is one of the countries in the BSR that does not yet have high Networked Readiness. Going from 35 to 39 on the NRI ranking, is not necessarily as poor performance as it might initially seem. However, it is evident that the Government has an important role to play in this matter. Ranking 58 in Political/Regulatory Environment, 47 in Infrastructure Environment and 53 in Government Readiness clearly shows the need for improvement. It is interesting that the Polish telecommunications sector is the most active part of the ICTs.

The deregulation of the sector has begun, as a step towards EU accession. The pace at which competition is entering the fixed-telephony market has been slow. The mobile market is instead the one that has become competitive. The increase in mobile subscriptions is almost exponential, as can be seen on the maps in the previous chapter. If the trend continues, mobile subscriptions will very soon surpass fixed subscriptions.

The Internet has just begun to spread in organisations and businesses. The country's top subindex is also in Business Usage, ranking 25. However, very few websites are available in English.

4.8.1 MOST – MOBILE OPEN SOCIETY THROUGH WIRELESS TELECOMMUNICATIONS

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MOST is a programme aiming to set up a mechanism that will organise broad cooperation between universities, wireless telecommunication providers and content providers operating in Poland, Germany and other countries of Central and Eastern Europe. Doing this, the founders of MOST hope that they will be able to help handling the complex inter-relationships between technology, content and people in a smarter way.

Our world is turning mobile as an increasing number of people carry out large parts of their activities on the move. As communication technologies are becoming wireless and invisible to the user, distance and location factors are becoming increasingly irrelevant. This leads to completely new ways of life. People's everyday behaviour is changing in many ways. Accessing, sending and receiving data via mobile handsets will soon be a natural part of everybody's daily life (MOST 2002:9).

Therefore, it is no longer enough to judge the mobile business only by its technology. We are arriving at a stage where content is what really matters. Roles of content creators such as artists, journalists and researchers as well as content providers, like publishers and editors, are growing stronger. Content can however not exist alone. In order to create value, it has to be promoted cleverly. It also needs to be accessible in a convenient way. The interrelationships between technology, content and people seem quite complex. It is therefore of importance to coordinate these relationships in a smart and mutually prosperous way. This is the goal of the MOST programme.

The founders believe that the telecom industry and content providers need stimulation, talents, independent assessment and intellectual agitation. These are the assets of the academic world. The mission of the programme is therefore to set up a mechanism that will organise broad cooperation between universities, wireless telecommunication providers and content providers. The idea is to establish a forum, which shall foster professional competence and the building of

partnerships and communities of practices in Poland, Germany and also in other countries of Central and Eastern Europe. The hope is that interdisciplinary thinking will result in synergies on several levels. Sharing a common interest in topics such as the Information Society, Mobile Economy and Higher Education Models, different actors should be able to make the interaction between humans and information systems more colourful and dynamic.

Establishing an efficient flow of thought and know-how, the programme should be able to exchange experience and personnel between involved parties. This will be done by establishing creative environments where promising ideas can flourish into new spin-offs. The idea is also to seek solutions to concrete problems through joint projects of both technical and business character. Achieving the set objectives will mean boosting the process of building a mobile information society. Milestones towards the realisation of the objectives are establishing the following entities: **Institute of Content and Mobile Technology**, **European Association for Mobile Technology and Society**, and **Education and Research Center for Mobile Technology and Society**.

Until now, a Steering committee and Secretariat have been formed as well as a Think Tank. A well functioning website has been constructed and several meetings have been held, the last one in Vilnius, Lithuania. The next meeting of the Think Tank will be organised in Bucharest in early 2004.

The organisation is now identifying possible stake/shareholders and also acquiring ICT projects. Some topics on the list of subjects that the Institute might develop into projects in the future are: Wireless security, Mobile wallet, Wireless e/m-business, Wireless games, dictionaries, Mobile TV etc.

The MOST programme is a cooperation between three founder-parties, namely Politechnika Warszawska, Polska Telefonia Cyfrowa (PTC) and the DeTeMobil Deutche Telekom MobilNet (T-Mobil). It was initially financed through voluntary donations of the partners as well as other donors. The hope is however that the programme will eventually be able to raise its own funds through the undertaken projects and resulting spin-offs. The programme turns to universities, content providers and telecom service providers, but is open for everybody interested in issues of mobile economy and society. The headquarters of the institute is in Warsaw.

4.9 SWEDEN

Sweden has managed to keep its 4th place on the NRI ranking. The best result is in Business Usage where the country ranks 2. Its rankings are evenly distributed over the subindexes, they are all above 10 with one exception; the Political/Regulatory Environment ranks only 17.

The Swedish telecommunications market was one of the first to be deregulated in Europe. The country has a high penetration of business websites and Swedish customers have had a tradition of quick adoption of new technologies and services. The ICTs are as a result adopted eagerly. The number of mobile subscribers surpassed the number of fixed telephone subscribers in 2000 (ITU 2003). There are almost 90 mobile subscriptions per 100 inhabitants in the country, an impressive figure.

The driving force for the Government has for many years been the motto "an Information Society for All". Now Sweden is aiming at becoming the leader in m-Government as well (Östberg 2003). The importance of the IT-commission in helping to shape national strategies is emphasised in the GITR 2001–2002. Unfortunately, this organisation has been closed after nine years of work. The future will show how this will affect ICTs as a government priority in Sweden.

4.9.1 mCITY – A TESTBED WITHIN THE CITY OF STOCKHOLM

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"How can we make everyday life easier?" – this question was the starting point of the mCity project, aimed at the citizens of Stockholm, its visitors and companies. Instead of concentrating on how to create needs in order to sell existing technology, ***mCity*** *is focusing on how to satisfy existing needs in the community.*

The objective of the project is to push usage of mobile services forward and, most importantly, make people's everyday life a bit easier. **mCity** is hoping to contribute to a better working and living environment for people in the City of Stockholm by improving service quality offered by the city to its citizens and by strengthening the business climate in the region. The project management is hoping to achieve these goals and improve the overall conditions for ICTs by working closely together with end-users.

Services for both private and public sectors are tested and thereafter developed onto a larger scale if proven relevant. At the same time, ownership is transferred to a suitable business company. Using this model, **mCity** has been able to connect different groups with specific needs with companies developing mobile services that can satisfy their needs. The project concentrates on areas where many people work under stress and areas that require large funding or resources. In such areas mobile solutions can have a dramatic and positive impact.

End-users are always priority number one in **mCity** projects. User needs are the starting point of every initiative. Projects range from health care and school aids to tourist information and networking activities on to commercial projects. The mStudent project is of particular interest. It gathers stakeholders from business and universities and covers students within the Stockholm region. The project points out a potential within the BSR to develop common services available to all students in the region. The following topics have been selected by students as possible mobile services in the future:

- Check course schedules

- Search for an apartment
- Register for examinations
- Check taxi prices
- Appointment reminders
- Payments via the phone

The idea behind the **mCity** initiative was born in 2001 when the former EU commissioner Martin Bangemann suggested a cooperation between European cities in order to stimulate the use of the upcoming 3G network and its services. However, this collaboration project did not become a reality. Instead, the City of Stockholm decided to proceed with a smaller scale project – **mCity**.

Once a small local initiative, **mCity** has now grown into a large project, covering many application areas. It is now broadening its boarders even further and becoming international by taking part in cooperation projects with Riga and Estonia. This benchmarking collaboration will hopefully result in the development of strategies for the concept of **mCities** within the BSR.

4.9.2 TESTBED BOTNIA – USERS IN REAL ENVIRONMENTS

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All ideas are great – except the bad ones. The problem lies in knowing which is which. With Testbed Botnia you can decide which ideas are likely to fail and which have a good chance of succeeding. You can test ideas, services and products together with end-users in real environments and make it possible for promising ideas to reach the market.

Testbed Botnia is one of Sweden's first and largest open testbeds for mobile services. Primarily it is geographically located in the Northern Swedish towns of Luleå, Skellefteå and Umeå, but tests are conducted all over Sweden. The most important assets are, apart from the end-users, a well developed technical platform and a unique evaluation method. This method is developed in cooperation with scientific researchers.

Test-pilots are individuals who have registered voluntarily as they are early adopters of all ages. They meet at the home website, which is their virtual meeting place. Here new test-pilots can register and take part in different tests. The website is promoted to continuously attract more test-pilots.

The idea is not new; it has been around since 1999 when the projects Arena and e-Street were launched. These two projects have now evolved into Testbed Botnia. Some 10 different service tests have been conducted, among them a mobile queue at the bank, road traffic information over SMS, location-based commercials and live sports over the Internet.

The technical platform is designed as a service network with service nodes, consistent interface and easy access. The service nodes are accessed with applications over the interface. Application suppliers can easily connect their application servers to the local network or be granted access over the Internet. The network supports various functions such as test administration, logging and evaluation. Qualified technical support is also available.

A broad range of different technologies are available through partners of Testbed Botnia, such as: Digital TV, a variety of mobile systems, broadband access etc. Within the geographical area of Testbed Botnia there is a wide network of different suppliers of technology and content. A live telecom network is available in the city centres and campus areas in Luleå, Skellefteå and Umeå, intended for advanced tests of the latest technology. In this network real broadband services or new technical components can be tested. Technological solutions such as Mobile IPv6, PKI and WLAN are important building blocks.

Behavioural scientists and researchers at the universities in Luleå and Umeå take active part in the projects. They contribute with their knowledge and experience thereby ensuring seriousness and high quality of the initiatives. The Department of Technical Psychology at LTU (Luleå University of Technology) and UCIT (Umeå Center for Interaction Technology) at Umeå University are responsible for technical evaluation. Examples of tests that can be conducted are: service usability, end-user behaviour, the willingness to pay for a specific service, user patterns and user satisfaction.

Some of the strongest Swedish and international actors in telecommunications are behind Testbed Botnia. The main responsible partner is the Centre for Distance-Spanning Technology, a project organisation within LTU.

4.9.3 INTERACTIVE ROAD – INCREASING THE EXPERIENCE OF ROAD USE

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We all seem to have an opinion about roads, their surroundings and use. Central for the shaping of the road are the activities that constitute it as a road – namely road use. The Mobility Studio, part of Interactive Institute, has studied this area and developed solutions that address issues of interaction among road-users.

The Interactive Institute is a multidisciplinary, innovation-oriented research institute working in the area of digital media. The Institute operates in the border zone between art, technology, science and enterprise. It consists of studios located throughout Sweden. Each studio has a minimum duration of five years and is supervised by a director. The orientation of every studio is unique. The Mobility Studio, which is in focus in this survey, generates innovative mobile services and corresponding supporting technologies that exploit benefits of mobile life in the area of road use.

The Interactive Road project focuses on road-users and bystanders and the means they have available to interact with each other. It also strives to augment the experience of the road through ICTs. People near the road are interested in being able to interact with the road-users without embarking on the road-use activity itself. In what ways could an interaction be established and what are its possible contents? How could road-users be informed when they are situated along the road? These are the main questions that the project focuses upon.

PumpTalk is a subproject focused on studying interactions between road-users and bystanders at petrol stations. The study is conducted in order to understand possibilities of road-related interactions as a part of future IT-supported road-use. Petrol stations are identified as important nodes in the road-use infrastructure. The importance of a petrol station can be enhanced if it is given the role of a digital "hotspot" or a "digital fill up" in the road environment.

Employing ethnographic and other qualitative methodologies, the PumpTalk project focuses on social practices regarding road-use that

take place at a petrol station. Situated actions and collaborative acts are constant elements in the practices that road-users embark upon. When seated in their vehicles the interaction with fellow road-users and bystanders is limited to the use of horns, flashers and the movement of the vehicle. The setting of the road environment is unique since the isolation and the speed of the vehicle contradict the necessity of social interaction when dealing with problems and contingencies.

The petrol station is a node where the character of human mobility changes. From being trapped in the seat of a car, the person is suddenly able to move. As the individual becomes mobile and capable of face-to-face interaction, both with other road-users and with bystanders, encounters become possible and open up a way for a different kind of interaction.

Backseat Gaming is another subproject of the Interactive Road. It is a mobile augmented reality game that makes use of the changing scenery in the real world that passes by the car window. Game contents have clear connections to the roadside objects seen outside. The game itself is implemented in a PDA equipped with a GPS card and a digital compass. These components provide the device with the player's whereabouts and the direction the PDA is aimed at. User feedback indicates that roadsides are fascinating game worlds to explore.

brainpool.

4.9.4 BRAINPOOL – A PROMISING PROVIDER OF ICT SOLUTIONS IN THE BSR

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Mobile solutions can bring a range of opportunities to businesses. Brainpool is working together with their customers in order to develop new solutions that will satisfy customer needs. According to Brainpool, mobile solutions can help business processes to become more effective and thereby improve competitive advantages of companies.

Brainpool started in 1994 and has a wide-ranging competence mix of staff as well as a presence in several different lines of business. The company aims at becoming a leading provider of ICT solutions and is therefore prioritising the competence area "Mobile & Wireless". Brainpool Mobile Solutions AB, one of Brainpool's affiliated companies, handles this area.

The range of possibilities that mobile solutions can bring to businesses is increasing. The company suggests that mobile solutions can help business processes become more effective by contributing to low-

ered costs and thus a competitive advantage for those implementing them. One example is when employees are able to use central systems while on the move. This can shorten administration time and increase quality and security for service intensive companies.

Brainpool is constantly developing new solutions together with their customers. The projects **Time Travel** and **Time Deviation** were started in order to cut costs in the travel administration of Scania, a global manufacturer of heavy trucks and buses. The projects have helped decrease costs by saving time. This has been done by reducing work duplications and by enhancing the quality of reporting. Time Deviation enables the user to report deviations by accessing the web or by using a handheld device. The report is then sent through Outlook to the manager. After approval, the central salary system is automatically updated. Time Travel takes care of allowances for different expenses. This project will evolve into a fully mobile solution enabling the traveller to extract all information about the trip, change bookings and register expenses.

The project **City of Stockholm and Söderhallarna** was initiated by **mCity**. The goal was to introduce ways in which the businesses of a shopping mall, in this case Söderhallarna, can gain from using the Internet and mobile solutions in their daily activities.

To this end, Brainpool has developed a communications platform called M3. A web interface enables communication between mobile phones, the Internet and wireless PDAs. This interface can be used to communicate offerings to end-users. It can also be used to ease existing services such as ordering lunch take-away. Instead of calling the restaurant you can send an SMS. Staff at the restaurant can check the SMS when it is convenient for them, instead of having to answer the phone and serve customers simultaneously. The web interface can also be used in administration. SMSs can be used to confirm meetings, notify maintenance as well as alert extra staff.

The first stage of the Söderhallarna project will run until the end of the year. The project will then be evaluated and possible future implementations will be discussed. One hope is that Söderhallarna will be turned into a wireless hotspot. This would greatly increase the potential for future solutions for both employees and customers.

4.10 N.W. RUSSIA

Russia, as a whole, ranks 69th in Networked Readiness, a drop from the previous NRI where the country ranked 61. The subindexes vary from 81 in Business Usage to 48 in Individual Readiness. The Russian Federation needs to increase its focus on developing Networked Readiness in order to provide a stable environment for companies to grow and contribute to the overall welfare of the state.

In contrast with the other countries in the BRS, the number of mobile subscribers is not even close to the number of fixed subscribers and both numbers are increasing at the same rate. This can be explained by the low maturity of the market. The number of fixed line subscriptions is only about 25 per 100 inhabitants and the number of mobile subscribers has just reached 5 per 100 inhabitants. These are clearly low numbers.

However, North-Western Russia is more ready. The St. Petersburg area is traditionally the Russian window towards Europe. Renowned educational establishments produce high numbers of graduates in ICT-related fields. The potential is therefore high, but it needs to be put in practice in order for the clustering capabilities to really excel.

4.10.1 PREMISES SEARCH IN ST. PETERSBURG

The service for premises search in St. Petersburg will make it easy to publish and collect information about available properties for business purposes. It will hopefully simplify the establishment of foreign companies in the area and have a positive effect on the local real estate market. This kind of service could however improve conditions for cross-border collaborations and as a result stimulate the business development in the whole BSR.

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The Internet marketplace for premises is a service for both Russian and Swedish companies that are planning to expand or establish a presence in St. Petersburg area. The service assists companies in their search for commercial buildings and premises. Making it easy to publish and collect information about available properties will simplify the establishment process for foreign companies. This will naturally have a positive effect on the local real estate market, where increased flexibility is a very important factor for growth and development. This kind of common marketplace can stimulate businesses in the whole BSR, thus improving conditions for cross-border collaborations.

The main objective of this project was to analyse the real estate market in Russia and based on the results establish an Internet based marketplace to search for business premises. Using experiences from the Swedish market, the hope was to adapt an already existing technical solution to Russian market conditions. A functioning solution along with the experience and the know-how of an established Swedish actor was expected to provide a stable basis for development.

During the project a solution for the setting up, maintenance and updating of an Internet database for available premises in the area of St. Petersburg was developed. The marketplace is already in function. There are however plans for further development. First of all, routines and contacts with real estate owners will be improved and frequently updated. Furthermore, according to Christer Asplund, who is head of the project, the marketplace could naturally be developed into a mobile solution offering new location-based mobile services for companies.

The project was carried out in cooperation between The City of Stockholm Economic Development Agency, Stockholm Representative Office in St. Petersburg, Internet real estate mediation company Capitex and The City of St. Petersburg with the support of St. Petersburg Construction Center.

4.11 NETWORKING OPPORTUNITIES BETWEEN CASES

As illustrated above, many countries and regions are committed to similar activities in the introduction of new mobile services. It is evident that some of the chosen projects have a lot in common or can contribute to each other's development. **mWatch** seizes this opportunity to show some complementary possibilities in order to stimulate cooperation.

BLUE WIRELESS HEART PROJECT AND X-MOTION'S TELEAMBULANCE

Both projects are concerned with health issues and remote monitoring of patients. Both have conducted field trials and have gained knowledge about used technologies and people's reactions to the systems. These two projects could certainly gain from sharing that experience.

MOST AND CROSSROADS COPENHAGEN

The initiatives are umbrella projects aiming at assessing different aspects of mobile societies and the development of new services. Both projects want to expand their activities and are looking for partners outside their own countries. Maybe they can find a new alliance in each other.

MOBIART AND TESTBED BOTNIA

MobiArt is mainly dealing with entertainment applications while Testbed Botnia has a functioning testbed environment where these applications can be tested. There are of course testbeds in Finland that are much closer to the MobiArt project, but Testbed Botnia can be an opportunity for MobiArt to expand the activities and test the applications on the Swedish market as well.

MOBILE CITIES GUIDE AND MCITY

Part of the mCity project is providing tourist information about Stockholm. Some time ago, a mobile solution was developed, but it has unfortunately not been used to the fullest. Mobile Cities Guide is a widely used mobile service for tourists. Taking advantage of each other's experiences could lead to improvements in both solutions.

MOBILE E-LEARNING WITHIN CROSSROADS COPENHAGEN AND KNOWMOBILE

Mobile e-learning focuses on developing advanced, mobile educational solutions. People involved with KNOWMOBILE acquired much insight into the use of mobile products and solutions for educational purposes. Combining theoretical knowledge about users' experience and requirements for technological expertise could result in a beneficial cooperation for both parties.

M-PATROL FROM BLUE BRIDGE AND XMOTION'S EMERGENCY MANAGEMENT

These two projects are working on almost the same solution – Emergency Management Systems. m-patrol is an existing solution which could pour some light onto the xMotion project, for example regarding its market introduction. On the other hand, Blue Bridge could test its solution in the German testbed, which would be beneficial for its further development.

PATS AND PREMISES SEARCH IN ST. PETERSBURG

The PATS project **For rent** is developing an apartment search system based on an existing wireless platform. **Premises search** has an Internet based system that is already up and running and there are plans for extending the service into a wireless solution. A collaboration between the two projects would therefore be ideal. One of them has a solution that is already in use and can contribute with market experiences of the real world. The other has access to a living laboratory where mobile solutions can be developed and tested on a small scale.

5. CONCLUSIONS

Several important facts supporting the idea that the BSR has a potential to become a "Smart Region" in ICTs have been presented in **mWatch**. A number of important telecom clusters are located here and the region encompasses some of the world leaders in mobile communications. It is the home location for two of the most significant companies in the mobile world, Nokia and Ericsson, as well as hundreds of innovative start-ups. The region has the world's highest mobile and Internet penetrations and deregulated telecom markets that stimulate further development of the sector. High educational and welfare levels characterise most of the countries in the BSR.

The region has a population of more than 100 million. Geographical proximity of the markets and well-developed infrastructures allow communication to flow smoothly. Shared history of trade, going back to the Hanseatic era, and strong industrial traditions make collaboration between sub-regions and cities natural. Cooperation initiatives are therefore relatively easy to undertake and maintain.

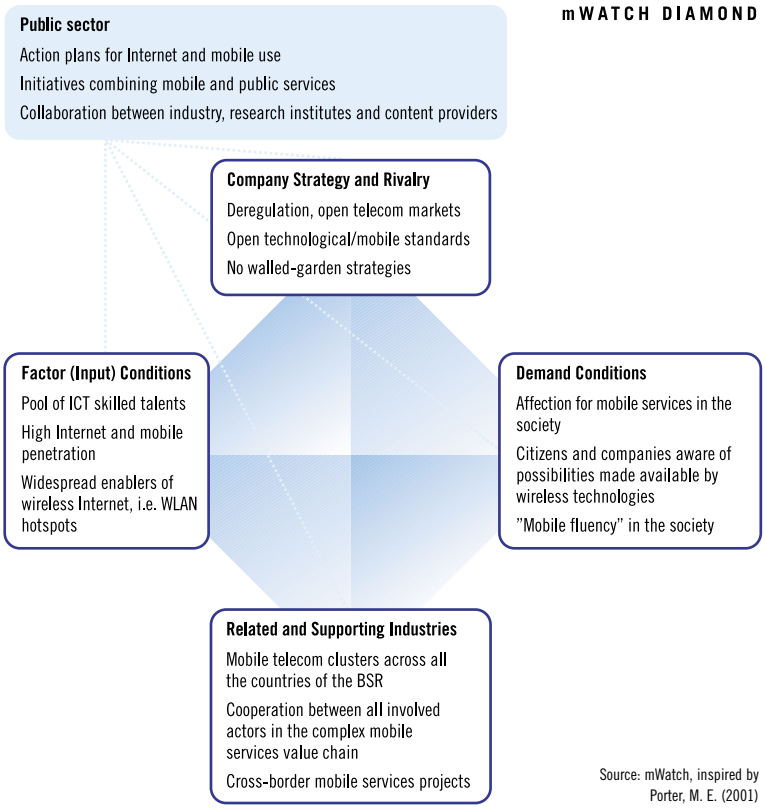
The countries in the BSR have travelled somewhat different roads along the evolutionary ICT trajectory and have thus not evolved equally far. In some countries, fixed communications infrastructure has not yet been developed to support everyone's needs for phones and Internet. This does however not have to be an obstacle for success of the region. Countries lagging behind are jumping over development steps by skipping fixed telephone infrastructure extension and instead concentrating on mobile infrastructure. As there is an enormous unexploited potential, growth rates in these countries are very high. In Latvia and Lithuania, mobile subscriber penetrations are increasing exponentially. Mobile subscriptions have already outgrown fixed telephone subscriptions, as is shown in chapter 3.

One important asset of the BSR is its innovative culture. As has been illustrated, there are many promising initiatives that are expected to result in groundbreaking mobile services. There is also a potential for the region to gain competitive advantages using a somewhat different approach in the development of new mobile services.

The mWatch has discussed clustering concepts and proposed cross-border cooperation between various ICT clusters in the BSR. It has also introduced the concept of Mobile Readiness describing a region's preparedness for a mobile society.

Inspired by Michael Porter's approach, the **mWatch** has revised the Diamond clustering model to reflect the mobile services market. Below is a figure of the **mWatch Diamond** illustrating the relation between Mobile Readiness and the clustering concept. For each dimension of the Diamond, critical factors that can positively affect Mobile Readiness are presented. The model can be used as a tool for a region to increase Mobile Readiness and strengthen its ICT clusters.

mWATCH DIAMOND



Source: mWatch, inspired by Porter, M. E. (2001)

5.2 EXPLOIT MOBILE READINESS AND GIVE RISE TO A "SMART REGION"

In order to exploit Mobile Readiness in a systematic way, a concrete mechanism to measure it is needed. The proposed Mobile Readiness Index can serve as such a mechanism. By mapping strengths and weaknesses in mobility, the Index can evaluate Mobile Readiness of regions. This can help decision makers to gain understanding about needed improvements.

Factors that affect the birth of a networked economy manifest themselves in cultural, social and structural changes. National and cultural identity is an important source for value creation, but only on the precondition that people and countries engage in multicultural dialogues based on a multiethnic coexistence (Castells and Himanen 2002). The EU enlargement will help the BSR to become a globally competitive part of world economy. It will bridge borders between West and East. Bridge-building presupposes mobility in daily life throughout the BSR. This may result in strong regional cooperation and a mentality of innovation and change.

One obvious way to become a global leader in ICTs is to stimulate new and user-friendly communication services for citizens, businessmen and visitors, by combining state-of-the-art information technology with services for day-to-day living. The best way to achieve this is by facilitating braincirculation and establishing more Private-Public Partnerships. Setting up clear goals, suggesting the best ways for their achievement, as well as follow ups of the results constitute a constructive start towards transforming mobile visions into mobile realities. Further development of ICT clusters can be stimulated by building on the strengths that the member countries have, by removing obstacles, relaxing constraints and eliminating inefficiencies that impede productivity and innovation. Establishing a joint platform responsible for further exploitation of mobile readiness is a natural step.

Summarising the lessons learned when studying the kaleidoscope of mobile cases in the BSR, **mWatch** suggests the following ten steps to exploit Mobile Readiness in the region:

1. Network and cross-fertilise
2. Focus on end-user applications
3. Use the public sector – especially the cities administration – to stimulate new services
4. Share best practices
5 Stimulate more living labs
6. Consider regulations in the light of mobile service exploitation
7. Brand the BSR as a "Smart Region"
8. Secure efficient project coordination and fundraising
9. Visualise the importance of cross-border Private-Public Partnerships in the BSR
10. Establish a BSR secretariat exploiting the opportunities offered by ICTs

The proposed Baltic Sea ICT secretariat could serve as a coordinating platform, responsible for organising joint efforts in the field of ICT. Such a platform would help break down barriers that can hold back joint ventures. It can also help member countries, regions and cities to co-brand the BSR towards a "Smart Region" in the mobile society of tomorrow.

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A pdf-file of the mWatch report can also be downloaded from the Baltic Development webpage: www.bdforum.org

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BALTIC.CHALLENGE

BALTIC CHALLENGE – A PLATFORM FOR BUSINESS AND GROWTH IN THE BALTIC IT-REGION

The Baltic Challenge is a competition for promoting wider use of IT, showcasing best practises and economically sustainable models for how IT can be used within all society sectors. The Baltic Challenge creates a platform for increased co-operation between public, private and academic sectors ("Triple Helix") in questions involving user-oriented and driven development of IT applications, mobile applications, infrastructure and other.

The activities in connection with the Baltic Challenge; networking activities, seminars, exhibition, workshops and other exchange of experience and knowledge, create great possibilities for companies to find new business partners and an outlet for products, which render an increased internationalisation of the companies in the region, through spread of products and services on a large, geographically close market. The Baltic Challenge comprises Estonia, Latvia, Lithuania, Poland and the north-west region of Russia, as well as Belarus and Ukraine. The commercial actors in both the Stockholm region and the participating countries will have the possibility to be involved in the Baltic Challenge from an early stage, and take part in the positive development of the Baltic Sea region.

The competition will be launched in October 2003, and the first Baltic Challenge final is planned to be held in October 2004. The City of Stockholm Economic Development Agency has in co-operation with Baltic Alliance of Regional Development Institutions (BARDI[1)]) formed a partnership consisting of companies, organisations and public institutions in the region, which is responsible for developing and implementing the Baltic Challenge.

The Baltic Challenge was initiated by the City of Stockholm Economic Development Agency, and is developed within the framework of the Baltic-Sea Billion. The Baltic Challenge is formed on the basis of the experiences made by the City of Stockholm in the Stockholm Challenge Award. Through the international profile and the network already established in the Stockholm Challenge, the Baltic Challenge will also strengthen the position of the Baltic area on the international market, in a long term perspective.

[1)] BARDI is a foundation associating institutions and agencies of regional development from the Baltic Sea Region. The seat of BARDI is located in Gdansk, Poland. BARDI was established in 2001, as a non-profit making, non-governmental organisation aiming at integration, cohesion and sustainable development of the Baltic Sea Region. International network of co-operating institutions of regional development is focused on: Promotion and strengthening their role through exchange of experience and know-how, common projects, common representation; Co-operation with regional, national, European and international bodies, especially the European Union institutions.

From the time of the Hanseatic League to the current Baltic Sea Region, mobility throughout the territory has always been on top of the agenda. Today, information technology and mobile services have given a new dimension to mobility.

The **mWatch** illustrates the exciting initiatives taken by cities, companies and academia in all corners of the Baltic Sea Region.

I believe that the Baltic Sea region can become a frontrunner in the global economy by sharing knowledge and best practices. Let the mobile cases and cooperation proposals presented in **mWatch** act as an inspiring appetizer for further exploitation.

Uffe Ellemann-Jensen
Chairman of Baltic Development Forum

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