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INFORMATION AND COMMUNICATION TECHNOLOGIES AND RURAL DEVELOPMENT

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Preface

Bridging the digital divide is one of the greatest challenges of the Information Society, a matter of concern in terms of social cohesion, economic development and territorial balance. The opportunities of a networked world are great, but as is always the case with major technological breakthroughs, certain groups and territories have easier access than others.

This report, covering social and economic aspects as well as technical ones, underlines the major issues concerning rural development in the light of Information and Communication Technologies (ICT). For rural areas there are risks related to a lack of strategies or plans for action. The hurdles, whether overcoming scepticism or mobilising adequate financial resources, cannot be ignored. But there are immense promises that some pioneering rural regions and communities are successfully beginning to achieve. This is illustrated by case studies conducted in five OECD Member countries highlighting preliminary but positive results and analysing strategies and methods of implementation.

This work has received support from the Ministry of Public Works, Housing and Transportation (France) and the Countryside Agency (United Kingdom). Philip Wade, working in the Division for Territorial Development Policies and Prospects of the OECD Territorial Development Service, has prepared the draft report, which was approved by the Working Party on Territorial Policy in Rural Areas in December 2000 and subsequently by the Territorial Development Policy Committee (TDPC). This study is to be followed by one addressing these issues in cities and urban areas, usually benefiting from adequate telecommunications infrastructure and services, but where mainly social and financial barriers must still be overcome.

Bernard Hugonnier
Director
Territorial Development Service

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Foreword

Globalisation is fast changing the world we are living in, for better or for worse, and the long heralded global village is now emerging. One of the main instruments behind these major changes is Information and Communication Technologies (ICT) and particularly the Internet, point of entry to the networked planet. In this context, are rural areas left behind? Is physical remoteness still an obstacle to economic development? Is delocalisation more a myth than a reality? In other words, can hi-tech comfortably settle in the countryside?

These are but some of the questions that this report seeks to answer. In doing so, identifying relevant projects that can be reproduced in other rural settings was an important step. Subsequent field visits in five Member countries facilitated meetings with people who are true actors in rural areas of either the Information Society or the New Economy. This rewarding experience usefully illustrated some of the possible synergies favouring a new approach to rural development issues and policies.

More and more rural areas world-wide are taking initial steps to harness the potential of ICT. Interesting projects exist in other countries than those visited. May this publication not only help to promote fruitful exchanges between these different experiences and approaches, but also facilitate identification and dissemination of other best practices. Shortening the learning curve by easily sharing valuable information on methods, difficulties encountered and results attained, is but one of the new possibilities opened by the aforementioned networked world.

In the meanwhile, may those who were particularly instrumental in the initial process of identifying some of the relevant experiences or of supplying a first hand view of things on the field, be thanked here for their contributions:

- **Canada**: Brian Beaton, Project Manager, Keewaytinook Okimakanak Smart Community, Sioux Lookout, Ontario; Elinor Bradley, Smart Community Program Director, Industry Canada, Ottawa; Daniel Deneault, Consultant, Rawdon, Matawinie, Quebec; Robert Leitch, Executive Director, Lanark Communications Network, Perth, Ontario; Steve Gurman, Smart Community Program Officer, Industry Canada, Ottawa.

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- **France**: Jérôme Chaussoneaux, Parthenay digital age town Project Manager, Deux-Sèvres; Benoît Michenot, ICT Development Agent of the *Pays de Gâtine*, Ménigoute, Deux-Sèvres; Pascal David, ICT Advisor, Poitou-Charentes Regional Council, Poitiers, Vienne.
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- **United States**: Ken Bandelier, President, Dillon-Net, Dillon, Montana; Nellie Bandelier, Dillon-Net, Dillon, Montana; Brian Staihr, Senior Economist, Center for the Study of Rural America, Federal Reserve Bank, Kansas City, Missouri; Bruce Terpening, President, Maddock Economic Development Corporation, Maddock, North Dakota.

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Introduction

Information and Communication Technologies (ICT) are progressively penetrating all areas of economic and social activity while a New Economy and an Information Society are beginning to emerge. The importance of these far-reaching phenomena are such that governments have taken major initiatives to accelerate developments, while also taking steps to ensure widespread dissemination, avoiding the creation of a digital divide. This report addresses specific strategies relevant to the dissemination of ICT in rural areas.

Within OECD Member countries, there potentially exists the risk of a territorial digital divide between urban and rural areas. Natural market patterns tend to focus investment in advanced telecommunications infrastructure and services in cities and major metropolitan areas where most important customer bases are situated. This imbalance can be aggravated by other factors such as access to education and training, since the New Economy is basically knowledge oriented.

On the other hand, ICT offers opportunities of renewed development for many rural and remote areas having long experienced economic decline and outward migration. These technologies limit the impact of time and distance factors in production of services that now represent the main economic sector. A growing number of activities are performed in multiple locations that are not necessarily urban. Given proactive policies, particularly to implement proper telecommunications infrastructure and ensure adequate educational and training opportunities, certain regions, communities and towns are beginning to harness the potential of ICT for their development. Sustained by innovative approaches concerning the delivery of basic public services on-line and local governance, forward looking projects of this kind can strongly contribute to economic regeneration of rural areas.

Such success stories are the more remarkable since they often appear in a context where they are not systematically encouraged and fully supported at the national level. Information Society strategies partially address the requirements of rural areas through different economic, social and educational programmes but there is not necessarily a coherent territorial view of needs and impact of measures. Public agencies, operating along traditional administrative boundaries, do not naturally co-ordinate and focus efforts with a view to spatial policy.

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In such an environment, lack of awareness at the local level, both in the public and private sectors, concerning ICT potential and useful strategies, hinder progress. These findings underline the need for specific policies inspired by the same principles as those of universal service that brought basic telephony to all geographical areas, under cost-affordable conditions, for citizens and businesses alike. Public subsidies alone are excluded, but new and innovative partnerships with the private sector can be devised and are encouraged by many governments. In this respect ICT policies in rural areas can be structured around three main categories: generic, social and economic, each analysed in the report.

Amongst *generic policies*, the main theme, with strong regulatory and financial implications, concerns deployment of advanced infrastructure in rural territories that needs to be supported provided there is a good business case showing direct economic benefit such as attracting new activities. Reference to a coherent ICT development model, based on strong support from the population, is also essential. Proper measurement of impact will require in the future the definition of a set of internationally recognised indicators.

S*ocial policies* for the development of ICT in rural areas are strongly focused on public access points, to develop awareness and training, their long-term sustainability being a major concern. Delivery of public services on-line can also permit access to distant specialised skills, whether in the education or health sectors, which are normally available in major urban areas only. Similar advantages can be obtained on-line for other public services requiring an information search, accomplishing a mandatory formality or payment such as in the case of taxes. Far-reaching e-government initiatives of this kind can greatly benefit rural areas. The potential impact on local governance is just as strong, insofar as ICT, introducing a greater transparency in the decision making process, can efficiently associate citizens.

E*conomic policies* concerning ICT in rural areas must basically address the needs of small businesses, often unaware, at least for the smallest, of the potential benefits. These concern extension of the customer base through new marketing techniques as well as development of new products and services. E-commerce can widen the geographical reach within the domestic market and even open new possibilities on the export level for local firms. Training appears essential and the specific needs of rural SMEs, often operating in traditional sectors, should be taken into account. Sustaining the existing fabric of enterprise is not incompatible with projects and incentives to bring new activities to rural areas, creating new value added jobs. With adequate attention to minimal telecommunications requirements, telebusiness and call centres, telework but also hi-tech rural start-ups are the main possibilities. They have been successfully implemented in several locations in different countries.

Convergence of national and regional generic, social and economic policies for the implementation of rural ICT strategies resting on local projects and support

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can strongly contribute to an increased attractiveness of territories. This new vision and the sense of opportunity it entails can be instrumental in reversing negative demographic trends and in attracting inward investment. Technical issues are secondary in such a context as compared with raising awareness and developing the territorial business cases that will justify investment to finance technology required for that purpose.

Mandate and method

The Working Party on Territorial Policy on Rural Areas included in the Agenda for its first meeting on December 6th and 7th, 1999 a discussion on "Information and Communication Technologies and Social Cohesion: Instruments for Territorial and Societal Development" [DT/TDPC(99)19]. On this basis, the Working Party decided to launch a study on "Information and Communication Technologies and their Implications for the Development of Rural Areas". The study began in April 2000 with a background paper and questionnaire that were presented to the Territorial Development Policy Committee on July 12th [Room document No. 3]. Following approval, this document was sent out to Member Countries on July 21st.

The analytic report was approved by the Working Party on Territorial Policy in Rural Areas on December 13th, 2000. It was prepared using the following sources:

- Official information, studies and reports available on the Internet and in printed form.
- Academic research material.
- Articles published in the general press and in specialised media.
- Information gathered during field visits to information and communication (ICT) projects located in five different countries.

The projects visited are situated in France (Parthenay, Deux-Sèvres, Poitou-Charentes region), the United Kingdom (Highlands and Islands of Scotland), Ireland (Shannon Region and Southwest Region), Canada (Matawinie County in Quebec, Sioux Lookout in north-western Ontario) and the United States (Dillon, Montana and Maddock, North Dakota). These projects, situated at different geographical levels, are presented as case studies within this report.

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Part I

ICT ISSUES IN RURAL AREAS

Issues and perspectives

The Information Society and the New Economy, based on virtual networking and knowledge oriented activities, are rapidly becoming a reality, particularly in the case of OECD Members. ICT is now a leading industrial sector in a growing number of countries, as many indicators show. Information and communication technologies (hardware, software and services) already account for approximately 5 per cent of GNP in several countries. They represent the highest growth rates as well as the most important contribution to the creation of new jobs. In spite of the accelerated pace of these developments, due to a favourable regulatory context and market oriented processes, take-up, as compared with identified potential in many areas, is still in the early stages.

Governments, aware of the strategic importance of ICT for future growth and development, have taken major initiatives to raise awareness amongst the general public and businesses as well as support implementation of ICT in various sectors. Far-reaching programmes have been developed to generalise use of these technologies in education and in the field of public health, but also for small and medium size businesses, while encouraging creation of firms directly linked to the New Economy. These national programmes, although often completed by regional initiatives, seldom distinguish urban areas from rural ones and progress is usually monitored without specifically singling out achievements from a territorial point of view. Since these programmes operate along traditional administrative boundaries that are not generally organised around such distinctions, they cannot readily deliver detailed information concerning their application in rural areas.

Even if it appears difficult to evaluate the impact of these initiatives in rural areas, available information tends to bring forward a certain number of basic findings. The first is that remoteness, lower population and cultural factors render implementation of ICT projects more difficult and proportionately more costly than elsewhere. Basically, the question of ICT development in rural areas is addressing a digital divide issue. The digital divide is usually considered in social

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and economic terms that concern the barriers to access for the least favoured groups in society. This applies to both urban and rural areas, but in the latter other handicaps exist as well. A lower degree of awareness and a less natural openness to innovation are intangible factors and their weight cannot be ignored. Lack of advanced telecommunications infrastructure, capable of supporting new ICT applications and services, moreover, creates on the other hand a very tangible technical and financial barrier in such territories.

It appears particularly useful from these different points of view to make a parallel with the situation of the developing world as regards ICT. The purpose of such a comparison is not to dramatise the situation, as rural areas in OECD countries, even if they lag behind cities in ICT deployment, all benefit from telephone service, which is not the case for many parts of the lesser-developed nations. Nonetheless, the issues, even if at another scale, remain basically the same, whether lack of proper telecommunications infrastructure, awareness or resources. This is fully substantiated by analysis of the different criteria for "readiness in the networked world" such as established by the Information Technologies Group of the Centre for International Development of Harvard University, which can be consulted at *readinessguide.org*.

This having been stated, the implications of ICT for the development of rural areas can be seen in terms of risks and opportunities. The risks are those of seeing ICT infrastructure and services continue being deployed preferentially where the most important and receptive customer bases are located. This would leave many rural citizens and businesses out of the Information Society and the New Economy for a long time, and probably aggravate existing economic difficulties. The opportunities, on the other hand, offer added value, since ICT tends to diminish the constraints linked to time and distance. A certain number of activities can now be located outside of traditional production centres, whereas a wide range of public services can be efficiently delivered through ICT to sparsely populated or remote areas. The potential is undeniably there and initial achievements substantiate this. Proactive and specific policies appear necessary to surmount the above-mentioned handicaps and spark the process.

Risks and opportunities appear in three major areas that will be specifically addressed: fundamental issues common to all policies and projects, societal concerns addressed directly or not, and overall economic development.

A*mongst the fundamental issues*, the most challenging one concerns telecommunications infrastructure since it conditions proper roll-out of ICT and brings forward complex legal and financial questions. The matter of understanding if there are any appropriate ICT development models applicable to rural areas may not appear as critical but it can avoid some costly mistakes. Lastly, monitoring progress

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and measuring results of specific projects with standard indicators would help in shaping future strategies.

S*ocietal issues* are extremely important since ICT dissemination is sought in a perspective of digital inclusion. Public access points, created to further awareness and offer proper training, appear to be a crucial focus point of government policies. E-government and the on-line delivery of public services are also of particular importance in rural areas, often at a disadvantage today from that point of view. Finally, the future impact of ICT on local governance, although limited for the time being to a few innovative projects, could be far-reaching.

E*conomic development*, whether sought through specific policies or projects or resulting from the creation of a favourable environment, is a goal pursued through a diversity of national, regional and local ICT initiatives. ICT can increase the efficiency of SMEs, develop their customer base and open new markets. Bringing in new activities is just as important, to partially compensate the decline of certain traditional activities, while spreading innovative entrepreneurial models. Lastly, synergies in ICT strategies can increase the attractiveness of rural areas for inhabitants and investors alike.

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Chapter 1

Fundamental issues

Introduction

ICT in rural areas suggests that recent technological evolutions require a different approach to rural development and spatial policies alike. The use of new advanced services in rural areas is an issue because of the high cost of deployment of the corresponding wide-band infrastructure. To put such questions in proper perspective amounts to reflecting on the ICT development model that would be most adapted to rural areas.

Proper implementation of ICT in rural areas thus requires addressing the three following issues:

- Telecommunications infrastructure and services.
- Choice of ICT development model.
- Methods for observation and measurement of results.

Telecommunications infrastructure requirements, concerning in particular delivery of advanced services, do not benefit from the mechanisms of Universal Service that brought basic telephone service to the most remote areas on a competitive basis. Important technical and economical obstacles to deployment of high speed, broadband infrastructure remain today but local authorities are playing an increasing role in an area where most recent regulatory measures give them increased leeway. A certain number of regional or local initiatives in this field have been successful in furthering economic development.

ICT *development models* are not necessarily explicit. They follow several different approaches that are more or less understood and shared by the main actors and the local population, social pull appearing always preferable to technological push. ICT development models can either be endogenous or exogenous. Spatial policies are just beginning to integrate the new parameters brought forward by ICT.

Observation and measurement in the field of ICT, particularly in rural areas, is far from being harmonised within a given country and even less on an international level. This situation has encouraged horizontal approaches on a national level as well as on a European one to set common standards for multiregional projects.

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Such a solution permits to better monitor project advancement, exchange useful information and define best practice criteria.

1. Telecommunications infrastructure and services in rural areas

Introduction

Universal telephone service, which means reaching all inhabitants without discriminatory pricing, whether living in rural or urban areas, has been a reality for many years now in North America, Europe and many countries in Asia and the Pacific. Telephone service is considered as a basic public commodity along with electricity, water, sewage treatment and roads. To ensure the equality of pricing between urban and rural areas, often remote or sparsely populated, universal service provision enacted into law obliges telecommunications operators to practice uniform rates, independent of number of customers in a given area or cost to reach them. This notion of public service was imposed more than fifty years ago in most countries on the historical operator, usually benefiting from a legal monopoly. This obligation was often completed by a complex internal funding mechanism that permitted to cross-subsidise users in rural areas through the revenues procured by urban and mostly business users.

With deregulation and the introduction of competition the basic provision for universal telephone service has been maintained to avoid unfair or discriminatory practices that would have led the new operators to concentrate on the areas with the widest customer base or the highest rates of usage. To avoid this, the funding mechanism has been extended to the new operators, who compensate the privatised public operator for incurring most of the cost of providing telephone service in areas with the lowest population density. This legal obligation concerns telephone service and, by tariff and technical extension, basic Internet access time, priced at the rate of local calls. It does not apply to digital data transmission or to the range of new broadband services aimed at business but that the general public is also concerned by, if only to benefit from high speed access to the Internet. This exclusion is not necessarily applicable to advanced services used by public health or educational institutions in certain countries where reduced rate mechanisms have been adopted.

a) Technical and economic obstacles to ICTs *in rural areas*

Data transmission was the first level of services not submitted to the obligations of universal service, the most widespread application today being ISDN (Integrated Services Digital Network). ISDN is an offspring of packet switching resulting from the conversion of telecommunications operators to digital technologies, offering higher data transmission rates than analog technology. ISDN, which

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developed in the eighties, is now commonplace in most industrialised countries, offering basic access at 64 Kbps for various uses: data transmission, videoconferencing (and now higher speed Internet access up to 128 Kbps). The standard service usually covers most rural areas but often leaves out a small fraction of the population (10% in France) that can only be serviced at request and at a higher cost. Even in rural areas where the basic offering is generally available, not all potential customers are serviced, as they must be located at a minimal distance (a few kilometres) from the local exchange. Aggregation of demand can be a way to solve the problem when the telecom operator is willing to install the necessary equipment to be used by several customers.

Digital technology is also one of the success factors of mobile telephony, introducing capacity, technical flexibility and easier coverage than the first analog offerings. Nowadays mobile service at very competitive rates is available in many countries, in urban as well as in rural or remote areas, but although up to 95 per cent of the population is often serviced, sometimes notable portions of territory (mountainous zones) have sketchy coverage or are totally out of reach. Sharing of infrastructure by operators is sometimes an answer, if there is the guarantee of a minimal customer base. Another possible approach, but at a much higher cost for the user (at least 30% more), concerns the new satellite systems being developed with the objective of bringing telephony and data services to areas not covered by present day networks.

Existing satellite systems for business uses in remote areas do not necessarily offer the same flexibility as terrestrial links, since available bandwidth is high for the downlink but far more reduced for the uplink. This will change with the next generation of satellite constellations (Skybridge and Teledesic) that will offer rates of 20 to 100 Mbps, but at a price not yet announced. Cable TV systems can sometimes offer an interesting alternative, if the local operator is willing to up-grade the network. With cable, effective downlink speed is situated between 64 Kbps and 1.5 Mbps and 512 Kbps for the uplink. The penetration of cable is nonetheless quite variable from one country to the other and is often concentrated in urban areas, even if there are exceptions in North America and some European countries. There is no reason to believe that difficulties experienced up to now by rural areas in obtaining certain services because of investment costs will not be repeated with the new mobile Internet applications. WAP (Wireless Application Protocol) and the future UMTS (Universal Mobile Telephony Service) that is to succeed to GSM (Global System for Mobility) could very well meet the same obstacles in rural areas.

The structural disadvantage of most remote or rural areas concerning new telecommunications infrastructure and applications already appears for access to the latest broadband multimedia services. The spectrum of technical solutions available all the way to the user's end are in effect not economically feasible in

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small communities for the operators, whether by wire or not. The unbundling of the local loop under way in Europe, that is compulsory since January 2001, will facilitate high speed, competitive Internet access offerings, in particular with ADSL (Asymmetrical Digital Subscriber Line) technology. ADSL allows for that purpose speeds of 1.5 Mbps to 8.5 Mbps on the downlink and 64 Kbps to 640 Kbps on the uplink, as compared with 64 Kbps rates on most networks today. At this stage operators plan rollout only in medium sized or bigger cities.

In France, the minimal population initially retained for ADSL is normally 60 000. The notable exceptions to this sequence are two of Europe's digital age towns, Parthenay (France) and Ennis (Ireland), where ADSL will be tested and implemented in a very specific environment with a high percentage of the population accessing the Internet as compared to the national average. The local radio loop, which is a cost-effective way for the new telecom operators to compete with the historical operator, constitutes a technical alternative to the unbundling of the local loop. In France, winning operators in a nation-wide competition have accepted to service 150 cities and towns with a minimal population of 30 000 within the next four years.

Whatever the technology, initial investment costs are such that telecom operators will concentrate on areas, mostly urban, where the largest customer bases and the most important business users are present. The layout of fibre optic networks have responded to the same constraints, with operators concentrating on trunk lines between big cities to carry most traffic and satisfy the needs of major business users, facilitating in the process local urban access. Until recently, following the logic of a market-oriented economy, such a situation was not necessarily perceived as a problem for rural areas. Major international corporations, by definition, would never set up activities in a rural environment and as far as the general public is concerned, needs for high bandwidth would be irrelevant. Such was the case before the emergence of the Internet as a strategic tool for businesses worldwide, big or small, as well as a new communication media for the public. In a New Economy, characterised by knowledge based activities, delocalisation and e-commerce, this is not true any more. Proper telecommunications infrastructure in rural areas appears today just as important as roads, rail-roads and air links were perceived at their inception.

b) National initiatives and the increasing role of local authorities

Just as for these traditional, physical means of transportation which came to rural areas later and often on the basis of pro-active public policies to secure economic development or limit/reverse negative population trends, securing adequate broadband telecommunications requires specific measures. The deployment of such infrastructure, now in the hands of private operators, seems too costly to launch

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national programmes, although some countries have made such announcements and are going ahead with plans in that direction.

F*rance* has taken measures at the end of 1999 to offer access to a 2 Mbps link to all citizens and businesses by the year 2005. The cost of additional nation-wide infrastructure is evaluated at 2.5 billion Francs, with 500 million allocated by DATAR, the public body devoted to regional development, the remaining investment to be covered by various ministries and the regions. S*weden*'s broadband initiative will roll out in several stages, for a total cost of 8.3 billion Swedish Kroner (SEK), equivalent to more than 800 million US dollars. A commercial backbone network to all municipal centres is planned by the end of 2002, for a total investment of SEK2.5 billion. Government funding will cover regional line connections from 2000 to 2004 at an additional cost of SEK2.6 billion. A government grant to local authorities and tax relief to subscribers over the same period will amount to SEK3.2 billion. These last two measures are designed in particular to facilitate access to the broadband network in sparsely populated areas. C*anada* also announced in October 2000 that high-speed broadband access would be available to all communities by the year 2004, leaving to a task force the responsability of making recommendations on how to attain this goal. Referring to remote and rural communities, the announcement specifically refers to "*the needs and characteristics of communities which without government involvement will not likely gain access to private sector delivered high speed services by* 2004".

In the meanwhile, many countries have implemented a good grid of fibre optic trunk routes, including links to medium sized cities. The challenge for rural towns and areas is to connect to these lines with sufficient bandwidth to offer new services to local businesses and the population and possibly secure inward investment. Insofar as the private sector is not willing to go in that direction without a sufficiently important customer base to begin with, regional or local authorities in most countries cannot avoid tackling the problem, possibly investing some public money to secure the proper infrastructure. Implementing such a strategy, notwithstanding the legal and regulatory framework, supposes that the relevant public body is able to deliver a satisfactory business case. The logic is that the investment should not have to be subsidised once launched but used at a sufficient level to become profitable and contribute to the general economic well being of the community by helping local businesses and by attracting inward investment. This of course requires imagination and vision, as the future cannot uniquely be seen as developing existing economic activities but in creating others linked to the New Economy, to compensate for the decline of certain traditional sectors. This has been accomplished with success in a certain number of regions or communities that have been analysed in this report as case studies that will be presented further.

T*he legal and regulatory framework* in a growing number of countries now allows local authorities to take these matters into their own hands if the private sector is

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unwilling to do so. In France a law passed in June 1999 authorises local public investment "if the offering of broadband services or infrastructure cannot be supplied by the market at a reasonable price or does not comply with the technical or quality requirements expected". The local authority cannot operate the infrastructure thus financed. It must be leased to an operator in a non-discriminatory fashion, with public expenses to be recovered after an eight-year amortisation period.

In the United States, the Telecommunications Act passed in 1996 does not preclude local direct public investment in telecommunications infrastructure if the market does not supply the expected (level of) service. State regulations vary on the conditions to be observed in that case and there is a certain margin of discretion. For that purpose the operators have brought some cases to court, obliging the local authority to limit it's intervention, insofar as the operator could prove it's willingness to bring the required service to the area concerned under competitive terms. In many cases the fact that the town was going ahead with a strategic plan to develop infrastructure and services was enough to incite the operator in delivering the expected services at a reasonable price, thus finally not requiring the local public authority to intervene itself.

This context could change radically should the present definition of universal service be extended to include advanced services, since the 1996 Telecommunications Act remains open to such a possibility. It states in article 254/c/1 that "U*niversal service is an evolving level of telecommunications services that the* F*ederal* C*ommunications* C*ommission* (FCC) *shall establish periodically taking into account advances in telecommunications and information technologies and services*". Of course such an extension would probably be rather complex to implement. On the basis of this mandate, with the growing realisation that broadband services are essential to future economic development of both urban and rural areas, the FCC will have to consider whether and how the present definition of universal service should be modified. The stakes for rural areas are analysed in detail in an official report released in April 2000, entitled "Advanced telecommunications in rural America: the challenge of bringing broadband service to all Americans". This report, jointly published by the Department of Commerce, the National Telecommunications and Information Administration (NTIA) and the Department of Agriculture is available on *digitaldivide.gov*.

c) Successful examples of local public financing of telecommunications infrastructure

Local initiative in the field of telecommunications infrastructure exists in many countries at different territorial levels: township, grouping of municipalities, sub-region and region. The examples presented here show that effective telecommunications strategies do not respond to a single territorial model. Likewise, initial motive of intervention can be linked either to emphasis on public services or

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on enterprise. In the first case the network will ultimately also benefit local businesses as well as the general public. In the second, the infrastructure will also facilitate delivery of on-line public services to all users, particularly in rural areas. Sometimes the two approaches are not as clear-cut and local investment in telecommunications infrastructure is motivated both by public and private concerns. In all cases the measure of success will be both in rendering quality public services, even in remote areas, as well as creating new jobs and activities.

Initiatives driven by public service considerations

At a regional level, the policies pursued by the *Southwest Region of Ireland* concerning telecommunications infrastructure rest on considerations linked to delivery of public services in rural and remote areas. The working group on public services within the regional ICT programme called STAND (Southwest Telematic Area Network Development) took the lead on examining the possibility of creating a broadband ATM system. It was decided that the region's public services would constitute a single customer for these applications, since their combined phone bills already represent the largest single telecommunications account in Ireland. Response from the operators was very positive, as they need a significant customer base for the rollout of broadband. The first result is the implementation of an ATM line between Cork City and Tralee (pop. 20 000), first linking the Institutes of Technology. Extension of network into more rural areas is under study, with applications contemplated in distance education and telemedecine.

Norfolk, Nebraska, (USA), with a population of 24 000 (plus 11 000 in adjacent areas), located 100 miles Northwest of Omaha, has implemented a state of the art telecommunications infrastructure to improve efficiency of public services. A fibre optic network links all city facilities and the excess capacity is sold to other users. The system was not deliberately overbuilt so the city could get into ICT businesses but to allow for schools and hospitals to dispose of sufficient capacity when they would need it. This initiative also led the local operator, US West, to upgrade its service in the area by offering DSL (digital subscriber line), which is not normally offered in such small towns.

Initiatives driven by economic development policies

The *Shannon Region of Ireland*, which comprises all of the Midwest and parts of the Southwest, is carrying on ambitious development plans in the field of ICT. The objectives are to sustain local businesses, encourage the creation of start-ups linked to the New Economy and attract inward investment. These goals fully integrate a spatial policy approach so that rural areas also benefit from the creation of new activities and jobs. A high level of priority is thus put on broadband telecommunications infrastructure, to create a regional network of technological innovation

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nodes, as satellite centres to the National Technological Park (NTP) located in Limerick. Just like the NTP, these technological nodes are located in an upper learning environment and will dispose of a fibre optic ring ensuring adequate capacity for new businesses. The Ennis information age town is one of these five nodes and new companies have already located there.

Whereas the preceding project is just starting, the *Highlands and Islands of Scotland* already have a more than ten year experience in the field of telecommunications investment implemented successfully as a policy to promote direct economic development. In 1989, the Highlands and Islands Development Board (HIDB) decided upgrading the area's infrastructure to the latest digital standards including ISDN. This was a direct consequence of the fact that the main telecom operator (the newly privatised British Telecom) was initially planning to bring such technology only to Inverness (40 000 inhabitants), the local capital. In a context of decline of traditional agricultural and industrial activities, local development authorities had come to realise that emerging services such as call-centres would locate in Inverness and that the rest of the area would have very few new economic opportunities. The far-reaching decision to deploy digital telecommunications in all of the Highlands and Islands is the combined result of successful negotiations with British Telecom and direct public investment. It constituted a paradigm shift in economic policy and also a calculated risk that was finally accepted by the British Treasury.

These discussions led to the implementation of a £20 million project with a 25 per cent share of public investment. By 1992, 80 per cent of businesses and 75 per cent of the population were within reach of ISDN. An extra £4.86 million were allocated (£1.8 million in public and European funds and £3 million from British Telecom) to bring ISDN to the most remote areas, particularly in the Islands, before the end of the year 2000. The availability of such infrastructure, continuously upgraded, coupled with a highly educated and skilled workforce as well as attractive packages for investors, brought inward investment to these rural areas and generally reversed the negative demographic trends. Today there are more than 2 300 employees in 17 telebusiness locations in the Highlands and Islands, including call centres servicing world class companies. Further detail concerning the strategy deployed by Highlands and Islands Enterprise, successor to HIDB, and the results achieved, is provided in the corresponding case study.

Digital age towns and smart communities, a multifaceted approach to infrastructure concerns

The notion of a "digital age town" or smart community is by definition all encompassing, and whatever the social and/or economic objectives, the goal of a high level of equipment and usage by households and businesses alike requires proper infrastructure to begin with. The driver here is the project in itself, the

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infrastructure being designed to support high rates of usage from the general public as well as by businesses and public services. A local network with adequate capacity, capable of supporting high-speed applications can also be a way, in an innovative environment, to attract investment that would normally locate in better-equipped urban areas. The two foremost digital age towns in Europe are Parthenay in France and Ennis in Ireland. Concerning involvement of local authorities in telecommunications investment, only Parthenay appears relevant. The high level infrastructure laid out in Ennis is in effect part of the award delivered by Eircom, the main telecommunications operator, after its choice of the digital age town of Ireland at the term of a national competition. In Canada, the Lanark smart community is based on similar concepts but at the level of a county.

Parthenay (12 000 inhabitants), located in Poitou-Charentes, started its digital age town project in 1996 with two main goals: using ICT to develop social cohesion and facilitate access to public services on one hand and to further economic development on the other. Both objectives required an adequate local network with a high level of service. For that reason, Parthenay decided to install a local fibre optic network linking all public services and facilities, schools and libraries. The capacity of the network was progressively increased to attain 100 Mbps today. Simultaneously the District of Parthenay obtained from France Telecom a 2 Mbps Internet access normally available only in bigger cities. The infrastructure deployed in Parthenay has been instrumental not only in helping local businesses adapt to the New Economy but it has also played a decisive role in attracting new dot com start-ups to the area. The ICT sector, practically inexistant a few years ago in Parthenay, now comprises 22 firms employing 63 people.

Lanark County (3 000 km^2), located south of Ottawa, has 60 000 inhabitants, with half living in four towns of 5 000 to 10 000 people. In 1996, the municipalities, local public bodies (schools, hospital) and the private sector got together within a Not for Profit Corporation with the goal of implementing a high-speed network through a proactive approach aggregating demand. The business case thus developed led to discussions with operators and Bell Canada was retained for this ambitious project. The agreement signed in November 1999 concerns the implementation of a countywide network responding to both public and business needs, with speeds adapted to user requirements from 56 Kbps to 1 536 Kbps (T1) in a first stage, with increase planned to a 10/100 Mbps capacity. The network based on an advanced Internet Protocol (IP) design uses Frame Relay and Asynchronous Transfer Mode (ATM). Frame Relay is a packet switching protocol that provides efficient control of data transmission while ATM allows better utilisation of capacity through bandwidth management. The project represents a total cost of more than C$12 million, Bell Canada investing C$7 million in the venture, federal, provincial and local public funds contributing for C$3 million and local businesses C$2 million. The Lanark Communications Network project, besides significantly bringing down usage costs for

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public bodies and businesses, is the foundation of a smart community project (*thelcn.on.ca*), with applications in various fields such as health and education.

2. ICT development models

Introduction

Various strategies at different territorial levels, led by both the public or private sector as well as general interest groups, are being deployed to develop the Information Society and the New Economy. From the national level to the region or state and down to counties, townships and associations of local authorities, actions underway can be classified or at least defined by certain characteristics evolving around different development models. These models are usually paired to their opposite, even if this oversimplifies reality. The twinned concepts that can be put forward are:

- technological push versus social pull;
- bottom up versus top down;
- infrastructure led versus content and service led.

Notwithstanding the fact that actions launched are often a mix of concepts, these categories ignore two strong factors that permeate them all: the role of knowledge and the capacity of the population to maximise theoretical benefits of the Information Society and the New Economy. This of course is linked to the learning environment, the degree of awareness concerning the stakes at hand and overall educational and training programmes implemented to ensure the best possible adequation between technology and it's effective appropriation by different users. In this context, cost factors with the corresponding financial barriers to access should also be taken into account, with special attention to measures conceived to overcome this.

In the end the major question concerns the impact on territorial development and spatial policy. ICT does open new opportunities for rural and remote areas but urban areas, where the biggest customer bases and the most important business users are concentrated, receive strong benefits through market processes. This is not the case of rural areas where the potential of ICT can be exploited only if proactive policies at different territorial levels create a favourable environment. This will help develop local businesses by use of ICT and strongly contribute towards attracting new investment. If telecommunications infrastructure plays a key role in this process, other factors characterising effective social appropriation of ICT potential are crucial and underlie the different models that will now be analysed. The degree to which this is effective could differentiate between endogenous and exogenous models of regional development based on ICT.

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a) *Distinctive approaches to* ICT *development*

The above mentioned models refer to different criteria but they can be regrouped as certain characteristics are by definition incompatible. An infrastructure-oriented project is necessarily top down and a social pull project can only be bottom up. For this purpose the six models can be reduced to two basic ones. On one side technological push projects are usually infrastructure (and equipment) oriented in a top down approach. On the other hand social pull projects are usually content or service oriented and proceed by definition bottom up. These distinctions are applicable at a micro-territorial level, that is to say a town, where social momentum and community support can be monitored. The Canadian Smart Communities Program (*smartcommunities.ic.gc.ca*), which led to the selection in May 2000 of 12 projects, one in each province or territory, put emphasis on involvement of the local population in conception and implementation. Winners were awarded up to C$ 5 million over three-years to match equivalent local contributions.

At the level of a region, even if ICT awareness is high, as is the case of Scandinavian countries, such an approach is irrelevant. Social pull, bottom up, service oriented projects suppose in effect some amount of initial involvement of the population, which is only possible when specific local needs are identified and perceived. The difficulty in regional programmes such as RISI (Regional Information Society Initiative) with 22 European regions participating, resides in effective mobilisation of the population. The challenge is to create an environment, through proper measures concerning awareness and training, that will tend to transform, at the town level, a proactive regional policy into multiple local projects with full involvement of inhabitants. Of course, if this policy can also rest in part on one or more local champion projects, this can be very helpful in creating and sustaining the necessary momentum. Poitou-Charentes, one of the 22 RISI regions, has thus fully integrated the digital town of Parthenay as a major actor in its project.

Insofar as social pull appears to be an important factor in ICT dissemination it is interesting to analyse the respective experiences, to this day, of the two most ambitious digital age town projects in Europe, Parthenay (France) and Ennis (Ireland). The P*arthenay* project (*district-parthenay.fr*), started in 1996, has been planned and managed with the goal of actively involving the local population as much as possible in it's implementation. To do so the first steps of the project, partially financed through European funds, sought to precisely identify expectations concerning ICT, level of awareness and groups that could be active supporters and users. From the beginning the project leaders, particularly the mayor, also a successful businessman, considered that a digital age town required a dense network of human relations to sustain it. In Parthenay, getting this accomplished meant integrating some of the numerous associations (more than 250) into the project and presenting it as a way of strengthening local democracy.

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These various associations became key actors in content supply for the local Internet site called "In Town Net", particularly in the field of cultural heritage and events and in the field of social action. On the "In Town Net", all information suppliers update regularly their own information and maintain their part of the site. This is the case for schools, libraries and various institutions as well as for businesses. The basic idea is to facilitate access to practical information for all citizens including municipal information. For this reason, a far-reaching e-government project is at the heart of the programme, to speed up formalities and introduce greater transparency in their handling. Since September 2000, all legal formalities submitted by E-mail are accomplished within specified delays and the responsible agent is identified in view of answering any questions that might arise in the process.

Various other features of the Parthenay project are devised to facilitate appropriation of ICT by all categories of citizens and to avoid a digital divide within the population. The visibility of the project, through the creation of "digital spaces" (13 at the end of the year 2000), has been actively promoted. These digital spaces, housed in different public locations are walk-in multimedia centres affording free Internet access and proposing training in basic computer skills. Around 200 people use these facilities each day. To facilitate acquisition of equipment a scheme, called "1 000 PCs", was implemented with success in 1997, whereby fully equipped computers were leased at a monthly rate of FF 300 for two years at the end of which it's ownership was transferred to the user. This rate included waiver of monthly access fee to the Internet and 200 free hours of connection during the two-year period.

The goal proclaimed for the year 2000, four years after the beginning of the project, was to have 50 per cent of the population of the District or 9 000 people connected. In February 2000, only 7 000 people, representing 39 per cent of the population, had used the opportunity of this very favourable environment to become active Internet users. This remains far above the French average, with an Internet penetration rate around 10 per cent, but considering the strategy deployed and the facilities offered, the result is undoubtedly below expectations. The project team explains that this figure could in reality be higher, because of multiple users within a family with only one account or use of other Internet providers. They recognise though that resistance to change remains for some adults and particularly elderly people. This shows that even ambitious ICT projects taking into account user's needs and closely associating them in the project are sometimes slow to roll out and that results have to be measured in the long run.

The approach taken by E*nnis* (*ennis.ie*), the Information Age Town of Ireland, is quite different, if only because the project is the result of a national competition that led to the choice of this town of 18 000 located in the Shannon Region amongst 46 initial contenders. The award delivered in September 1997 by Eircom, privatised successor to the public operator Telecom Eirann, is a Ir.£ 15 million subsidy

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to be spent over five years, without any specific contribution of local authorities (besides costs incurred in preparing the proposal, Ir.£1 million have since been committed). The sum allocated by the operator first permitted equipping Ennis with the proper infrastructure and subsidising the acquisition of PCs by households. This operation was a very successful one as more than 4600 terminals were installed in Ennis homes, representing 82 per cent of the population. The price proposed was quite interesting, Ir.£ 260 or around a quarter of the commercial cost at the time. On the other hand a representative from each household had to either pass a basic usage test or follow with success an 8-hour computer-training course.

This high level of acquisition, showing readiness to go through either test or training beforehand, is a measure of the enthusiasm the population showed for the project during the competition. A good amount of local debate, which was widely publicised by the media, went into the definition of the project. A well-selected panel of potential users, only one of which had a technical background, was able to define the broad lines of the project that was detailed with the help of a specialised consultant. Involvement and support of the population was precisely one of the important criteria put forward by Eircom in the selection process and this seems to have played a decisive role in the final decision in favour of Ennis.

Ennis is in a very specific situation from the point of view of the different ICT development models mentioned above. It is undoubtedly technology driven at the beginning, since a telecommunications operator initiated the process and is supplying all the necessary equipment. On the other hand the population was strongly mobilised during the phase of preparation and its high level of participation today shows continued support. This means that a top down model can evolve, under certain conditions, towards a more social pull approach, if not a bottom-up one, since the initiative is not a local one. Of course the decision to submit a proposal concerning Ennis, based on the backing of the population tends to go in the same direction. In trying to understand the motivations behind this endorsement several factors can be put forward.

The first concerns the role of young people. Forty per cent of the population of Ennis is less than 24 years old, and within families the enthusiasm of the younger generation for the project was certainly contagious. It should be added that the project comprises a strong component in education and that all students (more than 5 000) today have their own E-mail address, the rate of equipment in class-rooms being one of the highest in Ireland (1 computer for seven students).

Two other more intangible factors, concerning awareness and media coverage, should also be taken into consideration. The first one is the favourable environment of the Shannon region relative to ICT, since numerous software and hardware industries of this sector are based there and that an active policy is being developed to consolidate these first successes. The second element that should not be

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neglected and that can only play in the exceptional case of a national competition is media coverage. Ennis, as the digital age town of Ireland is in the spotlight and its citizens know it. A sense of pride and purpose can be very instrumental in creating continuing support. This is reflected well in the fact that one of the features of the project is identifying best practices within the general public and various associations as well as designating local business champions. Participation in these local contests reveals a widespread sense of purpose.

It remains to be seen if citizens will become involved in e-government projects, the urban District Council and the Town of Ennis having decided to launch a joint Internet site devoted to local public affairs. The participation in a planned electronic forum to debate a six-year strategic plan will also be a key factor to analyse. In the meantime, Internet usage in Ennis is one quarter of local users connected daily (1 200 PCs) for sessions averaging 30 minutes. Overall time spent on line is four times higher than in Irish towns of the same size, but of course no other town has such a high rate of equipment in households.

b) Endogenous and exogenous regional ICT development models

Looking at the factors of ICT development in regions, it appears quite relevant to establish a distinction between endogenous and exogenous driven models. This approach has been developed by the Centre for Urban and Regional Development Studies (CURDS) of the University of Newcastle upon Tyne in the UK in a 1999 study entitled "Regional development in the Information Society". The two concepts are defined in a very precise way. The "*exogenous models place particular emphasis on the propensity of enterprises and entrepreneurs in core regions to use advanced communications networks to gain access to assets in peripheral regions (labour supply, quality of life). The endogenous model emphasises rather the way in which enterprises and entrepreneurs in peripheral regions can use advanced communications networks to gain access to markets located in core regions.*" Core regions are regions that comprise an important urban population and where ICT infrastructure and activities tend to concentrate. Less favoured regions are the rural and peripheral ones, at least in the European context.

The findings of this study are that a "*subordinate incorporation of peripheral and less favoured regions into Europe's Information Society is taking place. Whilst this is providing development opportunities for some such regions associated with the mobility of information based work, it does not seem to challenge the concentration of economic power in core regions.*" This type of incorporation into the information Society is opposed to "active incorporation", defined as "*indigenous firms in less favoured regions reaching out to new markets, suppliers and knowledge, all of which are primarily to be found in core regions*". That such a situation should be occurring at this stage is not surprising. The implementation of proper infrastructure and training of a skilled work-force, capable of employment in the

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new information age activities, are precisely the new production factors that certain regions (Highlands and Islands of Scotland, Mid-west and South-west of Ireland, Norrbotten in Sweden, Northern Karelia in Finland) are actively promoting. Success in attracting inward investment is proof of the soundness of such strategic decisions.

This stage, although qualified by the CURDS study as a model of subordinate incorporation into the Information Society, is an essential first step towards integrating a given region into the New Economy. Take-up of ICT by local firms is always necessarily slower as it usually implies, in addition to extra initial expenses not always perceived as directly productive, training and a change in organisational modes which is always slower in occurring. The innovative environment created by this new kind of inward investment is in itself a factor of change, if only because local firms become suppliers of the new entities and tend to adopt not only basic ICT but also some of their business methods. The active incorporation model will only develop at a later stage when sufficient dissemination of ICT in SMEs will create a favourable setting for e-commerce adoption by these firms. Even when this occurs, core regions will retain their economic power but a more complimentary fit between regions will take place.

On the other hand this study has the merit of underlining that, whatever the model, the presence of telecommunications infrastructure does not guarantee development since other factors of an institutional, educational and cultural character play a key role. These production factors of an intangible nature cannot be moved around and for that reason they become more significant in investment decisions and in the potential for economic development.

Another perspective to be taken into account is an ICT development model more geared to promoting new endogenous actors. In the New Economy this means encouraging the creation of dot com start-ups, so as to diminish reliance on foreign investment. Such inward investment can be less stable in a global economy where ICT industries have greater location choices, including in the lesser-developed countries, where qualified software skills are also available at a lower cost. This potential competition also obliges seeking the highest value-added applications and activities through high level education and training. Certain regions pursue such policies, aiming to promote local entrepreneurship and actively retain existing foreign investment, with new patterns for spatial development now emerging.

c) S*patial policy and* ICTs

Promoting the New Economy in rural, remote or peripheral areas requires a radical rethinking of spatial planning. ICT related activities and jobs as well as the benefits for existing businesses are not only a mix of networks and higher education and training. Other factors that spark the process should not be neglected. These factors are physical ones, as ICT dissemination and training requires

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appropriately located buildings that are the entry point in the real world to the virtual one. Telecottages, and community access points are the first step towards ICT not only for the general public but also for many SMEs. In rural areas these facilities, often promoted by local authorities or associations and benefiting from help from national or regional ICT programmes, are usually the closest and easiest point of access to basic training. In the Southwest region of Ireland, 35 Information Society Access Points already exist out of a total of 200 that are planned.

Targeting ICT related growth activities in rural areas is also a matter of having the adequate facilities available for new businesses, with direct access to the proper telecommunications infrastructure. Business or technology parks in rural areas in Scotland, Ireland, Sweden and Finland have been created and investors whether local, national or foreign have settled there. In terms of spatial planning these telecommunications hubs, which are also technology or innovation nodes, have to be located in areas where a workforce, properly trained in ICT generated activities (call centres, software development), is available. This in turn relates to the proximity of institutions of higher learning that are able to deliver the proper level of education. Ultimately these new hubs will also have to cater to the needs of e -commerce of physical goods, that is to say provide adequate warehousing and logistics facilities to follow-up speedily on the order chain.

Although in terms of attracting new activities there are a certain number of success stories in the above-mentioned countries, it seems that integration of ICT in spatial planning is just barely beginning in most countries. The range of potential public planning and intervention has diminished however, and it was undoubtedly easier to have a spatial planning vision related mostly to roads and rail-roads than to telecommunications infrastructure. This is particularly true since private operators lay out this infrastructure; even if local authorities are able to intervene in certain cases, the strategic plan has to be very sound. Local development agencies play an increasing role in this field, as they are able to mobilise local funding and provide the necessary co-ordination between public bodies and potential investors. Whatever the perspective, facilitating the transition into the New Economy requires a careful scrutiny of the various factors interrelating, so that decisions in very different fields are properly co-ordinated.

3. Observation and measurement in the field of ICT

Introduction

The development of the Information Society opens up a new field for economic observation and measurement of performances, but quantitative as well as qualitative data, even at the national level, is far from being collected, from country to country, using the same factors and methods.

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One example concerns the definition and evaluation at a given time of the number of Internet users, following criteria that are often quite variable. Statistically, an Internet user can be someone (starting at a given age) who has consulted the Internet at least once during the past month, and on the basis of a given representative national panel, an overall figure can be deduced. Another approach involves measurement of the number of Internet accounts with service providers that can be surveyed and a given ratio of number of users per household established (usually around three). Measuring business use is much more difficult as corporate Intranets have multiple users and their number cannot be evaluated without companies agreeing to release figures that are difficult to homogenise.

In spite of these difficulties, basic figures are available in all countries that give a good idea of ICT penetration and also the share of the information and communications sector in the overall economy. Continuous monitoring is necessary since by definition what is being measured relates to very rapid fluxes, at least at the macroeconomic and quantitative level. The best example from that point of view is the number of Internet users world-wide, which just about doubles every two years, with traffic multiplied by eight every 12 months. The basic figures are regularly published by OECD in its yearly "Information Technology Outlook" and by a growing number of consulting firms, with national ICT rankings in different categories. These figures cannot by definition offer a territorial perspective and this is the first difficulty that arises when looking into the impact of ICT in rural areas. Monitoring of projects, so as to be able to evaluate results, is also lacking a homogenised approach. The situation is the same with measurement of longer-term benefits such as structural change and openness to innovation.

a) Collecting data on ICT *in rural areas*

The most pertinent level for collecting data on ICT with a territorial perspective is that of the region. In most countries, regional data is available that permits comparison from region to region on ICT penetration and share of ICT related activities or jobs in the regional economy. Sometimes this information is systematically analysed and published by specialised bodies. Such is the case for the Telecommunications, Teleservices and Territories Observatory set up in France by DATAR. This however does not give a territorial view of things at the level of a given region that would permit singling out rural areas as compared with urban or suburban areas. The "ICT deficit" of rural areas is a factor that does not appear *per se*. It can only emerge within the framework of specific studies carried out in view of finding solutions to the economic or demographic decline of certain areas. At the regional level this supposes taking into account these rural and agricultural areas on the basis of proactive spatial policies, with the objective of active ICT dissemination both for the general public and for local businesses.

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In each case relevant studies should be conducted to evaluate the degree of ICT penetration and on that basis devise proper policies to further the Information Society. In the Shannon Region of Ireland such surveys have been conducted, both for households and for SMEs in rural areas. The results of such studies are now being used for the implementation of various training schemes aiming small businesses in particular. In the absence of such regional studies, analysing the situation is necessarily the responsibility of local authorities and local development agencies, but again this will only be done if these bodies are aiming to deploy new policies or projects that vie to use ICT for economic development. The establishment of the profile of local businesses in terms of ICT and their needs thus usually emerge within the context of a wider ICT project.

b) Monitoring of projects

Just as for the collection of relevant data, the monitoring of ICT projects is not subject to specific standard methods, but there are some exceptions. Basically, the very different territorial levels of projects (regional, local), the diversity of actors and the related fields (education, health, e-commerce, etc.) concerned do not permit to conceive some kind of a reference model. This does not mean that projects will not be carried out without careful attention to advancement and interim results. All ICT projects devote proper resources to this monitoring which is essential to create and sustain a certain amount of support in the local population. Full transparency on the project, its achievements and its difficulties are part of the appropriation process. This is usually carried out through electronic forums that regularly publicise progress and permit a fruitful dialogue between the users. Collection of relevant data and analysis of usage patterns and behaviour is often accomplished through integration of sociologists in the project team, which is the case both in Ennis and in Parthenay.

Standardisation of monitoring processes is sought within projects that have a wider territorial range, usually multiregional. This is the case for the European RISI Programme concerning 22 regions and also for the Canadian Smart Communities initiative, which led to the choice of one flagship project per province or territory. Basically, although the projects are often distinct in their aims and their components, they usually share common general goals in the dissemination of ICT and methodology is never entirely different. For that reason, mutual exchange of information on a continuing basis is a very useful practice. It permits to better understand difficulties encountered and helps in finding solutions when necessary. This cross-fertilisation is not limited to project advancement but in some cases the experience of other regions can help directly in defining new projects and in monitoring their implementation. Such is the case within the RISI Programme of the experience shared by the Blekinge region of Sweden concerning a "Centre of

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Excellence for Software Development" with the Mid-west Region of Ireland, now going ahead with its own project.

In all cases, the most difficult task appears to analyse objectively the reasons for which a proclaimed goal was not attained. Was the goal unrealistically ambitious or were accompanying measures insufficient to create and sustain the necessary momentum? This underlines the importance of ensuring a high level of awareness and expectation amongst the population, so that proper motivation constitutes a driving force for the potential users. One of the hypotheses that can be made concerning the Parthenay project falling short of its goal of having half the population connected by the end of this year concerns the relatively low level of media coverage concerning the project and its aims. Compared to the younger generation, the interest of older people was slower to mobilise. Had the project received strong media attention both at the local and national level, like Ennis in Ireland, it is quite possible that the understanding of the stakes at hand would have been accelerated. Even if ICT projects can only very exceptionally receive a level of attention as high as that of Ennis, it is true that proper coverage does play an important role in furthering a project. Developing a full-fledged media campaign, even if costly, can be quite beneficial. This appears to be relevant even at the regional level, the Shannon Region planning to launch such a campaign, to promote itself as the "e-region" of Ireland.

c) Best practices and qualitative results on the long term

Criteria put forward in cases of potential projects eligible for national public or European funding are usually based on considerations directly linked to new economic development and strengthening of the community. This is also the case for prizes destined to further development of an existing project, such as the AOL Telecommunications Awards in the United States. The European LOCREGIS (*locregis.net*) best practices criteria, that led to the selection of 10 projects in three countries (Austria, Sweden and Finland) will be taken as an example, since measurement of results will necessarily refer to these. Five main areas are underlined: attractiveness, innovativeness, partnership, strategic planning and regional development policy.

1. *Attractiveness* refers to:
   - Improved access to telecommunications.
   - Creating demand for the use of existing infrastructure and services.
   - Providing a higher quality of life for the people.
   - Enhancing economic resources.
   - Increasing skilled potential in the area.
   - Improving and enhancing regional or local credibility.

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2. I*nnovativeness* refers to:
   - Innovation in project content and tools regionally.
   - Innovation in project content and tools internationally.
   - Innovation in objectives and content for the specified target group.
   - Reengineering existing structures.
   - Innovation in project management.
3. P*artnership* refers to:
   - Involving all natural/important partners.
   - Involving the private sector appropriately.
   - Creation of new (professional) networks during the project.
   - Optimising the competencies of the partners.
   - Displaying transregional features.
4. S*trategic* planning refers to:
   - Market analysis.
   - Involvement of end users.
   - Motivation and commitment of the partners.
   - Controlling system.
   - Sustainable development of the produced results, experience, infrastructure and network.
   - Existence of a dissemination plan.
5. R*egional development policy* refers to:
   - Compatibility with regional development strategies.
   - Connection to national or regional (ICT) clusters.
   - Transferability (at level of other regions).
   - Characterisation as a regional/local spearhead/key project.
   - Geographical coverage within region.
   - Potential leverage effects.

Many of the above mentioned criteria are of a qualitative nature and the degree to which the project will attain it's proclaimed goals will thus be difficult to measure objectively. Nonetheless these different elements provide useful reference points in retaining a project and than in following its deployment. In all cases project life, as refers to duration of funding, is comparatively short (two or three years on the average) in comparison with in-depth positive effects that can only be measured on the much longer term. The Highlands and Islands of Scotland can be

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cited as an example from that point of view. Implementation of new telecommunications infrastructure began 10 years ago but the positive economic effects, on a measurable scale, are only being felt since recently, with the multiplication of inward investment. This is particularly true since the impact is also linked to the long term effects of policies in fields such as education that never produce immediate results.

d) Guidelines

Bringing the benefits of ICT to rural areas is not an easy matter since such action requires careful strategic planning and a modification of traditional spatial policies but without expected immediate returns. The mistake would be to seek short-term advantages; these cannot usually materialise quickly and translate into tangible economic development permitting a rapid measurement of results. An ICT project, whether on a regional or local basis, is an on-going process that needs to be periodically questioned and readjusted, without necessarily seeking attainment of all initial goals.

Before the positive effects, often of an intangible nature (openness to innovation for instance) can be felt, a few quantitative milestones seem important to monitor. These can be the penetration of PCs and the Internet in households or the equipment and level of awareness of SMEs in this field. Once certain levels are attained, the direct economic effects and productivity will be possible to measure but in the meantime there seems to be no other choice than to improve assets in an economy with fast changing characteristics. If location is not as much a production factor as it used to be, and if social cohesion can be enhanced by ICT, the Information Society and the New Economy can also very well in certain cases lead to quite the opposite. In the following part of this report these different risks and opportunities will be closely scrutinised from the point of view of rural development.

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Chapter 2

Societal issues

Introduction

Societal issues in ICT deployment are essential since awareness and effective appropriation by users are key elements of success. For this purpose, particularly in rural areas, creation of points of entry into the Information Society, known as public access points, are necessary. The availability of public services in rural areas has long been a major problem for many governments because of the high cost of presence in territories often with a dwindling population. ICT can contribute to major changes by affording distant access to general administrative services as well as to high quality educational and health applications. Revitalisation of social cohesion can also stem from new practices in local governance that are beginning to emerge.

The societal issues at stake in the implementation of ICT in rural areas are thus the following:

- increasing role of public access points in ICT dissemination;
- proper delivery of basic public services;
- the impact on local governance.

P*ublic access points*, under various denominations and concepts are strongly encouraged and actively supported in many countries as a means of furthering ICT awareness and training both for the general public and SMEs. The Canadian Community Access Program and French projects in this field are presented as illustrations of these policies. The long-term sustainability of these centres is a matter of concern, especially since their role could be developed in other directions such as support for the delivery of public services.

O*n-line access to public services*, whatever the delivery mode, can be a very useful application in rural areas, particularly in the most remote and sparsely populated. This is especially the case of distant on-line education and telemedecine, permitting to share skilled human resources regardless of location and in a cost-affordable fashion. On-line access to basic administrative information, formalities and transactions, now developing in a growing number of countries on the basis of active e-government

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programmes, can also be of great benefit to rural areas where presence of public agencies is less developed.

L*ocal governance* can be greatly enhanced by ICT insofar as the greater transparency authorised by certain applications permits a closer participation of inhabitants in the decision making process. E-democracy, now being experienced in certain pioneering communities, can increase social cohesion, thus favouring local development. In a regional perspective, certain risks cannot be excluded if some municipalities lag behind others and do not address properly the issues stemming from the necessary transformation of local public services.

1. Public access points, telecottages and telecentres

Introduction

The dissemination of ICT in many countries today rests in good part on the existence of multipurpose centres usually situated in less favoured urban neighbourhoods and in rural areas. These centres, specifically conceived to bridge the digital divide, aim in particular to create ICT awareness by free or cheap hands-on access to computers and the Internet, completed by basic training in computer skills. Such public access points, created within the framework of national, regional or local initiatives, often with a public status, are open not only to the general public but also to local businesses, providing specialised and more sophisticated training in ICT. In some cases these centres also offer to SMEs temporary office space, use of PCs and telecommunication links. This is the case of telecottages and telecentres that can offer a platform for telework. In rural areas, public access points, telecottages and telecentres are strategic elements in policies aiming to bring the benefits of ICT to the local population and economy.

In many countries, public policy has greatly encouraged, facilitated and (co) financed the creation of these public access points situated in various locations: schools, public libraries, post-offices, youth centres, community centres but sometimes also in private facilities or in buildings created for this purpose. The basic idea is the use of whatever space is available, privileging whenever possible existing facilities that already attract the public for other purposes. Stepping into the Information Society can thus come naturally, without necessarily having to go to a specific location on the basis of a prior decision to do so.

The pioneers of this concept are the Scandinavian countries that launched the first telecottages in the eighties, but primarily with the aim of bringing computer technology to business users in rural areas and in suburban neighbourhoods with a certain focus on telework. These business-oriented telecottages, which progressively converted to a private status, are today far fewer in number in their countries of origin, probably because of their success in bringing ICT to local SMEs.

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They than developed in the United Kingdom and in Ireland and more recently in countries such as Hungary where there are around 100 today, focusing both on the general public and on businesses (*telehaz.hu*).

Public access points, aiming primarily at the general population, usually created within the context of national ICT policies, are more recent. One of the firsts of its kind is the Canadian Community Access Program that started in 1994. Since then other countries such as the United States, France, Ireland and the United Kingdom (although these examples are certainly far from being unique) have followed suit, whether through specific programmes or access to various sources of financing. Several national policies concerning public access points will be presented herewith as well as the challenges now facing most of these programmes and their possible evolution on the longer term.

a) National policies in the field of public access points

The Canadian Community Access Program (CAP)

The Canadian Community Access Program (*cap.ic.gc.ca*) is *the* key component of the Government of Canada's "Connecting Canadians" initiative, as officially stated on the Website of Industry Canada. This programme, started in 1994 in rural communities with populations up to 50 000, is implemented on the basis of a periodic competitive selection process within formal guidelines and has benefited up to now to more than 5 000 communities. It is interesting to note that this programme has not only been devised for rural areas; these were the initial focal point of a policy that has since been extended to less favoured urban neighbourhoods. The overall aim of the programme is to establish a total of 10 000 community access centres all over Canada by mid-2001. This initiative seeks to draw upon the combined efforts of federal, provincial and territorial governments, community groups, social agencies, libraries, schools, volunteer groups and the business community.

Conditions for applying for funding under the rural CAP component require one or several institutions within a given community or county to submit a formal proposal that is examined during one of the two annual meetings of the review board established at the level of each province. Candidates have to comply with detailed guidelines (proposal guide), including provisions for access to the handicapped, which are available on-line. In particular, Industry Canada now encourages a networked approach to projects with the linking of several sites within a micro-territory so as to share costs, experience and provide similar services to an extended community. The proposal must be presented in a standard summary form referring to an assessment tool outlining the minimum level of services per site to be provided for eligibility to CAP funding. A budget template, networking technical specifications and a technical reference guide are part of the material

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available to help candidates draft their proposal. A presentation of CAP network success factors and detailed success stories provide useful information for new projects.

A CAP project that is supposed to be self-sustaining on the long term typically includes an equipment and software component, their installation and training for personnel. Voluntary service has provided up to now most of the necessary human resources. Industry Canada covers 50 per cent of total investment cost (excluding building), the other half coming from the communities concerned. An amount of up to C$ 40 000 is thus financed per site by the Federal government. The basic function of a Community Access Centre is to raise the level of ICT awareness, provide different levels of training on standard software components and offer cheap Internet access to inhabitants. The second level of services to be developed is that of a local Website presenting the community, its services, businesses, touristic attractions and cultural events. The objective here is to create social and economic links and strengthen the community fabric. Recent developments concerning direct access to Federal and provincial public services on-line aim to use these Websites as portals permitting all Canadians to easily obtain public information and accomplish various formalities electronically.

The French approach to public access centres

The French programme concerning facilitation of public access to computer use and the Internet, contrary to Canada, is not founded on a single nation-wide programme but on a combination of initiatives associating national, regional and local authorities within projects located in various public sites. The initial steps were taken in 1997 with the creation of the first "Multimedia Culture Spaces", usually in public libraries or in "Centres for Youth and Culture" ("*Maison des Jeunes et de la Culture*"). These public access points, co-financed by national subsidies and local authorities, number more than a hundred today but they are located mainly in urban areas. This figure will double by the year 2003, bringing such facilities to smaller towns.

Other public access sites in France are located in public libraries, local employment agencies, schools and post offices. Small public libraries, located in towns of less than 10 000 inhabitants are subject to special attention. In 1998 and 1999 DATAR allocated FF 10 million for the PC equipment and connection to the Internet of libraries in 342 such towns. In certain cases like in Parthenay or in the area of Ardèche ("*Inforoutes de l'Ardèche*"), these dedicated public access points are an essential part of a wider ICT project. Due to the mix of programmes and financing sources no overall figure on the breakdown of public access points in France between rural and urban areas is readily available today.

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The importance of these public access centres for the transition to the Information Society has been underlined by government plans, announced in July 2000, that aim to more than double their number by the year 2003. A total target figure of 7 000 public access points for that year has been indicated, to be divided between the above mentioned public institutions (around 4 800) and the new model to be implemented (2 500 Public Digital Spaces). All local employment agencies (1 000) will provide this facility as well as most public libraries (2 753 in France, 250 equipped in July 2000) and a significant number of post-offices (the existing "Cyberposte" Programme concerns 1 000 units).

The 2 500 planned "Public Digital Spaces" will conform to a model defined in a charter (non-profit organisation, free access to a minimum of 5 computers, availability of trained personnel). They will deliver a "Passport to the Internet and Multimedia". Five hundred of these will be standard "Cyberbases", staffed with four trainers and equipped with 10 computers. They will be specifically co-financed by national funds (300 million Francs) and local authorities. Government funds for creation of public digital spaces in existing facilities amount to FF 90 million for the same period.

French policy concerning public access points places a strong emphasis on proper staffing of all centres. This is largely accomplished through the public Youth Employment Programme ("*Emplois Jeunes*") providing training and a nominal salary for a period of three years in a public service job. Four thousand new "multimedia trainers" will thus be recruited within the next five years, FF 2 billion being specifically allocated for that purpose. To facilitate the implementation of these different projects and ensure the proper co-ordination an interministerial mission for public access to ICT was created in December 2000.

b) Fundamental issues concerning public access points

Available information and case studies concerning public access points in different countries bring up four major issues concerning the long term sustainability of these centres: staffing, operating costs versus available financial resources, measurement of attendance and impact, development of community presence on the Internet.

Staffing appears to be the major issue since most projects rely on the work of local volunteers ready to devote some time for the benefit of their community. They can be either young people with adequate computer skills or adults, whether in active life or retired, having received, if necessary, training in ICT technology and usage. The use of volunteers is widespread in Canada for the Community Access Program. In Ireland Information Society Access Points also rely heavily on volunteer service. In the United States, various local initiatives concerning such centres benefit from Federal and State funds but operation generally rests on devoted volunteers. In France, it is true that these centres are functioning with the

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support of the "E*mplois Jeunes*" Programme. Nonetheless after expiration of the 3-year contract, communities will have to mobilise other sources of financing and recruit other people if current employees find better paid job opportunities in the private sector. Since there is actually a shortage of skilled personnel in this sector in many countries, devising new solutions will not be an easy task.

That national policies rely often so heavily on volunteer service for staffing of public access points can be easily understood from several points of view. First of all available funds have been allocated to equipment and training rather than recurring operational costs. Since most centres are located in existing facilities, mobilisation of their personnel (municipal employees, librarians, etc.) is up to a certain extent part of the answer to the problem. Besides, one can assume that if local authorities deem the centre essential to the future development of the community, some form of permanent contribution will always be found. In reality this might be the case for some towns, but generally, limited financial resources will only be reallocated if it is perceived that the centre plays an essential role in economic and social enhancement. This can only be measured on the long run and believing that it will be true supposes a good prior insight into the potential of ICT.

In Canada proper staffing of centres is more and more perceived as crucial for their long-term sustainability. For that purpose, Human Resources Development Canada (HRDC), a public agency, brings it's support to Industry Canada since 1998 in the CAP Program, by assistance in training and in some cases by allocation of funds to hire qualified personnel. The networking logic encouraged by Canadian authorities in the Community Access Program is also instrumental in the search for a pooling of rare and sometimes costly technical and training resources. The County of Matawinie in Quebec, with it's 15 CAP sites, one per municipality, presented in this report as a case study, is a good example of such an approach. In Dillon, Montana (USA), also presented as a case study, similar questions arise, one of the answers given up to now having been the donation by the state government of a set of lap-top computers to permit project volunteers to cover a wider area in some of their training activities.

Overall *operating costs* and the search for possible resources to cover them are a concern in most countries. Public access to the computers and the Internet is often free or charged at a nominal cost and thus represents a minor contribution, if any, towards covering expenses. Training courses, whether for the general public or for businesses are normally charged for, but fees collected usually cover costs incurred by the training session itself and seldom contribute to the general budget. A minority of centres, in Canada in particular, have devised ways of generating revenue by acting as Internet Service Providers (ISPs) in remote areas where no other private sector ISP is available, or by providing local businesses with Website design and support. Of course such revenue streams can only be generated if the project itself is properly staffed with qualified salaried personnel, capable of delivering such services. In such a case the CAP project is the foundation of a

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project established on a wider scale, comprising other components such as distance learning programmes that the centre supports.

Measurement of attendance and effective impact on ICT dissemination is not systematically pursued nor established in qualitative terms, although some form of monitoring is accomplished at the request of (national) funding authorities. In the United States, access points situated in public libraries provide open access to computers for the public but do not usually follow use. In Canada, CAP centres deliver membership cards that offer preferred rates for usage but occasional users are not systemically taken into account. In all countries, available local statistics refer to weekly or monthly number of visitors in centre, but this does not necessarily translate into number of effective users, since many come for multiple visits. Staffing problems can explain this up to a certain extent, but lack of perception of usefulness of such data can also be considered.

Basically all centres are able to deliver statistics on the number of attendants to pre-scheduled training courses but are unable to measure the effective impact of their action. Success for a centre is having an attendee or trainee not come back, following purchase and use of a computer at home or on a business location. No centres request these happy and successful users to inform them of their "conversion" to ICT or to maintain links, for instance by supplying their E-mail address, which would also be useful to further develop other community on-line projects that will be examined herewith.

Development of *community presence on the Internet* is not systematically pursued otherwise than in a basic fashion. Case studies accomplished within this report show that towns with public access points do not necessarily use their Website to develop interactive content that might keep the public well informed of project developments, enhance local content or provide practical information. Although there are notable exceptions, Websites are often static for lack of human resources to periodically update or enrich them. Due to the operating conditions of many centres, this is quite understandable, but the opportunity to establish a true dialogue with the local population and develop new ICT projects is thus missed. Even if a good level of computer literacy is achieved through the action of the public access points, this is far from enough. If new users resort to their recently acquired skills and equipment to consult mostly non-local information, however interesting, rather than getting connected regularly to relevant local content, community development will not be particularly favoured.

c) Perspectives for public access points

If public access points do not attract a sufficient number of users, appear to costly to operate or, on the contrary, permit a high percentage of the population to obtain a good level of computer related skills, should they be closed down? In

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other words, should either apparent failure or overt success lead to the disappearance of such structures in certain towns, and in others should they perdure, and if so, under what form? These essential questions cannot be eluded in terms of territorial development, even if existing reports do not openly look at these drastic alternatives. Evaluation of the performance of public access points is a major concern for national policy makers, particularly in Canada with the strong emphasis put on the CAP Program, but it is also of interest in certain European countries where comparable, even if smaller or more recent, programmes have been launched. Following developments are largely extracted from two reports, one Canadian, one European, whose conclusions are not fundamentally different.

A *Review of Community Access Program Sites in Canada*, prepared for Industry Canada by the New Economy Development Group Inc. was published in January 1999. This report analyses over 250 individual CAP sites through interviews conducted by telephone using a specially designed questionnaire. "*The purpose of the report is to gather basic information regarding innovative* CAP *sites, thereby achieving insight into the nature of* CAP *development across the country and the challenges facing* CAP *sites*". It states that "*one of the great strengths of* CAP *is the flexibility it allows each community to respond to its own local conditions*". It affirms that "*all* CAP *sites have in common a vision and understanding that communities must be active participants in developing solutions to the technological, economic and social challenges of the information age. In most cases the impetus for the development of a particular* CAP *site has come from a single individual or small group of citizens concerned with the social and economic changes wrought by the knowledge based economy to themselves, their families and their communities.*"

The report distinguishes four different categories of CAP sites depending on the level of services:

- Computer and Internet skills trainers.
- Computer training and Information Providers.
- Community resource networks.
- Business networks.

The first category provides basic training and does not usually have a broad resource base, tending to rely almost exclusively on volunteers. The second one, rapidly growing, provides access to work, social, health, and business related information, as well as computer and Internet related training. "*Although there is often a major sponsoring organisation such as a library, school, community centre or employment agency, leadership is shared among all partners and driven by a common mission and vision. The presence of partners with committed resources offers a broader funding base and both paid and voluntary staff is available to assist users*". The community resource networks constitute a third category moving beyond the provision of information to on-line learning and training. These electronic networks, which were but a few at time of report publication, share technology, training and technical support. Project leadership has a broad vision for their communities. These projects tend to have a major sponsoring body, with

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strong roots in the community. Funding is likely to come from various public and private sources. Business networks are similar to the preceding category but they focus on local economic development issues rather than on individual services and programmes.

Among the issues mentioned in the report that of long term sustainability is considered of major importance. "*There is a danger that sites could be viewed by communities and governments merely as an additional service, rather than as a new way of serving people and communities in more relevant and effective ways.*" "*There is also an emerging need to better understand and identify ways in which* CAP *sites* (…) *can be used to deliver government information and conduct service transactions in areas such as health information, licenses, unemployment insurance, income security benefits, etc.*" Such strong statements show that whatever the profile of a CAP site, its role in the long term could progressively evolve to higher levels of service and also to new areas concerning the delivery of public services (one-stop access). This means that longer-term sustainability supposes adequate human resources, beyond volunteers and students. "*The majority indicated that a fulltime co-ordinator is seen as essential to build partnerships, leverage other resources and develop* CAP *sites to their fullest potential.*"

Observation and analysis of the use of networks in public access centres in France, Spain *and* Portugal is a report of a panel of five experts to the European Commission (DG X), published in December 1998. It puts forward five categories of recommendations that can be considered as universal guidelines for best practices concerning public access points. Three of them appear particularly relevant in terms of local development:

1. "*When conceived, the operational strategy and the development of the centre must obey to a logic of usage rather than to a logic of supply. This choice must be translated into an effort to enrich and diversify services and inscribe the centre in a network of public centres sharing similar objectives.*"

2. "*The anchoring in existing locations and institutions, when it is possible and relevant, is preferable to the creation of specific locations and institutions.*"

3. "*Animators are necessary; their initial competence must be more relational than technical; a good part of their working time must be devoted to monitoring technological developments and self-training.*"

These statements, elaborated in a context concerning the study of public access centres in both urban and rural areas of the above-mentioned countries, located in various institutions, underline, as the preceding report, the importance of responding to other needs besides basic computer and Internet training. In Europe, as in North America, it is well understood that existing locations and institutions, which already attract users for other purposes, are usually preferable to dedicated centres. Insistence on the relational capacities of trainers is a novel

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aspect as this is usually taken for granted. On the other hand this cannot be underestimated, as technical skills do not suffice to initiate a newcomer, especially an elderly person, to computers and the Internet. Building of confidence through proper attention and an ability to teach, which requires minimal training in methods to transfer know-how, should not be neglected.

2. On-line access to public services

Introduction

Maintaining adequate public services in rural and particularly in remote and low-density areas has been a long-standing dilemma for many governments. The more the population decreases because of the decline of traditional activities such as agriculture, the more costly it becomes to operate schools and hospitals or maintain local agencies of public bodies. At a given time, budgetary constraints lead to the closing of some of these services. In certain cases, as for secondary schools, this can amount to obliging pupils to attend school far away from home, with the corresponding financial burden for the family. Even if minimal services are maintained, it becomes very difficult to recruit personnel, whether teachers or doctors. Such situations, in turn, induce more and more people to seek education and jobs elsewhere, even if they might be able to earn a living locally, since the absence of quality public services is an important factor in decisions concerning location choices. Absence of proper education for children at a reasonable distance, adequate healthcare and easy access to all public services can thus contribute to out-migration and economic decay.

ICT has the potential to bring quality public services even to the remotest areas at a reasonable cost since a proportionately higher population can be reached. These new possibilities that have their most striking applications in the field of education (on-line learning) and health (telemedecine) rest on the principles of resource sharing for manpower and on a new spatial organisation of activity. Teaching resources in various disciplines can be pooled to serve a wider area, dispensing part of their activity in a traditional fashion and the rest at distance for other pupils in a given territory. Specialised doctors can offer their support to generalists in other locations, thus reaching more patients. Such new collaborative methods of working imply a proper organisation and territorial distribution of resources linked in a network approach. This virtual network presents minimal telecommunications infrastructure requirements, depending on the applications. A 128 Kbps ISDN line, available in many rural areas is thus required for videoconferencing.

Besides these applications, especially well adapted to the requirements of rural and remote areas, the latter can also benefit, probably more than others, from the various measures now being implemented in most countries to bring public

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administration on-line, in an effort to improve and speed up service to all citizens. National ICT programmes comprise a strong component of this type with the goal of providing one stop access to all public bodies for provision of information and accomplishment of transactions on-line, whether to obtain a birth certificate, renew license plates or pay taxes. The simplification of all these formalities and their speedy delivery will be of particular help in rural areas where the accomplishment of such acts frequently requires a long drive to the closest town. In some countries efforts are even being made to bring together in one site access to local information and government as well as national public services, so as to simplify procedures.

a) *Distant education on-line*

Computer literacy is now a basic requirement of most educational systems and governments have been making big efforts towards that end. Ambitious programmes have been launched to bring computers and Internet connections to classrooms in primary and in secondary schools as well as in universities. One computer in each classroom is the stated goal, close to being reached by a certain number of countries. The acquisition of these new skills is not only designed for future use on the job market. It is also changing the way of teaching, educators and professors alike having had to acquire these capacities themselves so as to use these tools efficiently during classes.

Training in these skills and in the new pedagogical methods they allow is the second component of the above mentioned programmes and it has provided a basis for going a step further with distant on-line education. These new practices have begun to be implemented with success in some regions. They are distinct from full courses, usually at the university level, that are available on-line, with many educational institutions already competing for a share of this new global market. From a territorial perspective, distant education on line is basically the access to or the sharing of teaching resources within a given area, which can be accomplished through videoconferencing techniques and/or through the Internet. The following examples, at the primary, secondary and university level, as well as in the field of adult education, have been chosen to illustrate these new possibilities, but they are far from being unique as many similar projects exist in a growing number of countries.

At the *primary level*, the town of Moussac (Vienne, France), comprising 500 inhabitants, understood that keeping it's primary school (19 pupils) meant co-operating with other schools in the area to create an active network bringing together teachers and pupils in common pedagogical projects. Moussac, with the encouragement of departmental authorities, created a network of 8 rural schools called "*Réseau Vienne-Gartempe*" (Vienne-Gartempe network) in 1995 with the purpose of equipping all schools concerned with a multimedia computer and

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delivering proper training to teachers for the use of the new tools. Basic E-mail exchange and Internet access was completed in 1997 with videoconferencing, used mostly by teachers to prepare common projects, and in 1998 by the installation of NetMeeting software, allowing the creation of a wide area "electronic paper board" regularly used for "extended classes". The project, launched before schools in France started receiving basic computer equipment and Internet access, is now fully integrated into teaching methods. Besides it's main focus on a population of 200 primary school children, it also contributed to computer awareness and training in the villages concerned, since the computers were made accessible to the adult population after class hours.

At the *secondary level*, the project underway in Northern Ontario in the Indian First Nation of Keewaytinook Okimakanak, comprising a population of 2 800 people spread over 5 communities, (average density of 0.1 per km^2) is most innovative. It resorts to Computer Mediated Class (CMC) combining on-line teaching through the Internet with local supervision, which permits pooling of teaching resources amongst different locations. Courses are conducted both in the classroom and on-line, with help for the latter given by the pupil's own teacher. The mix of virtual teaching and real learning environment helps in solving problems when they arise and in monitoring progress. This is especially true since the pupil's own teacher's role is not limited to the sequences of on-line class, but also permits follow-up of homework assigned on-line through E-mail. The project has opened new perspectives in allowing high school students to attend classes without leaving the area. Before the only costly choice was to attend the Sioux Lookout High School located several hundred kilometres away, knowing that separation from families contributed to a high dropout rate.

For the purpose of *adult education*, the possibility of following courses at a distance through videoconferencing can afford the opportunity to acquire new skills without leaving town or present job. This was one of the main purposes that led the rural town of Nevada (Missouri, USA) to open in 1997 a telecentre comprising three interactive classrooms, fully equipped with video cameras and monitors. With a total capacity of 100 students, the facility permits students to see simultaneously the distant classroom and the teacher, ask questions and visualise desktop work or audio-visual material. The telecentre is thus able to bring the courses of the three state universities to the local population but local businesses are also using it for their own in-house training. This avoids sending employees out of town, which is a time and money saving process for employer but is also usually preferred by trainees, who often refuse training possibilities if they require a temporary move.

At the *university level* one of the most ambitious projects specifically conceived for rural areas concerns the Highlands and Islands of Scotland. This area's local development board devised and implemented at the beginning of the eighties a

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novel approach to financing telecommunications infrastructure through a public-private partnership, with the purpose of bringing in new jobs, particularly in the field of call-centres (see Chapter 1 of this report). The continuing success of this initiative rests not only on technical considerations but also on the long-term availability of a highly skilled workforce. The corresponding training requirements were not readily satisfied in the area until recently, preventing many potential students to follow courses without leaving home. For this reason, Highlands and Islands Enterprise, in conjunction with regional authorities have set up a University entirely conceived to operate through a combination of on-line courses and real classes delivered in one of the 13 different partner institutions located throughout the area.

The 11 colleges and two research institutions, fully equipped to that purpose with interactive videoconferencing facilities, offer a selection of courses focusing on the region's principal industries and businesses. Whatever the residence of a student, the co-operative approach can meet individual course requirements, by completing teaching in class with participation at distance in other classes and/or on-line teaching through the Internet. Students from different locations can come together for a live seminar or hold an on-line discussion through the Internet. Tutors can be in daily contact with their students by E-mail. The University of the Highlands and Islands (*uhi.ac.uk*) is seeking full university status. In the meantime, the Open University Validation Service, a public body certifying distance learning courses, has validated its degree.

b) *Telemedecine*

Telemedecine is the use of Information and Communication Technologies to provide and support healthcare when distance separates the provider from the patient. A telemedecine project usually connects distant "satellite" sites, located in rural communities, between themselves and with a main hospital located in an urban centre, known as a "hub" site. Telemedecine aims to provide health service in rural and remote areas that have often been hit in the past by the closing of hospitals or health centres. Besides satisfying to basic health needs for the local population, telemedecine can also be a cost-effective solution, as the following types of applications show.

Telediagnosis through active videoconferencing permits a specialist to deliver expert advice to a generalist giving a consultation to a patient in a remote clinic or health centre. It is also often used in emergency cases to analyse at distance possible requirements for surgery that may lead to transporting the patient to a given hospital rather than another, thus saving precious time and avoiding unnecessary costs. For these purposes scanner images can be transmitted over an ISDN line. Other fields of application for telemedecine range from distance train-

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ing for medical personnel to accessing hospital data bases containing a patient's profile, including real time results of laboratory tests requiring rapid treatment that can be prescribed at distance.

The potential field of telemedecine has not escaped health authorities in many countries and these practices have been actively encouraged. In the *United States* the number of telemedecine consults has risen more than twentyfold from 1993 to 1997 (US Association of Telemedecine Providers, 1998). Federal funding subsidises, through the "e-rate" initiative, long distance telecommunication rates applicable to high bandwidth usage by health centres and hospitals resorting to telemedecine applications. Federal agencies, such as the Rural Utilities Service or the Office of Rural Health Policy contribute to funding telemedecine programmes. Medicare reimburses teleradiology consults nearly since their inception but interactive video consultations are generally not reimbursed, since many states still require the patient and his doctor to be face to face. In 1998 the US Department of Health and Human Services established the Office for the Advancement of Telehealth, to co-ordinate telemedecine policy, support and funding. The Federal Telemedecine Gateway (*tmgateway.org*) details policy guidelines and applications.

In *France*, telemedecine applications identified in 1996 numbered close to 300 and covered all regions. One third concerned neuroradiology and radiology, followed by surgery and pediatry. National and regional policies have been implemented to further their development. At a national level, telemedecine strategy, monitored by a high level group, has laid down guidelines in the field of perinatal medecine, emergencies, prototyping of various applications, pluridisciplinary hospital networks and methods for transferring of best practices. A national initiative in the field of perinatology, supported by DATAR, with funding allocated for an amount of FF 20 million (to be matched by at least equivalent sums from regions) was launched in 1999. The objective is to encourage co-operative projects between maternities using videoconferencing and electronic transfer of medical information. Further detail on French policies can be obtained at the Website: *sante.gouv.fr.* France is also an active participant in European telemedecine projects that are monitored through the European Health Telematics Observatory (*ehto.org*).

Telemedecine applications potentially concern all fields of medical and paramedical practice. The following examples in teledentistry, telepharmacy and telepsychiatry are proof of the will of public authorities to experiment and develop these new possibilities in rural and especially in remote areas where their success can contribute to the stabilisation and reversal of negative population trends.

In the United Kingdom, a *teledentistry* application piloted by the University of Bristol Dental School has been going on with success for the past few years. With

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it's support, the South West Regional Authority of I*reland* is launching a similar application, within the RISI-STAND European project. The objective is twofold: decrease time for patient diagnoses in orthodontics and suppress travel, whenever possible, for rural clients to the Dental Hospital in Cork. The backlog in orthodontics appointments is such that rural patients often have to wait a long time before getting a diagnoses for which they have to travel from small towns not conveniently linked to Cork. By permitting orthodontic diagnoses on-line, thanks to ISDN videoconferencing and data conferencing, this time consuming process, both for the patient and the practitioners ought to be sensibly reduced, offering more efficient and less costly healthcare. Around 10 dentists are participating in the pilot started at the end of the year 2000 for a nine-month period. Costs for a dentist already equipped with a PC are around Ir.£ 700 in equipment (camera), software and ISDN line installation. Specific funding will cover operational costs including ISDN calls for the duration of the pilot (double the local call rate).

In the United States, the State of North Dakota, is preparing an ambitious project in the field of *telepharmacy*, with the objective of reversing the negative trend that is leading to the closure of many rural pharmacies because of depopulation and lack of sufficient revenue for pharmacists. The result is that more and more people are having to travel to bigger towns to have their prescriptions carried out, which is not only time consuming but also a problem for the elderly. This can also have adverse consequences on the presence of qualified medical personnel such as doctors, as most people expect to get the prescribed medicine right after consultation by the practitioner. Besides, in the United States, pharmacies also sell a wide array of goods thus providing other services for the local population. For these various reasons the state is laying the groundwork for a pilot of three to five years concerning up to five main rural pharmacies. These would open satellite locations in smaller towns, held by pharmaceutical technicians filling prescriptions under the responsibility of the pharmacist through a videoconferencing link. Register and supply of stocks would be maintained by the hub pharmacy.

In Canada the Keewaytinook Okimakanak First Nation in Northern Ontario has an ambitious telemedecine programme that has begun to be implemented with an initial application concerning *telepsychiatry*. A weekly psychiatric consultation with a Winnipeg hospital practician using videoconferencing was opened in Red Lake in 1999. Patients travel to Red Lake for that purpose, since videoconferencing facilities are not yet available in all of the communities. They are provided with help from a native language technician and, if necessary, that of an interpreter, for the duration of the video link. In the near future the five major settlements will be equipped and other telemedecine applications, such as delivery of ultrasound images to the local zone hospital, will be implemented.

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c) *Access to public services through the Internet*

In many rural areas, especially in the most remote or sparsely populated ones, the local offices of government bodies or public agencies are often situated in the county seat and in some cases even further away. The accomplishment of any basic formality, whether to obtain a certificate or license of any kind or obtain personal information on one's tax status usually means a long drive and half a day spent uniquely for that purpose. For elderly people, who often have to rely on neighbours for transportation, the situation is even more difficult. This has been aggravated in many countries over the years, an increasing number of public bodies having decided for budgetary purposes to streamline their territorial presence as the population decreased. For these reasons, rural, remote or sparsely populated areas should strongly benefit from the efforts now made by governments to bring public services on-line, not only to deliver speedily practical information but also to accomplish formalities and transactions implying electronic payment.

These programmes will open up new possibilities to rural areas but they will not in themselves really solve the problem if computer and Internet penetration in such territories remains low, either for economic reasons (cost of equipment or usage) or for cultural ones (lack of awareness or proper training). The long term impact and usefulness of these "e-government" initiatives in rural areas thus depends on the success of other actions, such as those initiated to develop the number of public access points. Besides, these public access points, especially in the smallest communities, can always provide electronic access to public services for those not willing or able to purchase or use a computer, which is mostly the case for the elderly. However, in the future the pitfall to be avoided in rural areas will be too strong a reliance on the electronic form of delivery of public services, since a minimal level of physical presence will always be necessary, whether for social cohesion or to maintain certain jobs. The temptation to continue the trend of closing public services could in effect be strong since a virtual solution is now available.

If governments are pushing on-line public services so actively it is because e-government is thought to be one of the remedies to the progressive distantiation of citizens from governance. The complexity of procedures and the not always logical division of attributions between agencies have certainly contributed to this situation. Simplified direct access to a wide array of services, proposed by themes rather than along traditional administrative barriers, is the main answer now proposed on-line to make things easier for the average citizen or business. The portal concept, offering one stop access to information, formalities and transactions, irrespective of territorial level, has been developed to greatly simplify the relationship between users, government and public agencies. Such programmes also aim to reduce delays and costs, thus permitting in the longer run a more productive reallocation of taxpayer's money.

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The initial step was for the provision of information useful or necessary for citizens. The steps now under way in many countries bring up important issues that require careful scrutiny before full-scale implementation can begin. These issues relate to protection of personal data, the acceptance of electronic signatures, the protection of the integrity of authenticated acts and the implementation of highly secure payments systems with corresponding proof of payment. If a certain number of these points remain open to discussion, most of them have led to legislative action to establish guidelines and modify, if necessary, existing laws. Once this groundwork has been accomplished, implementation of e-government will be a long-term process, but ambitious programmes have been launched and begun to be applied in a certain number of countries.

In the *United States* major action has been taken in the year 2000 to develop e-government, retained as a priority management objective (PMO) in the budget. This PMO calls for a certain number of actions including:

- Establishing a one-stop gateway to government information (Federal and State) available on the Internet, with information organised by type of service. This Internet portal (*firstgov.gov*) was launched at the beginning of the third quarter of the year.
- Identifying forms for the top 500 government services used by the public and making them available by the end of the same year.
- Implementing the Government Paperwork Elimination Act by gathering and making information available electronically.
- Building good privacy practices into Federal Websites.
- Creating public E-mail addresses for citizens to contact agencies.
- Ensuring accessibility for the disabled.
- Using the Web to improve procurement.
- Fostering the use of digital signatures by agencies and the public.
- Developing a strategy for Internet use that enables agencies to become more open, efficient and responsive.

Examples of effective Internet use for e-government during the year 2000 concern completion of census short forms and delivery of export licenses through a secure on-line service.

In *France*, the government announced in October 2000 a certain number of measures concerning e-government. First of all a gateway to all public services (*service-public.fr*) was opened at the same date. It gives access in particular to 2 600 public sites (1 100 at the national level and 1 600 at the territorial level). It is presented as an entry point, organised around themes of practical concern to the citizen. Besides, all "*Préfectures*" should open before mid-2001 an Internet site, presenting

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national services and programmes in the "*département*" and in the region, which will be a local public portal, following a concept already implemented in certain parts of the country. All forms will be made available electronically, more than 500 being already available on-line. Teleprocedures (on-line accomplishment of formalities and payments as well as public procurement processes) will be developed systemically, 20 frequently used formalities such as monthly payment of taxes, are to be implemented first.

In the *United Kingdom*, similar measures have been prepared and some are now effective. The UK online site (*ukonline.gov.uk*) states that it's aims "*are to continually improve the delivery of government services to the public and to provide easy and convenient ways for citizens and businesses to communicate with government*". This Website, which already provides services allowing the accomplishment of a certain number of formalities on-line, will be the entry point to many other applications such as a Learning and Work Bank, planned for 2001, giving one-stop access to educational opportunities and job vacancies. Guidelines concerning e-government in the United Kingdom were announced in September 2000, a cabinet minister having been appointed to co-ordinate the task.

3. Local governance

Introduction

Just like e-government, e-democracy is a wide encompassing concept that concerns potentially all citizens and is in no way limited to smaller communities. On-line voting, greater transparency in decision making, interactive forums permitting consultation of citizens on all issues, and co-operation with and between general interest groups can be accomplished at any territorial level, both in rural and urban environments. These processes are incipient, insofar as public authorities at any level can only test and put them to work as an enhancement to the democratic process so long as Internet penetration is not widespread. Nonetheless, and in spite of this difficulty, some communities have started using these new possibilities that appear particularly relevant in a small town context. The creation of an "electronic agora", in which all inhabitants can air their views and participate directly in the policy defining process as well as in projects that concern their everyday lives, could contribute to strengthening social fabric. Initial evaluation tends to corroborate such an approach, but the inherent risk of territorial imbalances at the regional level should not be overlooked, insofar as not all communities are yet ready to take such a leap.

a) The potential of e-democracy

E-democracy can be conceived from two different perspectives concerning governance: either the introduction of an electronic version of existing practices or

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the (re) invention of new forms of consultation and accountancy. The typical example in the first case is electronic voting. It supposes a certain number of legal and technical conditions such as strong encryption methods to insure confidentiality. The State of Arizona organised one of the first e-votes ever for the democratic primary that took place in March 2000. The outcome was most remarkable as voter turnout was boosted to six times its usual level. This positive response can be explained by the convenience of an option that takes much less time than to go to the voting booth. Voter abstention being a rising concern in many democracies, the Internet could provide in the longer run part of the answer to the problem. In any case the Internet is now an integral part of the election process as the November 2000 US presidential elections have amply shown. Campaigning now takes place also on the Internet, since Websites are powerful communication tools. Fund raising, with immediate payment on-line, has also proved its efficiency. Such practices will probably develop in countries with sufficient Internet penetration, as is the case for most OECD Members.

If one puts aside the above-mentioned example of the Arizona primary, at the local level, e-democracy, where it has started to become a reality, is much more focused on new ways of strengthening the democratic process or on reinvention of existing methods rather than on transposing these on-line. For the time being at least, the risks of excessive direct democracy bypassing traditional intermediaries seem to be excluded. Electronic forums, direct E-mail to elected officials, access (sometimes live) to municipal debates and decisions are creating a more level playing field for all those participating in the democratic debate. Being able to publicise views very easily and quickly gives, in a local context, a new definition of the notion of proximity, which is not merely physical but linked to the effective participation in on-going events, important to community life.

b) *Local examples of emerging e-democracy practices*

The following examples of emerging e-democracy practices, which are certainly not unique, tend to illustrate the synergies created by a global approach. It is more the creation of a favourable context in which numerous initiatives emerge than individual applications that tend to extend the field of e-democracy at the local level. The two examples that will be developed here are the digital towns of Parthenay (*Deux-Sèvres*, *France*), 18 000 inhabitants, and Blacksburg (Virginia, USA), 36 000 inhabitants.

The *Parthenay* project (see Chapter 1) is marked from the outset by its original approach to the relationship between citizens and local government. In 1996, the decision to create a digital town was based on the conviction that the use of ICTs is not an end in itself but the logical extension of thorough work at the local level, aiming to promote communication across traditional boundaries and facilitate the

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initiatives of associations. Following this view electronic networks are considered to be truly effective only if a dense fabric of human relations already exists. ICTs are thus used to increase communication between citizens and consolidate the social tissue. The inherent logic is to create conditions in which citizens are not only participants but also genuine actors in town affairs. As a result, all fields are concerned, whether they apply to school or business, administration or culture, commerce or agriculture. For this purpose, individuals and social actors are encouraged to experiment on-line with applications relevant to everyday life.

Well before the digital town concept was launched, the municipality had already introduced training programmes to help citizens create projects by supporting initiatives to organise associations, activities, and events. The role of the municipality was consequently modified: instead of acting on behalf of others, it tried to play an enabling role by providing help (premises, equipment or financial aid) or by inciting different actors to interrelate. The associations thus became important partners of local government, which provides a structure for voluntary initiatives and relies on the ability of each citizen to assume some measure of responsibility for town management. This approach has been developed in particular in the areas of culture (architectural heritage, music and local traditions) and social services (addressing youth and the handicapped) through partnerships with representative associations. The municipal "development agents" play an important role in putting the network of associations in touch with local government. This explains that they have been among the first to use the new tools, quickly becoming "providers of information", particularly on the "In-Town-Net".

The In-Town-Net (*district-parthenay.fr*), opened in 1996, is a virtual representation of the district, its activities and its inhabitants. All local government departments, the vast majority of companies, associations and numerous individuals, as well as the local radio are active contributors to its content. This Website has as many as 24 000 pages (out of 100 000 edited and archived at the end of the year 2000) providing economic, social, cultural, administrative and tourist information on Parthenay and its surrounding area. It has been deliberately conceived so as to facilitate the participation of citizens and interactive communication. Personalised management modules allow direct generation and updating of information by individuals, associations, firms and institutions. Access to local government services has received special attention on the site and new operational modes have been devised to improve their efficiency and increase accountability.

All requests for official documents or identity cards can be made from the site by means of electronic forms, even if for legal reasons the entire procedure cannot always be carried out on-line (production of documentary evidence, signature). The Internet site also allows access to the municipal council's deliberations. The E-mail address of each councillor is available and there is a forum in which councillors and the public can engage in dialogue on the most varied matters. The

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introduction of ICT was seized as an opportunity to reorganise the structure and functioning of the municipality in order to simplify procedures and bring it closer to the citizen.

The municipal administration (400 employees) does not have a general secretary any more, since there is no need for routine co-ordination in an entity that has become more transparent as a result of the widespread use of electronic media. Moreover, every area of responsibility is organised in such a way as to involve a team of two persons. One is a municipal councillor, who is responsible for the sector, and the other is a department head, benefiting from a high level of delegation of authority. Such an organisation permits the latter to deal with most matters without referring to the councillor. This delegation of responsibility and pursuit of greater efficiency is perfectly consistent with the idea of electronic mail, which requires a rapid response.

A further step was taken in September 2000 with the commissioning of the electronic "hot-line" for the use of citizens, who are no longer regarded as users of services but as customers of local government. The basic idea is to enable every citizen to follow the progress of any request formulated in electronic form and to obtain a guaranteed and standard reasonable time limit for a reply from the outset. Each stage in the process of dealing with the request can be immediately tracked upon demand. In case of absence of the employee directly in charge of the request, for whatever motive, the corresponding bureau is thus obliged to take adequate measures in due time to correct the possible impact on the assigned time limit.

Citizen services available on the In-Town-Net are not only based on partnerships established with associations or on more efficient access to local government. A third and original feature relates more to goals of social cohesion. The municipal social services department includes an "inter-generation office", which has introduced procedures to facilitate contacts between all age groups. The principal instrument for providing such contacts is the In-Town-Net, whose citizenry section provides access to the directory of E-mail addresses in the Parthenay district and to two other networks: the "network for the exchange of knowledge" and the "local exchange service".

The first is free and is based on the principle of reciprocity. It involves examining personal information volunteered by each Internet user in Parthenay (main interests, hobbies). By consulting different topics, the user is able to discover people with certain knowledge profiles and to contact them. The local exchange service is used for swapping goods or services on the basis of a scale of equivalent value freely determined by the two parties, using an accounting unit called a "PES" (Parthenay Exchange Service). If the swap does not take place immediately, the remaining "debt" is indicated on line until the second party fulfils its "obligation",

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which can also be transferred to another beneficiary if the first person agrees. The goods or services available are classified by type in a list of small ads indicating both offers and requests.

B*lacksburg* is a rural college town, home of Virginia Tech, a research university specialising in agriculture, architecture and engineering. In the late 1980s, faculty staff initiated a project with the local telephone company and the town government to provide access to the university network from homes. The implementation of the project rapidly led to questions concerning the possibility of wiring the whole community, so as to help all inhabitants to become more active, socially, economically and politically. The concept and the vision of the Blacksburg Electronic Village (*bev.net*), known as BEV, were born. The set-up of a high-speed fibre optic network connecting all homes and businesses permitted the launch of the project in 1993. With various aids and grants, completed by proper training of users, by mid 1997 more than 60 per cent of inhabitants were using the Internet on a regular basis. Today, close to 90 per cent of the population uses the network to access through the Internet the various local services available.

The Volunteer Action Centre matches up citizen volunteers with groups and agencies in need. The creation of the BEV greatly facilitated its efficiency and responsiveness, by eliminating the need for a large printed directory of resources. Today, a dynamic database has virtually eliminated all paper costs, providing easier access to information and increasing its accuracy. Services are now delivered more rapidly to a greater number of beneficiaries within 150 community groups of all kinds. Senior Citizens are not the least active on the BEV network where they keep up with old and new friends on a listserve. They also can contribute a profile to the senior's Web page and enjoy monthly senior's meetings and socials organised through and posted on the BEV. Parents follow classroom activities and school board issues on the school's Web page and a school board listserve. Since its introduction, a 13 per cent increase in attendance to the meetings has been noted. Citizens actively use Web based surveys to let the county supervisor know their opinion on a wide range of matters from proposed new roads to school renovations.

BEV now achieves 40 per cent cost recovery (in particular through resale to other communities and groups of their concept and software packages), completed by various funding sources. No drop in usage was noted when minimal fees (for E-mail accounts, Web design) were levied a few years ago. The BEV, often cited as a model, is considered to have strengthened the social fabric of the town. As in the case of Parthenay, it has permitted groups to interact in new and innovative ways without sacrificing existing traditions. Local government services are also considered by citizens to be carrying out administrative functions more efficiently thanks to the new possibilities offered by local on-line public services.

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c) Risks and opportunities of ICT *in local governance from a regional perspective*

An evaluation of the risks and opportunities of ICTs as an e-democracy tool within the context of a region has been carried out for Emilia-Romagna by Stefano Kluzer in a study published in 1998 by Databank Consulting (Milan) and the Regional Development Agency for Emilia-Romagna. This study is a contribution to the European "Forecast and Assessment of the socio-economic and policy Impact of advanced communications and Recommendations" (FAIR) Programme, one of the components of the "Advanced Communications Technologies and Services" (ACTS) Project. This study analyses in particular the "civic networks" created by local authorities in Emilia-Romagna with the encouragement of regional government. "*Civic networks are characterised by a strong role of the local (municipal or provincial) authorities, which initiate them by installing public Internet servers and putting content on them. They aim however to move beyond the promotional and informative dimension (...) towards on-line administrative services and public interaction with the citizens.*" These networks, present in the major cities, were also spreading at the time the report was written to smaller towns like Carpi, near Modena, and Cento, near Ferrara. Nonetheless, the bigger cities were taking the lead in connecting the smaller municipalities of each province to the same network. On these city sites (Bologna, Ravenna, etc.) "*the Web pages of several local authorities could be found, with a growing amount of information, interactive communication with the mayor and/or municipal offices, and some on-line services*".

The analysis of these civic networks lead to identifying three critical issues in the transition to the Information Society in Emilia-Romagna. First, ICTs are seen as playing an important role in the trend towards merging smaller municipalities in peripheral areas or integrating them within wider metropolitan authorities, "*telematics being a crucial tool to support it*". The second issue concerns "*the transformation of the services delivered by local authorities and of the work and workers which produce them*". The report states that civil servants in the future will have to use ICTs much more and also manage a new type of social interaction with their customers, underlining the need for a major retraining effort. It is also suggested that reallocation of staff made redundant by ICT should be managed so as to better assist the citizens without on-line access, in a "social compensation" approach responding to the needs of the weaker groups in society. The third question relates to "*the aims and practice of government (...) being challenged by the opportunities ICTs provide in terms of public access, interaction and processing*".

This last assessment leads to three policy recommendations. First, "*stronger strategic vision and leadership will be needed to bring together a wider range of (more autonomous) interests*". Second, since "*wide external (on-line) audiences can be reached at the touch of a button, public communication practices will have to relinquish the traditional all is good and going fine approach, in favour of more articulate and problematic messages which tell most if not the full*

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truth". F*inally*, "*managers and politicians will have to shift from coercion* (*less effective and practicable within networked organisations*) *to the creation of strong symbolic, identity founding mechanisms, to achieve internal co-operation and consensus*". These recommendations eloquently show that the introduction of ICT entails inevitable structural and operational changes within organisations as well as networks and versus the customer of public services that the user now is.

Lastly, if the benefits of ICT are to be reaped for all communities within a region, strategies should be devised with the purpose of affording equal opportunities. The level of awareness of the potential of these new tools and the available financial resources for projects are not usually well distributed from a territorial point of view. Creating a level playing field for the different towns in rural areas thus becomes an important aim for regional policy vying to promote the Information Society. "A*s the new* ICTs (…) *make it easier to find complementary or alternative key resources elsewhere, the risk is a centrifugal phenomenon, which will disarticulate the local society, lead to enhance or transfer value-adding functions in other locations, and likely increase local imbalances, with some* (…) *towns and social groups getting much better, while others lose*." This risk being identified, the report underlines, as a matter of open conclusion, the task to be accomplished. "I*n the transition from real to virtual networking, ways must thus be found to maintain or regenerate local identities* (*and*) *social cohesion*…"

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Chapter 3

Economic issues

Introduction

The basic economic issue for ICT in rural areas concerns effective adoption by SMEs since even the smallest of firms usually stands to benefit from the new business processes they allow. This should not exclude the creation of new activities directly linked to ICT, as they can contribute to renewed economic development and spread of innovation amongst existing enterprises. The overall stake is increasing a territory's attractiveness by an adequate mix of policies pursuing social cohesion and economic development through a proper understanding of ICT potential.

The economic impact of ICT in rural areas can thus be measured in three fields:

- development and support of small businesses;
- introduction of new activities;
- overall increased attractiveness of region or community.

The *adoption of* ICT *by small businesses*, very present in rural areas, is essential to economic development. Creating proper awareness is the first step, since smaller firms cannot necessarily understand the potential benefits of these new tools without prior sensitisation. The obstacles are more cultural than technical or financial, but SMEs often need neutral advice to proceed to the best cost-efficient choices on the basis of a well-defined strategy. Specific national, regional and local programmes are instrumental in these processes and in e-commerce implementation. Nonetheless positive results can be sometimes achieved with little or no support.

The *creation of delocalised activities in rural areas* can represent a significant element in economic renewal if such choices are based on long term strategies. Telebusiness and call centres require proper telecommunications infrastructure and important public investment but the rewards can be high. Telework cannot have the same kind of impact but it can help supplement revenue for people with certain skills when traditional agricultural activities are in decline, thus contributing

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to the reversal of negative demographic trends. Lastly, rural start-ups, even in very small towns, are not that exceptional, particularly in the field of Website design and maintenance. Bringing in specialised software firms requires a business incubator approach that can very well be developed in a rural environment, as successful examples show.

The regeneration of rural areas and communities is linked to success in creating a *new attractiveness for these territories*. This brings a sense of confidence and opportunity, instrumental in retaining inhabitants and in securing inward investment. Achieving it supposes proactive strategies and policies combining national, regional and local initiatives for economic and social development. The prerequisite is a proper assessment of telecommunications infrastructure needs. The ideal matrix is one that brings together all these elements, not only with the contribution of all public bodies concerned and private enterprise, but also with strong support from the local population. Vision, co-ordination and appropriation are the key factors as shown by the first successful rural experiences in this field.

1. Small and medium size enterprises in rural areas and ICT

Introduction

Small and medium size enterprises (SMEs) represent the great majority of private sector jobs in rural areas in all countries, even if some bigger firms, in particular in the agri-food business, are sometimes located there. From the point of view of ICT implementation in existing businesses in rural areas, the issues concern small firms and sometimes very small ones, up to the unipersonal enterprise. Whatever the statistical definition of SMEs, that can vary from country to country, surveys and studies available show that ICT take-up has been slower for SMEs than for bigger firms. The reasons to this situation are varied: lesser financial resources to purchase equipment and software, lesser awareness of the economic potential of ICT and its impact on development of business, lack of training. The situation is nonetheless changing fast, since computer equipment and usage, at least for enterprises comprising more than 10 employees, is nowadays commonplace in OECD countries. For these SMEs, the present trend is characterised by an accelerated pace in Internet use, whether for E-mail or browsing and now for creation of Websites considered as a marketing tool.

This is confirmed by national statistics in most Member countries, government awareness programmes and support in the field of ICT for SMEs having certainly comforted such a positive development, that is much more significant in the case of SMEs with more employees than those with few. This last finding is constant for all countries, as is shown in the background report of the OECD Conference held in Bologna (14-15 June 2000) on the theme R*ealising the potential of electronic*

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commerce for SMEs *in the global economy*. The report indicates that a large majority of the smallest Italian firms (1 to 19 employees) had no ICT equipment in 1999, and that among the 30 per cent that did have it, only a small share (3.7%) was connected to external networks. In the following category (20 to 49 employees), 15.3 per cent had no ICT equipment and 16 per cent were connected to an external network. In Quebec, data gathered by Cefrio and *l'Institut de la Statistique du Québec* for 1999 showed comparable differences, depending on size of firm. The smallest SMEs (less than 5 employees) were 56 per cent to use computer equipment and 27 per cent to have an Internet link. For SMEs employing from 5 to 9 people, the respective figures were 77 per cent and 40 per cent.

Since the smallest SMEs are usually located in rural and remote areas, the disparity is also a territorial one. For this reason, although no specific studies on SMEs in rural areas seem to be available, all reports and findings concerning SMEs in general fully apply to rural SMEs and in most cases the situation is by far more difficult for the latter. Besides, in rural areas, even for SMEs wishing to rely more on ICT potential through adoption of new practices such as e-commerce, quality telecommunications infrastructure affording the required bandwidth is not as easily available as in urban areas. The following developments will first analyse the issues at stake for existing SMEs in rural areas before reviewing the obstacles to proper implementation of ICT. Lastly, policies aiming to help such firms access ICT and use these new tools to develop their business will be presented with a few examples of applications to illustrate these findings.

a) ICT *issues for rural* SMEs

The basic issue concerning the proper adoption of ICT by SMEs, particularly in rural areas, is one of awareness about the potential benefits of these tools. For small firms having long worked without using computer technology and specific software, or having applied these only to certain sectors isolated one from another (accounting, stock inventory), understanding the fundamental changes in business processes cannot come readily. Acquiring ICT and making best use of it is a matter of grasping new possibilities in terms of:

- increased internal efficiency, better quality control and respondence to customer requirements, including in terms of after sale service;
- access to timely and accurate information to manage rapid technical change, the increased variability of demand and new market opportunities;
- access to specialised counselling and services useful for business growth;
- openings to international markets.

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Once convinced of these advantages and new perspectives, the small firm, on the basis of targets to be identified, must devise a proper strategy. The adoption of ICT is not an end in itself, but only a way to achieve one of the following:

- a more important customer base in (an extended) local area;
- development of new products or services;
- export sales to be achieved by presence on the Internet.

Understanding the process is also having the ability to engage in a step by step approach, to measure results, build confidence and acquire progressively the capacity to integrate more sophisticated applications. The above mentioned OECD report on e-commerce for SMEs emphasises this gradual build-up to achieve full e-commerce capacity. "*The first step involves using the Internet as a tool for communicating and obtaining information. In a second phase*, SMEs *consider basic electronic commerce activities such as buying and selling. Finally*, SMEs *start conducting banking and financial transactions*." Engaging in these steps also means defining which business relations will be going through a new process by adequate use of ICT applications. Depending on the area of activity one or all of the three following relations can be deliberately impacted with the goal of achieving greater efficiency or increasing sales: the end-line customer, the supplier, government bodies. Marketing, advertising and sales can be conducted on-line, just as identifying new cost-efficient suppliers or keeping abreast of government policies and filling in tax returns.

The conclusions of a French study published in July 1999 by the National Institute for Statistics and Economic Studies (INSEE), entitled L*e dynamisme des petites entreprises internautes* (Pascal Rivière) shows that small firms present on the Internet tend to perform better than their non-networked counterparts. "*In* 1997, 11 *per cent of small industrial firms declared being Internet users. From all points of view these enterprises distinguish themselves from others: their growth rate is twice as high* (7.2% *versus* 3.5% *from* 1996 *to* 1997) *and they export twice as much* (13% *versus* 6.2%)." Other indicators corroborate these findings in terms of overall performance: higher revenue per salaried person, higher added value, higher growth in job creation, proportionately greater number of patents registered. However, the study does not indicate whether these higher performance ratios were latent, insofar as openness to technological innovation led to early Web adoption, or if the decision in itself brought about a dramatic increase in efficiency.

On the other hand "*there are significant differences in perceived benefits between firms that already use* ICT *as a working tool and those that do not*", as the report to the OECD Bologna seminar on e-commerce states. In doing so it relies on the findings of a 1999 Canadian survey on SMEs that established that half of Internet business users believed that the Internet will have a major impact on their business, while only 19 per cent of non-users shared the same opinion. Similarly, almost 40 per cent of SME non-users could not identify a key benefit to using the Internet, compared

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to less than 5 per cent of Internet users (SES Canada Research Inc., 1999). If ICT opens up so many new and interesting perspectives for SMEs, one can ponder why the smaller firms, that tend to be located in more rural areas, have been taking up ICT slower than their counterparts employing more personnel or situated in a more urban setting. Whatever the answer, it is multifaceted and of course influenced by the local context, but the basic obstacles can be easily identified.

b) *Obstacles to full adoption of* ICT *by rural* SMEs

The take-up of ICT by small firms in rural areas is more a cultural and mind-set issue than a financial or technical one, even if cost or technicalities cannot be ignored. In a rural environment many small businesses are family run and their operating mode or their goals or customer reach have not fundamentally changed over generations. If they have survived competition from larger and more efficient firms, such as the local grocery in the retail or distribution sector, it is because they render a service to the local community. This service is appreciated versus having to travel a minimal distance to the closest medium size town for a wider choice of goods or services, often at a cheaper price. Within such a context, the idea of improved efficiency thanks to investment in computer equipment and software or even more that of servicing a wider area in terms of customers is not necessarily a natural step.

This situation in traditional sectors, very present in rural areas, is reinforced by the fact that ICT use by customers themselves, whether or not for on-line purchasing, is incipient and dependant on other factors such as national ICT policies and penetration rates. The above-mentioned OECD Bologna seminar report on e-commerce, citing the Canadian Federation of Independent Business (CFIB) stresses this point. It indicates that "*Internet use is less developed in the retail, construction, hotels and restaurant and personal services sectors, probably due to the fact that firms are waiting for e-commerce applications to be extensively used by the public*". The key to changing mind-sets that are often reluctant towards innovation and change resides in awareness and training programmes, to be devised and implemented by co-operation between national, regional and local authorities for maximum efficiency, as will be detailed further.

Even if the cultural barriers to ICT appropriation, that are not fundamentally different than those that exist for the general public, are overcome, the cost factor cannot be overseen. The OECD Bologna seminar report puts this forward very clearly, considering the fact that many e-commerce components are basic ICT functions such as the maintenance of a Website. "*Initial investment for the adoption of a new technology may be proportionately heavier for small than for large firms.*" "*Adopting new technologies may entail relatively high fixed costs in terms of development. If the costs of access to e-commerce technologies such as the Internet can be contained to a certain extent, the ongoing*

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costs of IT *support represent a continuing business investment. According to* SBA (*the* US S*mall* B*usiness* A*dministration*), *small firms suffer from lack of funds for up-front implementation costs and lack of monthly cash-flows to maintain their sites.*" This underlines the need for adequate funding mechanisms, to help SMEs begin their ICT projects and integrate their costs until initial return on investment materialises.

The third major obstacle to proper adoption of ICT encompasses the apparent technical complexities of the new tools and concerns the problem of access to proper advice and counselling on ICT strategies and choices. Even if convinced of the merits of the new technologies and willing to go ahead on the basis of allocated financial resources, the average SME usually lacks the technical and marketing expertise that permits to make the proper cost-efficient choices. In many cases this may lead to the wrong technology decisions if they are not subordinated to business strategies. Even if this is the case, a minimum level of external technical advice is usually required as most SMEs lack the corresponding in-house resource. Access to these skills is of course more difficult in rural areas where such competencies are rarely available. This basic fact and the various initiatives taken in a certain number of countries to help SMEs find a solution to this problem, emphasise the importance of this question for ICT implementation, particularly in rural areas.

This is underlined by the results of various studies concerning e-commerce. Deloitte and Touche, in T*he* E-*business readiness survey*, published in March 2000, established that less than 30 per cent of companies in the panel considered that their existing Website was efficiently conceived to further business development. The Retail Council of Canada, in June 2000, states the following: "T*he most important need for* C*anadian firms is to adopt an e-commerce strategy that integrates itself into their overall business strategy, because e-commerce is first and foremost a business project and not a technological one.*"

c) ICT *policies for* SMEs *and examples of successful implementation*

N*ational policies*

Most countries, within the framework of their national Information Society programmes, as well as the European Union in various programmes, have given attention to the requirements of SMEs for the transition towards the New Economy. Generally, governments have grasped the strategic importance for overall economic performance and creation of jobs, of helping SMEs to adjust to the realities of a networked economy. However, all programmes aim at SMEs in general and no specific treatment is given to rural SMEs, save at the regional or local level. Most programmes seek, by an active territorial presence, often in existing bureaus or facilities, to offer access to computers and various applications as a first step,

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completed by specific training at different levels. These initial points of contact open to SMEs are often public access points and sometimes telecottages with proper staff, to be able, in certain cases, to help the SME in elaborating proper strategy and making the technological choices corresponding to identified needs. Examples of such approaches can be found in countries such as the United Kingdom, the United States or Australia, whereas French policy combines various actions.

In the *United Kingdom*, the Information Society Initiative (ISI), launched in 1996, comprises an SME action plan placed under the responsibility of the Department of Trade and Industry's Program for Business. The main feature of this programme consists in the creation of a national network of local support centres, numbering 80 at the end of 1998. These centres are situated in various locations, ranging from Development and Enterprise Agencies, technology centres and Chambers of Commerce and Industry. They provide initial and specialised training as well as advice, support and financing for SMEs within several national projects. Multimedia Demonstrator Awards is a competitive funding mechanism designed to encourage the adoption of such technologies in small firms. Industry Sectors On-Line and Export On-Line support the work of trade associations and offer access to useful information on different markets. A national programme of training and accreditation for business advisors and an ICT financial management programme support these. A specific portal (*ukonlineforbusiness.gov.uk*) keeps small businesses abreast of most recent developments in ICT, training opportunities and e-commerce perspectives.

In the *United States*, the Small Business Administration (SBA), with more than 1 000 offices and resource centres located across the country, has supported various programmes to help SMEs enter the New Economy. In rural areas this action is carried out in conjunction with programmes and financing also made available to small businesses through the Department of Agriculture. Many of the SBA resources across the country offer access to computers, the Internet and provide training programmes for basic and specific applications. The Small Business Administration Website (*sba.gov*) includes a classroom section providing on-line training and useful information in ICT use for small businesses (in the United States, 70% of SMEs had Internet access at the beginning of the year 2000).

In *Australia*, the Australian Electronic Business Network (AeB.N) was established through a partnership of federal, state and territory governments with industry, to assist in training for and uptake of electronic commerce by SMEs. The initiative, presented in the OECD Bologna seminar report, was launched in response to the need to improve understanding of electronic commerce, taking into account the ways in which a given industry can share information and spread costs. The AeB.N provides business-training programmes, e-commerce information, access to Web-based information and training resources (AUSe.NET) and demonstration and pilot e-commerce business systems and solutions.

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In *France*, the *Programme d'Action Gouvernemental pour la Société de l'Information* (PAGSI) launched in 1997 includes measures in favour of SMEs. The Ministry of Economy, Finance and Industry (*industrie.gouv.fr*) first engaged in an SME awareness and training programme at the level of each region through the organisation of forums and road-shows. Specific attention was given to training of chamber of commerce personnel, so as to deliver the best programmes to SMEs. Small enterprise is strongly encouraged to work in a network approach, through projects presented by groups of firms in one sector or complementary sectors, between suppliers and business customers or at a given geographical level. This objective is pursued through the UCIP ("*Utilisation Collective d'Internet par les* PME") programme, initiated in 1998 and renewed since.

Fifty million Francs (with a maximum of 50% participation in each case) were allocated for the first year. In 1999 around 120 projects were approved under this programme. Twelve of the projects financed in 1999 are specific to rural areas and activities such as agriculture and forestry. One of these concerns the *Centres d'Économie Rurale* (CER), a network of organisations working at the sub-regional level to bring expertise and advice in different fields to more than 300 000 rural enterprises. This project was conceived to permit training of CER personnel and provide necessary support for conception and launch of a portal site offering access to professional information including ICT strategies.

Local policies and successful projects

To illustrate issues and obstacles and how to overcome the latter, presentation of a few possible approaches at the regional (counsel) or local level (training), as well as e-commerce success stories seem useful.

The "Acticiel 98" project implemented by the *Limousin Region in France* permitted to draw the attention of the business community on the necessity for SMEs to go ahead with Internet projects only on the basis of prior definition of a strategy. The project was conceived with the purpose of permitting 20 firms, selected on the merits of their plans for developing a presence on the Internet, to benefit for free from the advice of experts to define and assess their strategy, particularly in the field of business to business e-commerce. This project follows other actions in favour of SMEs initiated in 1995 to further awareness and training in ICT and ensure support for specific activities. Such is the case for the creation of a professional Website open to all farmers conceived to sustain the local cattle industry and promote export of the famed "Limousine" race.

The digital age town of *Ennis in Ireland* (see Chapter 1) developed a comprehensive ICT programme for SMEs to help these make the right choices and implement them. The programme, launched in April 1999, comprises the following elements: training, consultancy, hosting services and ISDN connection, grants for

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project start-up. Training was taken up at a good level, 350 people having followed ICT training courses at different stages. Besides, a business champion programme was devised, with the goal of identifying 20 companies with the capacity for embracing significant technology change. These companies will serve as basis for case studies that will be widely disseminated. Already, seven businesses have been identified as such and their business experience highlighted on the Ennis Internet site (*ennis.ie*).

Some success stories in the field of export oriented e-commerce, achieved mostly without help and counsel show that defining a strategy and implementing it can be sometimes accomplished just by relying on local resources. This is the case of *a French Internet project in the field of forestry* that emerged as a consequence of the devastating storm that hit France in December 1999, destroying thousands of acres. The Aquitaine region was hard struck and particularly the Médoc region with the equivalent of ten years of crops on the ground. Some foresters were able to sell wood abroad, simply using E-mail to initiate commercial contacts. These first successes created the basis for a more organised approach in favour of all local foresters, 500 agreeing to pool their offering (wood type and cut, age). This information is regrouped for potential buyers on the *mediaforest.net* Internet site, that has permitted addressing foreign markets, whereas sales were up to then exclusively on the domestic market. Financing from the regional authority and the donation of computers by the telecom operator Cegetel facilitated the launch of this project.

In *Canada*, the *Kagiwiosa Manomin co-operative company* of the Wabigoon Lake First Nation sells wild rice through the Internet world-wide since 1998 (*manomin.on.ca*). Before that the wild rice harvest was mostly used for local consumption, a small portion being sold to a distributor with sales on the Canadian market and in the United States. The opportunities offered by the Internet led to the creation of the co-operative that directly took in hand commercialisation and developed new markets. Customers are now in Japan and in Europe (half of sales achieved mostly in Germany and Switzerland), and the rest in Canada and in the United States.

2. The creation of new activities through ICT

Introduction

Economic decline, due to the difficulties of many traditional sectors such as agriculture, and outward migration, has long characterised many rural and remote areas. Geographical constraints due to the localisation of production factors and of main customer bases did not offer very much flexibility to counter these tendencies or create new activities. ICT offers from that point of view interesting perspectives

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for economic development and the creation of new jobs. In a networked economy, a rising number of service activities do not necessarily have to be performed exclusively out of urban areas any more, as long as telecommunications infrastructure provides cost efficient distance delivery. This is the case of telebusiness and call centres, often operated by specialised firms for important corporate customers. Telework, though its development is not as rapid as that of call centres, can provide useful opportunities for independent workers with specific know-how. Lastly, multimedia and software design, spurred in particular by the expansion of the Internet, provides a new sector of activity that is appearing in many rural areas not serviced by bigger firms. These voice or data services rely on a certain number of skills that can be found or developed in rural areas, within the framework of pro-active policies that a certain number of regions and communities are actively pursuing, either independently or with the help of national programmes.

a) Telebusiness and call centres

Call centres are the largest and most widely recognised types of telebusiness, distance work accomplished by skilled salaried personnel in a dedicated location, usually under contract for a bigger firm. More than 1 250 000 people were employed in telebusiness activities in Europe at the beginning of 1999, growing from about 300 000 in 1995. The UK is the leading European country in this field with approximately 400 000 employees, more than one third of the European total. Basically a call centre provides different and more or less sophisticated forms of customer service, handling queries or complaints, responding to follow-up needs or accomplishing transactions. Most companies in the financial sector (banks, insurance), in transportation (airlines, railroads) or major utilities rely on such centres to respond to customers and provide them with a wide range of services such as policy renewals, financial operations and bookings. Call-centres now also operate telemarketing and telesales activities, often in response to advertising campaigns.

Business process out-sourcing is another growing category of telebusiness, with the opportunities offered by the Internet. This activity involves the remote processing of business information by specialised firms in fields like accounting, insurance claims, secretarial and translation services or on-line travel bookings. Telebusiness operations are mostly generated in large centres (100/1 000 employees) located in urban areas with adequate telecom infrastructure and workforce. However there is a growing number of companies in this field that are able to achieve cost efficiency at a smaller scale of operation in rural areas, thanks to cheaper digital telecommunications or distributed network systems. This is the case for certain specialised activities, such as software engineering, database management, or research and consultancy services.

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In countries like the United Kingdom, Ireland, Sweden, Finland, France, the United States or Canada, telebusinesses and particularly call centres can be found in rural areas. Nonetheless, few regions, states or provinces have systematically followed policies to attract these activities to rural or remote territories. Such is not the case of Scotland where a sizeable proportion are located outside of urban centres or their periphery, mostly in the Highlands and Islands. In 1999, a total of 160 telebusiness firms, employing 21 000 people, were based in Scotland. The majority of these centres handle classical customer service queries and transactions but an important minority undertake business-processing operations. Ten per cent of employees are graduates, two thirds work full time, two thirds are female and seventy per cent are less than 35 years old. Fifty per cent of these employees work in the Glasgow area, which concentrates the majority of call centre operations. Five urban locations aggregate eighty-five per cent of jobs in this sector. Most of the remaining fifteen per cent are located in rural areas in the Highlands and Islands (2 300 employees). This achievement is the result of constant policies deployed for the past ten years by the local development agency, Highlands and Islands Enterprise, to implement a high quality telecommunications infrastructure (see Chapter 1), provide office space and train personnel in required skills.

The first call centre opened in the Highlands and Islands in 1992 in Thurso (8 500 inhabitants) with 25 people employed by Manpower for British Telecom. This activity, now including an Internet help-desk, today provides work to 625 employees. The telecommunications operator also has a call centre in Alness (population 6 000) staffed by 415 people dedicated to its mobile phone and ADSL customers. Cap Gemini Ernst and Young is another major player in telebusiness in the Highlands with six different locations and more than 500 employees today, rapidly expanding to 1 200 with the opening of a new centre in Forres (population 8 500). In Dingwall (5 200 inhabitants), the software and consultancy giant employs 260 people for Virgin Rail bookings. TSC (Telecom Service Centres), which started it's activity in the Isle of Bute in 1995 now employs 700 people in three different locations, including Aviemore, a small town of only 2 200 inhabitants. Database Direct operates call centres and Internet support for the Scottish Tourist Board out of two locations employing 180 people, one, Kinlochleven, with only 1 000 inhabitants.

What are the factors that decided such companies to locate activities in a rural area, often at a great distance from major cities like Glasgow or Edinburgh, and sometimes without practical or cheap air-links? Proper telecommunication infrastructure and competitive tariffs at par with urban areas being prerequisite, other factors seem to play an important role in these location decisions. The quality and availability of the workforce are considered by these employers as essential, putting them at advantage over urban employees in terms of turnover and wage rates, adjusted to local conditions, usually lower than those prevailing in cities. One of

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the explanations of lower turnover is the lack of competition between telebusiness employers in rural areas as compared to urban areas.

In the latter, competition is strong not only for very specific skills but also for basic manpower presenting the qualities required for work in a call centre environment (attention to customers, team-work, intense activity). Flexibility of the workforce also counts, Cap Gemini Ernst and Young having had no difficulty in recruiting volunteers for weekend shifts. Dedication and proper delivery of tasks is perceived as one of the positive consequences of living in a stress-free environment, with many leisure activities easily accessible. Top management appointed in these areas also appreciates this, just as well as the possibility of having a secure family life with a proper level of education, even in remote areas. Besides these advantages, the initial package proposed to potential investors in the Highlands and Islands is particularly attractive. When training is necessary, up to a third of the cost can be funded by the Local Enterprise Company. Availability of pre-constructed and adequately wired hi-tech buildings in Business Parks, at very reasonable rents, much lower than costs for premises in urban locations, complete this picture.

Telebusiness relying on a mix of adequate telecommunications infrastructure, a quality workforce with reasonable wage levels and corresponding linguistic skills, such requisites are today available in other countries, particularly in the developing world. It has been argued for this reason that choosing such ICT strategies for rural areas was not necessarily the best way to ensure long-term sustainability of employment. Such concerns merit proper attention as other countries in the Eastern Mediterranean, the Caribbean, the Indian sub-continent or Southeast Asia are getting their share of this market, depending on their linguistic area of influence. With 80 per cent of total operating costs in this field based on employment, the case is a strong one, even if Scotland remains within Europe a relatively low wage region.

On the other hand, most telebusiness operations located in these parts of the world tend to be on the lower side of the value-added chain or correspond to basic batch data processing requiring no human interface. More sophisticated applications require a good knowledge of the customer's business and constant software and process upgrading that give a leading edge to major European and North-American teleoperators. Besides, security or regulatory concerns can also prevent such transfers. Lastly, basic linguistic skills are not always sufficient for customer service and marketing and often require mother tongue empathy and use of specific words and expressions to make the caller feel at ease. Nonetheless, it cannot be denied that most low value added services will tend to be rendered by companies in other parts of the world. This means that workforce skills have to be permanently upgraded so as to satisfy the requirements of new applications. Highlands and Islands Enterprise is particularly attentive to this, both in

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generic training programmes or in specific ones designed for the requirements of certain teleoperators.

b) Telework

Telework is a new way of working that permits an individual to accomplish a service task at a distance, whether as a salaried person or as an independent worker, on a full or part time basis. Telework is usually done out of home, but it can also be carried out from a specialised location called a telecentre, providing office space, computer equipment and network access. Telework, requiring a mix of computer and more or less specialised skills in other fields, allows partial or total delocalisation of jobs at different levels of qualification. Independent telework covers a wide range of tasks such as secretarial, proof reading, indexing of articles, translation and graphic design. A growing number of consultants in various fields also resort to telework because of its flexibility and potential to attain customers regardless of their location.

The most important category of teleworkers, often known as telecommuters, is that of the salaried employee working part time out of home and the office. This form of telework responds to the needs of both the employer and the salaried person. The first gains on office space costs, by reducing the square meters required at any given time thanks to a new organisation of shared offices. The second is happy to work at least part time out of home either to reduce commuting and/or make a career more compatible with family life, especially for women wishing to devote more time to children. Such telework schemes are developing in many international corporations, particularly in the IT sector, and in major consultancies.

Within these diverse categories of telework, the last, applying to an urban and suburban environment, is not relevant for the purpose of this study. In a rural context, the independent teleworker working out of home constitutes the category to be investigated. Although no rural/urban breakdown of teleworkers is usually available, relevant data concerning telecommuting and various estimations converge to establish that telework out of rural areas, though it can be significant in some locations, is only a small proportion of the total. The *Status Report on European Telework* published by the European Commission in September 1999, indicates that there were close to 7 million teleworkers in the European Union in 1998, as compared to close to 16 million in the United States and 2 million in Japan. It underlines the fact that the Scandinavian countries (Denmark, Sweden and Finland) present the highest incidence of telework (8.25% of the active population) but that 65 per cent of teleworkers are basically working part time out of home for their employer. In the Netherlands, the United Kingdom, Ireland, France and Italy the proportion is around 50 per cent.

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The remaining percentages correspond only in part to independent teleworkers, since the study also takes into account another important category, that of the mobile worker. The latter is defined as the salaried person connected to the company wherever he or she may be (sales or maintenance people more often on the field than in an office). This leaves a small percentage of independent teleworkers working out of home (SoHo or Small Office/Home Office), ranging from 12 per cent in France, Italy, Spain, Portugal and Greece to 34 per cent in Germany and Austria and around 20 per cent for the United Kingdom, Ireland and the Scandinavian countries. The figure for SoHos does not establish any distinction between urban and rural locations, but one can reasonably consider that the latter represents the smallest proportion. In Finland there were 350 000 teleworkers in 1998 out of a potential of more than 800 000, that is to say 40 per cent of the working population, which is very high (the above mentioned European study indicates that 10% of Finns were teleworkers at the same date). This potential is estimated to be located for 50 to 60 per cent in the greater Helsinki area, as compared with 10 to 30 per cent in rural areas (R*ural programme policy and new information technology in* F*inland*, contribution of the Ministry of the Interior to the 15th Session of the Group of the Council on rural development, OECD, December 1998).

These findings do not mean that telework cannot be an interesting solution for job creation and economic development in certain rural areas. They simply establish that the independent teleworker remains to this day a scattered phenomenon, that does not usually have a significant impact on the local economy since it concerns in most cases only one or a few persons in a given community. On the other hand if a proactive policy to develop telework is devised rather than just let it happen at the initiative of one or more individuals, new and interesting perspectives can be opened for existing inhabitants and those wishing to settle in or return to a rural area. From that point of view the experience of the Western Isles of Scotland appears particularly relevant in terms of local economic development.

The Western Isles (spread over 3 000km^2, population near to 32 000) have developed since 1994 a very specific approach relying mostly on telework to bring new activity to a waning rural economy. The local economy is predominantly agricultural, with sheep raising on small farms (crofting) and fishing (mainly salmon fish farming), but both sectors are in decline. Extra revenue is procured in certain cases by weaving (Harris Tweed) and tourism (bed and breakfasts), but this does not suffice to ensure a proper income level to most families. Unemployment remains high (close to 9%) and many skilled youngsters tend to emigrate elsewhere in Scotland or the United Kingdom, where their educational capacities are put to good use. It is a fact that the area has the highest number of graduates per capita in the country and a secondary school achievement record double of the national average.

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The telecommunication infrastructure strategy deployed by Highlands and Islands Enterprise at the beginning of the nineties broke the island's isolation by bringing up to date telephone service to the most remote villages. However important for local inhabitants this was not enough in itself to nurture new activity deriving from ICT. Capitalising on the high level of education and using a strong local tradition of multiactivity with flexible working habits, the Local Enterprise Company initiated in 1994 with the Western Isles Council and European LEADER funding an original teleworking initiative. The nomination of an ICT advisor in the Highlands and Islands, coming from a computer marketing background and returning to Lewis from Edinburgh, was instrumental in this project.

This permitted the set-up of the Western Isles Information and Communications Technology Service (WIICTAS), based in the small village of Habost on the Island of Lewis (21 000 inhabitants, 9 000 in Stornoway, the main town) staffed by the expert and one assistant. An initial database of 160 people was compiled, comprising persons with the necessary skills to perform tasks such as technical authoring, editing, proof reading, computer graphics and software development. An early decision was made to avoid work involving mechanical data entry, due to competition from the developing world. To help potential teleworkers in securing contracts and to manage them, a specific company, Lasair Ltd., staffed by two people, was set up on the Island of Benbecula.

By the end of the first year of operation, Lasair was in a position to tender and succeeded in obtaining a contract from an American publishing company based in California, specialising in indexing and abstracting business journals. This gave work for over five years to 34 people, mostly women, working out of their home, with printed matter shipped weekly by air and production returned to the publisher via the Internet. Other contracts concern the production of digests and the indexing of publications of the Home Office Forensic Science Department, the editing of the Scots Law Times archives into CD-ROM format and conversion to electronic media of scientific publications. A company offering a quick transcription service to lawyers is one of the most recent contracts signed up, employing people committing to at least four hours availability a day, five days a week, with flexibility as to work peaks. Around fifty teleworkers are linked to this contract at the end of the year 2000.

The skills register maintained by WIICTAS now comprises close to 600 people covering a wide spectrum of applications and disposing of the proper computer equipment at home. The potential teleworker employer does not have direct access to names but only to availabilities in various fields, by getting connected to the "*work-global.com*" Web site. WIICTAS than notifies the possible employees, who volunteer on a given contract. If necessary this can be managed by Lasair at a fee. This original project, which won in 1999 the European Telework Award, has created from 1995 to 1998 approximately 120 jobs. The current second phase, ongoing till

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the end of 2001, aims to create a further 150 jobs and retain 55 of those already existing. Since inception the total costs have amounted to £565 000.

Undeniably, this innovative project has been a success, but its exact economic impact is difficult to evaluate. In supplementing families or single people with an extra source of income it has contributed, up to a certain extent, to the economic regeneration of the islands. On the other hand it cannot normally procure steady revenue nor become, for that purpose, the sole source of income. In spite of this limitation, it should be stated that it has certainly given to local inhabitants a good vision of possibilities within the Information Society. Being fully compatible with traditional activities this type of telework sustains the social fabric and gives reason to stay rather than emigrate. The European Commission Exchange Mart for Territorial Employment Pacts has recognised this by retaining this initiative as a model of good practice for remote areas with similar problems.

c) R*ural start-ups*

Between call centres employing several hundred people in one location and telework concerning a few individuals do rural areas offer the possibility of creating small innovative firms that could be characterised as local actors of the New Economy? Creation of new Web-based service and software activities tend of course, like all ICT ventures, to locate primarily where they can find the proper network infrastructure and connectivity and the human and financial resources required for that purpose. In many cities world-wide there now is at least one neighbourhood where a "silicon alley" is situated, attracting new talent and start-ups seeking capital risk funds.

This phenomenon, adding to that of "silicon valleys" along the famed American model, now sprouting up in various locations around the globe, would tend to exclude from these new opportunities the most rural and remote areas. Even if these territories do not by definition possess all the ingredients to begin with, the launch of local start-ups is not an isolated case any more. A growing number of regions are encouraging this and, most of all, an increasing number of small towns are going ahead with projects that support local innovative small enterprise with the aim of creating new and different kinds of jobs.

In rural areas, in North America and in Europe, such start-ups now exist but their creation is too recent to be able to evaluate their long-term sustainability. Nonetheless, insofar as they capitalise on their knowledge of local markets and are able to answer local needs more speedily and efficiently than bigger far away firms, they probably have a good business case. This would be applicable to most local Web design and hosting firms that are also often Information Service Providers (ISPs). Relevance and soundness of a business strategy can also be considered when know-how concerns a specific activity, like farming or cattle raising, for which new

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software applications are developed, with potential for reaching a wider customer base both on the domestic market and abroad.

In a context where finding a job or starting new businesses in often declining traditional sectors is usually difficult, these new openings provide opportunities for local young people who have been up to now candidates to outward migration. In some cases the momentum created locally can bring back people and even incite newcomers to settle, as some examples show. The potential benefit for the small town is not limited however to job creation and economic development in the ICT area and its immediate environment. The non-tangible benefits appear just as important: a spirit of innovation can be something contagious and it can reach local SMEs easier if there is a local model to observe. Besides, the simple fact that these new firms, sometimes with outside capital and some non-local personnel, locate in a small town is proof that something is changing and that depopulation and economic decline are not irreversible.

The most widespread area of application of the above mentioned opportunities concerns Web design and hosting. As more and more local public bodies and businesses are now present on the Internet, the need for local design capacities with proper technical support is growing. Local authorities often encourage this favourable climate, insofar as they help these small firms to start their activity by providing business incubator type services (office space, financial advice). Such is the case of the Future Development Corporation of Matawinie county located in Saint Alphonse Rodriguez, Quebec, Canada, that is supporting a local start-up created by two young adults in their twenties. This example is far from unique and often adds to the creation of jobs resulting from an increase in computer use justifying the opening of local distributors for PCs and software.

More specialised applications are not as frequent but they open possibilities for future development on a wider scale. Such is the case of Braidgrove, a firm located in a small business park next to the town of Allness in the Highlands and Islands of Scotland. It employed 17 people mid 2000 and 23 at the end of the same year. Braidgrove is a multimedia and software design house providing customer service for multichannel data base applications in the field of cattle traceability (600 customers) and e-commerce. The fully integrated services provided, accessible by telephone or through the Internet, are based on workflow management offering permanent up dating of operations and logistics.

An increasing number of regions are beginning to implement policies to help local start-ups and attract new ventures by ensuring that proper telecommunications infrastructure and possibly office space is provided in business parks. This is the case of the Highlands and Islands of Scotland, now actively targeting firms of the New Economy and also of the Shannon Region of Ireland with its project to create satellite technological nodes in rural areas linked to the main business park

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in Limerick. In Scandinavia similar developments already exist, whether in the province of Northern Karelia in Finland or in Blekinge in Sweden amongst others. Such policies based on the concept of the learning region, with close links between universities and business, create a favourable environment and facilitate access to national programmes and funds created with the purpose of supporting initial launch of New Economy start-ups. Besides regional initiatives, some small towns have gone ahead on their own to help these new businesses begin their activity or even attract existing firms in the ICT sector. Such is the case of the digital age town of Parthenay (Deux-Sèvres) in France and that of Maddock (North Dakota) in the United States.

P*arthenay* (12 000 inhabitants) uses its positive image as a digital town and its excellent telecommunications infrastructure to attract new activities and companies, particularly in the information technology and multimedia sectors. Whereas computer service firms were virtually non-existent a few years ago, there are now 22 such companies in Parthenay, with 63 employees in all. The prevailing climate of innovation, favourable to start-ups, and the provision of incubator type services explains this success. A decisive factor is the availability of a young, qualified workforce, from the digital town itself. Of the 37 people filling three-year youth employment programme positions to host the public access points, 27 were recruited by the private sector, mainly by computer service firms.

The experience of M*addock* (North Dakota) is a more recent one, since its Business and Technology Centre was only opened in July 1999. It appears particularly interesting since it concerns a very small town (558 inhabitants) and a project based on an innovative and original concept linked to an adequate telecommunications infrastructure. Maddock's economy is centred on wheat, and falling grain prices, particularly at the end of the eighties, entailed strong out-migration, with a population loss of two hundred people in less than three years. Heavy reliance on a single commodity not easily affording new job opportunities, a small local customer base for new businesses and a reduced level of available social and health services did not make Maddock an attractive option any more for young people, especially those with children. To stem what was mostly a "brain-drain", it became imperative to both provide the services that were lacking and encourage at the same time the creation of new activities. After extensive consultation, the Maddock Economic Development Corporation, a volunteer civic entity, decided satisfying these two different requirements in one single location, with the aim of sharing investment and operational costs as well as providing integrated services.

The Business Technology Centre comprises, besides business incubator support and office space, a public Internet access point, day care services for young children and medical consultations soon to be completed with telemedecine applications. The building, which cost around $750 000 to build, with federal and state funding and grants completing the $200 000 contributed by the town, has

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most of it's office space now rented, thus covering its debt payments and operating expenses. Amongst the tenants are a Chicago based printing company for customer follow-up (call centre), an on-line local women's magazine, a Web design start-up and a high tech start-up specialising in satellite imaging for farmers. The firm, AgriImaGis, has developed software permitting interpretation of soil and irrigation patterns to increase crop yield. It now employs 6 people. The Maddock Business and Technology Centre has permitted the creation of 15 jobs within the year of its opening. It won the AOL rural telecommunications award in 1999 in recognition of its contribution towards regenerating the local community following a model considered being replicable elsewhere.

3. Conclusion: attractiveness of communities and territories

Introduction

ICT policies and projects in rural and remote areas, whether socially or economically oriented, basically aim to make the corresponding communities and territories more attractive, both for inhabitants and investment. The challenge of ICT in rural areas today is to see if awareness, dissemination and active appropriation of information technology and its applications can be attained so as to contribute first in stabilising and than in reversing negative economic and demographic trends. Of course, ICT cannot *per se* and on the short term solve the major problems afflicting many rural areas, because of the decline of traditional activities such as agriculture and the lack of sufficient educational or training opportunities. On the other hand, policies and projects properly defined and managed, can produce tangible results and positive changes.

Such achievements have been witnessed in the different communities and territories in France, the United Kingdom, Ireland, Canada and the United States that were visited and that are detailed in individual case studies. Even if they are recent and not necessarily consolidated, they tend to support the idea that ICT can be instrumental in radically changing perspectives from that point of view. Inhabitants who would have left the community are now staying and some are returning, since new opportunities have been created. Other people, not necessarily from the region, are settling in rural towns as salaried people or as teleworkers. Inward investment, attracted in particular by proper telecommunications infrastructure and a sufficiently skilled workforce, is now coming to these areas, considered as an interesting option to investment in urban ones.

These new trends have brought about new concepts such as the *Learning Region* or the *Smart Community* that illustrate the fact that ICT is all encompassing and contains a strong educational component. No sector remains foreign to these major evolutions. In rural areas, ICT is impacting basic public services but also

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major economic activities such as farming, forestry or tourism. As the preceding developments have amply shown, ICT is not a tool that adds a layer to social, economic or spatial policies but a new ingredient that puts these fields in a different perspective. The far reaching consequences of ICT, as well as the risks of lack of initiative or improper implementation, underline the necessity, not only of specific ICT roll-out plans, but of integrating an ICT component into each area of public action. Bearing this in mind, the following developments, summarising the main findings of this report, underline the factors that can contribute, in a synergistic approach, to the renewed attractiveness of both rural regions and communities.

Depending on the goal pursued in a given policy or project, some factors are recurrent and some are specific. It is the contribution of each to a comprehensive development strategy that can renew the attractiveness of a community or region. The development of each factor brings added value to the others in a complex process of interrelation and positive spill-over. This requires vision, that is to say a capacity to consider a new spatial organisation not necessarily tied so strongly to the traditional equation of rural = agricultural. Renewal of traditional activities as well as creation of new ones is conditioned by effective appropriation of ICT. This demands proper co-operation and co-ordination of all levels of government with a strong supportive role for regional and local development agencies.

a) F*actors common to* ICT *policies and projects*

T*elecommunications infrastructure* issues are complex, involving both legal and technical aspects. This should not lead to believe that only national authorities, telecommunications operators and possibly regional or state governments have a saying in decisions that often precondition the success of policies and projects in the field of ICT. The major choices for widespread implementation of broadband, high-speed infrastructure are of course to be found at the level of national governments and of the main telecommunications operators. Countries like Sweden, France and Canada have announced ambitious plans in this field and in the United States the possible extension of universal service mechanisms to that area is one of the options now under consideration by the Federal Communications Commission (FCC).

Layout of such infrastructure will be a long term process and in the meanwhile there is ample room for state and regional authorities to take action, since new development strategies rest more and more on such equipment. The regulatory framework in a growing number of countries allows doing so and if this is not yet the case, aggregation of demand in view of negotiations with telecommunications operators is a logical approach. It has been followed with success in Scotland to favour inward investment and is now used in the Southwest region of Ireland to allow access of major public services to broadband.

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In the case of small local ICT projects at the level of a town, infrastructure aspects should not be overlooked either. The implementation of a public access point with a few terminals would not seem in itself to require any specific network analysis. However if local infrastructure is analog or of too low a capacity, access can be easily saturated and the still existing "world-wide wait" will discourage potential users coming to the public access point. In that case, ISDN, satellite or radio links can be sometimes implemented as an appropriate solution to this problem. Such considerations should also be taken into account when thinking of SMEs for which ISDN is usually today a basic requirement.

Analysis of ICT *development models* show that social pull projects are by far preferable to any other to ensure long term sustainability. Since this is rarely the case to begin with, because a project is often driven by a small dedicated group or devised outside the community (at the regional or national level), proper consideration should be given to effectively transfer responsibility to a wide array of citizens. The organisation of the Ennis Digital age town in the Shannon Region of Ireland perfectly illustrates this: even if Eircom is behind the whole project, the inhabitants of Ennis participate actively in the project and are regularly consulted on its advancement.

This point is an important one, since active ICT strategies and implementation have a particular relevance at the regional level, where proper co-ordination can be insured and coherent strategies defined and implemented. This level of responsibility is of course particularly adapted to spatial planning policies taking into account the specific needs of rural and remote areas. In this case the challenge will be for regional authorities to play their part efficiently without stifling local initiative and support. Encouraging more than doing, suggesting more than deciding, can preserve goals while allowing for effective dissemination and appropriation. To attain this, in depth awareness campaigns and consultation are necessary, if only to achieve a strong regional consensus on strategy and targets. Such an approach has been the underlying principle of the European Regional Information Society Initiative (RISI), that permitted a group of more than 20 European regions to define overall goals in the field of ICT before going ahead with detailed action plans.

Observation and measurement in the field of ICT seems to be the most neglected area of policies and projects, since this is often very formal and that no common set of criteria exist even within a given region or state. The absence of proper standard tools, methods or practices often make it difficult to proceed to an honest evaluation of the impact of a policy or project otherwise than in quantitative terms, usually ignoring effective conditions of use. The inconvenience of such a situation is often not perceived by the project leaders themselves, who usually allocate little or no resource to a field of observation that could permit to correct certain aspects in future projects. If a common set of standards were devised, at

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the level of each region, this would make comparison of projects easier and the establishment of regional data more to the point.

For this purpose, it seems that it would be very useful for regions to develop a common approach, translating into measurable units the criteria now often referred to as best practices, such as defined for instance in the European RISI Programme. Harmonisation of observation and measurement methods and definition of relevant territorial indicators for ICT penetration on the international level would certainly contribute to a better understanding of national and regional policies and their achievements. OECD could take such an initiative.

b) Social factors

P*ublic access points* are a focal point in various national, regional and local policies destined to increase ICT awareness and provide training both to the general public and to businesses. Further deployment of these small units in various public and sometimes private locations appears instrumental in promoting the overall objectives of the Information Society and preventing a digital divide that could also be a territorial one. Analysis of different public access point programmes in the countries visited and the observation of community projects show that the volunteer staff model, relying mostly on dedicated human resources is attaining its limits, due to a manpower shortage and the necessity of a constant up-grading of technical skills.

For this reason, proper attention should be devoted to the long term staffing requirements of these structures as well as to their operating costs. To ensure this, grouping of public access points in networks, as developed more and more in Canada, seems to be the relevant approach. Progressive partial inclusion in municipal budgets, besides providing for free space in public buildings, should also be considered, as national and local funds cannot provide all financial resources. Such support would also be recognition of the role of the public access point for local economic development purposes. On the other hand these public access points could usefully play an increased role in the delivery of public services on-line.

P*ublic services on-line* can constitute a very cost efficient solution in rural and remote areas to share rare human resources (teachers, specialist doctors), thanks to the implementation of videoconferencing networks. These projects are often regional in their application but national governments are systemically encouraging and co-financing projects, particularly in telemedecine. Proper coordination with public access points would permit, whenever useful, to ensure easier access for users. Distance learning programmes for adults or telehealth consults can very well be organised from the public access point if properly equipped, rather than from a dedicated building only used occasionally at a

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higher cost. Again, sharing of resources, across traditional administrative boundaries, underlies the logic of efficient ICT policies.

A comparable approach would also appear useful for general public services (issuing of birth certificates, driver's licenses, administrative information in various fields, filling of tax forms and payment on-line). In this case one stop e-government could usefully group national, regional and local information and formalities in an approach now deployed at least at the national level. Public access points could play an important role in facilitating implementation of such a policy by co-ordination with the local Internet site and by providing entry to those without computer equipment.

T*he impact of* ICT *on local governance*, if only incipient, because few towns have begun to explore in depth the potential of these tools for reinforcing the democratic process, appears promising. Initial observations made in towns which have launched such projects show that e-democracy, offering easy consultation of citizens on various matters of local concern, more speedy access to accurate information and facilitation of partnerships with general interest groups, can change the parameters of local governance.

Greater transparency in the decision making process and greater accountability can foster a renewed confidence in local authorities and contribute to a stronger local identity and sense of purpose. If some town councils seem reluctant from that point of view, the risk is that in "networked government" at the regional level, some bigger towns or groupings of municipalities may take pre-eminence. For this reason, small towns seem to have a longer-term interest in adopting progressively the opportunities in local governance brought about by ICT.

c) E*conomic factors*

SME *support* in the field of ICT appears to be a crucial area for economic development as in a competitive environment firms located in rural areas must be afforded the same possibilities as their urban counterparts to adopt efficiently these new tools. The stakes concern better response to customer expectations, development of new products or services and extension of geographical customer base thanks to e-commerce. The main issue is lack of awareness on the potential benefits of ICT for SMEs and this is particularly true for the smallest businesses, more numerous in rural areas. Once this initial obstacle is overcome with the help of appropriate national and regional programmes, training and counsel must be delivered adequately. Partial financial support, whenever possible, is also useful, since ICT can prove relatively costly for certain small firms, return on investment never being immediate.

On the other hand, most studies show that SMEs having adopted ICT and present on the Internet on the basis of a well-defined strategy are more performing

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than others. National and regional policies in many countries, although not specifically targeting rural SMEs, have been instrumental in changing mind-sets but continued efforts remain necessary for the smallest SMEs, often still reluctant towards ICT adoption. Public access points provide useful support from that point of view. At the upper end of ICT strategies, e-commerce, though nascent, is now being developed by some small rural firms or groups of firms. Such early adopters have already widened their customer base, with openings into foreign markets that were up to then out of reach.

T*he creation of new activities in rural areas through* ICT can be pursued at different scales, whether at the level of a sub-region or a given community, however small. Such proactive policies potentially concern three different fields: telebusiness (call centres and business process out-sourcing), telework, multimedia and software design. T*elebusiness* requires a high capacity network and substantial investment in buildings (small business parks). It should be coupled with a far-reaching educational and training programme to supply the necessary manpower. Those conditions being respected, the sustainability of such projects and their positive impact on local development and job creation has been proven.

T*elework* in rural areas is not situated at the same scale as telebusiness and call centres. Available figures show that the most developed type of telework, that of part-time commuting teleworkers, does not by definition concern rural and remote areas. The independent teleworker model is applicable in isolated cases to the city dweller settling down in a rural area and able to work at a distance (secretarial and administrative work, proof reading, translation, consultants). This can be useful but economic impact is necessarily reduced. The situation is different if existing human resources and skills are tapped within a local project bringing at least part-time work and complementary revenue to households. Such a model has been developed with success in Scandinavia and in Scotland.

R*ural start-ups* are certainly less publicised than their urban counterparts, but existing cases show that such new developments can occur even in the smallest of towns, provided certain conditions are met. The rapid expansion of the Internet and the multiplication of local sites open up new possibilities in multimedia, Web design and maintenance in rural areas, where major firms are seldom present and preference is often given to proximity. Such start-ups, usually created by very young people, are sprouting up in many rural towns in North America and in Europe. Firms engaging in more specialised software applications, often linked to farming (satellite remote sensing for crops, cattle tracing) constitute another promising category stemming from local know-how and not necessarily requiring high up-front investment. Such firms, on the other hand, need initial nurturing, best provided in a business incubator type environment, that can be successfully set up even in very small towns.

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Chapter 4

Policy recommendations

1. Telecommunications infrastructure

a) Issues

Deregulation and competition between telecommunications operators are not sufficient, on the basis of market based decisions, to permit the same level of ICT service (accessibility, speed, tariffs) in rural areas as in urban ones. This is particularly the case for broadband infrastructure and services, new applications that are the basis of the networked economy and the pre-condition for full implementation of ICT and e-commerce.

Rural areas are at a disadvantage because:

- Local businesses will not have the same cost efficient opportunities to fully use ICT, in particular to access other markets.
- Inward investment will not be attracted to the area.
- Consumers will not have the same possibilities to use ICT as their urban counterparts. ICT offer very useful educational and public service applications that can remedy distance and remoteness.

The issues of telecommunications infrastructure and services in rural areas should thus be given proper attention, to avoid the risk of a territorial "digital divide".

b) Recommendations

1. Consider deployment of a national broadband project, as some countries are already doing, either through public/private partnerships or with public funding in the areas with the lowest population.

2. Consider the possibility of extending universal service principles and compensation to other areas than telephony, and at least for public service applications useful in rural areas.

3. Create a favourable framework for the intervention of local authorities in these processes:
   - Help local authorities, through provision of expert advice, to develop a sound business case that will incite telecom operators to invest in new

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infrastructure, knowing that a minimum level of use is needed to justify such a decision.

- Take legal measures allowing, if necessary, local and regional authorities to invest in telecommunications infrastructure under certain conditions.

4. Facilitate the implementation of new hi-tech projects (Business parks, technology nodes) that require high bandwidth even in more rural areas.

5. Incite public services requiring high bandwidth (education, health services) to aggregate their demand, thus obtaining more easily implementation of new high speed networks with competitive pricing from operators.

2. Implementation of ICT projects

a) Issues

All countries and most regions have conceived and are implementing ambitious projects aiming to facilitate the entry into the Information Society for citizens and businesses alike. These programmes seldom specifically take into account the requirements of rural areas. When this is the case some useful parameters are not always observed. To improve efficiency and impact on these projects in rural areas, new practices should be applied from a territorial point of view.

Spatial policy today is barely beginning to take into account this new combination of telecommunication infrastructure, higher education, physical infrastructure (technology parks) and human networks connecting academia and business. For rural areas long experiencing outward migration, such policies can contribute to economic and social development. This implies sufficient co-ordination between different levels of government and with the private sector.

b) Recommendations

1. Favour the emergence of social pull projects rather than those that are technology driven. The key to success is appropriation by the whole population, which implies a good level of awareness. Such projects, even when launched on the basis of a national programme or competition with specific guidelines, should be highly respectful of local initiative to support the appropriation process. It should not be considered as an experiment but as a long-term project with conditions for sustainability fully taken into account.

2. Create a context in which innovation, either social or economic, will emerge. Inward investment can spur new activity for local firms and facilitate implementation of ICT by the latter. Attracting new activities and creating new jobs (start-ups) through ICT is possible in rural areas given a proper mix and co-ordination of policies hitherto isolated. The knowledge

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economy is based on telecommunications infrastructure, high level education and openness to innovation through proper training.

3. Prefer, whenever possible, all encompassing projects, broken down into different components, rather than isolated sectoral projects. The most developed examples of this approach at the local level are smart communities and digital age towns.

3. Observation and measurement of ICT in rural areas

a) Issues

Current national data on ICT penetration is rarely available on a territorial basis. When this is the case, it seldom distinguishes rural areas from urban ones.

ICT projects are usually not monitored with reference to standard practices. Experience sharing remains limited from one project to another.

b) Recommendations

1. Elaborate methods for collection and exploitation of data to monitor better and more accurately the situation of rural areas in terms of ICT penetration and needs. The region is the most logical level for doing so, insofar as a common methodology is applied on the national level. OECD might consider favouring the establishment of common indicators on an international level.

2. Organise more systematic monitoring of ICT projects with publication and exchange of results. In a given country where major projects could learn from one another from region to region, there is little exchange of information on implementation. Whenever possible, the *ex ante* obligation to do so, by participation in a national or European project addressing the regional level, is very useful.

3. Agree on best practice criteria applied to rural area projects in a given country and if possible establish these on an international level.

4. Public access points

a) Issues

Public access points, particularly in rural areas, constitute an essential tool in creating ICT awareness and in providing proper training, both for the general public and businesses. Generally located in existent non dedicated public buildings (schools, libraries, community centres and post offices), they are often staffed by volunteer personnel, equipment costs generally being covered by national or regional programmes.

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Even if effective attendance is not always measurable, these public access points play an essential role in bridging the digital divide. However, staffing, long term operational funding and use as basis of other ICT policies have not received appropriate answers up to now; countries most active in the promotion of these programmes are beginning to tackle these issues.

b) Recommendations

1. Permanent staffing of centres through national and/or regional programmes should be sought to provide adequate technical support and permit development of their activities towards more sophisticated training, targeting in particular the business community in rural areas.
2. Adequate funds should be provided through national, regional and/or local contributions to cover operating expenses directly linked to activity (telecommunication costs).
3. The two previous recommendations should be implemented in a way that incites public access points in a given territory to co-operate to share scarce human resources and costs.
4. Ways of reinforcing the role of these public access points should be examined with the purpose of providing better support for community Website design and maintenance and access to a wide range of public services on these sites (see following section).

5. On-line access to public services

a) Issues

Bringing public services on-line can greatly help in providing these in rural or remote areas where their territorial presence has progressively diminished with the population. Two kinds of public services are at stake:

- Those such as education and health services that can greatly benefit rural areas by videoconferencing techniques permitting teaching or specialist resources to be shared through a networked approach. Distance education techniques applied to rural areas are distinct from the possibilities of on-line education offered to all Internet users. Telemedecine is also more specific to rural areas, where telediagnosis can prove very useful.
- General public services (birth registries, tax services, automobile licenses and land use) that can be more readily made available on-line, whether for information or transaction purposes with a great convenience for the user and at a lower cost for the taxpayer (reduction of paperwork). Programmes of this type, now being implemented in many countries, benefit all public

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service users but are particularly relevant in rural areas where access to public services is generally more difficult.

b) *Recommendations*

1. Encourage and support regional and local initiatives in the fields of distance learning and telemedecine, based on the principles of resource sharing through a network. Secure proper funding mechanisms for this purpose, whether for project launch or operation, providing preferred telecom rates for usage, particularly of high bandwidth.

2. Monitor effective use of on-line public services in rural areas to measure their usefulness for inhabitants and deliver proper information on these new possibilities. Rely more on the public access points to provide this type of access for those not possessing a computer. Develop a truly one-stop approach to public service, whatever the territorial level of responsibility, through portals providing in particular useful and attractive local content.

6. Local governance

a) *Issues*

E-government at the local level can be an effective way to strengthen democratic practises by introducing greater transparency in municipal governance and associating citizens more closely in the decision making process. This can be attained through various ways:

- On-line publication of municipal deliberations.
- Speedier access to local government information and formalities.
- Active partnerships with general interest groups.
- On-line forums and debates.
- E-voting on certain local issues.

These possibilities are only indicative and numerous other fields for local e-democracy exist. Implementation is linked to awareness among public officials of impact on the democratic process and on know-how concerning best use of available Internet technologies.

b) *Recommendations*

Since adoption of these new practises cannot be decreed and rests entirely on the responsibility of local authorities, national (and regional) authorities should only:

1. Provide information and training on these new possibilities, disseminating best practises already identified as such in certain “digital communities”.

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2. Provide insight on possible reallocation of local government human resources and retraining to adapt to this new context.

3. Incite communities to grasp these possibilities in a co-ordinated fashion at the regional level through implementation of pilot projects and sharing of information on advancement.

7. Implementation of ICT by SMEs

a) Issues

Level of adoption of ICT is not as high for SMEs as it is for bigger firms. The smaller the firm the more likely it will not yet use ICT. Since in rural areas there are many SMEs and given that their size is often very small, ICT take-up by small firms is more reduced in rural areas than in urban ones. The major obstacle appears to be lack of awareness on the potential of ICT to improve efficiency, increase number of customers by use of adapted marketing techniques and expand sales beyond the traditional customer base, in particular through e-commerce.

There are also other barriers to access such as cost and lack of proper advice on strategies and technical choices. Studies show on the other hand that small businesses present on the Internet often perform better than others.

b) Recommendations

1. Governments should include a rural dimension in specific programmes designed to facilitate adoption of ICT by small businesses. Such an approach would help to determine if rural SMEs need added support from that point of view. Effective monitoring could be accomplished with regions and help establish detailed statistics, that often ignore the smallest firms.

2. Public access points should receive proper support, particularly in the field of training of personnel, so as to be able to increase their contribution to policies aiming to help SMEs develop awareness and adopt ICT.

3. Electronic business networks should be developed in partnership with professional sectors to deliver information and support training programmes well adapted to small firms located in rural areas and/or in traditional activities like agriculture.

4. Grouping of small firms for common actions, in particular to engage in e-commerce, should be encouraged through proper financial mechanisms and counsel on strategic planning.

5. Dissemination of success stories should be systematically pursued and awards well publicised could be attributed for that purpose.

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8. Creation of new activities

a) Issues

In many rural areas where traditional activities are declining and outward migration is a problem, creating new jobs and reversing negative demographic trends can be pursued through proactive policies to develop services that can be delocalised. Such policies can also be very helpful in spreading innovation to other businesses in same area through customer/supplier relationships in particular. Initiatives of this kind can be taken at the regional and local level with at least partial support from different national programmes.

b) Recommendations

1. Governments could implement initiatives targeting regional and local public officials instrumental in development programmes so as to create awareness of these new potentials and conditions for success. The private sector (chambers of commerce) and educational institutions should be associated to these efforts.
2. Success stories and best practices should be systematically disseminated.
3. Specific funding mechanisms could be devised to support such initiatives, in particular by proper co-ordination of different sources of public financing so that projects can be properly launched.
4. Advice on projects, their sustainability and assessment of business cases should be delivered by public development agencies.
5. Specific support to rural start-ups should be ensured through easy access to different venture and incubator funds set up or supported by government agencies or public institutions.

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Part II

CASE STUDIES

Geographical diversity

The case studies conducted within the framework of this report have been chosen on the basis of several criteria, the main one being definition of a clear ICT strategy with ambitious but not unrealistic goals. Another important element taken into consideration was the involvement of the population in projects, since it is now established that this is a basic element of successful implementation. A third factor was the usefulness of analysing different strategies, policies and projects at various geographical scales, so as to show that action is being taken at all territorial levels, within diverse administrative and institutional settings. In so doing there has been no initial limitation on the typology of projects retained, except that choices were nonetheless made so as to present a sufficiently wide spectrum of aims and sectors in project content. Bearing this in mind, some projects put a strong emphasis on one or a few applications, and others, such as digital age towns, are by definition of a much wider scope, requiring proportionately more human and financial resources on a given territory.

Considering these different factors, the case studies can be classified into three distinct geographical categories and contexts for definition and carrying out of projects: regional, sub-regional and communities. The latter category refers initially to townships but spill-over of positive effects into adjacent areas usually occurs in a second stage, often as part of a deliberate strategy aiming to revitalise a micro-territory. In all cases, anchoring within a given territory is not exclusive of co -operation with other levels of government, providing help and support. Besides, all projects analysed rely more or less on advice and funding from national (or European) programmes. This having been said, the case studies in the three groups are the following:

- ***Regions*:** Poitou-Charentes in France; the Midwest and Southwest in Ireland.
- ***Sub-regions*:** The Highlands and Islands of Scotland for the United Kingdom; Matawinie County in Quebec and Keewaytinook First Nation in Ontario, Canada.

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- ***Communities*:** Parthenay District in Deux-Sèvres, France; Dillon, Montana and Maddock, North Dakota in the United States.

Regions

Poitou-Charentes region in western France capitalises on certain multimedia activities existing in cities to develop its ICT strategy, aiming diffusion in all of its territory and particularly rural areas. Its regional project, SERISE, is one of the members of the European RISI (Regional Information Society) consortium, just as the two Irish regions analysed.

The *Southwest of Ireland* is characterised by its strong base of ICT industries, localised up to now nearly exclusively in major cities and towns. One of the features of its strategy is to bring IT activities to small towns and rural areas through the creation of small technological parks relying on the know-how of the National Technological Park based in Limerick

The *Midwest of Ireland* also has a strong tradition of ICT knowledge and industry in major urban centres such as Cork. Bringing the benefits of ICT to the countryside is sought in particular through emphasis on delivery of public services online in a cost-efficient manner by co-operation between the different agencies.

Sub-regions

The *Highlands and Islands of Scotland* have a very unique approach to ICT to revitalise rural and remote areas through a combination of proper telecommunications infrastructure and knowledge based activities. Training and higher education, capitalising on an already high level of educational achievement, aim to retain skills that were previously exported.

Matawinie County in Quebec presents an interesting case of a strategy to promote ICT awareness as a first step in direction of the public as a whole and also of SMEs. The main focus is on Community Access Points, with growing co-operation between these so as to share experience and resources.

Kewaytinook First Nation Smart Community project in Ontario, named Kuh Ke Nah, is one of the twelve projects retained across the country by Industry Canada to promote usage of ICT. With a strong accent on telecommunications infrastructure, as a way of maintaining contact with the outside world, the project puts priority on public services such as education and health delivery, also favouring cultural identity.

Communities

Parthenay is certainly one of the most ambitious digital age town projects in France. It is based on proactive policies putting citizens, grouped in numerous associations, at the heart of its definition and implementation. Thus, the main feature

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of the Parthenay project is innovation in local governance through ICT. It has also attracted new activities to the area, the *Pays de Gâtine*, which now has a project of its own.

Dillon-Net illustrates progressive ICT dissemination in a small rural town and than its surroundings through a very open approach to the concept of public access points and flexibility to cover a wide geographical area with limited human resources. Build-up of a typically grass-roots project has now drawn the attention of the State of Montana, seeking support to deliver on -line public services.

Maddock' Business and Technology Center rests on an innovative concept combining hi-tech and social services for the benefit of a small community hard hit by the slump of certain agricultural activities. This unique combination also helps other efforts aiming to maintain a certain level of services and small businesses necessary for the longer term sustainability of the community and its adjacent area.

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Case Study 1
The Poitou-Charentes Region and ICTS

1. Background

The Poitou-Charentes Region, in south-western France, encompasses the four *départements* of Charente (capital Angoulême), Deux-Sèvres (Niort), Charente-Maritime (La Rochelle) and Vienne (Poitiers, the regional capital). Covering nearly 26 000 km^2, the region has 1 600 000 inhabitants.

With regard to Information and Communication Technologies, the region is very well endowed. The P*arc de l'*I*mage* (Futuroscope) in Poitiers is the better known and major attraction. A cluster of knowledge industries has sprung up around it, beginning with the national distance-learning centre (C*entre* N*ational de l'*E*nseignement à* D*istance*, or CNED). In Angoulême there is an important graphics and multimedia industry based on comic-strip conception, design and production. Lastly, La Rochelle houses a digital television industry with state of the production studios. Depending on which indicators are used, Poitou-Charentes harbours between 200 and 400 ICT firms.

Yet paradoxically the region has never been a great user of the Minitel telecommunications system and has proportionately fewer Internet users than the rest of France (97 000 in 1999). To some extent this is because much of the region is rural, whereas the industrial centres listed above tend to wield their influence internationally and in other parts of France, rather than in their own region. In terms of ICT diffusion, therefore, the region faces the major challenge of striking a balance between town and country. In this respect, it is fortunate enough to encompass the "digital age town" of Parthenay, which became a model of its kind before the region began making its own ICT plans and launching its own initiatives.

2. An ICT strategy

It was for this reason that the Poitou-Charentes Regional Authority, seizing the opportunity to take part in the European RISI (Regional Information Society Initiative) Programme, joined forces with the four *départements* and the District of Parthenay to set up its own project (*serise.apce.org*). Drawn up in 1998/1999, the project seeks

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to define a strategy and priority themes to develop ICTs using an approach based on wide-ranging dialogue with all the social and economic players. Hence the strategy known as SERISE (*Stratégie Européenne et Régionale pour l'Information dans la Société et l'Économie*) with an initial budget of FF3 million, 50 per cent of which consisting of subsidies from the European Commission. This is a three-part project, with:

- A general framework setting four goals;
- 5 priority themes;
- 88 initiatives covering those five themes and giving direction to the project.

a) *Four goals for* SERISE

- Seize opportunities and manage risk with a horizontal, risk-sharing approach to ICTs, considered as the key to successful partnerships.
- Launch new services to generate use.
- Facilitate universal access to the Information Society and see to it that regional actors find ways of providing everyone with access to the new services.
- Foster the emergence of a regional forum for information, partnership and dialogue that will bring together the region's institutional and economic actors, in co-ordination with territorial planning structures.

b) *Five priority themes*

- Fostering widespread use of ICTs, through a regional campaign to raise awareness.
- Developing knowledge and skills among the young and also for lifelong learners, while promoting enterprise creation in the field of educational multimedia.
- Renewal of the traditional economy as well as developing new activities. This means supporting traditional industries that want to introduce ICTs, promoting start-ups and backing e-commerce.
- Encouraging people to develop their sense of being citizens of the region, and increasing the attractiveness of the region both in its architectural and cultural aspects. This includes a wide range of topics from modernising local government through the introduction of territorial information systems to promoting urban and/or rural development through ICTs. It also means providing support for the conservation of natural and cultural heritage and promoting tourism in the region.

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- Promoting the region and widening its influence by creating a regional gateway on the Internet, with a resource centre enabling firms to form networks and develop their export potential.

The implementation of all the initiatives covered by these five priority themes and the 88 different projects is linked to proper evaluation of costs and then securing appropriate funding. One of the major sources are the *Contrats de Plan État-Région* (funding contracts between central and regional governments) which encompass master plans for community services within the Information Society. Meanwhile the region has already launched specific initiatives, several of them either targeting rural areas or placing them high on the agenda.

3. First initiatives in favour of rural areas

One project focuses on small and medium-sized enterprises in rural areas (SIRCE) and another on local authorities (ARANTIS).

a) SIRCE

SIRCE, a regional information system for enterprise competitiveness, is an information and commerce gateway that helps rural SMEs in Poitou-Charentes to obtain the legal, economic and financial information they require, while at the same time serving as a platform for electronic commerce. The project, launched in 1998, was the first of its kind in France and has since been imitated by other regions. SIRCE's partners are both institutional (European Union, Poitou-Charentes Regional Council), financial (*Crédit Agricole* bank, *Groupama* insurance) and professional (Poitou-Charentes Centre for Rural Studies).

The server comprises the following functionalities:

- an e-commerce section for on-line sales;
- a showcase for SME goods;
- "business cards", or corporate profiles presenting firms to potential partners (suppliers or clients);
- a job centre, particularly for seasonal employment;
- EDI-type accounting;
- a electronic forum;
- a daily selection of information items.

The e-commerce site, "*Les Halles de la Ferme*" (country market) is based on the idea of a producers' quality charter for a range of fresh and processed products (food, wine and spirits). Information on products and producers can be accessed either by geographical location or product type, and purchases can be made via a secure link with *France Télécom*'s "Télécommerce" platform, which provides informa-

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tion on terms of sale and delivery. The showcase site, an initial step towards e-commerce for firms wishing only to advertise their products before expanding into on-line sales with the basic logistics these require, is called "E*ntreprises et Terroirs*" (rural enterprise). Here too, information on producers and products can be accessed either by location or product type. Individual farms are regularly singled out for attention.

The impact of SIRCE is hard to gauge for the moment as there are still few agricultural firms with Internet access in Poitou-Charentes, but the chambers of agriculture and commerce are conducting similar initiatives and some producers have even set up their own Internet sites to advertise their goods and services, including rural accommodation (G*îtes*) and country restaurants (F*ermes* A*uberges*).

b) ARANTIS

ARANTIS is an ICT resource centre set up jointly by the Regional Council, the four General Councils and the chambers of agriculture and commerce early in the year 2000. A staff of six assists individual or associated municipalities with their ICT initiatives. The service is free of charge as the centre is subsidised by its members. Assistance may take the form of information technology watch or advice on how to introduce awareness-raising schemes targeting the public at large or the business community. Also included in its mission are training and project support. It is naturally too early to evaluate its impact but, in view of the many enquiries the team has already received from local authorities, there is substantial demand for this type of service. There is definitely a great need for advice and expertise on ICTs in rural communities, which seldom have adequate skills or the right contacts to find suitable experts.

c) *Outlook*

The Poitou-Charentes region is pursuing its own initiatives to raise awareness about ICTs and disseminate them among both the public and the business community by backing or participating in other schemes. There are 110 public access points scattered around the region (including libraries with Internet links, multimedia centres, and wired schools). Many have been given regional grants to finance the initial investment and will receive assistance and support from the ARANTIS resource centre.

Furthermore, the Region has been selected by DATAR to become one of its regional information and e-commerce centres for SMEs, along the lines of "L'É*changeur*", the European study and training centre for on-line trade, set up in Paris in 1997. This regional version of "L'É*changeur*" will be used to demonstrate and provide training on the equipment, procedures and software used in e-commerce, particularly for on-line calls for tender.

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Case Study 2

ICT strategies and projects in the rural areas of Mid-western and Southwestern Ireland

Introduction: Information Society and New Economy in Ireland

The Information Society is a national priority for Ireland, with a comprehensive Information Society Action Plan having been published in January 1999. This ambitious plan particularly emphasises wide-band telecommunications infrastructure and higher learning in the ICT sector, with the goal of putting the country in the forefront of the New Economy. This strategy has been confirmed by the National Development Plan, to cover the years 2000-2006, telecommunications and e-commerce being specifically targeted, with 40 per cent of a total funding of EURO200 million allocated for that purpose. A first call for proposals was launched in August 2000 with the aim of assisting in nation-wide broadband connectivity. This measure follows the signing, mid-1999, of an international connectivity agreement to provide the country, by the end of the year 2000, with high capacity links to the USA and Europe.

Pending these most recent developments, Ireland is already well engaged on the path of the New Economy. A skilled workforce, modern telecommunications and attractive tax incentives were instrumental in luring important foreign investment in the IT software and manufacturing sectors as well as in the field of call centres. In this last area more than 60 American multinational firms have chosen this country as base for operations covering the European time zone, giving it, with the UK, the leading edge in this expanding activity. European Union Structural Funds were helpful in the rapid modernisation of an economy that now enjoys one of the highest growth rates in the world (8.25% in 1999) and one of the lowest jobless rates in Europe (5.6%) but also increasing inflation, estimated at 5.5 per cent for the year 2000. The strongest impact has been in the Dublin area, where one third of the population now lives, with a risk of deepening regional imbalances.

It is within this context that the initiatives of the mid-western and south-western regions of Ireland in the field of ICT, with a strong accent on developments in rural

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areas, must be appreciated, the initial process having been launched as early as 1996. Both regions were selected at that time by the European Commission as two of the 22 pilot regions of the RISI (Regional Information Society Initiative) Programme. The RISI Programme aims to assist less favoured or peripheral regions of the EU to integrate the concept of the Information Society into their regional development strategies, by an extensive consultation process of all public and private partners concerned. RISI was conducted in two phases, each during two years: definition from 1997 to 1999 of a strategy and action plan and beginning of implementation from September 1999 to September 2001. Funding for each phase amounted to EURO 250 000 per region (50% of cost) to help finance co-ordination, evaluation of projects and studies required. The funding plan for the ICT investments involved over the next four years amount to Ir.£66 million for the Mid-West, with close to half coming from the Irish public sector and European financing amounting to less than 20 per cent.

1. The Midwest programme for ICT and emphasis on rural areas

The Midwest of Ireland is better known as the Shannon Region, embracing the statutory region of the Midwest and parts of the Midlands and Southwest. Covering 10 000 km^2 and with a population of around 400 000 (10% of the Irish total), it consists of the counties of Limerick, Clare, Tipperary North Riding, North Kerry and South Offaly. The region is mainly rural and in recent years it has experienced a steady decline in agricultural employment. In contrast industry and services, concentrated in the Limerick/Ennis/Shannon triangle, have grown regularly, the risk being that, without proper action, the growth of the service sector, set at 15 per cent for the period 2000-2006, will mostly benefit these urban centres.

The Shannon Region has experienced various phases of economic decline and expansion, geared to the changes in international air travel. After the war, Shannon airport being a necessary stopover for transatlantic flights, aircraft maintenance and duty-free shopping were the main sources of employment in the area. The jet age spelled the end of those activities and a serious structural slump in activity was looming. To avoid this, the Irish government set up in 1959 a nationally funded public body, called Shannon Development (*shannon-dev.ie*) to promote the economy of the region. The first measure it decided was the creation in 1960 of the world's first industrial free zone besides Shannon airport. This was followed in 1961 by the creation of Shannon Town, an entirely new urban venture to help settle a work-force coming from other parts of the region and than from abroad. The first real step towards bringing hi-tech activities to the region was taken in 1984 with the creation of Ireland's first National Technological Park in Limerick, adjacent to the new University, specialising in technical and scientific curricula.

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This policy paid off as it brought in to the region major foreign investment (around 250 companies, 20 per cent of the Irish total), particularly in the field of ICT, with a heavy contingent of American firms. The Shannon industrial free zone has more than 7 000 employees today and Dell Computers (manufacturing and European call centre), based in Limerick, is the largest employer in the region with a staff of 4 000. These remarkable results, brought about by a very pro-active policy in the field of telecommunications infrastructure and ICT oriented university level education, present nonetheless two major shortcomings that Shannon Development is presently tackling with.

The first one is the risk of seeing major foreign investment leave the region if even more favourable conditions, in terms of a skilled workforce or from a fiscal point of view were to be found elsewhere. This explains the recent emphasis on multiplying small indigenous investment (dot com start-ups). The second limitation that regional policy is now seeking to overcome is that of a New Economy that would mostly benefit urban areas, leaving aside rural areas, experiencing depopulation and a decline in traditional activities, that tourism has not sufficed to compensate. These policies are at the core of the strategies deployed by Shannon Development as a consequence of the RISI initiative SHIPP project with support coming from the national programme for the Information Society.

a) *Presentation of Shannon Information Society Partnership Programme* (SHIPP)

The SHIPP project aims to build a regional Information Society based on a vision that stresses the expected benefits for all citizens. It is that of "*a proactive approach to generate new employment activities, to improve the quality of life and the competitiveness of enterprises, while addressing the challenges of structural adjustment, social inclusion, economic cohesion, democratic decision making and sustainable development*". For this purpose six key areas have been identified and permanent working groups set up to monitor the corresponding projects defined by the SHIPP action plan. These areas are infrastructure, learning, awareness, community, enterprise and public services, with flagship projects planned or ongoing in each case, some of which will be analysed in detail.

I*nfrastructure* objectives aim in particular "*to minimise the impact of peripherality by proactive public policy and actions in favour of rural areas to match the market driven* IS *infrastructure of urban ones*". These goals also concern the creation of a mutually supportive regional Information Society innovation system, based on the creation of "*innovation nodes*" linked to the National Technological park in Limerick and co-ordinated with higher level educational institutions.

L*earning*, as an important priority, aims to deliver different levels of ICT education and training and business courses in the entire region by an approach combining decentralised centres of education and video conferencing. The corresponding

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model is the Tipperary Rural and Business Development Institute, a third level educational facility designed as a distance learning campus, with facilities in Thurles and Clonmel and an outreach presence elsewhere in Tipperary. It also supports local primary and secondary schools in their actions concerning the implementation of the national IT 2000 initiative in basic ICT training, as well as Community Access Centres and adult education institutions.

C*ommunity* actions concern both urban and rural areas but an emphasis is put on small towns and villages. Again identification of needs is the starting point for specific actions capitalising on existing local initiative or projects. This is to be carried on through "rural audits" of small communities of 200-2 000 population. These audits cover telecom infrastructure and access but also economic activity, resources and potential, without ignoring social considerations. Listing of volunteer groups or local "champions" capable of helping in development of ICT awareness and usage as well as in implementing new projects aimed at economic development or better social cohesion, including measures in favour of disadvantaged groups, is part of this process. These audits will be used to select one to three "digital villages" to be equipped with a state of the art telecommunications infrastructure and benefiting from proper support to advance projects, as is already the case in the town of Ennis.

A*wareness* is a major area of action for SHIPP, with the Ennis Information Age Town being the main project. Others include road shows to raise the level of awareness concerning the potential benefits of the Information Society for citizens and businesses. A major media campaign, based on the notion of "e-region", is part of this strategy.

E*nterprise* actions aim to help local small businesses to use ICT in their everyday activity, by actively participating in the various learning programmes. Identification of needs to further awareness and encourage SMEs to acquire equipment, software and proper training is essential. A survey conducted in April 2000 concerning 500 small businesses, with half located in a strictly rural environment indicated that close to 66 per cent use computers in their business, an increase of more than 15 per cent in two years. Training of employees is offered by 54 per cent. E-mail has increased significantly since 1998, 81 per cent of companies using PCs now having an E-mail address, which represents a three-fold increase. Lastly, one third of companies also have their own Website.

P*ublic Services* are considered here with the requirement of an easy and personalised on-line access for all citizens to different services, irrelevant of classical administrative divisions, whether local, regional or national. This is particularly important for rural areas, where accomplishing any kind of formality often entails a trip to a city or town not necessarily in the vicinity. These actions are grouped under the European TITAN project (Tactical Integration of Telematic Applications

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across Intelligent Networks), involving also the Southwest of Ireland. This project aims in particular to create a multiservice portal, with easy access to all administrations and public bodies in the first stage and electronic transactions and delivery of official documents in a second stage.

Within these six areas, a great number of projects have started or are planned, selections of which are presented below, in fields that often overlap.

b) Shannon Digital Parks flagship project

The National Technological Park, established in Limerick in 1984 is a 650 acre site on the banks of the River Shannon, which houses today more than 90 different companies and R&D organisations, employing more than 3 000 people, primarily in the field of ICT and micro-electronics. It comprises in particular a Technology Incubator created to help the launch of new firms on the basis of technological break-throughs and innovative applications. Dot com start-ups today use it's facilities. The National Technological Park was able to attract a good mix of major foreign investment and Irish firms thanks to two major factors. The first are the close links developed with the University of Limerick, the location of which is adjacent to that of the Technological Park. The second is the availability of a high-speed fibre optic ring with proper connection to the Cork-Limerick-Galway trunk route. The development of broadband connectivity and services has led the National Technological Park to create a specific entity, "E-Park", as a joint public/private partnership with one of Ireland's new telecom operators, with the aim of providing the highest level of services (ATM and Frame Relay in particular).

Through the concept of "regional innovation nodes", Shannon Development aims to bring the benefits of such a hi-tech environment to other parts of the Mid-West, by adapting the digital park model to more rural parts of the region. These nodes, based in Ennis, Shannon, Tralee, Tipperary and Thurles will comprise:

- broadband telecommunications infrastructure;
- links to a higher education institution;
- an incubation process for new technology companies.

These technological nodes will not start from scratch, as they have been chosen for their favourable environment. In Ennis it is the Information Age Town, in Tralee it is a 20 year old campus closely linked to Limerick University and in Thurles it is the existence of the Tipperary Rural and Business Development Institute (TRBDI).

The Tipperary Rural and Business Development Institute (TRBDI) is a third level educational facility with a joint campus in Thurles (pop. 8 000) and Clonmel (pop. 25 000), whose operations started at the beginning of 1999 with major funding coming from the Department of Education. TRBDI presently has 70 registered

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third level students. It offers courses in Sustainable Rural Development, ICT (12 different modules in computing) and SME development. Part of teaching is delivered through videoconferencing link-ups with Limerick University.

TRBDI is also engaged in adult and continuing education programmes such as deliverance of the European Computer Driving Licence (ECDL). It is running such courses for teachers within the framework of support activities to help primary and secondary schools in the two towns integrate ICT into school curricula on the basis of the national IT 2000 programme. SMEs are another target group of TRBDI through promotion of the ECDL programme, with relevant business modules, in a number of rural communities in Tipperary County. Besides, the institute is co-ordinating the establishment of five community Access Centres in Tipperary County so as to facilitate ICT dissemination in the general public.

c) East Clare Telecottage: *a local champion for the dissemination of* ICT

This Telecottage is located in Scariff, a village of 1 200 in the County of East Clare (population 70 000). It is the biggest town in an area with a predominantly agricultural economy (sheep and dairy) that is experiencing a population drain. The East Clare Telecottage, created in 1991 as a co-operative venture, now private, employs 9 people full-time and delivers to the community a wide range of IT related services, both basic and more specialised. In the first category are printing, word processing, mailings, photocopying and a message service (phone, fax and E-mail). In the second, East Clare Telecottage offers services to business and to the general public. The translation service comprises 75 teleworkers, whose skills are used by a wide array of companies in the region. The Telecottage also proposes call centre services to cater to the needs of small local businesses needing to reach customers through specific advertising or marketing campaigns. For local public and private entities the Telecottage also draws upon it's experience of European programmes, to propose consultancy services concerning answers to calls for proposals.

Training is now a major area of activity: the Telecottage is a recognised entity for the deliverance of the European Computer Driving License (ECDL) and accredited by FAS, the Irish public body dedicated to adult learning. It offers different levels of training in ICT, aiming both individual and business users. Specialised courses are now addressing farmers, following a 1999 agreement with the National Farm IT Centre. This organisation is an offshoot of the Salesian College based in Warrenstown (County Meath), with a long-standing tradition in agricultural and horticultural education. It has now franchised 10 centres across Ireland to deliver specific courses (general farm computing, farm management, farm accounts, dairy financial management, farm planning, agri-ECDL), the East Clare Telecottage having

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been the first. This initiative has met with great success, more than 200 farmers having been trained the first year.

d) Ennis *Information Age* Town

Ennis is a town of 18 000 located in County Clare, in a predominantly rural part of Shannon region, that was selected in September 1997, on the basis of a national competition, as the Information Age Town of Ireland. This choice was made by a panel set up by Eircom, previously known as Telecom Eirann, the sole telecom operator until deregulation. The national competition, launched in 1996, was open to towns with a population of between 5 000 and 30 000. Forty-six towns entered and four emerged as finalists in July 1997: Castlebar, Kilkenny, Killarney and Ennis. The initial submissions had to explain in particular how the town saw itself benefiting from being chosen as the Information Age Town of Ireland as well as specify the membership and qualifications of a broadly based community task-force that would oversee the project. The task force set up by Ennis comprised only one person with a technical background and included a policeman, a farmer, a housewife and a teacher.

In the second stage the four finalists had to detail the town's potential for exploiting the Information Age in areas of business, education, public services and community activities. Another element taken into consideration was the degree of enthusiasm and commitment the town expressed in the Information Age. At that time, the town's submission, that had been funded by the Ennis Urban District Council, received the full backing of Shannon Development (up to the pre-selection other towns in the region were also competing). It also received an enthusiastic response from the population that was very clearly expressed when the judges visited the town. The award presented to Ennis is a Ir.£ 15 million subsidy (plus Ir.£ 1 million since allocated to the project by the Ennis Urban District Council), to be spent over 5 years on this ambitious project. The objective is introducing ICT in all households and businesses and analysing the changes brought about by such a major change. In allocating this sum, Eircom was seeking to answer five major questions:

1. What happens when every home has a telephone, not just an ordinary telephone but one with sophisticated voice-mail, caller line identification and other advanced services?

2. What happens when the majority of households have a PC linked to the Internet?

3. What happens when every business, large and small, has an ISDN connection offering high-speed access to the Internet?

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4. What happens when every student in the education system, from the age of 5, has regular, intensive access to a computer with learning, knowledge gathering and communication tools?
5. What happens when public services – from libraries to healthcare – are fully equipped to exploit the potential of the Information Age?

The first question is not accessory, considering the fact that in November 1997, 600 people who had never had a telephone in their homes applied for their free connection. This brought the household penetration to over 90 per cent, the highest of any town in Ireland. Concerning personal computers, more than 4 600 were installed in Ennis homes, representing 82 per cent of the population. This process was a controlled one, to be sure that each owner was at a sufficient level of proficiency in the use of computers. To take advantage of the offer (Ir.£ 260, around a quarter of the commercial price at the time), a representative from each household had to either pass a basic usage test or follow with success an 8-hour basic computer-training course. An equivalent number of households chose either solution.

Concerning businesses, consultations carried out after Ennis was selected showed the need for a comprehensive programme to help SMEs make the right choices and than implement them. This appeared to be more important than cost factors. The SME programme, launched in April 1999, comprises the following elements: training, consultancy, hosting services, ISDN connections and, in some cases, subsidies. Training was taken up at a good pace, 350 people having followed ICT training courses at different levels. Besides, a business champion programme was devised, with the goal of identifying 20 companies with the capacity for embracing significant technology change. These companies will serve as basis for case studies that will be widely disseminated. Already, seven businesses have been identified as such and their business experience highlighted on the Ennis Internet site (*ennis.ie*).

Ennis has a very young population (40% under age 24), hence the strong bias in favour of education. About 500 multimedia PCs were installed in Ennis's 12 primary and secondary schools (1 computer per 7 students). Besides 5 200 individual E-mail accounts were provided to all the students as well as their 300 teachers, who received specific training. The next step will be integrating technology in the curriculum in a systematic way. Big efforts have also been made to reach marginalised communities (early school leavers, long term unemployed, handicapped people). More than a hundred volunteer groups are active in the project and relations have been established with eight training centres for people with special needs. Community efforts also concern public services such as the Ennis Public Library, that was one of the first in Ireland to have its full catalogue on-line. E-government is to follow with an Intranet site shared by the Ennis Urban District Council and the Clare County Council, that will propose full services on-

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line (automobile registry, electronic payment of taxes etc.). Lastly, a six-year strategic plan for the town will be discussed through an electronic consultation permitting all citizens to air their views and amend the project.

Being the Information Age Town, Ennis is both a living laboratory and a showcase for Eircom. A digital broadband fibre optic ring circles the town and the digital exchange has a capacity of 3 000 ISDN lines, which is very comfortable. The town is now undergoing trials for ADSL (Asymmetrical Digital Subscriber Line) with 140 users to whom the service is delivered for free, the idea being to test the "Internet always on" model. Mobile access to the Internet (WAP, Wireless Application Protocol) as well as the next generation mobile phone system (UMTS) will also be tested.

Funded by a private company, the Ennis Information Age Town project has been organised as a private venture, with Eircom owning 51 per cent and the local task force, representing various public bodies, the remaining 49 per cent in trust for the Community. Once Eircom funding ends (in 2002), it is expected that the limited company will not any more be the mainstay to the project that should continue and thrive on it's own merit. Capitalising on its experience, it should transform itself into a firm rendering consultancy and technical services to public bodies and other companies. At this stage, the team comprises 22 people: four technicians for operations and maintenance, four devoted to Internet content, four whose mission is to promote usage both with the general public and SMEs, two on research and evaluation tasks and eight for general administration.

It is too early to evaluate such an ambitious project. Usage patterns, both quantitative and qualitative, are being closely monitored so an overall assessment can be made at end of funding period, with relevant data to be made public before that. At this stage it already appears that Internet usage in Ennis is four times higher than that of Irish towns with a comparable population. One thousand two hundred PCs connect daily to the Internet (25 % of homes equipped), with an average of 30 minutes per session. Notwithstanding future conclusions, several remarks can now be made. First of all when the psychological and financial barriers to access are overcome by free training and very low equipment costs, the Ennis experience tends to show a very positive response, considering that 82 per cent of the population now has a PC and uses it, at least occasionally. Of course usage is much higher amongst the younger generations, but in a family environment, youngsters can create the necessary impetus with parents or other members of the family. As far as social appropriation of the project is concerned, strong initial support of the population and high level of response to the PC and training package (for those not able to pass the usage test) are positive indications.

This permits to reasonably formulate the hypothesis that usage and full integration of ICT will develop. If this were to be the case, it would show that a tech-

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nology driven, top-down approach could very well transform itself into a social pull and bottom-up model. Nonetheless, for this to become a reality, besides quantitative usage, qualitative measurements on participation would have to show strong implication of inhabitants in community aspects of the project and particularly in e-government and e-democracy. These important factors cannot be taken into consideration at this stage, since the local Intranet, focal point of such activities, was only launched at the end of the year 2000.

2. The Southwest strategy for ICT, societal and rural concerns

The South West Region of Ireland, with a physical area of 14 200 km^2 and 550 000 inhabitants, comprises the City of Cork and the Counties of Cork and Kerry. The urban population accounts for 54 per cent of the total, the Greater Cork area, second conurbation of the country after Dublin, representing 240 000 inhabitants. The other major urban centres are Tralee (20 000) and Killarney (12 000). The majority of the population thus lives primarily in small towns and in rural areas. The regional economy is mainly based on agriculture and agriculturally based industries but there are relatively important industrial clusters, both traditional (chemistry) and more recent (electronics, computers and software). The region also has a strong tourism sector.

Realising that both industrial and agricultural activities were going to undergo profound changes and that the service sector, not only in tourism, should increase it's share in the regional economy, the South West Regional Authority (*swra.ie*) identified early on a necessary priority in Information Society actions. In it's strategic plan 1994-2000, the need to promote economic sustainability and quality of life, by supporting the development of the Information Society, was formally recognised. This strategic statement rested not only on economic considerations but also on social concerns, with the goal of bringing ICT to all citizens, both in urban and rural areas, without leaving out marginalised categories such as the jobless or the handicapped. Thus, the South West was a natural candidate to the European Commission RISI Programme and it was selected as such in 1996, alongside with the Mid-West.

a) *Presentation of the* South West *Telematic Area* Network *Development* (STAND), *Regional* Information Society *Initiative* (RISI)

The STAND-RISI mission statement is articulated around the following four points: People First, Rural and Urban development; SME development; Education and Training; Access to Public Services.

People First: Rural and Urban Development

"The Information Society by definition requires the involvement of all people. Our aim is to promote awareness of the potential of the Information Society not only to empower people but also to

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enhance their ability to participate fully in every aspect of social and economic life and to demonstrate new opportunities for inclusion."

Education and Training

"We want to facilitate community access to education and training and ensure that the identified needs of the communities and people across the region can be met."

Access to Public Services

"We believe that ICTs should be used to make the provision of public services more customer oriented and socially inclusive with the needs and requirements of communities and the general public. Our aim is to build upon existing initiatives and to improve the delivery of enhanced public services through the use of ICTs so as to ensure quality service, openness and transparency whilst offering greater choice and convenience to all citizens."

SME development

"We acknowledge the importance and economic necessity for SMEs to adapt their structures to take account of international developments in the use of ICTs whilst being aware of both the inherent threats and the employment opportunities. Our aim is to build the ICT and electronic commerce capabilities of SMEs through a series of awareness workshops, benchmarking trials and demonstrations of new business applications and services."

Within these four areas, in stage two of RISI, ongoing until 2001, developments are specifically more advanced in the first three, that will be specifically examined, with infrastructure aspects underlying the success of ICT strategy being fully taken into account.

The "People First" objective has been naturally translated into Information Society Access Points. Within the framework and with the financing of various European, National and Regional projects, STAND-RISI has been instrumental in helping to equip 35 communities in the Southwest with computers and basic training. Each of these locations offers free public access to the Internet. Two hundred are planned altogether in the region, using all available locations such as libraries, public agencies, post offices and family centres. The Duagh Family Resource Centre (County Kerry) is briefly presented herewith as an example of local initiative and possibilities.

In the field of education and training a special emphasis has been put on bringing ICT to groups at great risk with what is known as the digital divide, particularly the handicapped. This has been done through the SOLAS and DATE projects, initiated from a secondary school located in Boherbue (County Cork), which will be analysed here.

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As far as public services are concerned, focus is put on one-stop access and service within the European TITAN project, in which the Mid West region also participates, and a special priority is given to telemedecine applications.

Given the high bandwidth needs of these applications as well as the requirements of more and more firms, not only multinational, to dispose of a good telecommunications infrastructure with sufficient capacity, the Southwest Regional Authority has significantly advanced in the process of responding to this challenge. The STAND working group on public services established a sub-committee to examine the question of a broadband ATM system. The major recommendation adopted was that the region's public services would constitute a single customer for broadband. This is a very logical approach as the partners combined phone bills already represent the largest single telecom account in Ireland. Response from the telcos was very positive, as they need significant customer bases for the rollout of broadband.

The first result of this initiative is the implementation of an ATM line between Cork City and Tralee, which will initially link the Institutes of Technology at the two locations. The Regional Authority is now making an application for European funding to study how this network can be extended into small and medium-sized towns, to facilitate distance education, remote teleworking and small software production centres.

Strategic decisions on infrastructure are effectively required if the Southwest is to keep a leading edge on software development, also bringing the employment benefits to rural areas. With this objective in mind, the Regional Authority, inspired by the Swedish model developed at Ronneby (Blekinge), has decided to launch a "Centre of Excellence for Software Development" based in Cork and Tralee (County Kerry), as part of the new campus of the Tralee Institute of Technology. This project is also linked to the Shannon Digital Parks technological nodes plan preceedingly described. A specific organisation (IT@Cork), comprising both small Irish firms and major international players in the software area, has been set up for that purpose.

b) *The Duagh Family Resource Centre*: *Information Society Access Point*

The Duagh Family Centre is one of the 35 Information Society Access Points now existing in the Southwest. The concept is an interesting one, as use of computers and the Internet, with basic training is just one of the numerous activities of a centre devoted to community activities reaching all categories of the population in the town of Duagh (1 990 inhabitants) in County Kerry. The centre was established at the beginning of 1999, following the findings of a Community Development Committee. It identified the roots of most of the social problems experienced by families in underemployment/unemployment and poverty and a

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cycle of under-achievement in education. Isolation of the elderly was another factor taken into consideration in creating the centre as a focal point of community activities and services as well as training.

This centre is one of five in Kerry and part of a regional network of Family Centres who receive core funding from the Department of Social, Community and Family Affairs. Located in a two story house, next to the post office, the centre is open five days a week, three evenings and on certain weekends. Activities and services range from childcare (17 children age 6 to 12 attending) to senior citizens activities, community education, counselling, money advice and budgeting, but also sports and youth activities. Ten workers are employed by the centre on a Community Employment Programme to deliver the various services. The Information Society Access Point is just one of these and awareness has stemmed mostly from the fact that most people usually come to the centre for something else and discover this opportunity afterwards in a context where initial preconceptions are more easily overridden.

A growing number of adults and elderly people have made the first step and received basic training and success with children is, not surprisingly, overwhelming. For this reason the present day facility, only housing three computers in a room devoted to many other activities, will be extended, with the completion of an adjacent building that will house an "IT room", but also a sports centre and counselling rooms. As is the case today, ICT access and training will not be isolated from other activities, which is instrumental in the process of accepting and discovering the opportunities offered by the Information Society. Though recognising that the Information Society Access Point was popular, the centre was not able to supply any figures on attendance at this stage.

c) The Boherbue Comprehensive School, a pioneer in access to education for the disabled

Boherbue is a village of 200 inhabitants located in County Cork, whose secondary school, with an enrolment of 500, serves a hinterland within a 20-km radius. Thirteen pupils in the school possess various physical or sensory disabilities and their isolation within the school population as well as difficulties in benefiting from mainstream learning were quite obvious. The school decided on it's own in 1996 to launch an original experience to remedy to this situation through the use of ICT, by designing specific software and associating parents and teachers in a project implying also the purchase of costly terminal equipment. It should be noted that at that time the Irish national programme to equip schools (IT 2000) was not yet launched. The Comprehensive School obtained the financial support of the Southwest Regional Authority for this pilot project called SOLAS (Light in Gaëltach) that was integrated into STAND-RISI.

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The success of this experience led the Southwest Regional Authority to consider a wider regional project based on the same principles. The DATE (Disabled Access to Education) project obtained European funding for a total of EURO582 000, as well as sponsorship from major ICT companies. DATE selected a pilot group of 52 children from all over the region and implementation started for a period of two years that ended at the beginning of 2000. The new feature of the project, as compared with SOLAS, was the design of a Website (*dateproject.org*) as a communication tool for all those associated in the venture, permitting an exchange of experiences, a dialogue between the children and monitoring of advancement.

SOLAS and DATE succeeded, besides the acquisition of the necessary computer skills by the children, in building up their self confidence, pulling them out of their isolation and overall reducing their level of dependency. The Irish Department of Education has accepted this last programme as a key pilot in developing national policy in the delivery of education to persons with disabilities. From a rural perspective, SOLAS (and DATE for the other rural towns concerned) opened up the possibility for handicapped children to follow adequately and in an integrated fashion mainstream schooling, in their own town. Parents thus avoided the dilemma between costly placement in a specialised institution elsewhere or accepting unsatisfactory participation in local school curricula.

d) Bringing public services to remote areas: first application in telemedecine (dentistry)

The South West Regional Authority has prepared and is now launching an application in the field of teledentistry, prepared with and supported by the Post graduate Medical and Dental Board, Cork University Dental School and Hospital and the Southern Health Board, within RISI-STAND. The objective is twofold: decrease time for patient diagnoses in orthodontics and suppress travel, when possible, for rural clients to the Dental Hospital in Cork. The backlog in orthodontics diagnoses at the hospital is such that rural patients often have to wait a long time before getting a diagnoses for which they have to travel to Cork, often from small towns not conveniently linked to the regional capital.

By permitting orthodontic diagnoses on line, thanks to ISDN videoconferencing and data conferencing (mutually legible and modifiable diagrams and charts by use of standard graphic software), this time consuming process, both for the patient and the practitioners ought to be sensibly reduced, offering more efficient and less costly healthcare. ISDN video and data conferencing are also being used to deliver post graduate education and information to dentists. Around 10 dentists are participating in the pilot started at the end of the year 2000 for a nine month period and for which initial response is very positive. Costs for a dentist already equipped with a PC are around Ir.£ 700 in equipment (camera), software

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and ISDN line installation. Specific funding allocated through RISI-STAND will cover operational costs including ISDN calls for the duration of the pilot (double the local call rate). This project is carried on with the help and advice of the University of Bristol Dental School, which has been successfully using a similar application for the past four years.

Conclusion

The Midwest and the Southwest Regions of Ireland are both actively engaged in ambitious projects to bring the Information Society to all inhabitants with specific policies devised to take into account the requirements of rural areas. The strategies adopted by each region may seem quite different, but this resides more in the organisation of the different steps towards the same goal than choosing different objectives. On one hand the Midwest appears to emphasise strongly economic development through adoption of the latest technology whereas the Southwest puts the accent on a "People First" approach. In the first case this can be understood as a proactive policy seeking to capitalise on existing strengths, such as the National Technological Park in Limerick, to implement a new spatial development approach including rural areas in the knowledge based economy. In the second case the Midwest is seeking, through projects more centred on public service considerations, to bring the basic benefits of ICT to all people living in rural areas.

Looking closely at the SHIPP and STAND programmes, the differences appear to be more limited in scope. The Southwest also has an active approach to the dissemination of technology in a learning and business environment. It is linked to the "Digital Park" programme through the Tipperary Rural and Business Development Institute and it is devising it's own hi-tech project with the "Centre of Excellence for Software Development", co-located in Tralee. On the other hand the accent put in the Midwest on awareness, whether for the general public or SMEs, is not radically different from the "People First" approach put forward by the Southwest.

Besides the programmes adopted by the two contiguous regions rest on strategic actions engaged in the field of broadband telecommunications infrastructure. Both regions are fully aware that a "territorial digital divide" may stem from concentration of access points in urban areas and are taking action to avoid this. In the Midwest the driving force seems to be business oriented and in the Southwest public services requirements have initialised the process. In the end the public and the private sector will both use the high bandwidth available, introducing a certain degree of flexibility in the localisation of economic activities.

Another feature that appears important to be underlined in the experience of these two regions in their endeavours towards the Information Society is their

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close co-operation, which is systematically extended to other European regions through the RISI Programme. The various committees set up often include members from the other region and this is particularly the case for each of the steering groups. Besides, a certain number of common projects, such as TITAN in the field of public services, or the technological nodes being developed around the Shannon Digital Park, are being implemented to their mutual benefit.

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Case Study 3

The Highlands and Islands of Scotland and ICT

The Highlands and Islands area (H&Is), located in the Northwest of Scotland, represents slightly less than half of it's land mass, with 39 000 km^2 for a population of 370 000 out of a Scottish total of 5 120 000. There are 219 000 inhabitants in the Highlands, as compared with 151 000 in the 90 populated islands. The population density of the overall area is particularly low (9.5 persons per km^2 versus 65.5 for the rest of Scotland) in comparison with the European average (116).

In spite of the decline of traditional activities like fishing, farming and weaving, the slow down of off-shore petroleum drilling and the closure of military bases, the population of the Highlands and Islands (HIE), in line with the Scottish trend, has grown by 0.3 per cent over the period 1991-1998. The development of tourism and the creation of new jobs in the ICT sector explain this. These activities have counterbalanced, up to a certain degree, a long tradition of emigration, facilitated by a level of educational attainment higher than the UK average. In comparison to Scotland the population of the HIE area is slightly older, the number of people in the 20 to 44 year age group, the young economically active, being of 36.6 per cent in the former versus 32.7 per cent for the latter. The unemployment rate was 5 per cent in July 1999, as compared with 5.7 per cent in Scotland and 4.3 per cent in Great Britain, but peaks are registered during the winter months (+2%), when tourism is strongly reduced.

1. Highlands and Islands Enterprise

To counter demographic and economic decline, Highlands and Islands Enterprise (*hie.co.uk*), a public agency with 300 employees, funded by the former Scottish Office and now by the Scottish Executive, was created in 1991. It succeeded the Highlands and Islands Development Board, with a specific focus on economic and social development as well as on training. Ten Local Enterprise Companies (LEC), one in each major area of the H&Is, staffing 150 altogether, promote and co-finance various local projects within the priorities defined by HIE, based in Inverness. The total budget of the agency was close to £80 million for the fiscal

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year 1998-1999, with allocation of funds going primarily to fragile and regeneration areas, which are not necessarily the most populated.

The strategy deployed by HIE is threefold: helping business grow, strengthening communities, and developing skills. As far as businesses are concerned the main priorities are: making local businesses more competitive, assisting new business starts, attracting inward investment, improving the competitiveness of business locations. Provision of proper telecom infrastructure is an important component of this approach. Strengthening of communities is sought in particular through promotion of investment in community assets such as cultural heritage and development of community initiatives and leadership. The implementation of programmes to develop skills seek to match training and opportunities, to extend access to both and assist in the deployment of the training and learning infrastructure. In these fields ICT services play an important role.

Overall, since the beginning of activity in 1991, HIE claims to have created or retained over 28 000 jobs in the area and secured over 4 000 inward investment jobs. Support has been provided to over 3 300 community projects. Annually, 3 000 employees are assisted with in-company training.

2. Infrastructure and ICT strategies

The strategy of Highlands and Islands Enterprise in the field of ICT is based on the assumption that the economic regeneration of the area supposes adequate telecommunications infrastructure coupled with energetic action to create awareness and secure inward investment. Having been deployed now for approximately ten years and starting with the network it was defined and implemented progressively taking into account experience acquired along the way. The particular case of the Western Isles with an interesting telework project is analysed separately.

a) Infrastructure

At the end of the eighties economic activity was diminishing in the HIE area, particularly as a consequence of the slow-down in petroleum drilling and related activities (construction and maintenance of platforms), which had mostly had an impact in the northernmost isles (Orkney and Shetland) and in Inverness. At the same time, British Telecommunications (BT), newly privatised, and it's than sole competitor, Mercury, were going ahead with ambitious plans to deliver sophisticated telecommunications applications to major businesses, mostly located in urban areas. In this context, the only town in the area that would be getting digital infrastructure and local call rate access to data networks was Inverness (population 40 000). Awareness stemmed among the Highlands and Islands Development Board (HIDB) that without proper action the businesses located in other parts of the Highlands and Islands would be at a competitive disadvantage and

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chances of attracting new activities and big companies there would be near to zero.

Discussions with BT, which had more financial clout than fledgling Mercury and also higher stakes to preserve future market shares in Scotland, ended up in a unique decision whereby HIDB would fund a quarter of the investment for an infrastructure project costing £20 million. The upgrade of the trunk infrastructure to ISDN (Integrated Services Data Network) was accomplished through the installation of digital switches in most areas of HIE, offering capacity and competitive tariffs to 80% of businesses and 75 per cent of the population in 1991-1992. The following step was the provision of digital services to the remote areas left out of the initial plan. This implied costly software development in the smallest rural switches and the supply of new equipment. The £4.8 million project, covering the period 1998-2000, is jointly funded by HIE (£0.2 million), the European Rural Development Fund (ERDF) (£1.6 million) and BT (£3.0 million).

An ambitious new project, the (virtual) University of the Highlands and Islands (UHI), requested extra bandwidth for links between the Isles and the mainland, allowing to carry efficiently applications such as video-conferencing at affordable rates. The call for tender launched was won by a new operator called "Thus" (Scottish Telecom) to implement a £10 million development for island trunk routes, with the participation of HIE and ERDF, funding together £2.5 million. This extra capacity will also benefit local businesses.

Mobile coverage is another issue in sparsely populated areas that can greatly benefit from it. As with fixed infrastructure, operators tend to invest in areas were population is concentrated and the Highlands and Islands are no exception. For this reason HIE backed up a novel plan to bring mobile telephony to remote areas, thanks to a unique sharing of infrastructure between Vodafone and Cellnet. The two competitors accepted to share 190 new mast sites worth £46 million, reducing costs, ERDF contributing £3.8 million and HIE £200 000. With this plan 95 per cent of the population is now covered by mobile telephony, which has direct applications not only for emergencies but also for local businessmen and those, in increasing numbers, coming to the area as inward investors.

b) ICT *awareness and implementation*

Bringing adequate network infrastructure to remote areas is essential to stimulate economic development but in itself insufficient to bring local businesses to discover the advantages of integration of ICT into their everyday activity. When BT implemented the first digital infrastructure in the area, the telecom operator carried on a series of road shows to explain the potential benefits of this increased capacity and new applications. These presentations, although comprehensive, were perceived as too technology focused and insufficiently covered the business benefits of

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advanced telecommunications to encourage greater use among SMEs. Aware of this situation, HIE realised that another approach was necessary, with a permanent presence on the field of ICT advisors to deliver advice based on the identified needs of small businesses. Following this analysis, HIE and the Western Isles Council, with the financial help of the EU, decided in 1995 to appoint an expert in the Isle of Lewis, who was able to explain PC usage rather than networks. IT advisors were subsequently recruited in other parts of the H&Is, on the basis of their previous business experience. At one point ten advisors, one for each local enterprise company, were posted in the area. The initial idea was that these advisors would create ICT awareness among the local business community and that their role would cease to be necessary after a start-up period estimated at two years.

In spite of the high activity of these advisors, their direct impact on job creation was difficult to evaluate. Due to the cost of deployment (£35 000 per year per expert), their number was brought down to five in 1997, with a focus on economic development rather than on ICT facilitation. The emphasis was than geared to high level projects with strong job creation targets such as call centres. The Department of Trade and Industry (DTI) simultaneously stepped into the picture with its Information Society Initiative for business. The shift implied reliance on appropriate resource centres with help desks to lower the level of enquiries on the field, DTI bringing to the H&Is a £160 000 financial contribution over three years. Business information units, one per Local Enterprise Company, now including computer and Internet access and, in some cases video-conferencing, give support to the action of the four advisors sharing today the whole of HIE territory, with the exception of the Western Isles, covered since the beginning by the same expert.

Aside from this last area, benefiting from specific ERDF funds, the future situation in the rest of HIE is uncertain with the end of EU Objective One funding, which has amounted to 50 per cent of a total cost of £382 000 since January 1999. At this stage, without having yet found alternative financial solutions HIE tends to consider that some kind of permanent presence will always be necessary in the foreseeable future to keep up with new developments. In the meantime an e-commerce development advisor has been appointed at headquarters in Inverness to raise awareness, linking with the ICT advisors still in the field. In the longer run, even allowing for the amenities of rural life, one of the main issues for pursuit of such an effort is the inadequacy between public sector salaries and the requirement of attracting high level experts with a private sector background.

3. Results achieved

The strategy pursued by HIE in laying out a proper telecommunication infrastructure, developing incentives for inward investors and appointing ICT advisors

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able to help in attracting major firms is beginning to pay off. There are more than 2 300 employees in 17 telebusiness locations in the Highlands and Islands, mostly in call centres operated by/for world class companies. To understand the scope of this revolution and grasp the opportunities open to rural areas it is necessary to analyse the telebusiness sector and its major component, call centres.

a) *Telebusiness in* Europe

More than 1 250 000 people were employed in telebusiness activities in Europe at the beginning of 1999, growing from about 300 000 in 1995. The UK is the leading European country in this field with approximately 400 000 employees, more than one third of the European total. Call centres are the largest and most widely recognised types of telebusiness. Basically a call centre provides different and more or less sophisticated forms of customer service, handling queries or complaints, responding to follow-up needs or accomplishing transactions. Most companies in the financial sector (banks, insurance), in transportation (airlines, railroads) or major utilities now have such centres (run by own staff or under contract with a teleoperator) to respond to customers and provide them with a wide range of services such as policy renewals, financial operations and bookings. An increasing number of call-centres also operate telemarketing and telesales activities, often in response to advertising campaigns.

Business process out-sourcing is another growing category of telebusiness, spurred by the opportunities offered by the Internet for operations not necessarily requiring direct phone contact. This activity involves the remote processing of business information by specialised firms in such fields as accounting, insurance claims, secretarial and translation services or on-line travel bookings.

Telebusiness operations are mostly generated in large centres (more than a hundred people and sometimes as many as one thousand), usually located in urban areas with adequate telecom infrastructure and workforce availability. However there is a growing number of companies in this field that are able to achieve cost efficiency at a smaller scale of operation in rural areas thanks to cheaper wide-band telecommunications or distributed network systems. This is the case for certain specialised activities, such as software engineering, database management, or research and consultancy services.

There were 160 telebusinesses in Scotland in 1999, employing over 21 000 people, expectations for the year 2000 being 30 000. The majority of these centres handle classical customer service queries and transactions but an important minority undertake business-processing operations. Ten per cent of employees are graduates, two thirds work full time, two thirds are female and seventy per cent are less than 35 years old. Fifty per cent of these employees work in the Glasgow area, which concentrates the majority of call centre operations in Scotland. Five

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urban locations aggregate eighty-five per cent of jobs in this sector. Most of the remaining fifteen per cent are located in the Highlands and Islands (2 300 employees).

b) *Telebusiness in the* Highlands *and* Islands

The first call centre opened in this area was in Thurso in December 1992 with 25 people employed by Manpower for BT. This activity, now including the Internet help-desk, today provides work to 625 employees in a town of 8 500 inhabitants. BT also has a second call centre in Alness (population 6 000) staffed by 415 people dedicated to BT Cellnet customers and to servicing the new ADSL Internet high speed offering called Open World. Cap Gemini Ernst and Young is another major player in telebusiness in the Highlands with six different locations and more than 500 employees today rapidly expanding to 1 200 with the opening of a new centre in Forres (population 8 500, high unemployment rate at 7.8%). This major project will service One2One mobile customers and support e-commerce operations. In Dingwall (5 200 inhabitants), the software and consultancy giant employs 260 people for Virgin Rail bookings. TSC (Telecom Service Centres), which started its activity in the Isle of Bute in 1995 now employs 700 people in three different locations in the Highlands and Islands, including Aviemore, a small town of only 2 200 inhabitants. Database Direct operates call centres and Internet support for the Scottish Tourist Board out of two locations employing 180 people, one, Kinlochleven, with only 1 000 inhabitants.

Besides these established operators, favourable conditions in the Highlands and Islands have attracted investment from "New Economy" start-ups. Such is the case for Iomart in Stornoway (83 employees today), that will be analysed further, and for Braidgrove in Alness (17 employees mid 2000 and 23 at the end of the same year). Braidgrove is a multimedia and software design house also providing customer service for multichannel data base applications in the field of cattle traceability (600 customers) and e-commerce. The fully integrated services provided, accessible by telephone or through the Internet, are based on workflow management offering permanent up-dating of operations and logistics.

What are the factors that decided such companies to locate activities in a rural area, often at a great distance from major cities like Glasgow or Edinburgh, and sometimes without practical or cheap air-links? Proper telecommunication infrastructure and competitive tariffs on par with urban areas being a prerequisite, other factors seem to play an important role in these location decisions. The quality and availability of the workforce are considered by these employers as essential, putting them at advantage over urban employees in terms of turnover and wage rates, adjusted to local conditions, usually lower than those prevailing in cities. One of the explanations of lower turnover is the lack of competition between telebusiness employers in rural areas as compared to urban areas.

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In the latter, competition is strong not only for very specific skills but also for basic manpower presenting the qualities required for work in a call centre environment (attention to customers, team-work, intense activity). Flexibility of the work-force is also mentioned, Cap Gemini Ernst and Young having had no difficulty in recruiting volunteers for week-end shifts. Dedication and proper delivery of tasks is perceived as one of the positive consequences of living in a stress-free environment, with many leisure activities easily accessible. Top management appointed in these areas also appreciates this, just as well as the possibility of having a secure family life with a high standard of education, even in remote areas. Besides these advantages, the initial package proposed to potential investors in the Highlands and Islands is particularly attractive. When training is necessary, up to a third of the cost can be funded by the Local Enterprise Company. Availability of pre-constructed and adequately wired hi-tech buildings in Business Parks, at very reasonable rents, much lower than costs for premises in urban locations, complete this picture.

c) The future of telebusiness

Telebusiness relying on a mix of adequate telecommunications infrastructure, a quality workforce with reasonable wage levels and corresponding linguistic skills, such requisites are today available in other countries, particularly in the developing world. It has been argued for this reason that choosing such ICT strategies for rural areas was not necessarily the best way to ensure long-term sustainability of employment. Such concerns merit proper attention as other countries in the Eastern Mediterranean, the Caribbean, the Indian sub-continent or Southeast Asia are getting their share of this market, depending on their linguistic area of influence. With 80 per cent of total operating costs in this field based on employment costs, the case is a strong one, even if Scotland remains within Europe a relatively low wage region.

On the other hand, most telebusiness operations located in these parts of the world tend to be on the lower side of the value-added chain or correspond to basic batch data processing requiring no human interface. More sophisticated applications require a good knowledge of the customer's business and constant software and process upgrading that give a leading edge to major European and North-American teleoperators. Besides, security or regulatory concerns can also prevent such transfers. Lastly, basic linguistic skills are not always sufficient for customer service and marketing and often require mother tongue empathy and use of specific words and expressions to make the caller feel at ease. Nonetheless, it cannot be denied that most low value added services will tend to be rendered by companies in other parts of the world. This means that workforce skills have to be permanently upgraded so as to satisfy the requirements of new applications. HIE is

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particularly attentive to this both in generic training programmes or in specific ones designed for the requirements of certain teleoperators.

4. The Western Isles

The Western Isles have developed since 1994 a very specific approach relying mostly on telework to bring new activity to a waning rural economy. More recently, inward investment, like in the Highlands, has also brought new perspectives. The Western Isles are spread over close to 3 000 km^2 and the population is near to 32 000. The main island is Lewis with 21 000 inhabitants, with 9 000 people in Stornoway, the Western Isles main town. The local economy is predominantly agricultural, with sheep raising on small farms (crofting) and fishing (mainly salmon fish farming), but both sectors are in decline. Extra revenue is procured in certain cases by weaving (Harris Tweed) and tourism (bed and breakfasts), but this does not suffice to ensure a proper income level to most families. Unemployment remains high (close to 9%) and many skilled youngsters tend to emigrate elsewhere in Scotland or the United Kingdom, where their educational capacities are put to good use. It is a fact that the area has the highest number of graduates per capita in the country and a secondary school achievement record double of the national average.

a) Telework

The telecommunication infrastructure strategy deployed by HIE at the beginning of the nineties with BT broke the island's isolation by bringing up to date telephone service to the most remote villages. However important for local inhabitants this was not enough in itself to nurture new activity deriving from ICT. Capitalising on the high level of education and using a strong local tradition of multiactivity with flexible working habits, the Local Enterprise Company initiated in 1994 with the Western Isles Council and European LEADER funding an original teleworking initiative. The nomination of the first ICT advisor in the Highlands and Islands, coming from a computer marketing background and returning to Lewis from Edinburgh, was instrumental in this project.

This permitted the set-up of the Western Isles Information and Communications Technology Service (WIICTAS), based in the small village of Habost, staffed by the expert and one assistant. An initial database of 160 people was compiled, comprising persons with the necessary skills to perform tasks such as technical authoring, editing, proof reading, computer graphics and software development. An early decision was made to avoid work involving mechanical data entry, due to competition from the developing world. To help potential teleworkers in securing contracts and to manage them, a specific company, Lasair Ltd., staffed by two people, was set up on the island of Benbecula.

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By the end of the first year of operation, Lasair was in a position to tender and succeeded in obtaining a contract from an American publishing company based in California, specialising in indexing and abstracting business journals. This gave work for over five years to 34 people, mostly women, working out of their home, with printed matter shipped weekly by air and production returned to the publisher via the Internet. Other contracts concern the production of digests and the indexing of publications of the Home Office Forensic Science Department, the editing of the Scots Law Times archives into CD-ROM format and conversion to electronic media of scientific publications. A company offering a quick transcription service to lawyers is one of the most recent contracts signed up, employing people committing to at least four hours availability a day, five days a week, with flexibility as to work peaks. Around fifty teleworkers are linked to this contract at the end of the year 2000.

The skills register maintained by WIICTAS now comprises close to 600 people covering a wide spectrum of skills and disposing of the proper equipment. The potential teleworker employer does not have direct access to names but only to availabilities in various fields, by getting connected to the "*work-global.com*" Website. WIICTAS than notifies the possible employees, who volunteer on a given contract. If necessary this can be managed by Lasair at a fee. This original project, which won in 1999 the European Telework Award, has created from 1995 to 1998 approximately 120 jobs. The current second phase, ongoing till 2001, aims to create a further 150 jobs and retain 55 of those already existing. Since inception the total costs have amounted to £565 000, shared by the above-mentioned partners.

Undeniably this innovative project has been a success, but its exact economic impact is difficult to evaluate. In supplementing families or single people with an extra source of income it has contributed, up to a certain extent, to the economic regeneration of the islands. On the other hand it cannot normally procure steady revenue nor become, for that purpose, the sole source of income. This is quite different from the case of a totally independent teleworker, who reaches customers directly through his personal network and on the basis of his highly specialised or well recognised skills.

In spite of this limitation, it should be stated that it has certainly given to local inhabitants a good vision of possibilities within the Information Society. Being fully compatible with traditional activities this type of telework sustains the social fabric and gives reason to stay rather than emigrate. The European Commission Exchange Mart for Territorial Employment Pacts has recognised this by retaining this initiative as a model of good practice for remote areas with similar problems. Nonetheless, one must not underestimate, in results achieved, very specific local conditions such as insularity, a high level of education and skills, and the determining role of the project manager.

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b) *Telebusiness and local* SMEs

Up to recently, with the exception of telework, the penetration of ICT related activities in the islands was reduced. Besides Eolas, a small video production firm, that stepped into the Web development business less than five years ago and has now more than 18 full-time employees, there were very few other examples. The situation has recently changed thanks to a visionary Local Enterprise Company investment in Stornoway, to create a business park that was finished in 1998. This opened up the possibility for new firms to consider operations out of the Western Isles, tapping the young skilled workforce, normally tempted to work out of the area. Iomart, a Scottish start-up based in Glasgow opened up in February 1999 an Internet Helpdesk, now employing full-time 83 people and planning to soon bring that number to 160. Two main activities are deployed there: the hot line for its highly successful youth portal called Madasafish and customer service for Virgin Biznet, offering Internet services for SMEs. Within the same premises the University of the Highlands and Islands is delivering accredited training of the Cisco Academy (this company is the world's largest Internet professional equipment manufacturer).

If these new developments are encouraging, the majority of the more than 900 SMEs in the Islands, often micro-enterprises with not more than one or two employees, seem to remain aside the ICT revolution. A mailing posted in view of the Y2K bug to 930 SMEs, that more than two-thirds answered, indicated that only 316 were equipped with a PC but that 67 had already their own Websites. The SMEs that wish to inquire about ICT and receive initial training can do so at the local Business Information Unit, which functions as a resource centre with computers and Internet access, along the model developed within the national Information Society Initiative for business.

5. Perspectives

The Digital Scotland Task Force Report, published in May 2000, puts forward "A *vision of a Scotland where many people choose to work in rural areas, where they can combine an excellent physical environment with opportunities for knowledge work.* A *Scotland where no-one is excluded from education and training opportunities or from access to public services because of where they live, or their social or ethnic backgrounds*".

a) *The emphasis on rural areas*

This public document, like many similar reviews in various countries or regions preliminary to the definition and adoption of a detailed action plan, is far reaching in scope and seeks to deal with all aspects of the Information Society (education and training, e-commerce, e-public services and e-communities). It is interesting to underline, in this context, the emphasis put on rural areas. The action plan to be soon adopted, completing the national Information Society Initiative, will

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thus directly take into account territorial development issues. In particular, the preparatory document submitted to the new Scottish Executive puts the priority on communications infrastructure, as one of the main foundations of a Digital Scotland.

b) The importance of networks

Of course, Scotland already enjoys a very high quality network, which has permitted to attract major British and international investment in such activities as call centres and software development, thus creating thousands of jobs. Nonetheless, the Digital Scotland Task Force is perfectly aware that the latest broadband technologies like ADSL, now being deployed by operators in major urban areas, require specific attention if they are also to be brought to rural areas. The report indicates that operators have at the moment no plans to do so, with offerings limited to Edinburgh, Glasgow and Aberdeen. It also stresses that "*this type of always on access to the Web is likely to change the way people use the Web, leading them to use it more frequently and for longer periods*".

One can question the benefits of high speed, permanent Internet access for rural areas, believing that such offerings are mostly for the urban "Web addicts". Besides, digital TV, now being rolled out in the United Kingdom, will offer to 90 per cent of households, by the year 2007, alternative means of access to Web-based services. Nonetheless this will not satisfy the requirements of many business applications, including for SMEs, telemedecine and distance learning, that need both high speed and sufficient bandwidth. To ignore this would also make Scotland lose its present day advantage in terms of network availability, which has given it a certain lead in ICT developments.

For these reasons the Digital Scotland report seeks to explore various means of access in remote areas where the conventional or fixed networks may be difficult to upgrade, mentioning satellite downlinks with an ISDN return path (satellites offer a limited return path capacity). Likewise, the document recognises that even basic digital services, such as ISDN on the fixed network, can be more expensive to obtain as well as more difficult, particularly when the customer is located several kilometres from the local exchange. This situation (that exists in certain parts of the Isle of Lewis), can impact in particular on small business operating in these areas and act as a disincentive to inward location. These different questions are presently under review by enterprise networks like HIE and telecommunications companies in Scotland.

c) An open conclusion

Slightly more than ten years ago the Highlands and Islands Development Board pushed forward an innovative strategy to promote economic development in rural areas, the basis of which was investing public funds in telecommunications networks in a context of deregulation. The new Scottish Executive, in its will to

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sustain the development of a Digital Scotland, fully geared to the knowledge economy and e-commerce, is focusing on these issues once again. Without being able to predict which measures will be taken in the near future, maintaining the competitive advantage already acquired by certain rural areas and opening it to others will certainly require specific efforts and original partnerships between the public and private sectors.

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Case Study 4

ICT in Matawinie (Quebec, Canada)

Introduction

Matawinie is one of Quebec's 96 Regional County Municipalities (RCM). North of Montreal, Matawinie covers a territory of 10 600 km^2 whose southern tip is 80 km from the city. It has a population of approximately 45 000, living in 15 municipalities, the main one being Rawdon, the County seat, with a population of 9 000. A forested region, its economy is geared to exploiting this natural resource, poultry farming and tourism. Matawinie has some 2 000 firms, although the majority are very small ones: 75 per cent have fewer than five employees. The population is ageing: 28.65 per cent are over 55 years of age. The unemployment rate is high, at over 16 per cent in 1999. The level of educational attainment is low; almost 50 per cent of the population does not have a secondary level V diploma (a total of 11 years primary + secondary education). Young people who do attain an adequate level of education often leave the region to look for work, as local opportunities are still limited.

A series of co-ordinated initiatives – modelled on the same lines and with the same objectives as those implemented elsewhere in Canada – have been launched by the federal, provincial and local authorities in an attempt to halt the decline of this rural region. The main one involved setting up a public not-for-profit corporation, the Community Futures Development Corporation (CFDC), under the national Community Futures Program, which has resulted in the creation of 250 similar co-operative organisations countrywide. The Matawinie CFDC (*matawinie.qc.ca*), founded in 1992, is one of 55 in Quebec. It has a permanent staff of six and, in 1999, had an operating budget of almost C$ 230 000 and a total budget of C$ 1 100 000.

Information and communications technologies (ICT) account for an increasing share of the organisation's investment budget, almost 40 per cent in 1999. CFDC subsidies are additional to funding available under federal and/or provincial programmes. The main ICT initiatives relate to the network of Community Access Centers

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(CACs), set up to encourage the more widespread use of ICT as well as to provide support for various social, youth employment and SME projects.

1. Community Access Centers (CACs)

Fifteen of Quebec's 650 CACs are located in Matawinie (*caci-matawinie.qc.ca*), one in each municipality. Set up under Industry Canada's Community Access Program (CAP), the intention, right from the start, was to create a territory-wide network of such centres. Nine municipalities set up public access centres in 1998 and were joined in 1999 by the remaining six. Half of the public access centres are in schools and the rest in community libraries, municipal buildings or chambers of commerce. Industry Canada contributed C$ 30 000 over an 18-month period for the first centres and C$ 40 000 over 36 months for the rest. This subsidy enabled the purchase and installation of an average of six to eight microcomputers per centre, equipped with a variety of desktop programmes and Internet access. The main aim of these centres, open 20 hours per week and staffed mainly by volunteers, is to encourage the general public and local firms to make wider use of ICT. Territory wide, only 10 to 15 per cent of households are connected to the network and only 7 per cent of SMEs (the average for Quebec is 27%).

While the CACs have undoubtedly helped introduce basic computer skills and the various Internet applications to both the general public and firms, it is impossible to gauge the "success rate" of individual centres, since people who go on to get their own equipment rarely inform the CACs. However, approximate visitor figures are available. For instance, the centre of Saint Félix de Valois (population 6 000) had a total of 3 000 visitors from June 1999 to June 2000, including return visits and tourists (the CAC is in the chamber of commerce, which also houses the tourist office). For permanent pass-holders, sixty residents on average, the charge for one hour is C$ 3 instead of C$ 5. From an operational standpoint, the support of the chamber of commerce has been very valuable, since this has permitted sharing of three full-time staff with the tourist office. The active assistance of the chamber has also made it easier to pay well-qualified training staff and to publicise initiatives, particularly the choice of courses available.

The CACs are the lynchpin of the system set up by Industry Canada to ensure wider access to ICT throughout the country. The approach is highly decentralised, since the initial subsidies are granted to the CACs for local development projects on the basis of detailed criteria. This approach is still encountering various problems, which the federal authorities are making every effort to resolve with the help of the provincial governments. The first such problem is the heavy reliance on volunteers, which is causing major operating difficulties for some CACs. The number of available volunteers who have the necessary qualifications or could be trained varies widely among municipalities of roughly the same population size. The sharing

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of human resources among municipalities is sought but cannot always constitute an easily implemented solution. That is why CFDC managers encourage the municipalities to ensure that they have their own dependable skills and paid staff via a programme instituted by the Office of Learning Technologies of Human Resources Development Canada to promote youth training and employment. Schemes of this type are now being examined.

The second problem that the CACs are encountering deals with disparities in telecommunications infrastructure from one part of the territory to another. Obviously at this stage economic development projects in Matawinie do not need broadband networks, but some areas, even today, still have only analog lines, on which Internet access is impossible. As regards the CACs themselves, access speeds vary depending on whether or not they have ISDN (transfer rate 128 Kbps). Over half the CACs have 56 Kbps lines, which might be enough for one user, but is inadequate for a centre where several users are connecting to the Internet at the same time. Costly alternative solutions (satellite) are used only when there is no other option, as on the Manawan Indian Reservation in the north of Matawinie. In this case partnerships are established with the school board in order to spread costs. The situation could change somewhat by 2004, following the announcement by the Canadian authorities at the end of 2000 of projects for high-speed networks accessible throughout the country.

Despite these difficulties the Matawinie CFDC has been able to launch a number of development projects, particularly in the field of employment and training or strengthening of social cohesion and facilitation of access to public services. These projects are beginning to deliver results.

2. Economic and social development initiatives

In 1997, before the CACs were even set up, the Matawinie CFDC went ahead with a six-month training project in the hands-on use of ICT in a true working environment, thanks to two sub-contracts pertaining to digitisation of data. This on-the-job experience enabled three of the six project trainees to get a permanent job. The unavailability of adequate premises meant that it was not initially possible to organise a larger-scale project. This lack of suitable premises was one of the main reasons for the CAC network project that would be implemented gradually in 1998 and 1999. As soon as it had the premises and equipment it needed, the CFDC set up other youth employment programmes. In 1998, one such project trained 10 young people in digitisation, coding, Web page design and database configuration techniques. Nine of the ten trainees subsequently found employment or resumed their studies. Three of them set up a multimedia firm specialising in Web site design and configuration for the municipalities and local firms.

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The R*accord* (Connect) project launched in 2000 is aimed at supporting business projects based on networking and Internet access in the traditional handicraft industries, organic farming or tourism sectors. Human Resources Development Canada conducted a feasibility study on the project, for which an estimated C$ 635 000 will be spent over three years, including federal financing of C$ 300 000, the balance being funded locally (CFDC). The aim is to provide incubator facilities for 10 business projects.

As regards *social cohesion*, with the support of Service Canada, a public body aimed at facilitating access to administrative information, the CFDC launched an ICT information campaign aimed at target groups such as older people and the handicapped. This involved demonstrating how ICT could be used to obtain information and complete a range of formalities. The aim of the scheme is not necessarily to provide training in all the different applications, but rather to show people how easy it is to use these technologies to access public services from terminals in the CACs. In the long run this project could be followed by a second stage promoting local sites as choice "on-line points of entry" to federal and provincial public services (local portal), since residents more often turn to local services on a day-to-day basis.

On a more general level, managers of the Matawinie CFDC have recognised the benefits of continuous networking to increase the efficiency of the various initiatives in the field of ICT. The 15 Community Access Center managers meet regularly every two months in one of the RCM's municipalities. In order to implement this approach on a wider scale, the different project leaders decided to set up a "cyber-meeting of rural areas", open to the whole of Canada and to any foreigners who were interested. The three-day meeting, held in October 2000, brought together 140 participants, mostly from Quebec. It enabled the extension of the Matawinie node of the cyber-rural network to other members, mainly in Quebec and Canada. This network (*cyber-rural.org*) is a forum for open discussion on all ICT issues in rural areas, whether related to economic and social development, municipal administration, electronic democracy or public services, which were the main topics of the three-day event. One subject discussed at length was effective diffusion of ICT and adoption of electronic commerce by SMEs as Matawinie, in liaison with neighbouring regions, had launched an interesting training programme in this field.

3. SME training initiatives

In line with their resource sharing policy, five CFDCs including the Matawinie CFDC (Laurentides and Lanaudières regions) launched an electronic commerce training initiative for SMEs, potentially addressing over 11 000 firms (of which nearly 2 000 in Matawinie). The vast majority of these firms (7 000) are in the tertiary

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sector (tourism, retail trade and services), 2 300 in the secondary sector and just over 1 500 in the primary sector (forestry). Seventy-five per cent of these firms have fewer than five employees. As electronic commerce must be integrated into the business strategy of these firms, which often have just begun to use or make only limited use of ICT, the best approach was to address the problem without running the risk of putting off potential targets. This was why the wider concept of "electronic business" was preferred to that of "electronic commerce", more precise but not that familiar.

In Quebec overall, 77 per cent of firms with five to nine employees and only 50 per cent of firms with fewer than five employees are on-line. In the areas covered by the five CFDCs concerned, the percentage of firms on-line is well below this average. This is borne out by the very low numbers of Internet sites, judging from the preliminary study for the project published in November 1999. Of the 491 Internet sites found for this area using search engines, 309 are business sites, which means that only 3.5 per cent of SMEs have an Internet site. Among the most numerous are tourism and "trade and business" sites; agri-food and manufacturing sector sites are virtually non existent. Very few sites are geared to transactions: only 16 were identified by local access providers.

These findings prompted the project managers to initiate wide consultation with SMEs early in 2000 in order to identify their needs and expectations. Over 50 business owners and managers were brought together in several discussion groups, which highlighted a great need for information about the potential of electronic commerce and for support in defining and developing electronic commerce projects, as well as setting up networks to exchange information and monitor technological developments. In particular, entrepreneurs in these regions seemed keen on rapid access to further guidance and assistance services on electronic commerce strategies pertaining to technological innovation and monitoring of competition.

Following the consultation process, the CFDC set up a modular project, with an ICT foundation course as a first step. The training scheme developed comprises four stand-alone modules, the first being "Electronic business tools for SMEs". Only in subsequent modules are topics more directly related to electronic commerce introduced: "How to start and expand business on the Internet", "The Internet, a powerful marketing tool for SMEs" and "Improving your firm's Internet site". The training modules, from late 2000 to early 2001, took the form of three-hour workshops for groups of around 10 people. The workshops were held in different CACs and the attendance fees were C$ 30 per workshop, or C$ 100 for all four modules. Ninety per cent of those attending enrolled for all four modules, and before long all the workshops were fully booked (over 120 attendees), which shows that there is an underlying demand for this type of training.

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An Internet site was set up for this purpose (*pme-rurale.com*). Likewise, a CD-ROM showing real-life examples of how businesses could use the Internet was designed for this operation with the aim of using it as a teaching aid elsewhere. Training was provided by an electronic business trainer paid by the CFDCs, which received a subsidy for that purpose from the Canada Economic Development Agency, Quebec Province. It is too early to draw any conclusions, but the project has been well received. Whether it is renewed will depend on the availability of further federal funding.

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Case Study 5

Keewaytinook Okimakanak Communities, Northwestern Ontario, Canada and ICT: the Kuh Ke Nah Network of Smart First Nations

Introduction

The six aboriginal communities of Keewaytinook Okimakanak (Northern Chiefs Council in Oji-Cree language) are located in Northwestern Ontario. They comprise a total population of 2 800 people, which are part of the Nishnawbe Aski Nation with 20 000 inhabitants spread over a territory of 300 000 km^2 (0.1 person per km^2). Deer Lake is the largest community with a population of 850 and the smallest, North Spirit Lake, has 314 inhabitants. These vast territories of lakes and forests with few roads, experiencing severe winter conditions, are more remote than rural. These small communities have long been struggling against physical isolation. Hospital and high school access require air travel, with the exception of a 10 week period when four wheel drive vehicles can travel along a winter road. The economy is mainly based on forestry, mining, fishing and a little tourism. Thirty six per cent of the adult population is unemployed or are receiving some form of social assistance and high school completion rates are low. Fifty per cent of the population is less than 19 years old and only 4 per cent is 60 years or older.

In such a context, telecommunications infrastructure plays a vital role in maintaining contact with the outside world. Use of information technologies in these First Nations to counter remoteness is a practice that has been developed in the recent years with the active support of K-Net, a public organisation set up in 1995 to facilitate network and service implementation in the area. K-Net has worked with telecommunications operators and communities to ensure that radio and satellite links connect communities to the telephone network and the Internet. For some communities it has meant that they have just received residential telephone services in the year 2000! For others, it translates as access to local cable and rapid uptake of Web-based communications tools. More than 800 people in Keewaytinook communities regularly use their E-mail account. This situation is quite unique since many Internet users have never had a telephone! However, it

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mirrors ICT diffusion in lesser-developed countries where technological leap-frogging is common. K-Net's expertise in animating and supporting ICT use and development and the success of the Community Access Program are the building blocks of an ambitious Smart Community project.

1. Previous ICT projects

The Nishnawbe Aski Nation, as other aboriginal communities in Canada, have historically had extremely limited access to educational services. They have utilised extension programmes and employed training models that traditionally required that learners leave their community. Distant education services that employ videoconferencing and the Internet and permit flexible access are mostly unavailable in remote First Nation's communities. The one notable exception is a radio high school that was launched by a consortium of Aboriginal educational and communications organisations. In the middle of the last decade K-Net introduced Bulletin Board Services (BBS), permitting toll-free electronic posting and retrieval of information as well as the on-line organisation of forums between members of a closed community of users. The BBS platform anticipated user and technical standards that would later be entrenched with the diffusion of the World Wide Web and Internet Protocol.

Educational applications were some of the possibilities opened by these on-line services and the communities of Keewaytinook Okimakanak seized the opportunity. The K-Net BBS started operations in 1994 as a "stay in school project" connecting students and teachers. The system permitted easier monitoring of student's progress by teachers and introduced computer literacy amongst youngsters while giving parents a way of keeping in touch with their children attending school away from home. In 1995 the service was extended to the whole region, with phone and on-line support delivered to more than sixty First Nation schools across Northern Ontario. In 1997 K-Net moved to a Web-based platform that added the graphical dimension to existing services.

The following step came with the installation of six community access programme sites, one in each community, in 1997. This major initiative to secure the required telecommunications infrastructure as well as necessary funding from federal agencies was the result of efforts by the Northern Chiefs Council. The CAP Program finances only the computer equipment and software, for an amount varying from C$ 30 000 to C$ 40 000. Each centre is staffed by one person, responsible for technical maintenance of equipment and delivering computer literacy courses to local people. The sites are linked together in a network administered by the K-Net staff in Sioux Lookout.

K-Net has been pivotal in all of the ICT projects launched in the different communities of the Nishnawbe Aski First Nations since remoteness puts a strong

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emphasis not only on adequate telecommunications infrastructure but also on technical servicing expertise and provision of rapid response to network maintenance and community repair issues. For that purpose, K-Net and its seven staff has a strong technical and help desk component available around the clock. One member is entirely dedicated to educational applications and another is responsible for the design and maintenance of the very comprehensive Website (*www.knet.on.ca*). K-Net also supports the technical training of community access centre personnel residing in each community as well as bringing them advice when required.

2. The Kuh Ke Nah smart community

The *Smart Community Program* (*smartcommunities.ic.gc.ca*) is a federal initiative designed to encourage dissemination of ICT and identification of best practices. Just like the Community Access Program, it obeys to a competitive process that was launched in 1999, whereby communities must comply with a certain number of conditions to submit a project. The main feature is integration of broadband services in the project, which must apply to several sectors simultaneously and not be limited to a single set of applications. Community involvement and support of the population as well as previous experience are also elements taken into consideration by the selection committee. On this basis 129 communities submitted letters of intent and 46 were than pre-selected to present comprehensive business plans detailing the strategic, operational and financial aspects of the proposed projects. At the end of this process, 12 projects were selected nation-wide (one per province, one aboriginal, one for the northern territories) in May 2000. Winning communities receive from Industry Canada a sum of up to C$ 5 million over three years to be matched by equivalent local funds. Kuh Ke Nah, which means "everyone together" in Oji-Cree, was one of the 12 selected projects (*smart.knet.on.ca*). It comprises five main components: distant education, telehealth, a Web portal, extension of community access centres, adapted database and Internet access solutions for small user groups.

The *Internet high school* project uses a Computer Mediated Communication (CMC) platform that combines on-line teaching through the Internet with local supervision. This permits pooling of teaching resources amongst different locations. Courses are conducted both in the classroom and on-line, with help for the latter given by the pupil's own teacher, whose role is not limited to the sequences of on-line class, but also permits follow-up of homework assigned on-line through E-mail. The project has opened new perspectives in allowing high school students to attend school without leaving the area. Before that the only costly choice was to attend the Sioux Lookout High School located several hundred kilometres away. Separation from families is considered to be one of the main factors explaining learner under-performance and a high dropout rate.

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The Internet high school project was pilot tested in 1999. Thirty-five grade eight students in five communities participated in a newly developed Native Studies curriculum. This pilot helped to identify potential problems and find proper solutions before the main project started. Teachers had to adapt to a new environment where pupil's progress had to be monitored with a distant colleague. Students had to acquire extra skills on the computer through specific training in order to draw all the benefit of on-line courses. Amongst the recommendations made at the end of the pilot were necessary access to school computers for students in the evening for practice and "homework", with supervision by parents, thus associating them to the process. On the basis of this previous experience, the Internet High School was launched in September 2000, with 25 students attending. Fifty per cent are under 16 years of age.

In the field of *telehealth* an information and education programme was carried out mid 2000 with the goal of identifying priorities and guidelines. Local community health staff and Kuh Ke Nah project personnel jointly conducted field meetings and interviews for that purpose. Meetings with Health Committees, Band Councils, and the general public provided a forum for introducing the telehealth concept and gauging opinion. Follow-up home visits offered residents the possibility to ask specific questions and project staff to record personal concerns. The overall reaction to telehealth access was positive. Local political and administrative bodies showed cautious enthusiasm for the project, potential users expressed interest and highlighted concerns such as privacy. Health personnel welcomed the introduction of the new service. The support of these workers was of course crucial. They felt that it would improve patient care, reduce their experience of professional isolation, and increase access to health education and training. They also saw immediate benefits such as improved patient care and consultation, better co-ordination of medication orders and faster turnaround on laboratory results.

Access to mental health services was identified as a telemedical priority. The dearth of qualified personnel in the region makes delivery of such a service very difficult. This need has been the focus of a pilot study since 1999. In the pilot, patients attend a videoconference facility in Red Lake. A psychiatrist based in Winnipeg, Manitoba joins the videoconference and conducts the session. Patients are assisted by a native language technician and, if necessary, an interpreter. In the near future, once all the five major settlements are connected other telehealth services such as orthopaedics, paediatrics, and dermatology will be implemented. Other uses include transfer of ultrasound images to the regional zone hospital and virtual teleconference visits between patients and their relatives.

The five *Community Access Centers* are a strategic component of the smart community project. To fully support all its applications, these centres need to receive new equipment and have their role reinforced. They will thus become hubs for

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smart services access and training in each community. The local co-ordinator in each centre, renamed "e-Centers" will assume several different responsibilities. Besides running the centre, each will provide access to IP videoconferencing and ensure different levels of training in computer technology and applications. The e-Centers will play an important role in community affairs and in local government, since they will allow IP videoconferencing to replace monthly regional meetings.

The K*uh* K*e* N*ah portal* is a fully virtual community and meeting point presenting, explaining and indicating progress on the components of the smart community. It will also facilitate access to public information and services. Most of all it is conceived as a site reflecting local values and traditions, giving ample space to Aboriginal culture and ways of life. In particular, the Website will permit transmission of age-old legends in both English and Oji-Cree language. It will also constitute an entry point for visitors and support the development of tourism.

The fifth component of the project concerns *specific software development* based on the idea of replicability in other similar contexts, whether for very remote areas in developed Nations or in lesser-developed Nations. A data warehouse will facilitate the development and agreement on data policies, procedures, standards and definitions with a view to mobilise efficiently content supplied by the different communities. A caching/router project will aim to optimise network resources for recurring frequent usage of Internet pages by schools and e-Centers. Low bandwidth connections require local storage of most consulted pages to increase delivery speed.

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Case Study 6

Parthenay District, Pays de Gâtine (Deux-Sèvres, Poitou-Charentes, France) and ICT

Introduction

The medieval town of Parthenay (12 000 inhabitants) is the main urban area in the district of the same name (18 000), which includes the villages of Châtillon sur Thouet, Le Tallud and Pompaire (less than 2 000 inhabitants each). This district is the heart of the "P*ays de* G*âtine*", situated in the Deux-Sèvres *département*, comprising 94 municipalities and 9 associated towns in 10 counties with a population just under 70 000. Co-operation between towns is a strong tradition in this area covering a third of the area of the *département*. The "P*ays de* G*âtine*" was one of the first associations of municipalities to be recognised in France in 1996, when the law provided for this type of co-operation. This was because the pre-existing S*yndicat* M*ixte d'*A*ction pour l'*E*xpansion de la* G*âtine* (SMAEG) had been established twenty years earlier. It is useful to recall that a "*pays*" in this context is a group of communes with a shared economic development plan, extending over a territory that is not necessarily limited by normal administrative divisions (*département*, region).

The P*ays de* G*âtine*, like many rural areas, has experienced a slow and steady demographic decline (70 000 inhabitants in 1999 compared with 73 000 in 1990, a 3.23% drop). Of the working population, 23 per cent are employed in the primary sector, 31 per cent in the secondary sector and 46 per cent in the tertiary sector. The primary sector mainly comprises livestock breeding, which experienced a serious crisis in the 80s, affecting sheep in particular (falling exchange rates, competition from countries outside the European Union). Today, sheep breeding (in Vasles, in the canton de Mazières) and cattle breeding (Parthenaise breed) have recovered as a result of measures to improve quality. The secondary sector mainly consists of small firms (nearly three quarters have a maximum of two employees and less than ten companies have more than a hundred employees). The services sector has the fastest growth rate. In 1997 the increase in employment (the regional unemployment level in the same year being 13.3%) was mainly accounted

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for by services to companies or individuals (temporary work, hotel and catering business, cleaning, personal services).

Demographic and economic stagnation, or even decline, typical of many rural areas, was the context in which the Digital Age Town project in Parthenay was born in 1995, before the *Pays de Gâtine* as a whole embarked upon a project based on ICTs in 1998. Michel Hervé, the town's mayor and president of the district from 1979 to 2001, wanted to initiate a new local development strategy, by opting for creativity and innovation in all areas of economic, cultural, social and political life, while at the same time opening up the territory to the outside. For this company boss, former member of the European Parliament (1989-1994), who had taken part in working groups on these question with MEPs from other countries, ICT seemed to be the right instrument for a completely new approach to boosting the economy and revitalising local society. The importance of general interest groups and civic-minded associations (there are more than 250 associations in Parthenay) represents from that point of view a tradition to be relied on.

The mayor's conviction was all the more remarkable that the Minitel had not made a notable breakthrough in Poitou-Charentes, as it had in other parts of France, and that the development of the Internet in France was still in its infancy. Parthenay was therefore going ahead of the rest of the region (European project SERISE, *Stratégie Européenne et Régionale pour l'Information dans la Société et l'Économie*, starting in 1998) and the *département* (pl@n-Net for schools and awareness raising of the general public, launched the same year). If such an ambitious project was to be undertaken, substantial resources and the aid of outside expertise would be required, which explains the recourse to European funding made at the outset and the search for strong partnerships with the private sector.

1. Start-up and development of digital age town project

The digital age town project in Parthenay drew upon several complementary European programmes involving other towns in the EU, while at the same time using as a basis a number of purely local initiatives. The momentum thus created was sustained by solid partnerships with the private sector formed at the outset. The corresponding European programmes are METASA, MIND and IMAGINE.

a) METASA (*Multimedia European Experimental Town with a Social-Pull Approach*)

METASA is a European research and development programme that falls within the European Commission's "telematics applications" programme (DG XIII). It brought together in a single consortium four small towns (Arnedo, in the province of Rioja in Spain, the German towns of Weinstadt in the Rhine valley and Torgau in Lower Saxony, and Parthenay), social science research teams, equipment

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manufacturers (Philips and Siemens), telecommunications operators (France Telecom) and various other public and private partners. METASA set out to determine the future demand for interactive multimedia services by conducting a thorough analysis of users' real needs.

The first stage of the project, which received a European grant of FF 133 000, was completed in December 1996. It consisted mainly of an in-depth analysis of the population's expectations, employing an original method, which was rather different from standard marketing ones. In Parthenay a team of social science researchers from the University of Toulouse conducted the inquiry. Traditionally, technical innovations have been influenced by discoveries made in the research laboratories and by economic prospects in the markets. The new approach consisted in seeing whether individual users could help design new services from the outset.

b) MIND (M*ultimedia* I*nitiation of the* D*igital* T*owns*)

MIND is a European short-term demonstration project supported by the Commission's DG III. MIND fully complements METASA. It seemed important not to wait too long before presenting a few tangible applications that were a practical illustration of ICT potential in providing services. This pilot project adopted an empirical and progressive approach, which required that a few experts be made available to facilitate access to the technology and help train people in the use of the applications installed.

The goal of the project was to create a genuine "local electronic community", involving the different economic, social and administrative actors of the town. The project started in Parthenay in February 1996 with the deployment of the team that was to work with these actors in defining and creating the contents of the interactive services. This involved two platforms: Philips CD-I technology (since abandoned as the CD-ROM established itself as the market standard) and the Siemens interactive terminal technology.

MIND, co-financed by the European Commission (FF 930 000) and local government (FF 300 000) provided the first tool for familiarising local actors with on-line services. This also constituted the first element in establishing a link between the local and the global level: it provided experience of a kind of "information by-way" as a first stage on the way to the information highways. This was of particular relevance in that MIND was developed in synergy with other initiatives taken by the local authority (digital centres, In-Town Net), analysed further on.

c) IMAGINE (I*ntegrated* M*ultimedia* A*pplications* G*enerating* I*nnovative* N*etworks in* E*uropean* D*igital* T*owns*)

IMAGINE is part of the European Union's IADS (Integrated Applications on Digital Sites) Programme (DG XIII). Among the ten or so projects approved within

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the IADS framework, IMAGINE is one of the few that concern small and medium-sized towns and rural areas. It started up in January 1998 for a period of three years and built upon the previous projects (METASA and MIND) and on the particular experience of Parthenay.

The project brings together the following in a single consortium:

- Major industrial groups (Siemens, Microsoft-Europe, FINSIEL, France Telecom and Philips), which provide technological expertise and a guarantee that the services offered will comply with accepted standards.
- Four medium-sized towns in the European Union (Weinstadt, Torgau, Parthenay and Casale-Monferrato, province of Turin, Italy).
- Local SMEs from each age digital town, with expertise in multimedia.
- Teams of European social science researchers to monitor the procurement of ICTs by citizens in each town and the emergence of new needs and uses.

The strategy of the project, reflected in the composition of the consortium, is to ensure that the needs of the citizens (social-pull) and those of industry (technology-push) are better matched.

Organised around three main areas of application (education/training, labour-market/social integration, and local government), it was intended that a great variety of terminals (PC, kiosks, televisions and screenphones) be used in the project so that the widest possible public be involved. The main results of the project, which received a European subsidy amounting to FF 1 752 000, are to be disseminated via a European network of observer towns (20 to 30). The consortium has already organised for that purpose seminars and visits to digital towns, as well as workshops concerning prospects for the new digital urban services. The project consists first of all in evaluating needs (reconvening of the METASA groups), then in assessing the initial flow of information so that adapted technology can be supplied, thus validating the project, and demonstrating it to local actors as well as the general public. Parthenay has been assigned the educational and training components of this demonstration project.

2. The originality of the Parthenay digital age town project

The Parthenay project is strongly marked from the outset by its original approach to citizens' and local government initiatives, though it does not disregard technical aspects or the ways in which the services are accessed and designed, which are very much the result of proactive policies.

a) Objectives and ambitions of the project

Successive measures to create a digital town are firmly based on the conviction, confirmed by the practicalities of implementation, that the use of ICTs is not an end

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in itself but the logical extension of very thorough work at the local level. The latter is intended to promote communication across traditional barriers and encourage initiatives stemming from civic action groups. In other words there is an assumption that local electronic networks can only be established once a dense grid of human relations has been developed. This means that ICTs should be used as a catalyst to increase communication between citizens and consolidate the social fabric by encouraging various individuals and economic and social actors to experiment with specific aspects of everyday life. As a result, the approach is multisectoral and not segmented: all aspects of local everyday life are concerned, whether they concern school or business, administration or culture, commerce or agriculture.

The point of such a step is to create conditions in which citizens are not only participants but also genuine actors in town affairs. Well before the digital projects were launched, the municipality introduced various procedures and training programmes to help citizens become more autonomous and creators of projects by supporting initiatives to organise associations, activities, and events. The role of the municipality was consequently modified: instead of acting on behalf of others, it tried to play an enabling role by providing help (making premises, equipment or financial aid available) or by encouraging different actors to interrelate. The associations thus become important partners of the local government services, which provide a structure for voluntary initiatives and rely on the ability of each citizen to assume some measure of responsibility for town management.

This approach has been marked in the areas of culture and social services, with associations that are very active in the fields of architectural heritage, music and local traditions and others whose concern is the social integration of young people with specific problems and the handicapped. The "development agents", put in place by the municipality, encourage these initiatives. They provide a lead and a contact point, putting the network of associations in touch with local government. These associations have thus been among the first to make use of the new tools made available, so that they have been quick to become "providers of information", particularly on the In-Town-Net (see below).

b) A *local network*

In 1996, Parthenay resolved to install telecommunications equipment and set up an efficient local network in order to provide the best technical and financial conditions for access to the Internet. This would be even easier today, given that local authorities are legally empowered since June 1999 to finance telecommunications infrastructure though not to operate it themselves. At that time, there were still very few Internet service providers in France and the cost of access was not the same throughout the country, but depended on the location of the subscriber in relation to that of the provider. Even after this situation had been redressed by

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the historic operator France Telecom (complete deregulation only came into force in January 1998), it was no easy matter for a rural community to obtain the most effective infrastructure rapidly. This was the case for all equipment, whether for communications restricted to the local district or for exchanging data with other French partners or foreign countries via the Internet.

For these reasons, Parthenay decided to go ahead with the installation of a local optical fibre network serving all the local government buildings, the schools, public or private colleges, and the various public services in the district. The data transfer rate of this network has been gradually increased to a level of 100 MB. At the same time, the district made sure that the operator, France Telecom, would provide an external link allowing Internet traffic (TCP/IP) at 64 Kbps in 1996, raised to 128 Kbps in 1997 and 2 Mbps in the year 2000. Since access to the network was not only supposed to be adequate from a technical point of view, but was also to be made available to subscribers at low cost, the district decided to become its own service provider. This permitted to do away with the monthly access charge (in 1996 an individual subscription to the Internet cost between FF 120 and FF 200, depending on conditions), the price paid by the user being limited to that of a local telephone call.

The network choice, adding to the need to maintain and service a large number of terminals (about 1 500 machines) in homes (see below "1 000 microcomputers" operation), in teaching and training institutions, and in "digital centres" open to the public, entailed the deployment of a strong information technology team. More than a dozen people are needed, especially since the district hosts its own applications on platforms provided by Microsoft. Furthermore, being anxious to anticipate the new possibilities opened up by rapid technological change, Parthenay is one of the first towns to have been chosen by France Telecom to launch ADSL (Asymmetrical Digital Subscriber Line). This technology allows a considerable increase in the digital transfer rate (512 kilobits on uplink and 1 megabit on downlink) at a very reasonable cost to heavy users, whether institutional, corporate or private. This service, first offered by the operator to towns of 60 000 inhabitants began in Parthenay in March 2000.

c) Measures taken to accelerate the spread of ICTs

In keeping with the same general tendency that prompted the district to intervene directly in infrastructure matters, two measures have been adopted to facilitate the more widespread use of ICTs. The first is the provision of terminals in individual's homes under particularly attractive financial conditions and the second consists in the creation of numerous public access points ("digital centres").

Operation "one thousand microcomputers"

This operation was launched in 1997, to enable all individuals, whatever their financial situation, to have a micro-computer at home through a package deal costing

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them FF 300 per month over 2 years. This amount pays for the leasing of the computer, the link to the district server at no extra cost and 200 hours of free connection per year, extra hours being billed in the normal way. The operation was a huge success and the entire stock of microcomputers was installed.

Digital centres

The district chose to provide areas that allowed free access to multimedia devices and training: the "digital centres". They serve to give support to inhabitants and prepare them for the use of ICTs by overcoming barriers to access, whether financial, psychological or generational. These public access points, of which there are thirteen today, are run by young people with suitable experience both in the technology and its different uses. Basic courses and specific training are available to individuals or groups upon request or in modules. Special attention is given to the elderly. The free training covers all applications (word processing, spreadsheets, electronic mail, access to and navigation on the Web, creation of Web pages). These open centres provide general access to information, but they also permit exchange of knowledge and know-how within the premises. The centres are visited by more than 200 people a day.

d) *The In-Town-Net*

The In-Town-Net (*www.district-parthenay.fr*), opened in 1996, is a virtual representation of the district, its activities and its inhabitants. All local government departments, the vast majority of companies, associations and numerous individuals, as well as the local radio are active contributors to its content. This Website has as many as 24 000 pages (out of 100 000 edited and archived at the end of the year 2000) providing economic, social, cultural, administrative and tourist information on Parthenay and its surrounding area. Intranets specially developed by public institutions (local government, schools) facilitate updating of many shared topics.

This community tool is available to all citizens (a third of the inhabitants of the district have an electronic mail box listed in it), and each individual contributes to its content. It comprises:

- a directory with a personalised home page;
- fora for debates involving the general public;
- small ads;
- a calendar of events;
- databases (cadastral surveys, zoning regulations);
- personalised management modules enabling direct generation of information by companies and individuals.

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3. Sectoral policies

On the basis of the above-mentioned principles, the main one being the importance of supporting the different actors in gaining familiarity with ICTs without taking over from them, the district has adopted ambitious policies in the following sectors:

- economic development;
- local government and public services;
- social action;
- education;
- health.

a) Economic development

The economic department of the Parthenay District is highly original in that it is entirely structured around the New Economy. First of all, the department is based in a digital centre with resources addressing the needs of SMEs. The person running is also head of the development department, comprising a team of three:

- a person responsible for the development and use of ICTs;
- a computer technician specialising in multimedia and e-commerce applications;
- a person in charge of economic information.

The facilities of the digital centre can be reserved in advance so that companies can hold seminars or ICT training sessions for their employees, with the support of the development department. The latter also organises regular meetings targeting specific professions or sectors of activity, with a view to introducing participants to ICTs and raising their level of awareness. The digital centre also welcomes the Gâtine businessmen's club, which addresses topics related to the New Economy, the Internet and electronic commerce. Furthermore, firms located in the *Pays de Gâtine* benefit from a monitoring service on the Internet concerning technical and economic issues. This application was set up under the "UCIP" Programme (collective use of the Internet by SMEs) introduced by the Ministry of Economy, Finance and Industry. The more than 300 companies connected to the Internet in the area thus receive periodical strategic information. On a daily basis local businesses can consult very complete pages on the In-Town-Net (economic information, events, statistics, directory of firms, export procedures, etc.).

The role of the development department goes beyond raising awareness or providing information about ICTs since it also offers SMEs methodological or technical support in creating a Web-site. Most of the 80 businesses with an Internet site at the end of 1999 took up this offer. Moving into the field of secure electronic

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commerce, the development department designed a standard "electronic shop", offering personalised features, providing support in setting it up and running it. This service, which is free, has been taken up by about twenty nearby shops since it was launched in January 2000. Without such a service, very small enterprises would hardly have contemplated a move in this direction before a very long time, since they lacked information and advice, and were afraid to incur expenses that could not be written off quickly.

The results seem convincing though difficult to measure quantitatively. Several local enterprises were able to develop their exports since their Internet site opened. This is true of the *Établissements Fillon*, a manufacturer of articles for events and parties and a major supplier of retirement homes in France, which is now developing a market in West and North Africa. AC *Motors*, which specialises in the refurbishing of second-hand police motor cycles, is now exporting machines to Indonesia and Russia. *Clipcar*, a cottage industry with five employees, which developed an original design for a compact caravan, has recently been exporting part of its output to the British market. *Rymy Chaussures*, a small shoe retailer in the town centre, has set up shop on the Internet, choosing a specific niche: very large-sized shoes. This market now accounts for 10 per cent of its sales, both in other regions of France and in Africa and Spain. The growth rate of this new activity is regular but no investment in advertising is required. Furthermore, this recent activity has brought in new customers from Parthenay and the surrounding area.

The economic department also ensures that the excellent telecommunications infrastructure of Parthenay and its positive image as a digital town are used to attract new activities and companies there, particularly in the information technology and multimedia sectors. Whereas computer service firms were virtually non-existent a few years ago, there are now 22 such companies with 63 employees in all. Apart from the network, the attractiveness of Parthenay can be explained by the prevailing climate of innovation, favourable to start-ups, which can benefit from "incubator" type aids (provision of premises until the company is fully set up, support from the development service, etc.). A decisive factor is the availability of a young, qualified workforce, from the digital age town itself. Of the 37 working under the national youth employment scheme – notably to host the digital centres – 27 were recruited by the private sector, mainly by computer service firms. It should be pointed out that under this scheme, jointly financed by central and regional/local governments the contract is limited to three years, the person concerned having to make the most of the experience gained to find a permanent job.

Furthermore, the start-up of new activities may finally satisfy other aspirations related to quality of life in the country and possibilities opened by an activity that can be pursued at some distance from the main customer base. These factors were crucial to the company *Escape*, specialising in the design of databases in an Intranet environment. Its young managing director decided to leave Paris and the

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stress of metropolitan life for a suitable environment both from a business point of view and in terms of quality of life. His company had no difficulty in recruiting in Parthenay the personnel required for rapid expansion, which had not been the case in Paris, where the labour pool suffers from a shortage of specialists in different areas of IT development.

b) Local government and public services

The structure of Parthenay's local authority and the way it operates have been gradually reorganised in order to bring it closer to the citizen by simplifying formalities. The local authority, with around 400 employees, does not have a general secretary, since there seems to be less need for routine co-ordination in a body that has become more transparent as a result of the widespread use of ICTs. Moreover, every area of responsibility is organised in such a way as to involve two persons: a councillor, who is responsible for the sector, and a head of department, who receives as many delegations as possible and deals with most matters without referring them to the councillor. This delegation of responsibility and pursuit of greater efficiency are perfectly consistent with the nature of electronic mail, which requires a rapid response.

The In-Town-Net is the visible tool of the transparency sought for the citizen. From the site, all requests for official documents or identity cards can be made by means of electronic forms, even if, for legal reasons, the entire procedure cannot yet be carried out on-line (production of documentary evidence, signature). The Internet site also allows access to all the municipal council deliberations. The E-mail address of each councillor is given and there is a forum in which councillors and the public can engage in dialogue on the most varied matters.

A further step was taken in September 2000 with the commissioning of the electronic "hot-line" for the use of citizens, who are no longer regarded as users of services but as customers of the local authority. The basic idea is to enable every citizen to follow the progress of a request and to obtain a guaranteed delay for a reply from the outset. Each stage in the process of dealing with the request is traced, so that the local authority is obliged to take adequate measures in due time to lessen the impact of any unforeseen circumstances (holidays, sickness) that might affect the assigned time limit. The names of those responsible for a particular case are of course indicated and it is always possible to establish direct contact at any time through electronic mail.

Parthenay has also considered ways of simplifying the various procedures involved in dealings with national administrations. Thus, the local authority, in co-operation with the *Sous-Préfecture*, has tested successfully the electronic control of legality for deliberations requiring approval (vote of the municipal budget). The time thus gained means that decisions can be implemented more quickly and that

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the employees concerned can be assigned to tasks yielding higher added value. The experiment, which has been in progress for two years, could provide a model for all local authorities in France. Lastly specific action is under way with the police and the *gendarmerie*, so that complaints can be lodged on the Internet in encrypted form, providing the plaintiff with all necessary guarantees of confidentiality.

c) *Social action*

In the field of social action, ICTs have been used in innovative approaches intended to establish links with people in precarious situations, whatever the reason might be. Such initiatives target young adults looking for work as well as the elderly; moreover ways of developing contact between different generations are constantly being sought.

The unemployeds receive help in realising their job search, whether they are youngsters in difficulty or other unemployed persons. The "*Maison de la Citoyenneté Active*", which houses the local authority social services, provides a place where young people benefit, not only from the services offered by the digital centres, but also from personal attention and advice, provided in collaboration with the social services of the *département*. The latter normally takes charge of them to help define employment plans with the ANPE (national employment agency). Besides all the unemployed can put their personal profile on line, in a particular section of the In-Town-Net, frequently consulted by the local businesses. Help in drafting a CV and in sending out job applications is also given. In particular, five-week training on job search methods is provided.

As for elderly persons who benefit from help at home (daily shopping and housework, and simple presence), an original system has been developed to reduce the time spent by the helper in shopping, so that more time can be spent in the elderly person's company. A special "basket" is made up at the local supermarket, in accordance with the tastes and requirements of each of these customers. The order is made on-line by the helper, who then needs only to go to the shop to pick up the order, without wasting any time choosing items. Nearly three quarters of an hour are gained through this procedure for each visit.

The local authority social services department has an "inter-generational office", which has introduced schemes intended to facilitate contacts between all age groups. The principal instrument for providing such contacts is of course the In-Town-Net, whose citizenry section provides access to the directory of E-mail addresses in the Parthenay District and to two other networks: the "Network for the Exchange of Knowledge" and the "Local Exchange Service". The first is totally free and is based on the principle of reciprocity. It involves examining personal information volunteered by each Internet user in Parthenay (main interests, hobbies, etc.). By consulting different topics, the user is able to discover who is in

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possession of knowledge of a certain subject and to contact the persons in question. The Local Exchange Service is used for swapping goods or services on the basis of a scale of equivalence freely decided by the two parties, using an accounting unit called a PES (*Parthenay Echange Service*). If the swap does not take place immediately (in the case of English lessons in exchange for baby-sitting, for example), the debt is indicated on line and can even benefit a third party. The goods or services offered are classified by type in a list of small ads indicating both offers and requests.

d) *Education*

A national plan to equip schools, which also involved various measures for training teachers and introducing new pedagogical practices, was launched at the end of 1997. Without waiting for this, Parthenay had already begun to implement various measures in this field, which have enabled it to maintain its advance. This explains why Parthenay was chosen to develop the educational component of the European IMAGINE project. Its object of this is to promote education using an Intranet incorporating a tool box intended to facilitate interaction between the district, the schools, the teachers and pupil's parents. The tool developed makes it easy for each school to establish fora, "chat lines", and lists of available administrative information.

In the meantime, the 4 500 pupils in the district attending nursery, primary and the eight secondary schools are well equipped with data processing devices. There are 4 PCs per class in the nursery schools, 3 per class in the primary schools, and an average of 6 sockets per class at the secondary level. Most of the teachers have been trained in their use, and have developed corresponding ICT projects. An inquiry conducted at the end of 1999, which involved primary and secondary school teachers, shows that more than 40 per cent of them used the PC with their pupils for up to two hours a week and nearly 30 per cent used them for two to five hours a week. Nearly 60 per cent of the latter used the Internet with their pupils and three quarters worked with CD-ROMs.

Of the pedagogical projects of particular interest, those intended to help children with specific difficulties can be mentioned. They attend a special class (CLIS) designed to integrate them in the educational process (CLIS). The class has produced a CD-ROM on Middle Age costumes. Every day a pupil records a weather forecast for Parthenay (based on information provided by *Météo France*), which is sent in the form of an audio file to the local radio station to be broadcast in the morning. This demonstration of the pupils' capabilities, together with their recognition by the community, are very important factors in building up the children's self-confidence, and in supporting them in their effort to catch up.

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On the whole it can be said that the different pedagogical projects and the environment provided by the digital age town provide all children with an excellent understanding of the way ICTs are used and the possibilities they offer. Many classes produce their own Web pages themselves, and even the Web site of their school. The existence of high-quality teaching, based on pedagogical projects requiring the pupils to show initiative, and owing a great deal to the availability of ICTs, is one of the arguments adopted by the economic development department to present the advantages of Parthenay to firms that are considering setting up there.

e) *Health*

The provision of hospital care across the Deux-Sèvres department is being reorganised on the basis of specialisation, in accordance with policy implemented at national level. Under this arrangement, the maternity unit nearest to Parthenay is in Bressuire, the nearest surgery unit is in Thouars and the gerontology unit is in Parthenay itself. This specialisation requires the setting up of sophisticated communications infrastructure connecting the establishments, as well as applications that facilitate access to patients' files and, where appropriate, sharing by several doctors. This is why a high-speed Intranet is being set up within the area, notably for the transmission of the results of X-rays and other medical images. The shared patient file is also open to paramedical operatives in the case of elderly persons treated at home. The initial training of doctors in the use of ICTs is provided in Parthenay in the digital centres.

4. La Gâtine and ICTs

In 1998, the *Pays de Gâtine* also moved onto the information highway, thereby following the example set by its capital, Parthenay. Benefiting from the example and the advice furnished by the district, the *Pays de Gâtine* first established its own Internet site (*www.gatine.org*), hosted on the same server as that of Parthenay, but having its own developers. It is connected with an Intranet linking up most of the 94 communes of the Pays de Gâtine. It should be recalled that the Pays de Gâtine has just under 70 000 inhabitants, of whom around 18 000 live in the Parthenay District.

Apart from this, the immediate priority of the *Syndicat Mixte d'Action pour l'Expansion de la Gâtine* (SMAEG) is to encourage the widespread use of ICTs. First targeted are the associations and their leaders, leaving the task of training the general public, as well as secondary school pupils, to the General Council, whose responsibility this is. To this end the *Syndicat Mixte* financed the setting up of a network of ICT development agents in each of the nine municipal groupings, as part of the Youth Employment Programme. These ICT agents are more especially

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responsible for training municipal agents in the use of ICTs, which is all the more necessary since many city-halls are now equipped with computers, as a result of an initiative by the *Syndicat Mixte*, and have access to the Internet. Members of associations can benefit from the same training. These possibilities are also open to young people who have already left the education system and have not followed the ICT training given there.

The action taken on the territory of the *Pays de Gâtine* is combined with that taken by the General Council throughout the *département* as part of the Pl@n-Net (*deux-sevres.com*), which benefits secondary schools. Now that qualified ICT agents have been recruited, the General Council is able to provide training for school children during class, in presence of their teachers. These ICT agents manage well equipped "resource centres", which are open to the public in the evenings and on Saturday mornings upon request. The Ménigoute resource centre thus welcomes at least ten visitors per day. Lastly the Ministry has put an ICT development agent in each primary school as part of a national plan of action. Taken together, these actions mean that there are 3 ICT agents in a canton like that of Ménigoute for 4 500 inhabitants spread over 10 communes.

As to the main lines of future development, the *Syndicat Mixte* established a Commission on Future Prospects at the end of 1998 to consider different options for the territory. This work, which involved many actors across the whole of society, led to the emergence in 1999 of a "regional plan" entitled "Gâtine 2000-2010". It was possible to consult a large section of the population in the course of the exercise owing to large-scale voluntary participation in a series of workshops devoted to the priority themes that had come to light (image of Gâtine; economy; agriculture; agronomy; habitat, quality of life and infrastructure). More than 150 people took part. Most of the workshops put forward plans that were partly or entirely based on the use of ICTs. After clearing of their technical and financial feasibility, the different proposals have been included in a final document, which constitutes the draft development charter for the *Pays de Gâtine*. By adopting this approach, the area is able from the outset to submit detailed plans directly linked to requirements for funding procedures in development contracts (*contrats de plan*) for the period 2000-2006.

5. Prospects for ICT in Parthenay and the *Pays de Gâtine*

For the year 2000, four years after the first concrete measures concerning ICTs had been taken in the field, those responsible for the Parthenay project had set themselves the goal of achieving a penetration rate of 50 per cent of the population of the district, or slightly more than 9 000 inhabitants. In February 2000 only 7 000 inhabitants or 39 per cent of the population are in this position, although conditions for access in terms of awareness and initial training and also of financial

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and technical considerations, are particularly favourable. They indicate that this figure could in reality be higher since it appears difficult to identify all the Internet users in Parthenay, because of multiple use in a family with only one mailbox or recourse to another ISP. They recognise nonetheless that there is still resistance to change amongst many adults and particularly elderly people, who do not always see the usefulness of it. This is also the case of some potential business users who do not readily accept the organisational changes that ICT entail. It should nevertheless be pointed out that this result, even though it fails to meet the objective, places the Parthenay District well above the national average (7 million Internet users in France halfway through the year 2000 for a population of 60 million).

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Case Study 7

A rural ICT training network: "Dillon-net", Beaverhead, Madison and Silverbow Counties, Montana, USA

Introduction

The counties of Beaverhead, Madison and Silver Bow are located in Southwestern Montana, in a high-altitude mountainous area with a particularly low population density (1.7 people per square mile). Dillon-net covers most of Beaverhead County (8 000 inhabitants) and some parts of adjacent Madison and Silverbow counties. Beaverhead (county seat in Dillon, 4 000 inhabitants) is in itself comparable in size to the state of Massachusetts. This part of Montana is characterised by a traditional economy dominated by forestry and mining, both experiencing a sharp decline and by cattle ranching, grains and hay that provide most of local revenue. Beaverhead's median income is 16 per cent below the national average and the population is ageing. Many young people have left the area, although this phenomenon has recently slowed down and older people are coming back for retirement. During the last five years, the demographic balance has thus increased by 200 people.

Dillon is the home of Western Montana College, a 100 hundred-year-old land grant university with an enrolment of 1 000 students. This institution, as well as a primary school environment, provided the background for first steps into the world of computing and use of ICT as a teaching tool for the two teachers who were instrumental in the launch and now in the operation of the Dillon-net project. What is today a fifteen site volunteer operation for the set up and staffing of a local network of public access points (*dillon-net.org*) started in 1996 with one single centre in Dillon. The groundwork that led to it resides in the efforts of Ken and Nellie Bandelier, retired in 1988, who got acquainted with computers in 1979 and took a personal leave of one year from their teaching jobs to become knowledgeable in educational applications. Writing such programmes led the couple to participate in the process of initial equipment of classrooms and the pedagogical transformations the new tools brought with them in the eighties.

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The purchase of a home computer equipped with a modem in 1993 was the starting point in the process that launched Dillon-net. Both pondered the potential for community applications, particularly through E-mail, to bridge distances in such a vast territory. An article in the local newspaper started a debate between different citizens and groups in Dillon. This is how the idea of creating a local centre to further computer awareness and provide basic training emerged. A federal grant was obtained through the United Way programme to purchase the equipment and a small location was made available for free the first year. At the beginning of 1997, Dillon-net moved to its present location when extra funding obtained for computer acquisition through the federal Telecommunications and Information Infrastructure Assistance Program (TIIAP), required more spacious premises.

In the pragmatic fashion that has characterised the management of the project since inception, continued funding possibilities permitted extension of the concept to surrounding communities with close networking of the centres, all staffed by volunteer personnel having received if necessary basic training for that purpose from the project managers. Centres were created in various locations such as schools, public libraries, county and state offices, community clubs and even in private homes, provided the owner would permit the same access as in public locations. The premises are provided on a cost-free basis, as well as monthly Internet connection fees, Dillon-net bringing in the equipment and proper support. This way there is no usage charge for the public. Such an open approach permitted bringing these services even to the smallest communities. One of these has only 6 inhabitants.

1. The experience of Dillon-net

Dillon-net, with a grass-roots approach, has brought ICT to a remote rural area with some measure of success. Most offices, equipped with one to seven computers depending on location, are open up to forty hours a week with schedules adapted for working people. The main Dillon centre is open every weekday afternoon until 9 PM, and it receives an average of 80 to 100 weekly visits. Individual tutoring is preferred to the organisation of classes except for specific training now provided by outside public or private institutions, Dillon-net lending its premises and ensuring proper information of would-be recipients, both in the general public and within the business community. A particular focus is put on the needs of elderly people, numerous in these different communities, and often interested in the potential of E-mail for communicating with distant relatives.

The efforts of Dillon-net within the county seat itself seem to have paid off, since 35 per cent of the local population is estimated to be on-line today following the purchase of a home computer. There are now six computer vendors in the area as compared with only one when Dillon-net started. Several individuals who

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acquired skills in one of the centres now do Web page design and maintenance as a business. The list-serve that is maintained by students at the Western Montana College reflects this expansion. It is actively used by inhabitants in the area to keep up with city and county government agendas but also to participate in local debates, particularly in matters concerning the environment. The Dillon-net project has adapted to this progressive take-up by providing more and more information and training in use of the Internet and access to its most useful resources. A recent evening conference given by a medical librarian was devoted to finding and evaluating on-line medical information.

Considering the impact of the project, the fact that it is staffed entirely by volunteers and that private individuals and companies have made some voluntary financial contributions, has greatly helped in keeping operating costs at the lowest possible level. The estimated salaried costs, all covered by the volunteers, are equivalent to $60 000, out of a total average yearly budget of $67 000, not including equipment costs that are not always covered at 100 per cent by the different contributing programmes. They correspond to board work (monthly meetings), office management, consulting, tutoring, publicity, grant writing and technical support. The difference (rents, phone and ISP costs, electricity, insurance, etc.) are covered by each centre, with volunteers sometimes reaching into their own pockets to pay monthly bills.

As far as the network is concerned, centres and customers in the area get very different levels of service depending on their location. Three phone companies and three ISPs cover the area, most users having access to 49 Kbps phone modem speed for access to the Internet, but in some cases "end of the line" means 14 Kbps, which is totally inadequate. On the other hand some communities benefit from high-speed access thanks to the proximity of a fibre optics trunk line. These constraints constitute of course obstacles to ICT take-up in the area but the Dillon-net volunteers are not in a position to facilitate aggregation of demand or initiate a project with a strong business component. As has been analysed in the first part of this report, only such an approach can have some chances of triggering extra investment by the telecommunications operators to improve service in the areas where low speed access still exists because of an insufficient customer base.

2. New perspectives for Dillon-net

In spite of the above mentioned difficulties and lack of resources, the Dillon-net project has been able to capitalise on its achievements concerning computer literacy and usage in the area to further develop its action. It has thus become a facilitator in conjunction with different public and private initiatives in the field of ICT. One of the most original and ambitious of these is a State of Montana project in the field of public services called the Virtual Human Services Pavilion (*vhsp.dphhs.state.mt.us*). Such is the

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name of the corresponding Internet portal site aiming to bring together access to all federal and state public services in a particularly user friendly way. Site design is organised around the concept of rotundas in the virtual state capitol building, with entry to the different services in a simulated physical environment familiar to the user. Human services (certificates, child support programmes, senior services and long-term care), justice, commerce, labour and industry services (job searches), education and governor's office are the main entry points. In a state so sparsely populated as Montana, this project constitutes a strategic choice to facilitate access to public services in areas where their presence is often reduced. Accomplishment of any formality can be under these conditions a very time consuming process because of distance, not to mention the barriers for the elderly. Such a concept can of course only be applicable if ICT dissemination is sufficient and users are aware of the project.

Support from Dillon-net for that purpose has been obtained through a specific programme whereby existing volunteers increase their actual range by using laptop computers provided by the State of Montana. Publicising the Virtual Human Services Pavilion can thus be done even in communities where Dillon-net is not necessarily present. Basically this also amounts to providing basic computer awareness and training to incite potential users to get equipped. This programme of travelling tutors will also permit visiting outlying Dillon-net sites to update supervisors, volunteers and local residents' skills and co-ordinate small classes.

Dillon-net supports and participates in Internet awareness and training programmes organised by Qwest, one of the telecommunications operators present in the area. Qwest operates for that purpose a specially conceived van within the framework of an initiative called WOW ("Widen our world") and its training material is also used by Dillon-net. As far as the business community is concerned, Dillon-net obtained a grant from Montana Rural Development Partners Inc. to organise within their premises a one-day workshop for SMEs at the end of the year 2000. Just as with Qwest, Dillon-net here plays the role of a local facilitator and entry point for various organisations active in the field of ICT.

Dillon-net received two awards for its achievements as finalist in two competitions in 1999. One was the European Global Bangemann Challenge delivered in Stockholm and the other the AOL Rural Telecommunications Leadership Award. This recognition shows that such local volunteer projects can, with the support of regional or national programmes, implement useful actions for ICT development in a given area. In this case though, future developments are limited by certain restrictions that make it difficult to recruit necessary salaried staff. Community learning centres like Dillon-net are by definition non-profit and cannot have salaried employees, even if some federal programmes authorise employment of certain people at minimum wages but only for a limited period of time. The second

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question concerning further diversification of activity rests more on the overall organisation and objectives of Dillon-net. The issues now arising are more technical and economic, relating to telecommunications infrastructure and business applications. Presenting a possible business case for that purpose requires minimal expertise that is often costly. The possibility of using a college teacher and/or student to lay the groundwork is being considered for 2001.

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Case Study 8

Business and Technology Center in Maddock, Benson County, North Dakota, USA

Introduction

The town of Maddock (558 inhabitants) is located in Benson County (population 4 000), North Dakota. Adjacent counties are Wells, Pierce and Ramsey situated within a 30-mile radius from Maddock. This sparsely populated area of the Midwestern plains is characterised by an economy based on the production of grains (wheat, barley and oil seeds) complimented by ranching (cows and bison). Falling grain prices and lack of sufficient economic diversification have led to a steady decline in the population. At the end of the eighties the severe drought accelerated the phenomenon, the number of inhabitants in Maddock dropping from 750 to around the present day level.

This population is also ageing, the younger generation seeking job and career opportunities elsewhere, mostly in the cities and larger towns of North Dakota (Bismarck and Grand Forks). The profile of outward migration explains that the jobless rate remains low, at around 2 per cent in the county. Maddock is 45 miles away from the nearest shopping centre and movie theatre but the town has its own elementary and high schools, a clinic, a bank, a grocery store and a pharmacy. The presence of the latter two was nonetheless imperilled before the Business Technology Center changed perspectives.

Realising that measures had to be taken to renew confidence in the future and favour the creation of new businesses, the Maddock Economic Development Corporation (MEDC), a non-profit organisation, launched a phone survey in 1994 with the support of Minot State University. Level of response was good and inhabitants identified three major requirements: better health care, childcare and more better paid and qualified jobs. Simultaneously, the new opportunities for businesses brought about by the Internet were just beginning to appear, although little had been done at the time in rural areas. This combination of social and economic expectations, taking into account the limited resources available, led to the idea of satisfying these within the same premises.

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A new building could shelter both various services to the population and lodge new businesses, the two benefiting from adequate telecommunications infrastructure, with fibre optic trunk lines within reach. Besides these two types of services could be mutually supportive, childcare facilities offering the possibility for young parents to work and have their children attended to. The engineering of the concept was the outcome of collaborative work produced by several dedicated groups bringing together local authorities, public services, businesses, the rural electric co-operative and the local phone company.

The Maddock Business and Technology Center was a 1999 winner of the AOL rural telecommunications award, one of the criteria advanced for this choice being the replicability of a concept that seems well adapted to the environment and constraints of a small town with limited resources. Creating a very visible focal point for activities linked to the New Economy, combined with various social services, is an original approach. It can help the local population become more confident in the potential of ICT by witnessing it's immediate results and being able to understand the direct and indirect benefits of such a diversification and the revitalisation it can bring about.

1. Putting it all together

This audacious idea of course brought about a certain amount of scepticism as to its soundness and long-term viability, even if it was the brainchild of the respected president of the Maddock Economic Development Corporation, Bruce Terpening. On the other hand, full backing by the mayor, also a successful local businessman and member of the project team, was extremely helpful in convincing the local population and obtaining proper support from the state level, thus triggering financing from several federal programmes. As early as 1996 the required financial package was put together and the following year the longer-term financial feasibility of the project was established.

This permitted allocation of the necessary funds to cover expenses amounting to $774 000 for the building and its equipment. The cost of the project was shared between the town of Maddock ($200 000), USDA low-interest loans ($400 000), USDA grants ($149 000), and the State of North Dakota ($25 000). Construction of the building on a vacant lot in the centre of town was accomplished in record time and the official opening took place in July 1999. More than a year later costs are in balance with income, as rent from the various businesses in the building, owned by the town but operated by MEDC, cover both debt payments and operating expenses.

To achieve this, operating costs are kept at a minimum, the only salaried personnel being a chartered accountant and a receptionist paid through the "Green Thumb" federal rehabilitation programme. Even network operating and maintenance costs for the project are below normal level, taking into account the expenses usually linked to

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such sophisticated equipment. This is accomplished by a cost-sharing scheme with one of the hi-tech businesses that requires qualified technical personnel. A group of eight to ten volunteers manages the operation and helps organising training sessions and securing continued outside support for future funding if required.

Basically, besides providing social and business services, the Business Technology Center (*maddock.org*) is also a public access point to computers and the Internet for the general public as well as other business users, open from 10 AM to 6 PM each working day. Both general and specific training courses are provided within the computer lab. A series of five basic classes with ten students was organised over a six-week period the first year during weekly three-hour sessions. A majority of attendants was more than forty-five years old. Addressing more specialised requirements, the centre provides the premises and equipment for various training courses. One concerned medical transcription organised by Medquest for teleworking. Eight women completed the 18-week course bringing extra revenue to their household through a part time activity conducted from home. Another addressed the needs of local Credit Union personnel.

The childcare services available for young parents are of two types. The daycare centre is a classical facility with services provided for a basic fee. Being lodged in the building it also benefits from the wired environment and the possibilities it offers. A Webcam located on the spot permits parents and family to observe children at distance if they wish and the children themselves can acquire their first computer literacy skills and discover Internet sites conceived for them under guidance.

The other facility is run by the federal Early Head-Start programme that permits young working parents to benefit in groups and with their children present from advice on up-bringing, supporting reading and writing activities etc. As all other activities in the building, this programme is conducive to socialisation and exchange of experiences. It can be stated from that point of view that the Business Technology Center is also a second community centre, facilitating integration and social cohesion in parallel to its business objectives.

The Business and Technology Center was specifically conceived to encourage the creation and development of new businesses either able to profit from a networked environment or directly linked to the New Economy. For this reason admittance criteria have been established. Businesses engaged in light manufacturing distribution, mail order, telemarketing, data entry or other services may apply. The facility is not compatible with retail business, except to the extent that a retailer might launch a new division that could comply with requirements. The purpose of the centre is thus to assist and nurture new or fledgling small businesses by providing a package of training, affordable space, shared administrative and office

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services and equipment along with management assistance services. It provides to this end worldwide Web and supportive Internet technologies to business tenants.

2. New business developments

The Business Technology Center's office space is near fully occupied with eight different companies using the facility, half of them directly linked to the New Economy. In the first category there is a firm using satellite imagery for crop development, a multimedia start-up, an Internet woman's magazine and a call centre. In the second, a trucking firm, a meat-processing company, a farming insurance firm and an accountant have their operations greatly facilitated by the networked environment. All told, since the opening of the centre, 15 jobs, including 10 full-time, have been created in private businesses.

In the first group, Agri ImaGIS is the most hi-tech, working in the precision agriculture industry where use of computers and satellite technologies aim to improve crop yields. Remote sensing through infrared images permits to identify soil and irrigation patterns as well as vegetation density. The satellite imagery used for that purpose is in the public domain and is interpreted by specific software developed by the company. This information provides the basis for adapted use of fertilisers and pesticides from one plot to another with possible variations within the largest. Customers in Canada and the United States retrieve this data from the company's Website by individually secured access. The expanding firm, founded six years ago by a local farmer who acquired training in computer technology was originally based in Fargo, but moved part of it's operations to Maddock when the Business Technology Center opened. The low rent for a fully equipped facility and the quality of the environment were instrumental in this decision.

The development of local content on the Internet explains the presence of a fledgling multimedia design firm, 00 Web Design and of an on-line version of a women's magazine called Plainswoman. The multimedia firm is engaged in Web design, hosting and site maintenance for local public entities and small firms. The adapted environment facilitated the incubating process, free business management consulting being provided by a volunteer senior to the teen-agers who started the business. The on-line women's magazine hosted in the technical facilities provided by the centre represents a useful addition to local content, the development of which should further spur the area's Internet penetration rate now at 20 per cent.

The call centre is operated by Innes Publishing, a Chicago based firm that publishes four trade magazines for the printing industry and various catalogues, business forms and flyers. It employs five people in telemarketing for data base maintenance as well as customer service follow-up, conducted in particular through phone surveys. The company seems very satisfied with this extension,

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appreciating the friendliness and availability of people on the phone as well as employee stability. Such a view recoups information gathered in other countries as to the advantages of call centre operations located in rural areas, where average wages are also lower than in urban areas.

Firms in other sectors that are tenants in the Business Technology Center are from very diverse horizons but they are all able to improve the efficiency of their operations thanks to easy access to ICT, whether applications or network, the quality and speed of the latter representing an important advantage. Dakota Hallal is a wholesale meatpacking company addressing the specific requirements of Moslem customers in the United States and in Canada. Flexible use of the Internet for distant sales through e-commerce is the basis of this new company's activity. Likewise, Sear's Trucking is developing a Web based approach to manage it's small fleet of vehicles and optimise routes and loads. In the financial services area, the local accounting firm and the farmer's insurance company, besides on the spot technical assistance, can more easily benefit from the latest ICT applications than if they were in other locations.

3. Future projects

The second stage of the centre's development is planned around distance learning and telemedecine, the provision of adequate public services being an essential component of the scheme to revitalise the community. In the educational field, video-conferencing giving access to selected courses of the state university system will be implemented for the fall of 2001, both for high school students and adults in need of training. For telemedecine, the planned applications for mid 2001 concern telediagnosis and teleradiology, to be conducted with several local hospitals. This will improve the overall delivery of health services in the area that should also benefit from a state initiative in the field of telepharmacy, in which the local pharmacist plans to actively participate.

The Maddock pharmacy is the only remaining one within a 45-mile radius. It is located across the street from the Business Technology Center and now owned by a former officer forced into early retirement, who successfully completed pharmaceutical school after the closure of a military base in the vicinity. His decision to settle in Maddock is directly linked to the construction of the centre, considered as a positive indication of the character of a town putting up a fight against out-migration. In the same spirit, the closing of the adjacent grocery store led the pharmacist to temporarily sell food-stuff until a new owner took-up the business, also confident that new people moving in and lesser people going away would provide a sufficient customer base for his activity.

The objective of the State of North Dakota telepharmacy project is to reverse the negative trend that is leading to the closure of many rural pharmacies because

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of depopulation and lack of sufficient revenue for pharmacists. More and more people have to travel to bigger towns to have their prescriptions carried out, which is not only time consuming but also a problem for the elderly. This can have adverse consequences on the presence of qualified medical personnel such as doctors, as most people expect to get the prescribed medicine right after consultation by the practitioner, as in Maddock where a clinic is located. For these various reasons the groundwork for a pilot of three to five years concerning up to five main rural pharmacies is being laid for implementation in 2001. Satellite locations would be opened in the smallest towns, with pharmaceutical technicians filling prescriptions under the responsibility of the pharmacist through a videoconferencing link. Register and supply of stocks would be maintained by the hub pharmacy, located in this case in Maddock.

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Appendix 1

Information and Communication Technologies and their implications for the development of rural areas

The Territorial Development Service (TDS) and the Working Party on Territorial Policy in Rural Areas have decided to carry out a study on Information and Communication Technologies (ICTs) and their implications for the development of rural areas. To this end are presented herewith successively:

1. The objectives, the logic and the method of the study.
2. The questionnaire submitted to the member states.
3. The issues concerning ICTs and rural development.

1. Objectives, logic and method of the study

a) *Objectives*

The objective of this study is to identify the possibilities of better cohesion open to rural areas, both on the social and territorial level, by network development and the new economy, which implies a review of actions engaged to facilitate access to the information society for all the populations concerned. The identification of this potential will rely in particular on the analysis of certain pilot projects for local and regional development based on ICTs, so as to identify best practices in that field. The study will strive to put forward the factors of convergence of national, regional and local policies and the conditions of success for partnerships between the public and private sectors and with interest groups concerning ICTs. The issues concerning public services, with the new possibilities open by distant access will also be considered.

b) *Logic*

The dissemination of ICT in rural areas represents a strong stake in economic and social terms, capable of contributing to the revitalisation of areas disadvantaged by certain handicaps: important distances from big cities, geographical barriers, loss of population, decline of traditional agricultural activities. The approach to ICT in a rural environment cannot thus be the same as in an urban setting, given the risk of maintaining current lags or reproducing schemes that cannot succeed without a critical mass of users to begin with, as well as diversified expertise and substantial financial support.

Studies undertaken in various countries have nonetheless put forward requirements concerning expertise and new skills to define projects in rural areas, particularly in micro territories, define the goals to attain than manage the project and evaluate results. These highly

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qualified skills are often spread out between the private sector, academia and research, whilst local government bodies don't always have the resources to identify and than contract with the experts they might need.

Partnerships can usefully be established with universities or the private sector or new types of training (territorial development and ICTs) devised. The study will aim to gather a list of training courses and underlying partnerships existing in this field in the various member states, so as to identify needs and possible answers.

Insofar as measurement of results is concerned, the lack of homogeneous criteria at all territorial levels can only be deplored, thus preventing useful comparisons, both from a quantitative point of view and even more from a qualitative one.

The study will seek to define the most adequate indicators, taking into account the first evaluations accomplished. The difficulty to be surmounted stems from the fact that the various indicators that would be useful concern both major public services (education, health), in terms of network connections, economical activity (number of jobs created directly or indirectly), with more qualitative aspects such as improved productivity or increase in revenue for small and medium size enterprises (SMEs) through electronic commerce.

c) Method

The gathering of the most useful data to be analysed and the identification of the most interesting case studies depends in large part on the active contribution of Member countries, who are requested to answer the questionnaire in four parts included hereafter. The method and the questionnaire have been conceived so as to be applicable, at least in part, to a future study on the impact of ICT in urban environments. The latter will be taken into account in the present study at the level of small and medium size towns in rural areas.

Data collection

Due to the considerable amount of data available both off-line and on-line, each country should designate a contact person, who would facilitate research by supplying:

- Basic documentation on public policy concerning ICT (national and regional programmes, most significant local projects).
- The Internet addresses of the Websites that appear the most useful to detail actions and projects in the field of ICT and territorial policies.
- Names of other interesting contacts at the national, regional and local level, in view of possible meetings and/or interviews.

Case studies

It would be most useful to obtain through the national contact person an inventory of the most significant projects in each country, at various territorial levels. On the basis of this inventory, the analysis should be circumscribed to a few cases representative of different situations from an economic or geographical point of view, preferably when specific methods of observation or an ad-hoc committee with such a mission have been decided.

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The analyses to be carried out will seek to answer a certain number of questions and substantiate hypotheses concerning possible impact of ICT on:

- Structuring of territory (co-operation between townships, transborder co-operation, and leading role of certain small and medium sized cities in development of rural areas).
- Territorial cohesion (by distant access to essential public services such a health and education) and social cohesion (programmes implemented to avoid exclusion from the Information Society of underprivileged social categories, electronic democracy).
- Economic development (revitalisation of traditional activities, creation of new activities, increased attractiveness of certain areas).
- Governance and partnerships (conditions of convergence of national, regional and local policies, synergy between public, private and interest group action, integration of ICTs in territorial policies, definition of indicators and measure of results).

The contribution of Territorial Reviews

Territorial Reviews provide in-depth analysis of the factors underpinning territorial development. Particular attention, both in National and Regional reviews, will be devoted to the risks of the emerging digital divide and to the identification of policies capable of fostering a balanced process of diffusion of digital technologies and services across territories, taking into account social and environmental as well as economic aspects of development. The changing role of governments and of territorial governance in the Information Society will also be assessed from these points of view. Within this framework, Territorial Reviews will contribute substantially to the study, providing quantitative and qualitative information and helping in the identification of best practices.

Calendar

This document has been approved by the Bureau of the Working Party on Territorial Policy in Rural Areas. It is proposed to send it to Member countries immediately after the 3rd Territorial Development Policy Committee (TDPC) meeting so that answers to the questionnaire can be prepared by mid September. Several case studies will be carried out at the same time.

Analysis of the responses to the questionnaire will lead to the preparation of a draft report, including policy recommendations, which the Working Party on Territorial Policy in Rural Areas will be able to discuss at it's 2nd meeting on December 13th 2000, in the expectation that a final report can be submitted to the Territorial Development Policy Committee in July 2001.

2. Questionnaire

a) Contact person

1. Name.
2. Surname.
3. Title or position.
4. Administration or organisation.
5. Postal address.

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6. Fax.
7. Telephone.
8. E-mail.

b) National policy in the field of ICT and territorial development

1. Does there exist in your country a national programme concerning territorial development, now specifically taking into consideration ICTs in rural areas, or a national programme concerning ICTs specifically including rural areas?

Detail objectives, when started, budget and sectors concerned (public services, education, culture, small and medium size enterprises, electronic commerce, etc.).

Indicate main partners on a national, regional and local level, whether public, private or self interest groups. Identify useful Websites.

2. What technical measures or tariff policies, including specific legal requirements have been taken to ensure a proper coverage of rural areas in the field of telecommunications, whether for fixed infrastructure, mobile access or Internet access?

Supply appropriate technical information (capacity and type of networks, when deployed or up-graded) and specify if implementation is the result of public mandate or of needs expressed by local authorities and businesses.

Specify if there are any existing wide-band projects (optic fibre and/or satellite) that could particularly benefit rural areas.

c) Pilot projects and training

1. What are the integrated projects for the implementation of ICT that exist in rural areas (with social and economic aspects: education, culture, initiation and training in the field of ICT, local government but also new services, electronic commerce, etc.), supported either by regions, by small towns or an association of local authorities, and characterised by ambitious goals or promising initial achievements?

Present briefly each of these projects and indicate starting points (previous projects or not), major objectives, conditions under which it is carried out, including from a financial point of view, explaining difficulties met, if any. Give appropriate contact names and address of Internet site.

2. What are the most significant projects in this field driven by major enterprises (delocalisations, telework, etc.)?

Present briefly each of these projects and indicate major objectives and conditions under which they are carried out. Give references of useful Internet sites.

3. Do training courses in ITC and territorial development aimed at local authorities exist in your country?

If so, supply relevant information. If not, have needs been identified and are there plans to implement such type of training?

d) Data and measurement of results

1. Supply, if possible, figures illustrating requested information, distinguishing national and regional levels, for instance:

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- Breakdown of Internet users between urban and rural areas.
- Figures on Internet access in rural areas, particularly in terms of public services: public libraries, multimedia centres, schools and vocational teaching centres, post offices, telecottages and telecentres.
- Penetration rate of the Internet in SMEs.
- Figures on telework and/or call centres (demographics, rate of development, etc.)
- Number of businesses created in the field of ICT (or through the use of) in rural areas.
- Number of jobs created in the field of ICT (or through the use of) in rural areas.

2. What are the organisations or working parties created in your country at the national, regional or local level, to collect data in view of measuring the impact of regional projects, on the basis of harmonised indicators?

Identify the main regional indicators used up to now.

3. Issues concerning ICT and rural development

The OECD has produced different reports during the last few years in the field of ICT. The latest one, "OECD Information Technology Outlook: ICTs, E-commerce and the Information Economy" (March 2000) underlines the increasing role of these sectors in the economies of member states. In this logic, the Territorial Development Service and the Working Party on Territorial Policy in Rural Areas wish to engage a study on Information and Communication Technologies (ICTs) and their implications for the development of rural areas.

To this end a document entitled "Information and Communication Technologies and social cohesion: instruments for territorial and societal development" was adopted in December 1999. This document puts a focus on the usefulness of a comparison of the territorial policies developed by member states that are beginning to include ICTs, so as to define the most efficient strategies, identify best practices and make some recommendations. In this context the report would simultaneously take into consideration territorial and societal aspects with the objective of avoiding the appearance of regional disparities or social exclusion in access to ICT.

For this purpose, it appears necessary to answer the four following questions:

- If ICTs present a risk of exclusion, can they nonetheless contribute to territorial and social cohesion?
- What are the experiences implemented in the field of ICT and what lessons should be drawn from them?
- What are the justification and the role of public policy in this field?
- Which strategies are recommended from that point of view to promote territorial and social cohesion, referring to the different categories of actors and territorial levels concerned?

The present working document is established with the purpose of defining the framework and the method of the study that would proceed, following the guidelines of the above-mentioned document by:

- a summary evaluation of the information available on the subject (various reports, studies and press articles);
- an evaluation of ICT in terms of (technological) practice and the kind of jobs involved;
- a diagnosis of the actions undertaken in various regions of Member countries;

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- a strategic and prospective evaluation of territorial government policies in the field of ICTs.

a) The context

Until recently the most frequently used generic term to qualify the convergence of computer technology and systems, television and telecommunications, the Internet being it's most striking illustration, was that of new information technologies. Today one speaks more and more of ICT (Information and Communication Technologies), as the Information Society ceases to be a mere concept to become a nascent reality, whereas the foundations of the "Net-economy" are put into place. The pioneer phase is now of the past: projects rather than experiments are the order of the day as these technologies and their usage become progressively commonplace, at least in certain countries.

With more than 200 million Internet users in the world at the end of 1999, the information society is mostly a network-connected society, with implications in the professional, social and family or personal realms of life. Of course, risks of exclusion must not be ignored and that is why, both in rural areas as well as in underprivileged urban neighbourhoods, various projects aiming to facilitate Internet access, particularly to the public services present on the Net (employment agencies and welfare) have been implemented.

These changes come forward in a context of challenges that the rural world cannot shrink from: urban sprawl and it's corollary, the loose of vitality of small adjacent towns on one hand, concentration in agriculture (big enterprise and big farms) on the other hand. Under those conditions will ICT accentuate these tendencies or, on the contrary, do they constitute an opportunity to enhance the advantages of rural areas? One can reasonably consider – and the results of the first experiences go in this direction – that ICT, by modifying the relationship to spatial and temporal constraints, can contribute to the revitalisation of rural areas, by attracting new activities and new inhabitants.

This is even more the case since remoteness from major urban areas or the absence of certain infrastructures, particularly in the field of public services (education and health) does not necessarily constitute a handicap any more, thanks to the possibilities open by distant access (teletraining and telemedecine). In the traditional industrial economy such a situation often favoured the most populated regions and the urban and suburban areas in terms of investment or the creation of new factories. Besides, whereas these activities could have a negative impact on the environment, those of the new economy, based on immaterial services, are by definition non-polluting.

The risk of an increase in social inequalities and territorial disparities through ICTs must nonetheless not be excluded, insofar as expertise and investment capacities necessary to launch new activities are concentrated in big urban areas. Public policies, by facilitating both the dissemination of information on the potential of ICT and the implementation of projects, can help the rural world to catch up. Technology contains an important potential to insure a better equality of chances in social as well as territorial terms, under the condition that the various actors can get fully familiar with these new tools, by innovative and dynamic approaches, with at least an adequate support from public authorities at the beginning.

Governments seem to have understood this by launching action plans concerning the Information Society, so as to facilitate the integration by public and private entities as well as associations of the new realities characterising a networked world. These different policies, more or less ambitious, share the objective of creating an environment favourable to the implementation of new projects (education, health, etc.), whilst the telecommunication markets for infrastructure and services were strongly deregulated. The territorial dimension

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is often specifically taken into account in these strategies, so as to reinforce existing territorial development policies. In this perspective it appears necessary to:

1. consider the objective factors that could influence both the definition and the implementation of territorial development policies relative to ICTs;
2. identify the possible elements of cohesion pertaining to the deployment of ICT.

b) Objective factors

So as to avoid falling into abstract generalities on territorial development policies and ICT in rural areas, the study will have to discern clearly the objective factors with a bearing on policies and projects. They are mainly of three categories:

- the economic and geographical environment;
- administrative and territorial realities within the framework of territorial development;
- telecommunication policies relating to infrastructure, terminal equipment and services.

Economic and geographic environment

ICT undeniably have a potential to facilitate access of inhabitants of rural areas to different kinds of services, by overriding distance and low demographic density (education, training and health), as well as to new jobs (teleworking). Their deployment must also take into consideration local economic realities, particularly with electronic commerce in mind, either to sustain or redynamise a traditional activity or develop new ones.

Administrative and territorial realities

Overall, well thought out policies and projects in the field of ICT can have positive effects in terms of territorial, economic and social development. It appears useful to bring into focus the spatial and administrative dimensions and the level of territorial responsibility of actions or projects undertaken, insofar as several categories of local authorities are concerned:

- small rural towns and/or groups of towns or local public entities;
- medium sized towns exerting an influence on surrounding areas (poles of development);
- sub-regional entities or regions;
- states.

In all cases, the study will strive to identify the factors and conditions of true convergence of national, regional and local policies, capable of creating a favourable environment for the implementation of durable projects, able to generate economic and social development. Specific attention will be given to the degree of initiative given to the actor(s) closest to the field, which usually plays a decisive role in the success of local micro-projects. It is of essence that the prior context concerning territorial development policies will also play an important role, since the deployment of ICTs will be obviously facilitated, if this appears to be a natural extension of existing policies, in particular at the regional level.

Telecommunications policies

Telecommunications (infrastructures, terminal equipment and services) can strongly contribute to a better territorial spread of economic activities. Policies in the field of telecom-

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munications (deployment of fixed service, universal service, etc.) have always constituted a decisive component of territorial development. Today, other elements must also be included:

- Mobile infrastructure: degree of territorial coverage, competition, complement of fixed equipment, tariff policies.
- Internet access: capacities, public access points and tariffs.
- Broadband: the installation of broadband links, for fixed or mobile communication, by optical fibre and/or satellite with technologies such as ADSL (Asymmetrical Digital Subscriber Link) on the copper wire, conditions widespread access to services of the future (video, audio/video conferencing, audio data bases and Internet telephony). Most populated areas will benefit from these services first because of the high cost of investment: how can territorial disparities be avoided from this point of view? Can global high capacity satellite systems represent an adequate response in economic terms for the final link to the subscriber?
- Policies adopted in the field of standards: the endorsement of GSM (Global System for Mobiles) by a majority of countries has greatly contributed to the rapid deployment of mobile infrastructure and decrease in costs thanks to interoperability. For the third generation of mobile telephony, the choice of UMTS (Universal Mobile telephony System) is to be considered in the same terms.

c) *The conditions of cohesion*

ICTs can facilitate the emergence of a new approach to territory, and particularly to micro-territories, in reference to common traditions or activities. This transversal view, without modifying existing administrative boundaries, favours new forms of local co-operation or accelerates implementation of existing processes.

The access of remote areas, thanks to ICT, to quality public services (health and education) and the greater transparency that they induce in the management of local authorities (instant access to administrative documents and to the deliberations of municipal councils) can represent a factor of social cohesion.

Besides, access to ICTs in these areas can contribute to strengthening policies aiming to prop up traditional activities, whilst creating a favourable framework for the creation of service activities (New Economy).

In all cases, convergence of national, regional, and local policies as well as innovative partnerships between the public and private sectors and general interest groups, constitute the basis for success, the measure of which supposes the definition of homogeneous indicators.

ICT *and territorial structuring*

In every country, administrative boundaries are a product of historical evolution, influenced by specifically political factors but also of an economical and geographical nature. Certain rural areas, with an ancient identity, constituting employment basins or zones of specific activities, were subject through the ages to administrative divisions that did not always take into consideration the weight of local history. For this reason new forms of municipal co-operation or merging have been encouraged in some countries.

Can the implementation of these new co-operative structures, based on very vivid cultural and economical traditions, be facilitated by the emergence of ICTs, instruments easily expressing more horizontal identities? The question arises in the same terms for the development of transborder co-operation or for the revitalisation of a micro-region around a small town. It

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seems possible to answer affirmatively, referring to the first known examples of projects where ICTs are considered as instruments of social innovation and territorial development, fully integrated into these last policies.

ICT *and social cohesion*

Up to what point can handicaps due to distance, geographical isolation or low population density be compensated, at least in part, by the implementation of specific actions in the field of ICT? Experiences launched in certain countries in telemedecine (telediagnosis, dealing with emergencies) or in teletraining (networking of groups of schools) show that it is feasible to insure quality of basic services in parts of a country that are at a disadvantage from that point of view.

The same question exists for "cultural handicaps" (elderly people) or economical ones (low salaries, unemployment) within the information society. Answers brought to these problems by post offices or public libraries with Internet connections and telecottages, places of access and initiation to the new virtual world are encouraging.

And finally, can electronic democracy, by facilitating the expression of citizen's opinions and bringing local politicians closer to voters, be a vehicle of social cohesion? The more spontaneous emergence of initiatives coming from the field, in particular from general interest groups, that has been witnessed here and there, a more direct dialogue with members of municipal councils, often encouraged by them (e-mail and forums), seem to stimulate democratic debate, in giving it's full meaning to the notion of proximity.

ICT *and economic activity*

Possible economic impact of ICT in rural areas can be seen under three different angles:

- aid to traditional activities;
- creation of new service activities;
- increased attractiveness of territories.

On the first point, can the relatively high level of connection to the Internet in certain Member countries (e-mail and in many cases own Website) facilitate the promotion and the commercialisation of existing, and often traditional, products (small industry, handicrafts and agriculture)? Also, for rural tourism, can the new information, promotion, reservation and payment systems available on the Internet help to develop access to a market segment often dispersed and heterogeneous? The example of rural SMEs in different sectors, positioned on niche markets and whose revenue has significantly increased and developed outside of the domestic market seem to verify this.

New activities made possible through ICT are within the categories of telework or teleservices as well as within the general field of multimedia. Telework corresponds to three categories of preoccupations that do not always converge: that of the employee wishing to accomplish at least part of his work at home or that of the independent worker wishing to live out of town; that of firms striving to reduce costs (office space); that of local authorities aiming to have new jobs created by attracting teleservices or by creating telecentres.

In this context, if delocalisations (for instance call-centres) can create a certain number of jobs in rural areas, they are not always highly qualified and their impact on the local economy is not necessarily obvious. Can projects encouraged by local authorities or initiated by them (telecentres, telecottages) play a role in disseminating added value? Under the condition that they are situated in a wider context of transversal policies in the field of ICT, associating various categories of existing and new actors, the answer seems to be affirmative.

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The direct impact of telework or telecentres is not always easy to measure in terms of job creation but the hypothesis that the dissemination of ICT is in itself the source of job creation and, at least in the initial stages, a factor of re-qualification of existing jobs, can be considered. Whether for telecottages, connected schools, public libraries with Internet access or the distribution, installation or maintenance of equipment or software, new technical or commercial jobs are necessarily created, whereas certain categories of personnel (teachers and librarians) acquire new skills.

Beyond the direct economic effects of ICT and their impact on job creation, it appears useful to consider the possible consequences of their dissemination in rural areas within the framework of integrated projects (including both an economical and social dimension), in terms of increased attractiveness of territories. This seems to constitute a development factor for the future, capable of bringing new investment and skills, that could be investigated with a prospective view.

Governance and partnerships

The deployment of ICT is that of a galaxy whose different components, articulated around an international sphere, is organised in each country around policies and projects at a national, regional and local level. In this galaxy the role of governments, local authorities, associations and the private sector cannot be separated, because the search for possible synergy, through the converging of initiatives is essential. This can be facilitated by policies destined to properly evaluate projects as well as by a prospective vision of change.

Nonetheless a successful deployment supposes the adoption of accompanying measures, and possibly specific aid as well as proper training. For this reason all industrialised countries have developed ambitious programmes and correlated policies in the field of ICT, a sector considered as strategic for economic development and growth. The concrete measures that have been engaged within the framework of these different programmes are quite diverse, relating to technology and content, equipment and software, basic research and production or encouragement in launching new multimedia activities (start-ups). Beyond these measures and their direct impact, these programmes have had the merit of sensitising public opinion and regional and local authorities to the stakes concerned and to the potential in terms of economic and territorial development.

In certain cases visionary decision-makers have anticipated and worked at their level (region, township or group of towns) to implement coherent development projects organised around ICTs. Often in partnership with associations and the private sector and with national or multinational (European Union) aid, they managed to implement dynamic projects that are considered as references. The question that arises today is that of the generalisation of such approaches in other places by the use of elements or the application of methods that are now proven in regions or townships who pioneered them.

The attentive analysis of a few of these projects can also be useful for others (elements that could be reproduced). The more these projects are embedded in the field within the framework of territorial development policies of which ICT appear to be a natural extension, the more the chances of success are great. Likewise, the implication of local politicians as relays to these projects is essential. Maintaining and strengthening of initial impetus can be carried out by an evaluation of first results achieved than by full integration of ICT in territorial development policies, as is now the case in some countries. Even if these evaluations are still more quantitative than qualitative and not always sufficiently detailed, they can usefully contribute to understand the scope of change.

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Appendix 2

Internet sites consulted for this report

1. Canada

National

Name	Address
Community Access Program	*www.cap.ic.gc.ca*
Smart Communities	*www.smartcommunities.ic.gc.ca*
Canadian Rural Partnership	*www.rural.gc.ca*

Quebec

Name	Address
Matawinie Future Development Corporation	*www.matawinie.qc.ca*
Cyber-rural network	*www.cyber-rural.org*
E-commerce training for SMEs	*www.pme-rurale.com*

Ontario

Name	Address
Lanark digital community	*www.thelcn.on.ca*
Northwest Ontario communications network	*www.knet.on.ca*
Kuh Ke Nah smart community	*www.smart.knet.on.ca*

2. France

National

Name	Address
ART, telecommunications regulatory authority	*www.art.telecom.fr*
DATAR (Délégation à l'Aménagement du Territoire et à l'Action Régionale)	*www.datar.gouv.fr*
Information society	*www.internet.gouv.fr*
Public access to the Internet	*www.accespublics.premier–ministre.gouv.fr*
Telemedicine	*www.sante.gouv.fr*
Public services on-line	*www.service-public.fr*

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Regional and local

Name	Address
Information society in Poitou-Charentes	*www.serise.apce.org*
Parthenay digital town	*www.district-parthenay.fr*
Gâtine (parthenay region)	*www.gatine.org*
Ardèche ICT project	*www.inforoutes-ardeche.fr*
Limousin region ICT for SMEs	*www.acticiel-98.net*
Observatoire des Télécommunications dans la Ville	*www.telecomville.fr*

3. Ireland

National

Name	Address
E-Ireland, government ICT policy	*www.irlgov.ie/taoiseach/eireland/intro.htm*
Information Society Commission	*www.isc.ie*
Telework	*www.ework.ie*

Regional and local

Name	Address
SHIPP project (Shannon Region)	*www.shannon-dev.ie*
STAND project (Southwest region)	*www.swra.ie*
Ennis digital town	*www.ennis.ie*
DATE (Disabled Access to Education) project	*www.dateproject.org*
East Clare Telecottage	*www.bealtaine.ie*
Gateway to countryside	*www.greenpages.ie*

4. United Kingdom

National

Name	Address
Office of the e-envoy, UK government policy for the information age	*www.e-envoy.gov.uk*
First entry point to UK public sector information	*www.open.gov.uk*
E-commerce advice	*www.ukonlineforbusiness.gov.uk*
Countryside Agency	*www.countryside.gov*
Telecentre, Telework, Telecottage association	*www.tca.org.uk*

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Regional

Name	Address
Digital Scotland	*www.scotland.gov.uk/digitalscotland*
Highlands and Islands Enterprise	*www.hie.co.uk*
University of the Highlands and Islands	*www.uhi.ac.uk*
Centre for Urban and Regional Development Studies (CURDS), University of Newcastle upon Tyne	*www.ncl.ac.uk/curds*
"Work global", telework facilitator	*www.work-global.com*

5. United States

National

Name	Address
First click to the US government	*www.firstgov.gov*
Closing the digital divide	*www.digital divide.gov*
Federal telemedicine gateway	*www.tmgateway.org*
Electronic commerce policy	*www.ecommerce.gov*
Department of Agriculture, Rural Development Agency	*www.rurdev.usda.gov*
Center for the Study of Rural America	*www.kc.frb.org/RuralCenter/RuralMain.htm*

Regional and local

Name	Address
AOL rural telecommunications award	*www.ruraltelecon.org/aolawards/aol00-aolawards.asp*
Dillon-net project (Montana)	*www.dillon-net.org*
Montana Virtual Human Services Pavilion	*www.vhsp.dphhs.state.mt.us*
Maddock Business and Technology Center (North Dakota)	*www.maddock.org*
Blacksburg electronic village	*www.bev.net*

6. European Commission

Name	Address
Information Society	*www.ispo.cec.be*
EHTO, European Health Telematics Observatory	*www.ehto.org*
Ecatt, Electronic Commerce and Telework Trends	*www.ecatt.com*
European Telework on-line	*www.eto.org.uk*
LOCREGIS, regional IT projects in 3 countries (Austria, Finland, Sweden)	*www.locregis.net*
Regional Information Society (RISI) projects	*www.erisa.be*
Rural Europe, LEADER projects	*www.rural-europe.aeidl.be*
European Digital Cities	*www.edc.eu.int*

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7. Other countries

Finland

Name	Address
Council of State, ICT policy	*www.vn.fi/vn/english/index.htm*
Statistics Finland	*www.tilastokeskus.fi*
Finnish National Fund for Research and Development	*www.sitra.fi*
North Karelia ICT project	*www.unk.pkky.fi/englanti.htm*

Hungary

Name	Address
Hungarian Telecottage Association	*www.telehaz.hu*

Italy

Name	Address
ICT projects in Emily-Romagna	*www.databank.it-dbc-fair-index.htm*

Sweden

Name	Address
"An Information Society for All", Swedish ICT policy and action plans	*www.naring.regeringen.se/inenglish/info*
IT Commission	*www.itkommissionen.se/english/eng.html*

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Appendix 3

Tables and Graphs

Table 1. **Access technologies transmission speed**

	Transmission speed[1]		Worldwide market share in % (households)		Platform
	Downstream	Upstream	1998	2002[2]	
Dial-up modem	Up to 56 Kbps	Up to 56 Kbps	90.8	66.8	Normal phone lines
ISDN	56-128 Kbps	56-128 Kbps	8.0	20.4	Supplied by PTT
XDSL	1.5-9 Mbps	16-500 Kbps	0.1	4.4	Normal phone lines
Cable modem	0.5-30 Mbps	0.1-1 Mbps	0.9	7.7	CATV networks
Wireless[3]	9.6 Kbps	9.6 Kbps	0.2	0.6	Wireless path
Satellite	400 Kbps	100 Kbps			Wireless path

1. Downstream refers to data transmission towards the user; upstream refers to transmission back to the service provider.
2. Forecast.
3. Market share includes satellite.

Source: EITO in Morgan Stanley Dean Witter (1999) and PricewaterhouseCoopers (1999).

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Table 2. **Policies and programmes designed to bridge the digital divide**

Policy areas	Programmes
Network infrastructure	Regulatory initiatives to enhance competition Basic infrastructure development Broadband infrastructure development
Diffusion to individuals and households	Access through schools Access through other public institutions ICT for the elderly / disabled Access in rural / low-income areas
Diffusion to businesses	ICT support and training for small businesses Diffusion of information
Education and training	ICT education and training in schools Vocational training Teacher training
Government projects	Government services on-line Governments as model users of ICT
International co-operation	European Union, United Nations, G8 Bilateral programmes

Source: ICCP/OECD Secretariat, based on qualitative analyses of responses to the Digital Divide Policy Questionnaire, [DSTI/ICCP/IE(2000)6].

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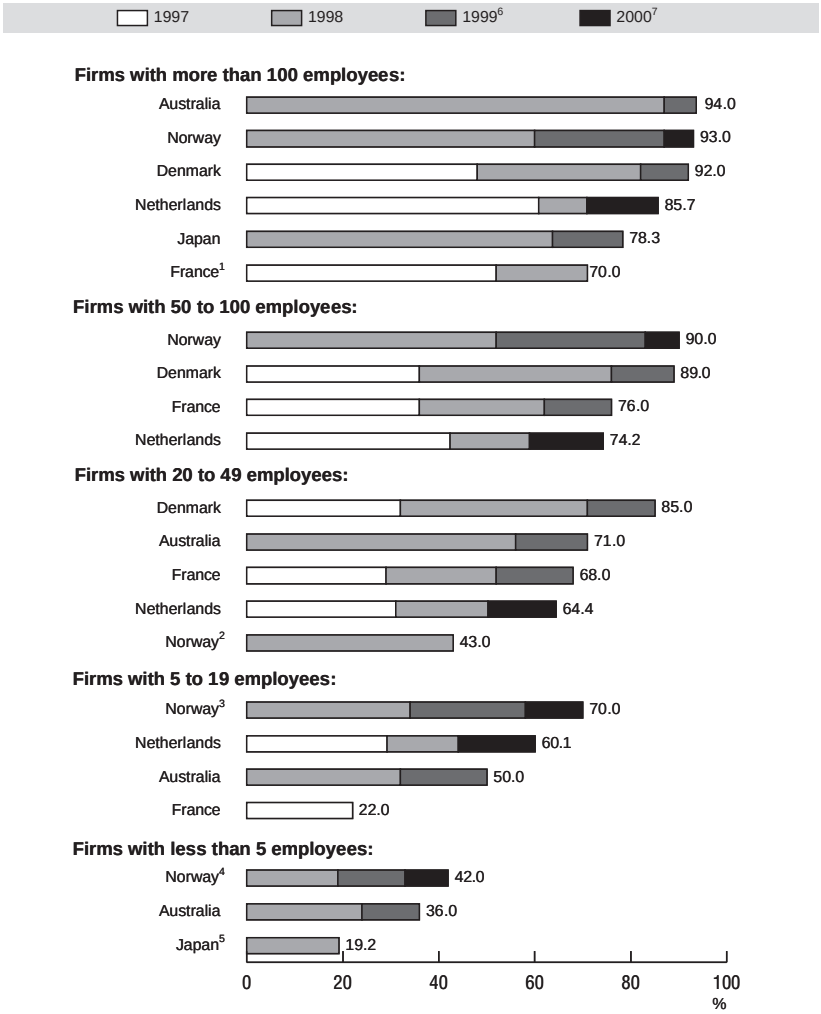
Figure 1. **Internet access in the business sector by firm size**



1. SMEs with 100 to 200 employees.
2. Firms with 20 to 99 employees.
3. Firms with 10 to 19 employees.
4. Firms with 20 to 99 employees.
5. Firms with less than 6 employees.
6. For Australia and Denmark, 1999 are forecasts made in 1998.
7. 2000 are forecasts made in 1999.

Source: National statistical sources: ABS Australia, Statistics Denmark, MPT Japan, Statistics Netherlands, Statistics Norway. Private source for France: UFB Locabail.

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