

Anne Matilainen (ed.)

# ICT – Tools for Providing Information, Advice and Services for Rural SMEs?

Seminar proceedings  
6<sup>th</sup>–7<sup>th</sup> of April 2006, Oulu Finland

Reports 10

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Anne Matilainen (ed.)

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# Introduction

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Information is a very important tool in sustaining existing businesses and supporting the desire to create new ones. Information can be seen as the fourth business resource along with land, labour and capital. Especially the information needs of rural SMEs and micro entrepreneurs have increased. Complexity of the operational environment of the present-day SMEs, internationalisation, continuous development of the information technology and the significance of immaterial capital (e.g. human capital, know-how) as competitive weapons evokes the need for information and wide expertise in SMEs. Ability to utilise and apply information is continuously more and more significant factor in developing business and succeeding in competition.

Due the limited resources of rural SMEs, they do not have possibilities to hire skilful staff for different business operations, which is the case e.g. in larger companies. This puts more pressure to the skills and knowledge of the entrepreneurs. Against this background, it can be estimated that the entrepreneurs' needs for external information as well as the use of external experts are continuously increasing in near future.

However, SMEs are traditionally not seen as proactive in the acquisition of external information. The information is not sought for until it is urgently needed (Kaipainen 1989). When information is needed, it's supposed to be quickly at hand. For entrepreneurs the information can be seen simply as a tool for solving the problems in the company. Information or knowledge itself has no actual value to the entrepreneurs, if it can not be used solving their problems. (Matilainen and Zimmerbauer 2005). SMEs use many sources of information. The sources are both verbal (e.g.: customers, other entrepreneurs, experts) and printed/written (e.g. publications, reports, researches, information in Internet etc.). (Sapman 1999.) On the other hand rural SMEs favour clearly time saving information sources, but at the same time they highlight specially the role of face-to-face connections in information acquisition (Matilainen and Zimmerbauer 2005). This contradiction causes interesting challenges to the information dissemination: how to be effective and still retain the personal interaction?

Without a doubt the significance of knowledge in decision making and risk control is essential. Lack of information is a major part of the uncertainty in decision making in the small rural enterprises. According to Saapunki's research (2002) the needed information of the Finnish entrepreneurs for decision making process was related either to information of their own field of industry (future trends and estimations, information for comparisons, current information on the situation on their field of industry) or it was situation related information (can be very specific and difficult to categorise). (Saapunki 2002). The information needs are usually very much connected to the problems on hand. The intricate specifics for particular types of information vary widely also according to the enterprise's type, its size, the nature of its market and also to the capabilities and ambitions of the business (of its owners/managers). Furthermore, the specific information needs of SMEs will vary according to enterprise's lifecycle stage (e.g. start-up, growth and expansion, winding down) and the financial position of the business (e.g. information required by a business with money to invest will be different than the one facing financial difficulty).

As well as the needed information in decision making, also the delivery channels used in acquisition of it are related to the target of decision, the influences of the decision (how wide they are) and the knowledge and experiences of person making decisions. Also the role of tacit information is significant (Saapunki 2002).

Since the variation in information needs can be enormous, SMEs are challenged to use more and more different kind of information sources. Information networks give an ability for SMEs to obtain information

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they need. Especially it can be estimated that the use of ICT gives rural SMEs access to such services (e.g. design or marketing) which have not been easily at hand before. (Maaseutupoliittinen... 2004.)

Due to the increased demand for external information, different kind of business services' and especially knowledge-oriented business services' (i.e. expert services) significance for SMEs has become more and more important. The trends of development connected with SMEs (specialisation, networking, internationalisation etc.) will likely increase SMEs' need to use these services. Even the general trend of the use of the expert services in SMEs is upwards, the problem is, as Storhammar (1995, 1996) states, that SMEs are, because of their characteristics, a group, whose needs are difficult to take in consideration in service supply and whose abilities to use business services are quite deficient. In many national researches made among rural SMEs in Finland, the entrepreneurs have criticised the possibilities to find meaningful information for their business operations. They also state, that they do not have enough knowledge of the new services targeted to SMEs (see e.g. Tiainen et. al 2004, Lahtinen and Roose 2003, *Internetiä käyttämättömät...*2003, Saapunki 2002, *Selvitys pk-yritysten...*2001, Rutanen and Matilainen 2001). In practise this has caused, that the use of external information services and sources has not been as vivid as anticipated. It can also be questioned, whether the lack of knowledge of the existing services is the real reason for not using them, or are there some more complex reasons or obstacles behind it.

It is evident, that there is a clear need to improve the accessibility of the rural SMEs to the meaningful external information. It is also essential to develop better delivery mechanisms of the information especially in remote rural areas, where the distances e.g. to advisory organisations and other information sources are long. ICT can provide an interesting possibility in solving these problems e.g. by providing some possibilities to improve information delivery. Nowadays, ICT adoption in rural enterprises in Northern Europe is not considered to be anymore an actual competitive advantage as itself, but the fact of "not to have" implies to disadvantage and exclusion. However, before possibilities offered by ICT can be fully utilised, there are several problems to be solved. There can be problems both with technical issues as well as with the methodological issues relating to the information delivery and content of different kind of information services (Matilainen et al 2005) . It is also essential to understand more in depths the SMEs' acquisition of the information in general: how the information aquisition and delivery processes work, how the operational and cultural caps and obstacles in delivery chain could be overcome and what are the most suitable methods for delivering information in each case. These are some of the questions that the RuBIES –project is focusing on.

RuBIES (Rural Business Information Exchange System) is a transnational project aiming to provide assistance and support to rural businesses and SMEs, to improve their access to relevant business information and thereby improve business efficiency and decision making. The project has examined rural business information needs and black spots, and aims to deliver improvements to their understanding to delivery of the business information. In addition the project aims to solve problems of information exchange by providing new solutions and methods for it from the demand driven point of view.

The same problematic is also in focus in *ICT – Tools for Providing Information, Advice and Services for Rural SMEs?* –seminar. The seminar is focusing on one of the most acute question in the sector of business advising in rural areas: how is it possible to deliver external information to the micro enterprises in remote rural areas, so that it has a positive impact to the business development. And what kind of possibilities ICT has to offer in this process.

The problematic is approached in the seminar presentations by introducing technological as well as methodological solutions. The seminar papers provide also a review to attitude based problematic in utilisation of ICT as an information delivery channel in rural SMEs and micro enterprises, and give an overview to so called ICT culture of rural SMEs in European context. The articles in the seminar proceedings include theoretical approach on the problematic as well as present various case studies from different European countries. The focus is on rural micro entrepreneurs and diversified farms. The articles are based on the presentations of the seminar held 6<sup>th</sup>-7<sup>th</sup> of April in Oulu, Finland.

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## References

- Internetiä käyttämättömät lähikuvassa: laajakaistapalvelujen käyttötarpeet. 2003. Liikenne ja Viestintäministeriö. Liikenne- ja viestintäministeriön julkaisuja 27/2003.
- Kaipainen, R. 1989. Pienyrityksen tiedontarpeesta ja tiedonhankinnasta Mikkelin läänissä tehdyn selvityksen valossa. Kirjastotiede ja informatiikka 3 (8).
- Lahtinen, M. and Roose K. 2003. Selvitys pk-yritysten tietotekniikan ja sähköisen liiketoiminnan tarpeista. Tarvetutkimus 2003. Helsingin kauppakamari, Tietoyhteiskunta 2000+ -projekti.
- Maaseutupoliittinen kokonaisuohjelma. 2004. Elinvoimainen maaseutu – yhteinen vastuumme. [http://www.mmm.fi/ytr/Ajankohtaista/2004/4.%20maaseutupoliittinen%20kokonaisuohjelma\\_luonnos\\_4.5.2004.pdf](http://www.mmm.fi/ytr/Ajankohtaista/2004/4.%20maaseutupoliittinen%20kokonaisuohjelma_luonnos_4.5.2004.pdf)
- Matilainen, A. and Zimmerbauer K. 2005. The Role of Information Technology in Mediating External Information to the Rural Micro Enterprises -a study on the importance of information delivery channels RuBIES (Rural Business Information Exchange System) -project National report, Finland. University of Helsinki, Seinäjoki Institute for Rural Research and Training
- Matilainen, A, Suutari, T., Kattelus, P, Zimmerbauer, K and Poranen T. 2005. The Role of Information Technology in Mediating External Information to the Rural Micro Enterprises –National literature review. University of Helsinki, Institute for Rural Research and Training Reports 4.
- Rutanen, J. & Matilainen, A. 2001. Luontoyrittäjyys-portaali. Luontoyrittäjyyden verkkopalvelun toteuttamissuunnitelma. Luontoyrittäjyyden tietopankin valtakunnallinen organisointi –hankkeen loppuraportti.
- Saapunki, J. 2002. Asiakaslähtöisen verkkopalvelun kehittäminen. Selvitys Yritys-Suomi –verkkopalvelun kehittämistarpeista yritysnaökölmasta.
- Sapman, P.1999. Raportti elinkeinoelämän tietopalveluselvityksestä Etelä-Savossa. <http://www.uku.fi/kirjasto/elet/mikrap1.html>
- Selvitys pk-yritysten tietotekniikan ja sähköisen liiketoiminnan tarpeista. 2001. Tietoyhteiskunta 2000+ -projekti. Helsingin kauppakamari. Edita Oyj, 2001. Helsinki.
- Storhammar, E. 1995. Yrityspalvelujen tarjonta ja pk-yritykset. Jyväskylän yliopisto. Keski-Suomen taloudellinen tutkimuskeskus. Julkaisuja 134.
- Storhammar, E. 1996. PK-yritykset yrityspalvelujen käyttäjinä ja asiakkaina – kokemuksia, ongelmia ja kehittämistarpeita. Jyväskylän yliopisto. Keski-Suomen taloudellinen tutkimuskeskus. Julkaisuja 139.
- Tiainen, T, Luomala, H, Kurki, S & Mäkelä, K. (toim.) 2004. Luottamus sähköisissä palveluissa. Kuluttajan ja palvelun tarjoajan vuorovaikutus. Tampereen yliopisto, tietojenkäsittelytieteiden laitos, julkaisusarja B.



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# Access to Information and advice by SMEs in the Northern Periphery – some findings from the RuBIES<sup>a</sup> Project

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This paper draws on work completed by RuBIES project partners: Ruralia Institute, University of Helsinki, Finland; Upplýsingatækni í dreifbýli (UD Project) Iceland and; Hushållningssällskapet Norrbotten (Rural Economy and Agricultural Society of Norrbotten County), Sweden.

## Abstract

With the recent rapid adoption of ICTs by rural SMEs those operating in peripheral areas should no longer be disadvantaged in the “knowledge economy” as they are now reported to have improved access to a wide variety of business information to assist with the increasingly complex business decisions they face. However, digital exclusion and poor connection with the ‘knowledge economy’ are identified by many as barriers to the sustainable development of rural businesses. This exclusion, coupled with the fact that the majority of business support information is supply driven, and rarely founded on the clear analysis of end-user needs, means that some SMEs are clearly not benefiting from the digital age and the wealth of knowledge it is proclaimed to provide access to. The RuBIES project has focused is on addressing the problems faced by rural SMEs, located in the Northern Periphery Region of Europe, in sourcing, processing and using pertinent and timely business support information to make efficient and effective business decisions. Tools utilising ICTs are being developed as part of the project to help solve problems of information exchange and provide new solutions and methods for it from the demand driven point of view thus providing relevant and meaningful assistance and support to rural SMEs in the Northern Periphery.

## Background to the research

In recent years there has been a proliferation of discourse giving attention to the “knowledge economy”, “information society”, “e-governance”, etc., as the exposure to and use of information communication technologies (ICTs) has become common place for many people and businesses. Contemporary wisdom suggests that in order to live and work in this “information age” the ability to use ICTs is imperative with the Internet being described as “the fourth major communications medium after word of mouth, the printed word, and broadcast media” (O’Neill, 1999). The use of ICTs has changed the way in which many SMEs interact with customers, suppliers, advisers and government. Governments throughout Europe<sup>1</sup> are committed to e-government and digital access to on-line information, policies, papers and it has been found that rather than for conducting e-business “*much of the use of the Internet is for accessing more general contextual information*” (Commission of the European Communities, 2004).

The significant research base in the field of knowledge management in business, offers an insight into the information requirements of corporations, companies as well as SMEs. Information is now supplied to rural SMEs from a wide-variety of sources, through a variety of pathways and about a variety of topics. Institutional

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a Rural Business Information Exchange System Project is part funded by Interreg III B, Northern Periphery Programme, Measure 1.2 – Access to Information Society.

<sup>1</sup> See: UK: <http://www.cabinetoffice.gov.uk/e-government/> or <http://www.egovmonitor.com/>  
Finland: [http://www.tietoyhteiskuntaohjelma.fi/en\\_GB/](http://www.tietoyhteiskuntaohjelma.fi/en_GB/)  
Iceland: <http://eng.forsaetisraduneyti.is/information-society/>

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networks provide assistance and support, helping transform the information acquired by rural SMEs into relevant and meaningful knowledge through exposure and experience. The diversity of needs and requirements of rural SMEs means that businesses and advisory agencies are increasingly using ICT solutions to help facilitate access to (geographically) remote specialists and specialist information that would otherwise be unavailable to them. Without question ICTs (such as e-mail, Internet, CD-ROMs, etc.) have become a popular way to disseminate information to rural SMEs and Kraft (2004) suggests that *“traditional sources of written communication have been increasingly replaced by electronic information delivery, due both to fiscal constraints and the need for rapidly updated information”*.

The Internet appears to increasingly be the preferred tool for information dissemination and many argue that it allows information to be accessed without spatial constraints. It has also grown rapidly as a communication tool with the use of instant messaging, teleconferencing, web-cams, voice-messaging, etc. However, there is a growing body of research examining the ‘digital-divide’ (e.g. Selwyn, 2003, Malecki, 2003, Skerratt, and Warren, 2003) and terms such as ‘information apartheid’, ‘information rich and information poor’ and ‘haves and have nots’ have evolved. There are clearly problems with Internet connectivity by SMEs in rural areas (in comparison to their urban counterparts) in terms of broadband availability and the costs of connection. Yet despite many commentators opposing the commonly used notion that ICTs have led to the “death of distance” it is, however, acknowledged that some of the spatial disadvantages of rural areas can be ameliorated by ICT developments (Skerratt, and Warren, 2003).

As well experiencing Internet-connection problems many rural SMEs (and advisers) still find difficulties in accessing pertinent information on the Internet. Polsen and Gastier (2001) report that only with *“patience, resourcefulness, organisation, tenacity, and a variety of search engines, was it possible to find university and other research-based information on many of the subjects of interest to (advisory) agents on the Web.”* Furthermore, Benbuan-Fich (2001) found that users of commercial web-sites could not find specific information 58 % of the time, adding that there has been a lack of evaluation of the usability of web-sites by academia.

Clearly many rural SMEs are using the Internet to gather information but sifting out practical information from the growing plethora of data available on the Internet is becoming increasingly problematic for user who are progressively becoming overwhelmed and overloaded with disordered information that is often irrelevant to their needs as *“increased electronic access... (makes it) easier to get carried away and gather too much or include inappropriate sources”* (Webster, 2003). Information on the Internet is often poorly presented, out-of-date, and is often duplicated in various guises (leading to further confusion). This can make on-line searches for information frustrating and time-consuming and challenges the premise that the Internet provides immediate access to knowledge. Users today may indeed be information rich because of this bombardment of data, but unless they can harness this information and make sense of it they will remain knowledge poor as. As Webster (2003) puts it, *“Information is everywhere - good information is harder to find.”*

Most rural SMEs have generic information and advice requirements in areas such as, law, accountancy, finance, management skills, technology, etc. However, the intricate specifics for particular types information vary widely according to the enterprise type, size, location, the nature of its market and also on the capabilities and ambitions of the business (owners/managers). SMEs that are innovative and competitive require the ability to access, understand and utilise business information and emerging knowledge readily to reduce the risks and uncertainties they face. These SMEs generate significant demands for external information (e.g. for new techniques, processes, products, markets) since most small businesses can not meet their information needs inhouse and they may also lack the resources, skills or time required to obtain, sift and analyse information.

To date much of the research on the use of ICT in rural SMEs has concentrated on the acceptance, adoption and uptake of e-commerce and ICT technology (eg, Grimes, 2004). It is clear that the impact of changing from traditional sources of information to ICT based sources in rural SMEs has been largely overlooked in the discourse about the ‘information age’ and the ‘knowledge economy’. Until such research is conducted it is very difficult to establish the true role and value of ICTs to rural SMEs a means of accessing information and advice other than the value of business generated through e-commerce



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## Research Phase 1 – The current state of play

The first research phase was designed to give an overview of issues surrounding the use of information and advice to rural SMEs and what role ICTs play in that process. Literature reviews provided understanding of contemporary regional, national and international knowledge relating to:

- the information requirements and demands of rural SMEs
- provision of rural SME advice and information
- ICT usage and trends
- ICT insights specific to rural locations within a global context.

A comprehensive product and service inventory (sources of information and advice and the dissemination pathways<sup>5</sup> used) was compiled to provide an accurate picture of what was available to the project's target SMEs. A technology watch (TechWatch) was also started in this first phase and has been running throughout the life of the project. It is used to gather and provide information about new technologies that are potential ICT solutions for improving access to information and advice. This TechWatch has largely been guided by general business trends and identification of technologies that are already successfully utilised by many rurally based SMEs.

## Research Phase 2 -The reality faced by RuBIES' SMEs

The second, extensive, research phase involved surveying<sup>6</sup> the SMEs, rural advisers and key (institutional) providers of information and advice. This evidence base was backed up with SME interviews / focus groups to corroborate the research findings and give as comprehensive understanding of the use and acquisition of information by SMEs and advisers as possible. In Iceland because of financial restrictions and a rapid identification of the key issues and potential ICT solutions the full survey was not conducted. Some of the key findings focusing on communication pathways used by SMEs from the Scottish survey of farmers in the Highlands and Islands of Scotland and the Finnish survey of nature-based entrepreneurs (NBEs) in Central Finland and Northern Ostrobothnia regions<sup>7</sup> are presented here. The surveys of information providers and SME advisers are not presented here.

## Research Findings

### *Information need*

In Finland the survey of NBEs found that the biggest information need related to customer information (22 %), followed by business diversification (15 %), technical business issues (15 %) and marketing intelligence (14 %). This contrasts slightly to the situation in Scotland where agri-businesses said that their biggest (by-far) information need was policy-related information (83 %) followed by technical information (16 %). This highlights the divergent information needs of different business groupings. What is interesting is that if the policy-related information need is removed from the results there is quite an even spread of identified information need relating to financial management, diversification, legal and market intelligence at around the 20 % level (similar to Finland). The findings from Scotland are good example of how single issues can

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<sup>5</sup> For example: CD-ROM, DVDs, radio, television, newsletters, Internet, consultancy, press, text books, etc.

<sup>6</sup> The surveys were designed to ensure there was a core set of common questions to enable transnational comparisons between the partners and regions.

<sup>7</sup> For the full Finnish report see: Matilainen, A and Zimmerbauer, K (2005). The Role of Information Technology in Mediating External Information to the Rural Micro Enterprises -a study on the importance of information delivery channels. RuBIES (Rural Business Information Exchange System) -project National report, Finland, University of Helsinki, Seinäjoki Institute for Rural Research and Training:

dominate the precise needs of business through time. The survey was conducted during the last round of Common Agricultural Policy reforms when the Single Farm Payment was being introduced and there was a great deal of uncertainty concerning the business and market impacts of the policy. This highlights the needs for providers of information and advice to monitor industry to establish current (and future) information needs of rural SMEs.

#### *ICT technologies*

It is clear from Table 1 that Scottish farmers lag behind the NBEs in Finland with regard to business use of computers, connection and use of the Internet as well as having their own web-site. It is an established fact<sup>8</sup> in Scotland that the agricultural is the sector of the economy with the lowest level of uptake of computers, the Internet, web sites and engagement in e-commerce. Scottish farmers who have diversified their enterprises are more likely to have a web presence (marketing and selling) as are beef farmers (who can access cattle movement records on-line).

**Table 1.** *Business use of computers, Internet and web-sites*

	<b>Scotland</b>	<b>Finland</b>
Uses computer for running business	77.5 %	94.6 %
Computer is connected to Internet &	91.3 %	93.7 %
Have website for business	16.2 %	72.7 %

#### *Internet Connection*

The surveys (including members of Icelandic Farm Holidays) examined how businesses were connected to the Internet. Clearly in all countries there is considerable reliance on modems for connection to the Internet by the SMEs with ISDN connection being the second most common method of connection. There is still only a small amount of broadband penetration (18 % of NBEs in Finland have ADSL connections, and only about 5 % of farms in Scotland and Iceland). Information providers must be mindful of the dominance of low bandwidth connections to the Internet when using it as a medium for delivering their services to these user-groups.

**Table 2.** *How the business is connected to the Internet*

	<b>Scotland</b>	<b>Finland</b>	<b>Iceland</b>
Modem	64 %	43 %	56 %
ISDN	16 %	25 %	49 %
ADSL	6 %	18 %	5 %
Broadband >2Mb	9 %	9 %	2 %
Don't know	5 %	5 %	4 %

#### *Modes of communication*

The Scottish and Finnish surveys examined the perceived importance and frequency of use of various different methods of communication for accessing external business information. Table 3 shows the proportion of respondents who said they were very important or essential to them as a means of accessing external business information. This clearly shows that in Finland the Internet and e-mail were considered as the most important followed by informal face-to-face discussions and phone (mobile and fixed-line). This contrasts with the findings from in Scotland where trade press radio and face-to-face (both formal consultancy and informal discussions) are the most important means of accessing information followed by the more familiar ICT media (which are still important for more than half the Scottish respondents). It is clear from further discussion and other anecdotal evidence that the importance of the radio is to access weather forecasts (which are an essential

<sup>8</sup> See Highlands and Islands Enterprise (2005) and Scottish Enterprise (2003).

part of the daily farming routine). It is also evident that the relative importance afforded to trade press, consultants and other informal discussions relates to the timing of the survey coinciding with the introduction of CAP reforms. The lack of importance afforded to of trade press in Finland is perhaps due to the disparate nature of the NBEs who often have niches for which there is limited topical publications.

**Table 3** *“Very important” or “essential” modes of communication for accessing external business informatini Scotland and Finland.*

	<b>Finland</b>	<b>Scotland</b>
CD-ROM	14 % (18)	9 % (18)
E-mail	68 % (2)	56 % (8)
Fax	23 % (17)	36 % (11)
formal face to face discussions in groups (seminars, training)	35 % (12)	18 % (15)
Informal face to face discussions in groups	34 % (13)	33 % (12)
Internet	70 % (1)	62 % (7)
Mobile phone	57 % (6)	65 % (6)
newsletters, by e-mail	59 % (5)	16 % (16)
newsletters, by post	41 % (9)	56 % (9)
Newspapers	44 % (8)	38 % (10)
personal letter	26 % (14)	23 % (14)
Phone	59 % (4)	76 % (5)
private face to face formal discussions (consultancy)	40 % (11)	79 % (2)
Private face to face informal discussions	66 % (3)	78 % (4)
Radio	25 % (15)	79 % (3)
Text books	49 % (7)	14 % (17)
Trade Press	40 % (10)	88 % (1)
TV	25 % (16)	33 % (13)
Video/DVD	10 % (19)	4 % (19)

(figures in parenthesis show the relative ranking of each communication channel in each country)

As the surveys used a scaling criteria (1 to 4) to measure the both the frequency of use and importance of use of different types of media it was decided to aggregate these to establish an “efficiency value”. Although not presenting the absolute effectiveness of the media, it highlights the trends about (combined) “use” and “importance” which can then be compared across the project . The relative “efficiency” of each of the different media to access external information is highlighted in Table 4.

**Table 4.** The ten most “efficient” media used to access business information in Scotland and Finland.

<b>Finland</b>	<b>Efficiency Rank</b>	<b>Scotland</b>
Internet	1	Trade Press
E-mail	2	Radio
Phone	3	Mobile phone
Mobile phone	4	Phone
Newspapers	5	E-mail
Private, face to face informal discussions	6	Private, face to face informal discussions
Newsletters, by e-mail	7	Internet
Text books	8	Private, face to face formal discussions (consultancy)
Trade Press	9	Newspapers
Newsletters, by post	10	Newsletters, by post

Clearly the NBEs in Finland for are utilising and valuing ICTs as a means of accessing information and advice. In Scotland this is also the case but to a slightly lesser extent where the traditional communication channels of the farming press and radio (for weather forecasts) prevail. Using this “efficiency value” it is clear that ICT tools using the Internet, e-mail and mobile phones can offer potential solutions to the concerns surrounding rural SME access to information and advice.

The results of the research phase have shown that despite differences between location (Scotland and Finland), business sector and social structures, attitudes about, and issues encountered when accessing information and advice are very similar. The uptake and use of the mobile phone and the Internet (specifically e-mail) as a communications tool for rural SMEs in the Northern Periphery has developed rapidly in recent years despite some problems remaining over connectivity (Internet) and service coverage (mobile phones). In both Scotland and Finland many of the SMEs reported that there is enough external information available, the problem is that often it is not utilised for one reason or another. “Lack of time”, “too much effort” and “lack of motivation” are frequently given as reasons for not using available external advice and information and it is clear that this is often related to a lack of strategic planning within the SME (if they can not express what the problem is they can not specify their information needs). It is progressive SMEs that are most likely to adopt new technologies and it is they that are clearly the key target group to benefit from improved access to information and advice. In order to improve the knowledge transfer to rural SMEs the information provided must be readily accessible using a variety of communication pathways and it must also be summarised succinctly with regard to the SME (e.g. it may require writing in a non-scientific style).

### Phase 3 - Development and testing of tools

The results and findings of the research phases were evaluated and communicated with the SMEs (and advisers) through meetings / focus groups in each region. This provided the basis for dialogue about the types of tools the SMEs would like to see developed. In Iceland’s case the generic proposal for the most appropriate tool was relatively straightforward as many SMEs had a common business objective. In Scotland the process needed more facilitation, as the SMEs were divergent with their ideas concerning the specification and appropriateness of tools and methods to be developed in the project. A brief summary of the tools and benefits to end-users in each region follows:

#### *Iceland*

In Iceland an Internet-based reservations-database for tourist-based farmers is being developed as part of the wider UD project. An increasingly large proportion of marketing and sales in the agri-tourism sector is being

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conducted directly to consumers using the Internet rather than through traditional channels (such as contracts with travel agents). It is therefore increasingly important for the marketing of the service to be ever-present, being at the right place, at the right time for the customer.

With increased competition in the selling of tourism services in Iceland it is essential for the farm-based tourism operators to offer economical, accessible and safe sales methods to their potential customers. As micro enterprises, tourist-based farmers need, more than most, a co-ordinated business system (a sales system) where customers can tailor their purchases specific to their individual needs. In order to capitalise on their unique selling point it is essential that a co-ordinated, collaborative approach be taken to the marketing and selling the “Icelandic Farm Holidays” (a co-operative) brand.

Icelandic Farm Holidays currently sell the services provided by tourist-based farmers, dealing with travel agents and taking care of other marketing ventures. Tourism customers are increasingly utilising the Internet to plan and purchase their holiday experience. However, the marketing position of individual tourist-based farmers has been weak due to the cost of promotional material, marketing, Internet connection, etc.

It became clear during the research phase that tourist-based farmers lacked an inexpensive and co-ordinated reservations system. During consultations with the group it was established that a reservations database for tourist-based farmers which co-ordinated information about accommodation availability was needed in order to adapt to this new market environment and reap higher returns through direct sales. The expected advantages of such a database that were identified during consultations included:

- a clear, accurate representation of all accommodation offered by tourist-based farmers
- a fast, secure and nearly automatic sales processes
- reduced marketing/sales costs per reservation

The tool that is being developed uses the Internet as the interface for both tourist-based farmers and their clients, with the reservations database being at the core. The system is reliant on the tourist-based farmer using the system to manage all their bookings as it collects information of unsold accommodation (and other services provided) in real time. This means that customers using the system have the current accommodation availability displayed to them continually and do not have to experience time delays in the booking process as availability is checked. The RuBIES project has been developing this Internet-based interface, and reservations database, which enables tourist-based farmers to up-load their information into the system, and check accommodation availability should customers come through other routes (e.g. at door sales). The tool is designed so that the only mode of communication required between the customer (tourist) and the supplier (farmer) is the Internet.

### *Scotland*

In Scotland two tools are being developed to deliver demand driven information to farmers through the use of mobile phone services and Internet systems. These are being developed as a result of the consultations with end-users through a number of focus groups.

With most farmers now using a mobile phone, technology provides a means to send information directly to SME subscribers, with the messages being read quickly and conveniently. As a result, SMEs are well informed with the most up-to-date industry information ensuring they can keep one step ahead of their competitors. Farmtext is a service that uses mobile phone messaging facilities to offer up to the minute advice directly to farmers in their own workplace. This project was originally piloted in 2003 with financial assistance from the LEADER+ Programme to 90 farmers in central Scotland to assess the quality and relevance of the service. A team of specialist advisers can provide text messages on a range of topics, from important deadline reminders to brief and concise technical information. Using a simple database, text messages up to 150 characters long can be prepared by an adviser and sent out on a particular to a specified audience (e.g. determined by the farmer’s preferences and location). Farmers in the original pilot have commented specifically that reminders on important dates have proved invaluable.



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To date there has been little penetration of the tool in the Highlands and Islands of Scotland as network coverage has been limited (patchy) until recently. Given the recent adoption of mobile technologies by farmers in this region, there is considerable potentially benefits from dissemination of such a tool to have a high impact for farmers and crofters in the Highland and Islands. Issues such as frequency of messages, appropriate message content, need for local input are being examined.

There is scope for this type of service to be provided collaboratively between the key agents delivering government funded services to the agricultural sector. It is perceived that the long term sustainability of such a service would be best served by an integrated approach between agencies, although this is the most difficult to develop. Business advisers could benefit from using a similar type of service which would act as a sign posting to new research publications/findings from agricultural research organisations and form the Scottish Executive.

The second tool being developed in Scotland is the use of is Really Simple Syndication (RSS). This is an Internet based format designed for sharing headlines and other web content that allows users to create a customised feed to track any topics they specify. In this age with billions of web pages, if rural SMEs track news from multiple online sources or need to stay informed on specific subjects, it's a challenge for them to keep up with all the latest news and most recent updates. Use of RSS would simply allows them to identify the content they want and have it delivered directly to them taking the hassle out of staying up-to-date. These "RSS feeds" can be used to inform end-users of news stories, new publications, updated advice, new products, upcoming events, etc and a key benefit is that end user does not actually have to know anything about the technology in order to benefit from it. The identified benefits to accessing information this way include:

- Efficiency - timely news and information is automatically there when you need it
- Breadth - headlines from the web sources you care about are consolidated
- Organisation - sources can be displayed in order of importance with the latest news on top
- Productivity - email newsletter subscriptions and unruly bookmarks can lead to clutter and information overload

Few websites currently provide RSS feeds, but it is growing rapidly in popularity and many public/government bodies and news providers are now providing RSS feeds. The SME simply needs news-reader (some of which are accessed using a browser, and some of which are downloadable applications) which allows them subscribe to information feeds they specifically want (demand driven). RSS feeds come straight to the subscriber meaning each site does not need to be visited individually to see what's new.

The key to the successful implementation of this tool for the end-users is getting the key providers of agricultural information and news in Scotland to provide RSS feeds, and provide them into categories that allow specific farming topics to be chosen (eg. CAP policy, sheep, beef, dairy, crops, etc). The second stage is to develop simple training material to show end-users the benefits of using RSS feeds and how to access the News Readers and select the information that they want feeds from. There are possible links here with Farm Text – in that specific RSS feeds could be sent to mobile phones to inform users of important developments (eg flood alerts).

### *Finland*

In Finland three tools are being developed which not only will provide SMEs and advisers with improved access to information and advice but also provide differing "methods" of delivery. This will enable an evaluation of the most effective types (and combinations) of tools and delivery channels to be made at the evaluation stage.

An Internet-based tool for collects and analysing customer feedback for the NBEs has been developed in response to issued raised in the surveys and interviews. The tool contains a "question bank" from which the entrepreneur can choose the specific questions they want to ask from their customers. Once the bespoke questionnaire is complete it is automatically sent out to the customers (who supply details) for completion. When the customer completes and submits the questionnaire the answers provided are automatically be saved

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into a database, where the data is automatically summarised and a graphically presentation of the data given. The concept behind this tool is to save the SME's time by automating the task whilst still enabling objective customer feedback to be collected. In addition to the automated feedback tool, the SMEs testing the tool will also receive a personal face-to-face consultation by a local advisory organisations. The adviser's role is to help the SME to interpret and give meaning to the collected information, giving recommendations about how to respond to the feedback. This combination of face-to-face consultancy and electrical consultancy tools will allow the interactions between the methods to be evaluated and may highlight optimal solutions to concerning the current and future ICT culture in the companies. This tool also has the potential to be used to assist advisers/trainers etc in gaining feedback from clients and it has the benefit over conventional feedback methods in that it allows the feedback to be submitted after a period of reflection remote form the trainer/adviser/SME. After the testing of the testing of the tool it is anticipated that the Internet based system will be provided by Finnish Nature-based entrepreneurship association.

A second tools is being developed by Jämsek (local development organisation in Central Finland) which provides an "e-service" to test business ideas and get feedback from experts. A person interested in starting new business or diversifying the current activities can fill an Internet based form which is automatically sent to the group of pre-determined business advisors. After three advisors have answered and commented on the idea, the form will automatically be sent back to the customer. The key benefits to this service are that it is interactive, it provides personal comments to the entrepreneur from the experts and the whole process can be completed remotely from the specialist business advisors. This tool is targeted at those people who are thinking of starting a new business or who want to expand their current business with new ideas. In essence it is a electronic sounding-board where the entrepreneur is assured of getting "expert" feedback. The tool is expected to be maintained as a part of Jämsek service selection.

The third tools being developed in Finland tests a more passive form of information delivery. Essentially, an information leaflet can be tailor-made by the SME/adviser through the selection of topics from a centralised database which is then sent to them by e-mail. An option also exists where the SME can select to be updated with current information relating to the topics selected. Existing databases of the Finnish Nature-based Entrepreneurship Association are being used, with some modifications, to test this tool and for the delivering automated information leaflets. The tool is targeted to the entrepreneurs, advisers and any other people interested in up-to-date information about NBE issues. The service will be maintained by the Finnish Nature-based Entrepreneurship Association after project's lifetime.

## Lessons Learned

There has been quite a steep learning process on how to (and time taken) develop appropriate tools for the end users by each of the project partners. The concept of developing sophisticated tools for the dissemination of information and advice to rural SMEs that could be readily adapted across the regions of the Northern Periphery seemed to be a welcome challenge. The research phase of the project gave the research teams a comprehensive insight into the specific needs and desires of the target groups in their locale. This detailed research process has led to the development of a range of tools that are specific to the articulated needs of disparate end-users. This is inconsistent with the initial project concept where it was envisaged that 'common tools' would be developed. Nonetheless, this does not mean that the technologies behind the tools is non-transferable between the regions and user-groups, rather it means that the relevance of the delivery interface of the technology was not articulated as a solution to the identified problems faced by specific groups.

Without doubt, ICTs have the potential to improve access to information and advice by rural SMEs but as Webster (2003) says: "information is everywhere - good information is harder to find". The RuBIES project has developed a variety of different ICT based tools to help improve the information experiences of rural SMEs trying to delivery of the 'right information' at the 'right time' for the 'right people' in the 'right way' for the 'right purpose'. Only time will tell how successful we have been.

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## References:

- Benbuan-Fich, R., (2001) *Using protocol analysis to evaluate the usability of a commercial web site*. Information and Management 39 (2001) pp151 – 163.
- Commission of the European Communities (2004). *Connection Europe at high speed: recent developments in the sector of electronic communications*. Communication from the Commission to the Council, the European Parliament, The Economic and Social Committee and the Committee of the Regions. Brussels 3.2.2004 COM(2004) 61 Final.
- Grimes, S. (2004) *How well are Europe's rural businesses connected to the digital economy?* Paper to the Regional Studies Association conference Europe at the Margins – EU Regional Policy, Peripherality and Rurality, Angers, 2004.
- Highlands and Islands Enterprise (2005) Scottish e-Business Survey 2005. *Annual survey of Scottish businesses investigating attitudes to and adoption of e-business - Highlands and Islands Enterprise Report*. <http://www.hie.co.uk/Scottish-e-Business-Survey-2005---HIE-Report.pdf>
- Kraft, C. (2004) Pond management: An evaluation of web-based information delivery. *Journal of Extension* [On-line], 42 (1).
- Malecki, E. J. (2003) Digital development in rural areas: potentials and pitfalls. *Journal of Rural Studies* 19, 201-214.
- Matilainen, A, and Zimmerbauer, K (2005). *The Role of Information Technology in Mediating External Information to the Rural Micro Enterprises -a study on the importance of information delivery channels*. RuBIES (Rural Business Information Exchange System) -project National report, Finland, University of Helsinki, Seinöjoki Institute for Rural Research and Training.
- O'Neill, B. (1999). Teaching consumers to use the Internet to make consumer decisions. *Journal of Extension* [On-line], 37(3).
- Polson, J. and Gastier, T. (2001) *Small Farm/New Farm: One Agent Meeting Other Agents' Needs for Research-Based Information Through the WWW*. *Journal of Extension* [On-line], 39(4).
- Scottish Enterprise (2003) *Scottish e-Business Survey 2003: Annual survey of Scottish businesses investigating attitudes to and adoption of e-business*. *Agriculture & Fisheries Cluster Report*.
- Selwyn, N. (2003) Apart from technology: understanding people's non-use of information and communication technologies in everyday life. *Technology in Society* 25, pp. 99-116.
- Skerratt, S. and Warren, M. (2003) *Broadband in the countryside: The new digital divide*. Paper to EFITA Conference, Debrecen, Hungary, July 2003.
- Webster, J. (2003) *Bibliographies as an Extension Outreach Tool: An Old Method in a New Age*. *Journal of Extension* [On-line], 41(3).

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# Delivering external expertise to the rural SMEs – how and to what extent can ICT-solutions be used

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## 1 Introduction

The title of this seminar is indicating anything but a uni-directional view of the potential impacts on ICT in helping rural SMEs. The research literature on IT transfer is supportive of this view and encourage us to carefully examine the relations between the business actors and tasks involved as well as the institutional factors when implementing IT (Leavitt 1970; King, Gurbaxani, Kraemer, McFarlan, Raman and Yap 1994). Ignorance of these factors is a potential source for failure of governmental programs to help SMEs.

Second, there is a need to stress the plethora of SMEs in rural areas. While there indeed in most countries are predominately SMEs involved in agriculture, fishing and hunting, there is a range of other SMEs such as handicrafts, carpenters, truck services, small shops etc. Furthermore, in countries as Finland and Sweden, there has been a wave of SMEs in rural areas that exists due to the emergence of the Internet and broadband services. Small, independent consultant and design companies are among these. Thus, there is a need to have a diverse or segmented view of the challenges to deliver external expertise to SMEs in rural areas.

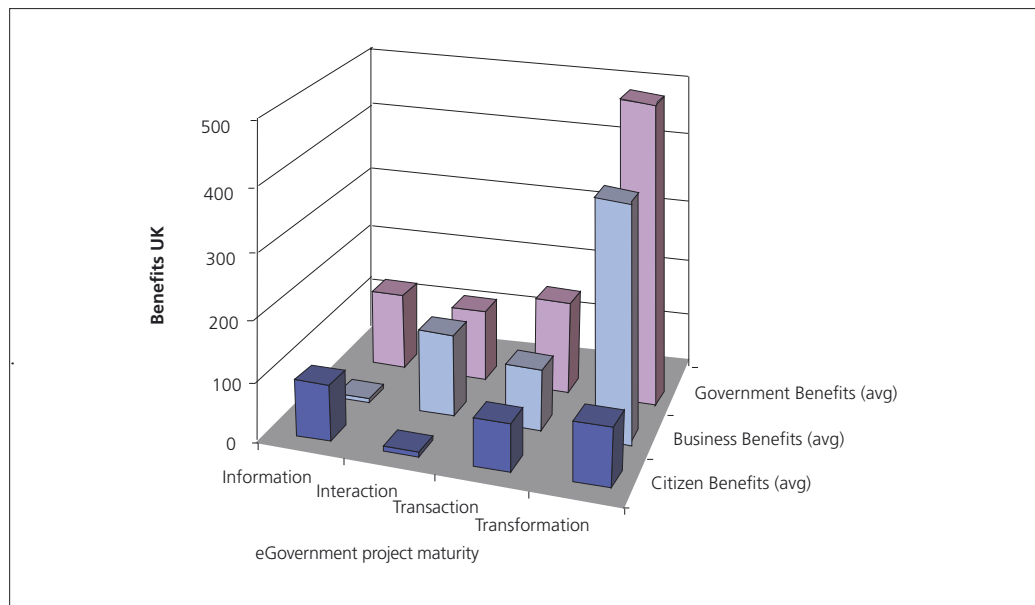
The overall storyline of the paper is that governmental websites and other ICT initiatives can help delivering expertise to rural SMEs, but government needs to revisit the strategies for reaching this goal ensuring that websites are in line with the external need, rather than only internal needs for reduction of transaction costs, etc. In pursuing this argument, the paper has four sections: (I) the ICT platform and transportation channels, (II) the ICT maturity models for e-government solutions to SMEs, (III) presentation of an alternative model to the existing maturity models guiding governmental investments in websites, and (IV) the implications of adopting an active and customer centric model.

The proposed model has been developed through a series of empirical studies during the past 10-15 years in Europe and the US as well as through experiences working on ICT projects in Asian countries as Vietnam, Laos, Sri Lanka, China, Pakistan and Bhutan and research / teaching visits to various European rural areas such as in Greenland, Denmark. The paper will not be a list of specific experiences from these countries. More information about the specific projects can be obtained by contacting the author of this paper.

## 2 The push and pull mechanisms for governmental ICT-initiatives

The e-government wave with extensive use of the Internet might not bring about any fundamental new mechanisms in government (Bretschneider 2003; King and Kraemer 2003). Yet, it is our proposition that management is challenged to move away from a transactional view of IT to a more strategic view of IT adoption in government (Stamoulis, Gouscos, Georgiadis and Martakos 2001; Affisco and Soliman 2006). In our research we have come to the conclusion that governments in designing website for businesses which are good at identifying governments' own needs but yet do not identify the needs of the businesses. As a con-

sequence, there is limited strategic use of the Internet to help SMEs in rural areas. At best, there are services that alleviate the transaction's burden in areas as e-taxation for businesses and online application forms for import licenses. A study published by the OECD, showed however, that the benefits at the governments' part far exceed the benefits at the businesses' part.



**Figure 1.** Benefits of governments' webservices: Government, business, and citizen benefit Source. OECD (2005)

A reason for the leisurely governmental style in directing their web-services to SMEs in a more strategic sense could be that government follows a budget driven approach and is by most means facing demands of a much faster pay-back time than the private sector. Government will often have to finance their spending on IT on current accounts and not be able to argue that investment in IT will lead to reductions in transaction costs, etc., on the longer term. On top, we have to acknowledge the absolute amount of funds available for governmental actions in this field differs substantially. Some regions and countries have quite substantial funds available for government. Other countries, most often in the developing countries, are less favored.

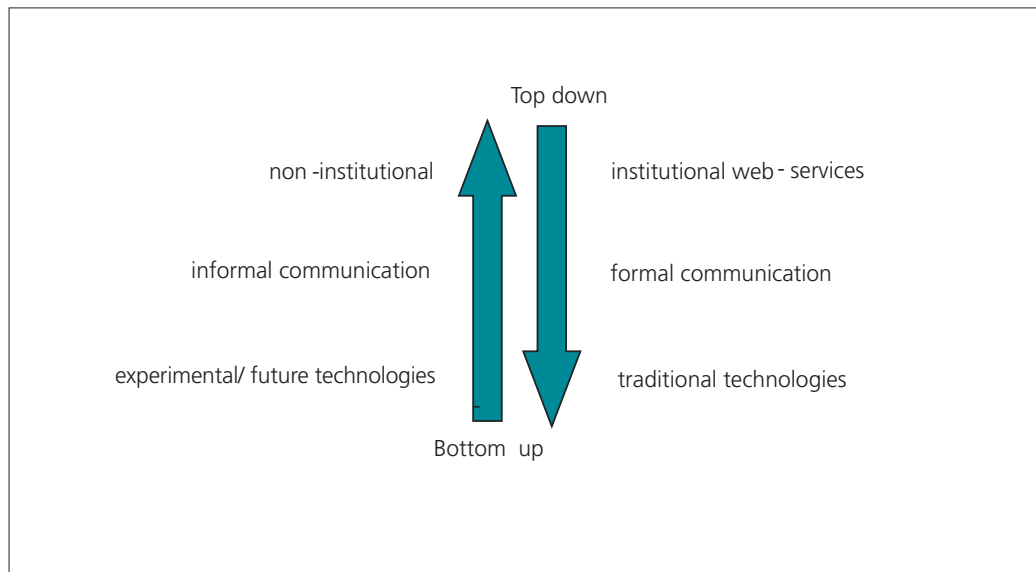
This might be explaining why government tends to use conventional technologies when building web-services. Government has not yet realized that the demand for web-services occurs in a variety of technological settings and situations rather than in a stereotyped and unified pattern. In some instances, web-services require high levels of security technologies, as in the case of elections. In other cases, there is less demand on security and more emphasis on flow of information and open dialogue, as in the case of public hearings. Most of the web-services that have been implemented are text based, rather than speech and video enabled, and, in general, are not an active part of the dynamics of multimedia. Instead, government lags behind in the uptake of media that supports involvement based on audio-visual media and synchronous dialogue, such as chat.

Also, most of the applications designed for web-services are done half-heartedly in the sense that critical parameters, such as scalability, logs and software transparency/updates, are left unattended at the time of the first round of implementation of the application. Instead, government implements applications for often very small numbers at the front-end and back-office.

Further, most applications for web-services seem to be top-down driven, supporting formal communication following the traditional administrative-bureaucratic procedures and standards, where traditional technologies are used, and institutional values are applied as measures. Few applications are situated at the left side of the web-services depicted in Figure 1 enabling informal communication and non-institutional values using experimental technologies. While the top-down approach might be useful in various settings, it falls short in understanding the gate-keepings mechanisms deployed by the street-level-bureaucrats that are interacting

with the customers and managers (Lipsky 1980). The gate-keeping does not assume that policy strategy on increasing web-services is an issue of top-down implementation. Rather, understanding the means of gatekeeping such as psychological issues, time, and budget allocation mechanisms holds the key to successful implementation of web-services.

The more informal the communication where the IT applications invite the customers to take part in the debate, the less is the requirement for structured involvement. The second component technology refers to the sophistication of the applications, ranging from the well-known current or conventional technologies to the experimental. Finally, the third component focuses on the degree of institutional level of web-services, ranging from institutional to non-institutional web-services.



**Figure 1.** *Top-down and bottom-up approaches to web-services*

### 3 Conventional maturity models for e-government

A large amount of the maturity models on e-government view the challenge for government to be able to (horizontal and vertical) integrate their ICT-systems and link them with the front-end services for SMEs. The issue of integration is profound in the Layne & Lee model (Layne and Lee 2001). The Layne and Lee model reinforces intragovernmental data integration with a front-end built on top. This could enable integration and will require the solving of various technological and organizational challenges.

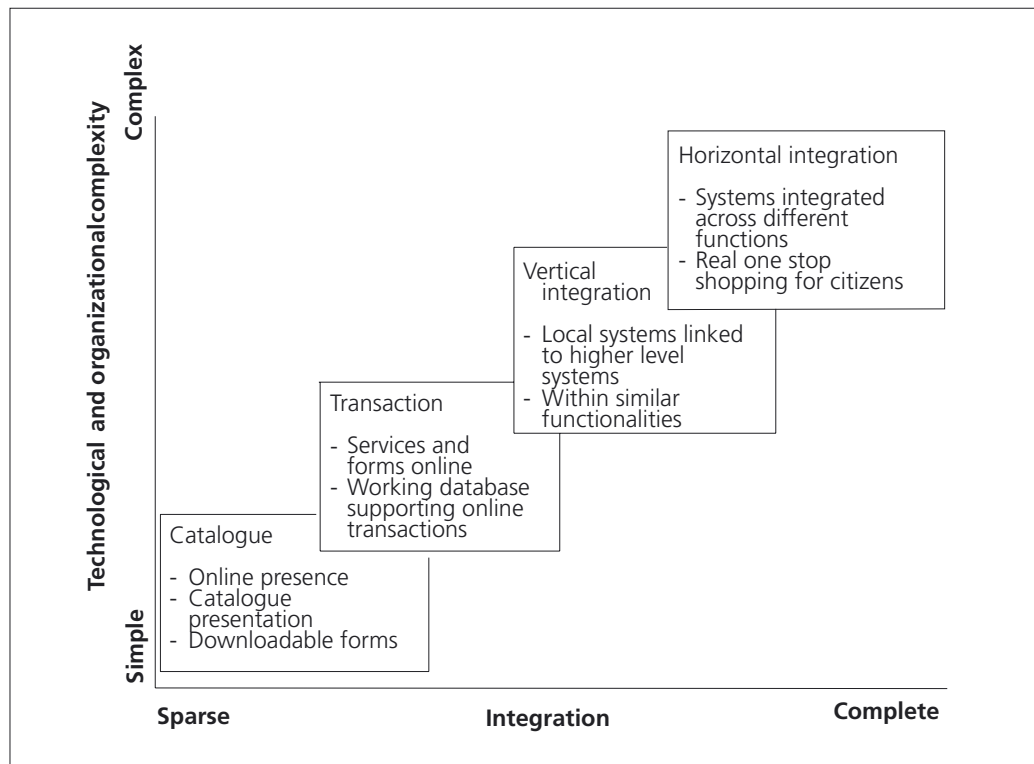
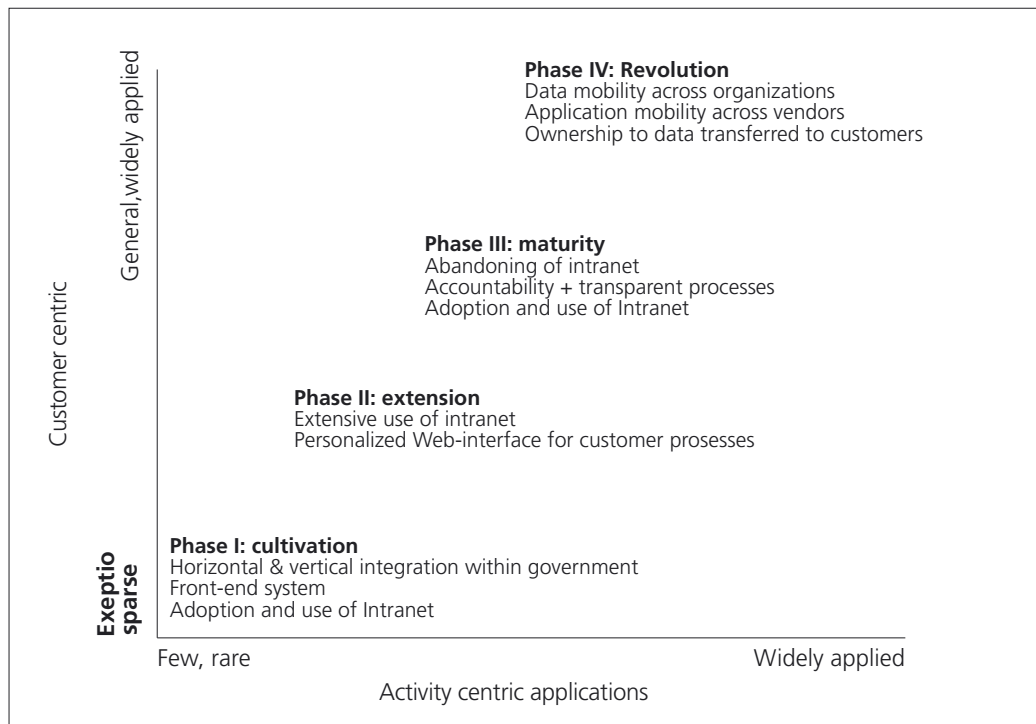


Figure 2. The Layne and Lee Maturity Model

## 4 The Activity and Customer Centric Maturity Model

We have in our research argued that the Layne and Lee model is not bringing about a new strategic perspective on ICT in government. Instead, the Layne and Lee risk reinforcing the patterns of internal consolidation of data structures, standards, etc. without a clear mission to help the external users. The activity and customer centric model we have developed is called the Public Sector Process Rebuilding (PPR) model (Andersen 1999; Andersen 2004; Andersen and Henriksen 2006) The two key dimensions are displayed along the horizontal and vertical dimensions, respectively, in Figure 3. Applications developed along these two dimensions can be rare or widespread in the extended organizational room of governmental activities. Rather than being discrete variables, the variables should be used as a continuum.



**Figure 3.** The PPR maturity model: Activity and customer centric stages Source: Adopted from Andersen & Henriksen (2006)

The cultivation phase (I) shelters horizontal and vertical integration within government, limited use of front-end systems for customer services, and adoption and use of Intranet within government. There can be elements of self-service but most often in the form of pdf-files that can be downloaded, completed, and then returned either as an attachment to e-mail or by mailing the completed form to government. This is the stage where most governments are now, and worse, it is often considered a strategic goal for most governments. Having the characteristics of this phase as a strategic goal can be counter productive to the activity and customer focus.

Phase II is the extension stage with extensive use of intranet and adoption of personalized web user interface for customer processes. There is a sharp distinction between “our data” and the services provided through “them”. At this stage there are still many manual routines, and while the user might find many forms and information, the agency is equally interested in re-directing the users to information at other agencies.

Phase III is the stage where the organization matures and abandons the use of the intranet, has transparent processes, and offers personalized web-interface for processing customer requests. In this phase, Internet and intranet applications are merged and the key concern is to use IT to lower the marginal costs for processing the customer requests for services. Rather than linking to other institutions, the homepage is feeding information from other institutions to the users online. Further, the website is organized to solve problems and requests rather than presenting formal organizational structures and general information. Self-service is a key priority in this phase and the exceptions where this cannot be completed online are clearly stated with instructions on how to proceed in analog mode.

Phase IV is the revolutionary phase characterized by data mobility across organizations, application mobility across vendors, and ownership to data transferred to customers. In this phase the employees’ actions can be traced through the Internet and there is information available online about progress in, for example, case handling. This is possible through intra- and extraorganizational mobility of data and services. Also, economics of scale is sought after actively. The Internet is not seen exclusively as a means to create increased mobility within the government. Rather, the ambition is to transfer data ownership and the orientation of data base infrastructure to the end users.



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There indeed is a long push to reach phase IV. The blooming literature on e-government (Andersen and Henriksen 2005; Grönlund and Horan 2005) has provided the fuel for the hypothesis that governments are still predominately in phase I, that is, they are aiming for data and system integration, but have only limited front-end services, and essentially still have an intra- and intergovernmental view of the development and implementation of IT.

Accordingly, a personalized web-interface for customer processes, data mobility across organizations, application mobility across vendors and transfer of data ownership to the customers are still not implemented and constituted in light of the PPR-approach key challenges to be met.

For example, the lack of mobility on data and application level lock government and their customers to path-dependency and decrease the competition for IT-enabled services. The in-house and lock-in path has been a convenient road to follow for government, its consultants and IT-suppliers since this has in reality created a myriad of e-government solutions that are just as incomparable, in-transparent, and in-accessible for the customers as the previous information and communication channels were. The only difference could be that they are “faster and smarter” as formulated by the former UK e-envoy.

## 5 Implications of adopting the activity and customer centric model

We have in this paper argued that governmental websites and other ICT initiatives can help delivering expertise to rural SMEs. Yet, government needs to revisit the strategies for reaching this goal ensuring that websites are in line with the external need, rather than only internal needs for reduction of transaction costs, etc.

The proposed activity and customer centric model called PPR (public sector process rebuilding) can help moving in the direction of meeting the customer needs, rather than inhouse needs. For government, this is a challenge due to the associated costs and due to institutional factors. On top, the PPR-model will prompt individual employees to show their value to the SMEs. This is also a challenge since most government apply organization wide value based assessment of their webservices.

The proposed maturity model is changing the focus of e-government to the front-end of government and away from a technical integration issues. The proposed PPR-model emphasizes the digitalization of the core activities not from the perspective of what is technologically feasible but from what is beneficial for the end-users regardless of the possible internal changes caused by the digitalization.

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## References

- Affisco, J. F. and K. S. Soliman (2006). "E-government: A Strategic Operations Management Framework for Service Delivery." *Business Process Management Journal* 12(1): 13-21.
- Andersen, K. V. (1999). Reengineering public sector organisations using information technology. *Reinventing government in the information age: International practice in IT-enabled public sector reform*. R. Heeks. London, Routledge: 312-39.
- Andersen, K. V. (2004). *E-government and Public Sector Process Rebuilding*. Amsterdam, Kluwer.
- Andersen, K. V. and H. Z. Henriksen (2005). "The First Leg of E-government Research: Domain and Application Areas 1998-2003." *International Journal of Electronic Government Research* 1(4): 26-44.
- Andersen, K. V. and H. Z. Henriksen (2006). "E-Government Maturity Models: Extension Of The Layne And Lee Model." *Government Information Quarterly* 32.
- Bretschneider, S. (2003). "Information technology, e-government, and institutional change." *Public Administration Review* 63(6): 738-744.
- Grönlund, Å. and T. Horan (2005). "Introducing e-Gov: History, Definitions, and Issues." *Communications of the AIS* 15(39): 713-729.
- King, J. L., V. Gurbaxani, et al. (1994). "Institutional Factors in Information Technology Innovation." *Information Systems Research* 5: 139-169.
- King, J. L. and K. L. Kraemer. (2003). "E-government: Will the Time after Be Any Different?" Retrieved May 5, 2005, from <http://www.crito.uci.edu>.
- Layne, K. and J. W. Lee (2001). "Developing fully functional E-government: A four stage model." *Government Information Quarterly* 18(2): 122-136.
- Leavitt, H. (1970). Applied Organizational Change in Industry: Structural, Technological and Human Approaches. *Management and Motivation*. V. H. Vroom and E. L. Deci. Middlesex, Penguin.
- Lipsky, M. (1980). *Street Level Bureaucracy: Dilemmas and the Individual in Public Services*. New York, Russel Stage Foundation.
- OECD (2005). *e-Government for Better Government*. Paris, OECD.
- Stamoulis, D., D. Gouscos, et al. (2001). «Revisiting public information management for effective e-government services.» *Information Management & Computer Security* 9(4): 146.

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# Agronet.fi – a portal with single sign-on access to farmers’ web services

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## Abstract

Agronet is a web portal for Finnish farmers and other rural entrepreneurs. The site was first launched on the Internet in 1995. New services were developed in the portal, and its contents were reorganized a few times during the years. In October 2005 a completely renewed interface of Agronet was launched. The most notable features in the new concept are the single sign-on option (SSO) and “Tilan nettitoimisto”, an electronic “Farmer’s Web Office”. Single sign-on provides the users with an easy access to web services, which require usernames and passwords. Agronet is today managed in co-operation by six organizations.

## Electronic information service to farmers and related target groups

Agronet portal has since 1995 served Finnish farmers and other users on the Internet. Agronet was in a pioneer position to disseminate information and enable interactive communication for farmers and other user groups dealing with agriculture and rural development.

Agronet has from the beginning been a collaborative initiative, developed and managed by organizations representing agricultural and rural research agents, service development and farmers’ union.

## New era in ICT development

The development of the web users’ needs, facilities and IT skills has been rapid during the recent years. At the same time the deployment of electronic information technologies has expanded in the society, including agriculture. Access to the web and web based tools have become everyday life in farm management. Enhancing efficient use of IT and the Internet in farming has been in a central role also in the organizations managing Agronet, and new applications and services have been launched to market.

The role of Agronet in the rapidly developed situation was evaluated. Planning of a comprehensive renewal of Agronet was initiated 2004, in order to respond to the users’ needs and the objectives of the organizations involved. The redesigned interface with completely new features was launched in October 2005.

## The history of Agronet in brief

- 1992: Agronet information net service was established. Information to farmers, extension agents and other target groups was distributed electronically using Videotex technique.
- 1995: Agronet web site was launched on the Internet.
- 1996-2004: new Web services were developed for Agronet users.
- 2005: A redesigned interface with SSO and Farmer’s Web Office was launched in October 2005.
- 2006: Further upgrading of the server, portal application and the content is being carried out.

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## Baselines for the development project

Joint workshops and user interviews were organized in 2004 to recognize the baselines and determine the goals of Agronet. The objective was set to offer a portal, which helps the major target groups enhance their business.

- Target group: farmers and vegetable producers committed to improve their competitiveness.
- Other potential users: extension agents, administration, teachers and students, media and the public.
- Users' needs: easy access to relevant web applications and information related to farming and rural enterprises; interaction with farmers and rural entrepreneurs.
- Objectives of the organizations: improving customer satisfaction; marketing web based applications; further strengthening of co-operation between the contributing organizations and thereby decreasing costs.
- Strengths: the contributing organizations represent the leading expertise in the country in agricultural research and development services for farms and rural enterprises; intensive co-operation has good potential to produce improved value for the target group; regular contacts with farmers.

There are today six organizations contributing to Agronet's management and upgrading:

- ProAgria Association of Rural Advisory Centres
- ProAgria Agricultural Data Processing Centre Ltd
- The Central Union of Agricultural Producers and Forest Owners MTK
- Viestilehdet Ltd /Maaseudun Tulevaisuus
- MTT Agrifood Research Finland
- Agropolis Ltd.

The portal technique is managed by OracleAS Portal 10<sup>g</sup> at the Service Unit of MTT Agrifood Research Finland. Concept development and production is coordinated by a part time service manager, employed by ProAgria. All participating organizations are represented in the executive board and the development team.

## News, forecasts, price information and SSO access to web applications

The front page of Agronet today offers access to news headlines and weather forecast and to recent information from agricultural research and other relevant sources. The content of the portal is organized under six main titles: farm management, crop cultivation, cattle production, pig production, other domestic animals and rural entrepreneurship.

Logging in Agronet benefits the user by opening access to personal Farmer's Web Office and to SSO links to external applications. Those include commune level weather forecast, which is available to the subscribers of the newspaper Maaseudun Tulevaisuus, access to the various ProAgria web services and data banks like Feed Price Monitoring, Agriculture Plot Database, Dairy Benchmarks, Farm Economy Database and to MTK Reppu, an extranet service for farmers' union members, offering e.g. price monitoring reports of agricultural products and timber trade and other information for farms.

The discussion site of Agronet is very actively visited. There are thousands of users registered in the site. Browsing the forum does not require logging in.

Agronet does not charge for its use. Logging in the external applications via Agronet however requires that the user has valid usernames and passwords to the selected services.

The involved organizations maintain and manage the web applications they offer through Agronet, including their authentication systems and user passwords. The advantage of logging in the applications via Agronet is the single sign-on: the user needs to fill in the username and password on the first access only. Once logged in Agronet, accessing the desired external application will not demand further authentication as long as the username and password are valid and approved by the external application server. All data transmitted in Agronet is secured and encrypted with SSL protocol.

Picture 1.

The home page of Agronet in May 2006.

1 = Links to daily news and weather forecasts;

2 = Information about farm management, crop cultivation, cattle and pig production and rural entrepreneurship;

3 = Discussion forum. Additional options for registered users:

4 = Access to personal Farmer's Web Office;

5 = Single sign-on to local weather forecast and other web applications for farms;

6 = Option for saving personal favourite links.

Logging in and the use of the portal is free of charge.

agronet.fi

Testi Käyttäjä Hakuohje | Sivukartta

Etusivu | Ajankohtaista | Tilan johtaminen | Kasvi | Nauta | Sika | Muut eläimet | Monialaiset tilat | Keskustelu | Linkit

Agronet > Tilan nettitoimisto

Toukokuu 2, 2006 Kirjautu ulos

Tilan nettitoimiston esittely

TILAN NETTITOIMISTO 02.05.2006

Omat linkit Räsäsi

Laiduntori  
Lohkotietopankki/ProAgria  
MTK Reppu  
Maaseudun Tulevaisuuden  
saapalvelu  
Markkinatieto/MTK Reppu  
ProAgria Maito -palvelut  
Puukaupan hinnat/MTK Reppu  
Rehukunto/ProAgria Maito  
Taloustietopankki/ ProAgria  
Tilakunto/ProAgria Maito  
Tuotostenhinnat/ ProAgria  
WebElmer/ProAgria  
Ohje

Suosikit Räsäsi

Artturi  
VIPU  
Ohje

Puukauppa  
Puukauppojen keskihinnat  
huhtikuu 2006, €/m<sup>3</sup>

Tukki Kanto Hinta

Mänty 47,02 48,19  
Kuusi 48,41 48,97  
Koivu 44,17 47,31  
Kuitu Kanto Hankinta

Mänty 13,88 25,86  
Kuusi 22,82 29,99  
Koivu 12,50 25,14  
Koko maa, sisältäen erikoispuut  
02.05.2006  
Avaa Puukaupan hintatiedot >  
Tukkipuun kantohintojen  
kehitys (pdf, 41kt) >

Rehujen hinnat  
Rehujen ostohinnat viimeisten 1  
ja 3 kk aikana

	C /tn
	1 kk 3 kk
Rehuvilja	
Täysrehu	225,00
Puolitiiviste	263,50
Tiiviste	201,00
Nurmisilorehu	

Etelä-Suomen lääni 2.5.2006

Hintatiedot ovat koko maan  
keskiarvoja. Jos havaintoja on  
alle 5 kpl, keskihintaa ei näytetä.  
Avaa Rehukunto-palvelu >

Nurmen D-arvo %

	21.06.	Ennuste 26.06.
Jokioinen	69,7	64,4
Hämsinurmi	69,5	65,8
Seosnurmi, apilaa 25%	70,3	67,2
Seosnurmi, apilaa 50%	71,0	68,6
Seosnurmi, apilaa 75%	71,8	70,0

02.05.2006  
Avaa Artturi-palvelu >

Kasvinsuojelutiedotteet

Herne  
Herukka  
Kaali  
Kotipuutarha  
Mansikka  
Omena  
Porkkana

Viljan tulosruutu

Nurmen tulosruutu

Säilörehun tuotot ja kustannukset

4 = heikoin 25 % tiloista,  
1 = paras 25 % tiloista,  
jaottelu satotulosten mukaan.  
Koko maan tiedot 2005.  
Lohkotietopankki 15.03.2006  
Avaa Lohkotietopankki >

Maitotilojen tavoitteet

Alueelliset tavoitteiden keskiarvot  
2005 ja 2006.

	2005	2006
Ominaisuus	4,25	4,25
Maidon rasva-%	3,43	3,43
Maidon valkuais-%	1,82	1,65
Siemennyksiä/ pölkiminen	7538	
Säilörehua ry/ha	68,9	os,1
Kannattavuus- kerroin		1,7900
D-arvo		
Elossa olevien elinkaistuotos, kg/lehmä		

Picture 2.

Farmer's Web Office offers a quick glance to price monitoring tables and other summaries indicating regional and national data.

1 = Monitoring animal feed prices in the region

2 = Results from crop plot data bank

3 = Data of local dairy farms' objectives and results

4 = Timber market price monitoring

5 = Single sign-on links to farm's own results and benchmark data

6 = The view can be customized according to the user's interests by closing or opening the info boxes.

SSO links to farms' web services provide the users with an easy access to further detailed information and production benchmarks. More services and information will be available during the coming months in the site.



**Picture 3.** To utilize the SSO, the username and password to the selected external application are needed when accessing the application for the first time via Agronet.  
 1 = The user logs in Agronet and selects the desired external web application.  
 Authentication is requested.  
 2 = The user may authorize Agronet to save the username and password.  
 3 = The user selects, which applications to show in his/her view. Updating personal authentication information can be done by the user when needed.

## Lessons learned and future prospects

The immediate response from the users was positive after launching the new interface in October 2005. The new concept was welcomed and found to ease the use of the web, particularly when applications, which require authentication, are frequently accessed. Agronet is the first Finnish web service in its substance area to provide the users with SSO option.

It was noticed, however, that the less experienced web users would benefit from personal assistance in order to adopt the new features. The SSO was by some users found somewhat difficult to be realized.

The users have requested some more SSO links to be added in the system, which was done. We are now looking forward to completing the set with a few more in the near future. New services in the Farmer's Web Office and content in the portal are being planned and compiled, to be published during the coming months and the ongoing year.

Surveying the users' behaviour, further desires and needs as well as the usability of the service will be executed in 2006. Strengthening the role of client participation in the service development in general is justified.

Long term, intensive promotion with a clear message and service concept is needed, along with proper maintenance and development of the service, in order to reach the set objectives. The average number of daily accesses in Agronet is between 5000-7000 at the moment.

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# Landmand.dk - experiences with a personal portal for farmers

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## Abstract

About 82 % of the Danish farmers have access to the Internet, and there is an increase in the activity on sites offering information and services to the farmers. However, being a typical farmer, it is a time consuming exercise trying to utilise the possibilities on the Internet. To solve this problem, Danish Agriculture, Danish Agricultural Advisory Services and the publishing house Danish Agriculture Media joined forces to develop a portal for farmers. The portal – which was launched in April 2005 – is free to use for approx. 40.000 members of Danish Agriculture and offers extended possibilities for personalisation of a “My page” section. This paper describes the portal and experiences gained after one year of operation.

## 1 Introduction and background

In October 2003, Danish Agricultural Advisory Services (DAAS) held a meeting, where a group of farmers were invited to come and discuss their use of the Internet: What kind of information and services they would like and how should it be delivered to them.

Statements like this came up:

- Why do we have to go to so many different sites – I would like to have it “all” on just one page.
- I can’t remember all these passwords. Why can’t we have just one password that is valid everywhere?
- There is a lot of useful information on the Net, and I would like to be able to collect it all on just one page. Even if I would spend half a day setting up such a page.

The farmers didn’t know it, but at the time, Danish Agriculture had already decided to develop a portal with personalisation features for farmers, thus the statements from the farmers were taken as a clear signal to proceed with the planned portal and in April 2005, the portal called Landmand.dk was launched.

Landmand.dk was developed on the one hand to rationalise Internet presence of the different bodies under Danish Agriculture, and on the other hand to make it easier for farmers to utilise the Internet. There are approx. 45.000<sup>1</sup> farmers in Denmark (2004 census) – 38.500 of these are members of the organisation Danish Agriculture. The object of Danish Agriculture is to handle the interests of Danish farmers – i.e. professional, political, social or cultural interests. The organisation works for all farmers, irrespective of farm size, branch of production or special fields of interest.

Danish Agriculture works through three bodies

- The secretariat in Copenhagen, which focuses on political and organisational issues,

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<sup>1</sup> Approx. 22.000 of these are full time farmers with 5.700 specialised in dairy production; 5.800 in pig production and 5.800 in plant production.



- Danish Agriculture Media, which publishes “LandbrugsAvisen”, the largest weekly farming news paper in Denmark,
- Danish Agricultural Advisory Service (DAAS), National Centre in Aarhus, Jutland, which is one of two levels in a unique advisory system where the farmers are both the owners and users of this system. The primary task of DAAS is to provide technical know-how and service to about 60 local advisory centres which are located throughout the country. These centres, which are owned and managed by the local organisations, give the farmers advice on biological, technical, economic, educational, IT and social issues. In this two-level advisory system DAAS plays the part of a development centre, and it serves as an "advisor to the advisors" and utilises the Internet based information database LandbrugsInfo (Hansen & Hørning., 2001; Hansen 2004) for this purpose.

The secretariat of Danish Agriculture has a web site; “LandbrugsAvisen“ has a web site; there is LandbrugsInfo, which also are accessible by farmers and also most of the 60 local advisory centres have web sites. In the end, development and maintenance of all these sites, is paid by the farmers.

Most Danish farmers do have access to the Internet (see table 1) and they use the Internet in relation to their farming. There is however, a disproportion between the information and services offered to the farmer and the amount of time he is able to spend in front of his computer. Especially, when considering that most farmers are not experienced Internet users. Therefore, just finding the relevant information and services is an error prone and time consuming task.

To solve this and at the same time focus on cost-effective ways to utilize the Internet in Danish Agriculture, drove the decision to develop a common technical platform to be used by all bodies of Danish Agriculture, and to place a portal with personalisation features on top of this platform, so to offer the farmer a common entrance to Internet based information and services.

**Table 1.** Access to the Internet among Danish farmers. Results of a survey Autumn 2005 (GfK, 2006). For comparison, the number in parenthesis shows the values for households in Denmark.

No access to the Internet	16 % (14 % <sup>1</sup> )
Modem connection	28 %
ISDN connection	13 %
DSL connection	43 % (36 % <sup>2</sup> )

1) Statistic Denmark (2005)

2) Eurostat (2005)

## 2 The development of Landmand.dk

The development of Landmand.dk was initiated in the middle of 2003 as part of a larger project aiming at establishing a common technical platform for Danish Agriculture. The group at DAAS responsible for LandbrugsInfo was assigned the task of leading the project including the coordination of wishes from the different bodies, the selection of technical platform/CMS and writing a preliminary set of requirements, which formed the basis for a tender.

### 2.1 Technical issues

Landmand.dk is developed on a Microsoft Sharepoint Server (SPS) platform. SPS offers a number of out-of-the box facilities, but it is also obvious that SPS has its strength when the users are skilled pc users. Therefore,

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much effort had to be put into developing a better user interface and shielding the farmers from the more complex possibilities in SPS.

The system is scaled to handle 100.000 registered users each having a personal site and 50.000 page views per hour. This performance has yet to be tested.

Before Landmand.dk, all Danish farmers who are members of Danish Agriculture were registered in a database maintained by Danish Agriculture, but the same farmers were also registered in databases at one or more of the local advisory centres.

As a solid user data base is a prerequisite for offering personalisation, a new database common for all bodies of Danish Agriculture was built. Existing databases have been merged into this database, and it is now used by Landmand.dk, local advisory centres, Danish Agriculture and LandbrugsAvisen.

The user database holds information about who the farmer is and what he is allowed to see and do on Landmand.dk. There are also a number of attributes describing the farmer's interests and his kind of production system. The latter information will be used to filter information and target new possibilities, when these are developed.

## 2.2 Content and services

To help establish which kind of content and services would fulfil the objective of *making it easier to be a farmer*, we asked farmers by using methods of focus groups and card sorting tasks (Maurer, 2003):

- With the purpose of clarifying the farmer's priorities for information and services, they were asked to group approx. 60 cards (cards with graphics in fig. 1) in three groups: What they would like to see on their starting page; what they would like to be able to find on a second level and finally the kind of information and services, they did not find useful. Weather and market information, personal links, a Google search box, early disease warnings and a clipping service delivering newspaper coverage of agriculture were some of the most popular.
- With the purpose of uncovering their mental models for how farmers group different subjects, a hierarchical tree with 136 nodes (=menu items) for a fictive advisory centre site was made. The name of each node and a short explanation was written on cards (cards with text in fig. 1), and the participants were asked to sort the cards in groups with related subjects. A cluster analysis on collected data revealed a very clear preference for grouping items by production areas – e.g. extension staff specialised in dairy production should be placed under Dairy production and not under Advisors.

The gained insight was - along with considerations concerning availability of information/services and time and cost for development - used to select content for Landmand.dk. An incomplete list is presented here:

- General utilities such as Google Search, address search, etc.
- Localised weather forecasts
- Localised forecasts for grass growth
- Weather observations (soil temp., evaporation, precipitation, etc.)
- Market information
- Feed planning for beef cattle
- Break even calculations
- Irrigation Manager
- On-line investment calculations
- Variety-Info Database (Jensen, 2001)
- Plant Protection Agent Database
- Disease warnings
- Important dates (regulations, applications, tax statements, etc.)
- For dairy farmers – comparison of own results with groups of dairy farms
- News feeds from 50 different sources
- Danish Field Database / Field Maps Online
- Plant Protection Online (Jensen et al., 2000)
- Access to own data for milk cell count; herd information, medicine usage and milk quota usage (under development)

Static information and tools are typically accessed via a simple link, whereas dynamic content and services are presented in web parts<sup>2</sup> allowing the user to get an overview in a quick glimpse.



**Figure 1.** Examples of material used in card sorting task. Cards to the left for prioritising content; cards to the right for uncovering mental models.

<sup>2</sup> A “web part” is a modular unit of information that consists of a title bar, a frame, and content. Web parts are the basic building blocks of a My page.

### 3 Landmand.dk – user’s perspective

Landmand.dk was launched in April 2005. It is designed with five tabbed pages (see fig. 2). There is a general start page that covers common farming aspects, and there are pages targeting dairy producers, swine producers and farmers with arable farming. These pages are business as usual – the site owner decides what to present.

The interesting part is the so-called My page (“Min side”). A user has to identify himself to login to this page. If he holds a full membership of Danish Agriculture, the name of his local advisory centre will be shown – it is “LandboSyd” in fig. 2 – and a web part with logo and contact information for his centre will appear as seen in the upper right corner of fig. 2.

After login his options include:

1. selection of web parts,
2. customisation of web parts,
3. selection of navigation elements and customisation of these,
4. establishing single sign on (SSO) to other sites,
5. layout of page(s)

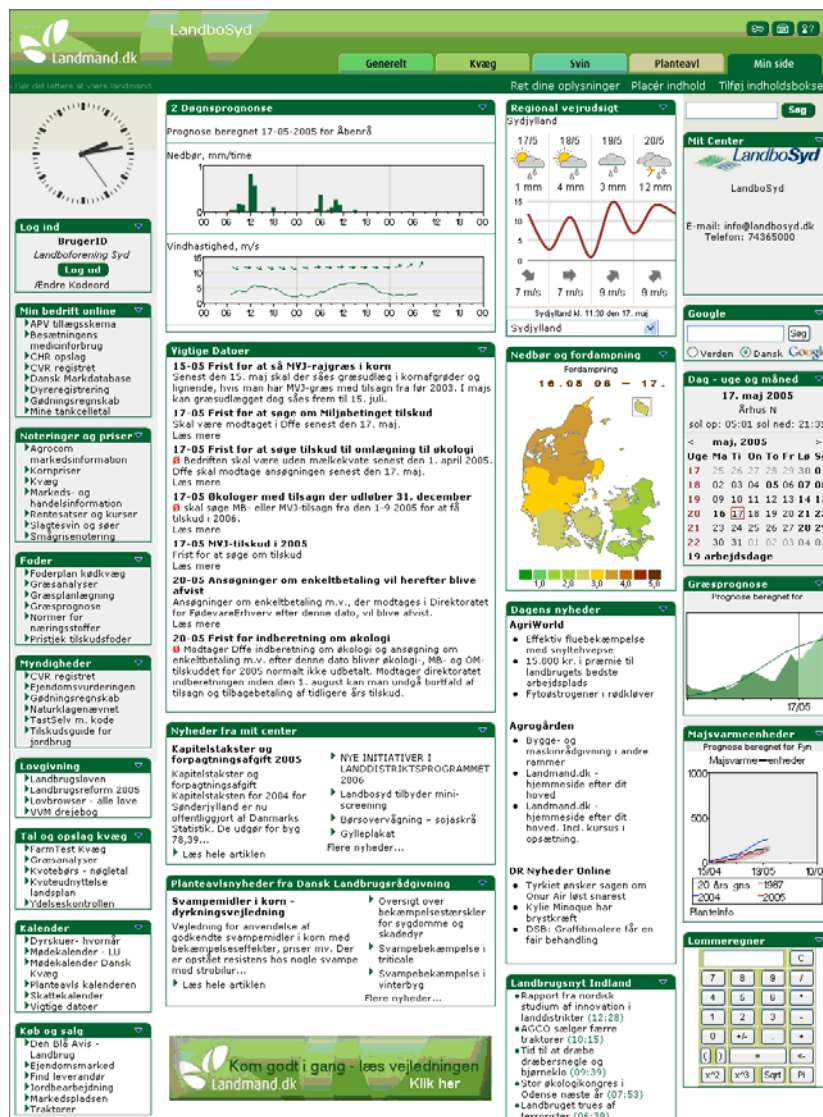


Figure 2 Screen dump of a My page from Landmand.dk

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### 3.1 Selection of web parts

At present, the user has 59 different web parts to choose from and more are under development. Selecting a web part is done by marking desired ones with a checkmark in a pop-up window which presents all available possibilities ordered in different groups. It is possible to select several instances of the same web part. By customisation, same web parts will present different content.

### 3.2 Customisation of web parts

When on the user's My page, most web parts can be customised using the appropriate tool panels. Examples of customisation include:

- Weather forecast: The selection of the location for the weather forecast by selecting a square on a map of Denmark. Each square covers 10x10 km. Choose the presentation of prognosis for precipitation, temperature, humidity and/or wind speed & direction.
- Daily news: Select between 45 sources of news organised in 11 groups. News from local advisory centres accounts for 21 sources at present. Choose the number of headlines per news source.
- Important dates: This web part shows, in timely manner, information about deadlines to example for applications of subsidies; tax payments or changes in regulations / restrictions. To avoid cluttering the list, the user can state that he has organic plant production and then this information will be used to filter the important dates, thus he avoids information concerning dairy production or use of pesticides.
- Day calendar: The user enters his postal code, which the system uses to control which times are shown for sunrise and sunset. The user can choose to see only this or also a calendar for the current month showing the week numbers and working days.

### 3.3 Selection of navigation elements and customisation of these

The left column of Landmand.dk is designed to hold a number of web parts with links. This way, the user can build a My page with a left side navigation as it is common on web pages. When such a web part is selected, it might show 5-7 links. These links are a subset out of a total that might be as high as 35-40 links. The links that are presented to the user to start with, are determined by comparing user attributes with information about the links. If the user is not happy with these, he can open a tool panel and select/deselect links from the complete collection on the specific web part.

### 3.4 Establishing single sign on (SSO) to other sites

At present, there is SSO to three external sites (LandbrugsInfo, PlanteInfo, Landmandsportalen) and a benchmarking application. The user selects a synchronisation web part in which he states his login credentials to the external site once. SPS remembers these credentials and takes care of an auto login to LandbrugsInfo. There are also SSO to a number of sites for local advisory centre using the common technical platform.

### 3.5 Layout of page(s)

Using standard SPS drag-and-drop, the user can arrange the layout of his My page. There are small left and right zones; wide top and bottom zones and left middle and right middle zones. Zones adjust to fit the widest web part it is holding. This means that a user can make a really messy page, but with a bit of care, it is possible to layout pages fitting an 800x600 screen (avoiding the use of middle zones) and 1024 x 768 (using middle zones but not top/bottom zones).

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## 4 User reception of Landmand.dk

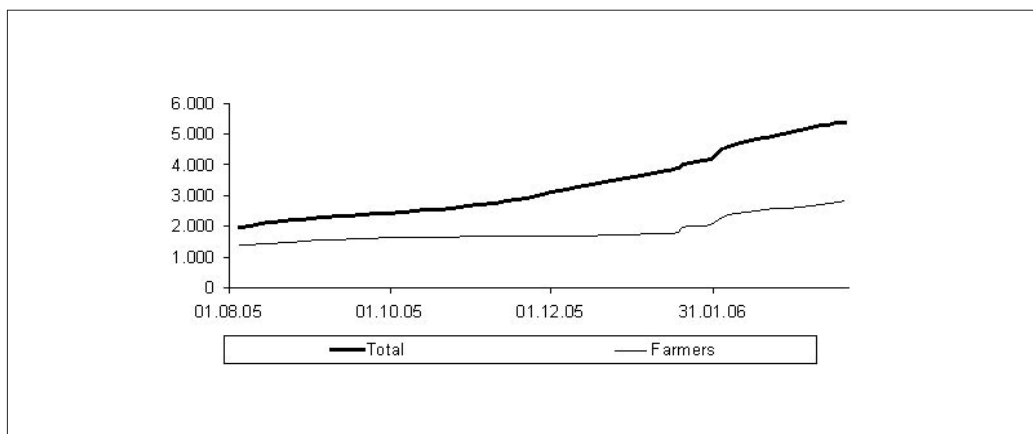
### 4.1 Subjective response

Prior to the launch, the portal was presented in a beta version for the public in January 2005 at Agromek - the largest annual agricultural mechanization exhibition in Northern Europe. Here, it received the prize as the most important new product. The prize committee consisted solely of farmers.

Since then, we have presented landmand.dk at a number of meetings and conferences, where we in face-to-face situations have demonstrated and helped farmers getting started with Landmand.dk. The responses have been very positive and overwhelming with expressions like *This made the trip to this meeting worth while* or *Wow, this is clever*.

### 4.2 Facts

Looking beyond the subjective responses gives a more nuanced picture. At present, (March 2006) Landmand.dk has 5.500 registered users. Of these, 2.900 are full members of Danish Agriculture. As it can be seen in fig.3, the growth rate number of users has increased a bit in 2006.



**Figure 3.** Registered users on Landmand.dk over time

On week-days, Landmand.dk has around 1 000 sessions with an increasing tendency, see fig. 4. The actual number of sessions is higher, as we at present count sessions by using the IP address, user name and a session time-out, the latter is 15 minutes. This means that users, who do not have an unique IP number and are not logged in, might not count as a session if somebody else with the same IP number already is on the site.

There has been a total of 1.648 different users logged on the site in the last 30 days<sup>3</sup>. 8 % of these were logged in “yesterday”; 19 % had been on the site in the within the last three days; 35 % within the last week and 55 % in the last fortnight.

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<sup>3</sup> 20-02-2006 – 21-03-2006

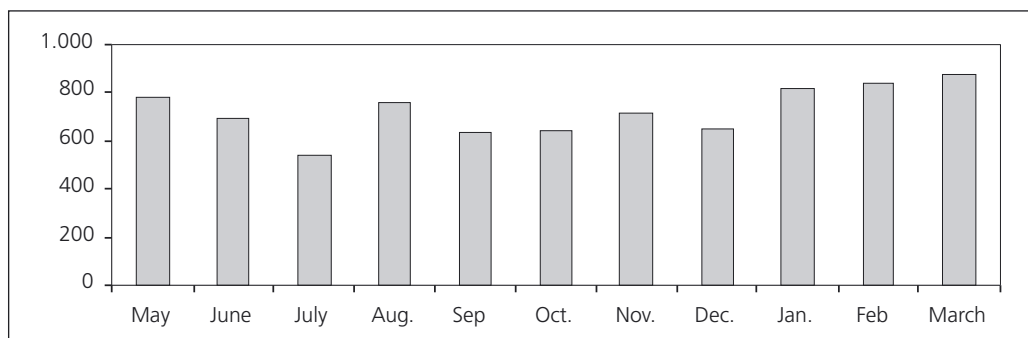


Figure 4. Average sessions per day

In fig. 5, monthly page views for the homepage in general, My page and the cattle profile page are compared over time. The increase in page views in August was probably caused by a positive article in LandbrugsAvisen and the increase in January can be explained with the presence of Landmand.dk at the Agromek agricultural exhibition.

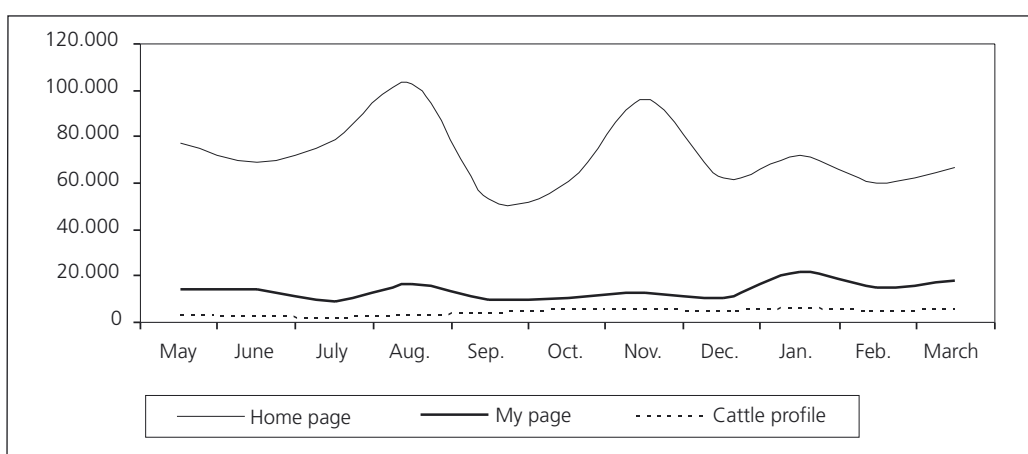


Figure 5. Page views over time for Landmand.dk

In a recent survey (Gfk, 2005), 1.106 farmers answered which sites they use in relation to farming. In table 2, the use of Landmand.dk is compared with the five most popular sites. It is worth noticing that a farmer can actually get key information from these sites on his My page or jump to the site with SSO.

Table 2. The farmers' use of Landmand.dk compared to most used sites of a farming business relevance. GfK (2006)

	Each day %	Once a week %	Once a month %	At rare intervals %	Never %	Site not known %
Landmand.dk www.landmand.dk	1	5	6	11	42	35
Landmandsportalen www.landmandsportalen.dk	9	17	15	12	22	21
Danish Meteorological Institute www.dmi.dk	9	17	14	18	19	21
Danish Crown www.danishcrown.dk	1	13	10	13	34	29
Danish Agriculture www.danskladbrug.dk	3	10	15	18	27	26
Landbrugsavisen www.landbrugsavisen.dk	4	9	10	16	35	25

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At Agromek 2006, we were present and helped farmers setting up their My page and showed them how to do it. Now, two months later, analyzing more than 50 of these users' usage of their My page in the last month reveals that

- 65 % has not logged on again;
- 19 % has had three or more visits;
- 17 % has had only one or two visits;

The analysis also reveals that since Agromek, 40 % never logged on to Landmand.dk again, or at the most two times before they stopped using the site. An explanation to this low degree of returning users could be that the visitors at an agricultural exhibition include a much broader spectrum of farmers. For example farmers who are unaccustomed with the general use of a computer or farmers with a slow Internet connection (41 % according to table 1), who simply show interest at the exhibition, due to the fact that the service is free.

## 5 Discussion

Landmand.dk is developed to fulfil the needs expressed by users, and the users pay positive lip-service to the portal. Still, the use of the portal is not overwhelming. Several reasons contribute to this:

- Initially, some users had technical problems with their registration – this has since been solved. Furthermore, users can now call a hotline, which will create their identity on Landmand.dk on the spot. Another problem, which unfortunately did not come to our attention until after the launch, is a huge overhead of approx. 650 K java script and style sheet files, which the underlying Sharepoint platform has to load for a start. This has partly been solved by using http compression techniques but still the site is very slow if not using DSL. As it can be seen in table 1, only 43 out of 100 farmers have DSL, although this number is increasing very fast.
- Many farmers cannot figure out how to compose a My page. They might succeed getting the relevant web parts on their My page, but a number of these needs further customisation, i.e. pin-pointing the precise locality for the weather forecast, choosing the relevant news sources, and establishing a single sign on. Also, the arrangement of web parts on the page seems difficult for the farmers – the page ends up being a mess. If they cannot manage to create a useful My page, the idea with Landmand.dk is out of sight. Our response to these problems has been to make the web parts more intelligent e.g. letting the weather forecast web part choose locality based on the user's zip code, even if this might not be completely accurate. And just recently, we have launched a free service, where a farmer can fill out and submit an online form, which we then use to create his identity and a My page in accordance with the information he supplied us with.
- Does Landmand.dk offer the right content and services? The answer is yes according to our interaction with the users. It is also striking that it is possible to compose a My page, in a way that the user gets the cream of content from the popular sites shown in table 2.
- At present, the user has to key in his credentials to access his page – for security reasons it was decided not to offer a "Remember password" functionality. Users are complaining about this, and even if it is a small obstacle, it might bear the blame for the low usage of My page. It will be changed in the near future.

Landmand.dk has a growing number of services, but the major part of content on the site is still information. As such, Landmand.dk is up against a general lack of preference among farmers for receiving information via the Internet or other electronic methods (Jensen et al., 2003; Howell & Habron, 2004). We expect to gradually



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overcome this barrier, as we develop more services specifically related to the individual farm, such as data visualisation, simulation based on own data and elements of integrated farm management systems

## 6 The future

In its current state, Landmand.dk is just the tip of the iceberg, we will see it developing to in the future. The foundation, in the shape of the common user database, the SPS framework and strong organisational settings are the base for further development. This will include serving the user his own data from different, already existing systems and a number of small portal residing tools, for example electronic versions of compulsory log books for spraying operation and control of crust on manure tanks.

It is essential for the user that he is able, not only to access relevant information directly on the portal, but also to locate information which is not on the portal. To solve this, a search function will be developed, which will be highly customised towards retrieving agricultural information. This customisation will involve specialized dictionaries as well as the use of advanced ranking algorithms. The aim is to provide all types of users with optimal search results.

Farmers do not spend much time in front of their computer. Therefore, a portal like Landmand.dk shall also be made accessible on handheld devices (smartphones, PDA) or other kinds of ICT equipment in the farmers working environment (ubiquitous access). With a structure using web parts as building blocks, it should be possible to distribute pieces of a My page to such devices.

The possibilities for sharing further development with other countries will be investigated. Being based on standard Microsoft software, it should be possible to use the same framework across different countries and languages.

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## References

- GfK 2006. InternetMonitor® 2005, GfK FarmScan. En kvantitativ undersøgelse blandt landmænd. Job 772-084, GfK Danmark A/S.
- Hansen, J.P., 2004. Supporting local advisory services by dissemination of information over the Internet. In: Nowoczesne techniki Informacyjne w nauce, edukacji i doradztwie dla wsi i rolnictwa. Materiały z konferencji. September 16-18, Brwinów, Warszawa. pp. 51-61.
- Hansen, J.P. & Hørring, A., 2001. Re-organizing information architecture of a large agricultural web site - why and how. EFITA 2001. Third conference of the European Federation for Information Technology in Agriculture, Food and Environment, June 18-20, 2001, Montpellier, France. pp 187-191
- Howell, J.L. & Habron, G. B., 2004. Agricultural Landowners' Lack of Preference for Internet Extension, *Journal of Extension*, 42, 6 [Online] <http://www.joe.org/joe/2004december/a7.shtml>
- Jensen, A.L., 2001. Building a web-based information system for variety selection in field crops - Objectives and results. *Computers and Electronics in Agriculture* 32(3): 195-212.
- Jensen, C., Thøgersen, J. O. & Jørgensen, T. 2003. Analyse af økologiske landmænds informationsbehov og-kanaler. Landbrugets Rådgivningscenter, Skejby.
- Jensen, A.L., Boll, P.S., Thysen, I. & Pathak, B.K., 2000. Pl@nteInfo - A web-based system for personalised decision support in crop management. *Computers and Electronics in Agriculture* 25. p. 271-294
- Maurer, D., 2003. Card-Based Classification Evaluation. Online: [http://www.boxesandarrows.com/archives/cardbased\\_classification\\_evaluation.php](http://www.boxesandarrows.com/archives/cardbased_classification_evaluation.php)
- Statistic Denmark, 2005. Nøgletal om informationssamfundet Danmark – 2005. Danske tal. Statistic Denmark and Ministry of Science, Technology and Innovation. Copenhagen, 62 pp. Online: [http://www.vtu.dk/fsk/div/presse/2005/danske\\_tal\\_01\\_62.pdf](http://www.vtu.dk/fsk/div/presse/2005/danske_tal_01_62.pdf)

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# The development and application of central data bases in Icelandic agriculture

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## Background

The Farmers Association of Iceland (FA) is an umbrella organization representing all sectors of agriculture. It is not only a farmers union, in the narrowest meaning, but also has an important role in supervising the advisory (extension) services, organizing and operating national breeding schemes for livestock, as well as enhancing miscellaneous development programs within the agricultural sector.

FA has a staff of 50 people, of which 18 are advisors or livestock specialists, 13 belong to the computer department and 5 are concerned with publication and PR work. This staff is in direct touch with farmers as well as providing support, advice and technical means to the local advisory centres, which now are six in different parts of the country.

One of the basic pillars of livestock improvement is performance recording on the farms in combination with individual assessment and progeny testing in varying proportions. The collection and analysis of these breeding data has always been in the hands of FA, which has, through the years, built up central data bases with breeding and production data for sheep, cattle and horses. At present, around 90% of all sheep and dairy cattle are recorded, while this figure is somewhat lower for horses. It was first in the late 1960s that computers were first taken into use, and in 1974 all breeding records for cattle and sheep had been computerized and were kept in main-frames.

Around 1990 the policy was reinforced that farmers and advisors alike should be encouraged to make the most possible use of the computer technique in their breeding work and in farm management in general. Hence it became an increasing activity within FA to develop specialized computer programs or adapt existing programs for specialized needs of farmers and / or advisors. The initial programs were all developed for stand-alone personal computers (PC's).

## Program development in the 1990's

The first program put forward by FA was **"BÚBÓT"** - an accounting program, first introduced in 1989 and updated annually ever since, until three years ago that it was replaced by a general accounting program which was adapted to farm accounts. This program was not, and still is not, connected to any database, but reports can be sent via Internet to the Tax Bureau and via e-mail or on discs to the Agricultural Statistics Bureau. The new program can also provide the user with various financial analyses and reports. It is now used by or for over 1000 farmers, or about one third of all farmers in Iceland

The next programs were developed to bring the registration of livestock data to the farms and, at the same time, provide the farmers with tools to analyse better their breeding flocks and assist in various farm planning tasks.

**"FENGUR"**-a Window-based PC-program on LAN (intra-net) was opened in 1991. It was designed for systematic gathering and management of horse breeding data. The first breeding evaluation by the BLUP

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method had already been carried out, but with “FENGUR” the BLUP-evaluation became more reliable with increasing amount and quality of data.

“**FJÁRVÍS**”-a program for sheep farmers was taken into use in 1994 and is still in use. This is a DOS-program for PC's. Data transfer to and from the central base is via e-mail or on floppy discs. About 1/3 of all record keepers register ca. 50 % of all sheep data through this channel.

“**ÍSKÝR**”-a program for dairy farmers was rented from Norway (Info-Ko) in 1999 and adapted to Icelandic needs and developed further. This is a Windows PC-program, for which FA developed a communication pathway to and from the central database; however that means of communication is relatively complicated. It is only being used by some 15 % of dairy farmers.

The last Windows-based PC program to be mentioned from the 1990's is called “**NPK**” and was designed to keep records of land cultivation, field management, soil composition analysis, fertilizing plans and application, harvesting data etc. The program is used mainly by the local advisory services on behalf of farmers. Most fertilizer suppliers offer the program free of charge to their customers, but FA maintains a data base with information on all available fertilizer types, composition and prices, which the programs can approach via the Internet.

## Internet access to the central databases

At the turn of this century, it became the main policy within FA to develop the service programs into central programs, meaning that for each data base there is one central program that all users access through an Internet browser. This system has several advantages:

- It gives the farmers direct access to enter data at any time and fetch the most recent reports / results available. Thus, they are always working with up-to-date information.
- It stimulates the users to register their data themselves instead of sending written records. Furthermore, employed registrars can be located anywhere.
- Single data entry reduces likelihood of errors.
- Safer data management as daily back-up is taken on powerful and secure servers and there is no use of individual back-up systems for data.
- Better and cheaper service to users and more frequent updates of programs.
- Single program for all means that everybody always works on the same version, eliminating the problem of incompatible data.
- Makes it possible to work with huge databases with ordinary PC-computers, as the data is kept on a central server and the processing takes place there too.

However, for this system to function properly, we must have sufficiently good Internet connection throughout the country, which is still not the case in Iceland. It is, however, the Government's policy to provide adequate Internet connection to every dwelling place in the country that so wishes. In 2002 it was ratified by law that the minimal standard to be fulfilled in rural areas should be 128kb/s Internet speed in accordance with EU legislation (ISDN used in Iceland) and that has been achieved nearly 100 %. Experience has shown that this is not satisfactory today for some of our reciprocal systems, i.e. there are too long delays when entering massive data sets. Already, several rural areas have gained high speed Internet connections and, recently, the Minister for

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Telecommunications announced that such or similar connection will be available anywhere within four years. So, we continue our development and shall now describe briefly what exists and what is being developed.

The first database to be made accessible over the Internet was the horse data base through a new program called **World-Fengur**. It was decided, in co-operation with FEIF (The International Association of Icelandic Horse Owners) to develop the program / base as the studbook of origin for the Icelandic horse and serve owners and breeders of Icelandic horses in all countries.

World-Fengur was developed using JDeveloper tools from Oracle and the data base is in Oracle 9i version. This development tool was then fairly new and made it possible to construct a system on the Internet, such that the only item needed to access the system is a web browser and a connection to the Internet. Subsequent development of other databases has also applied the Oracle tools.

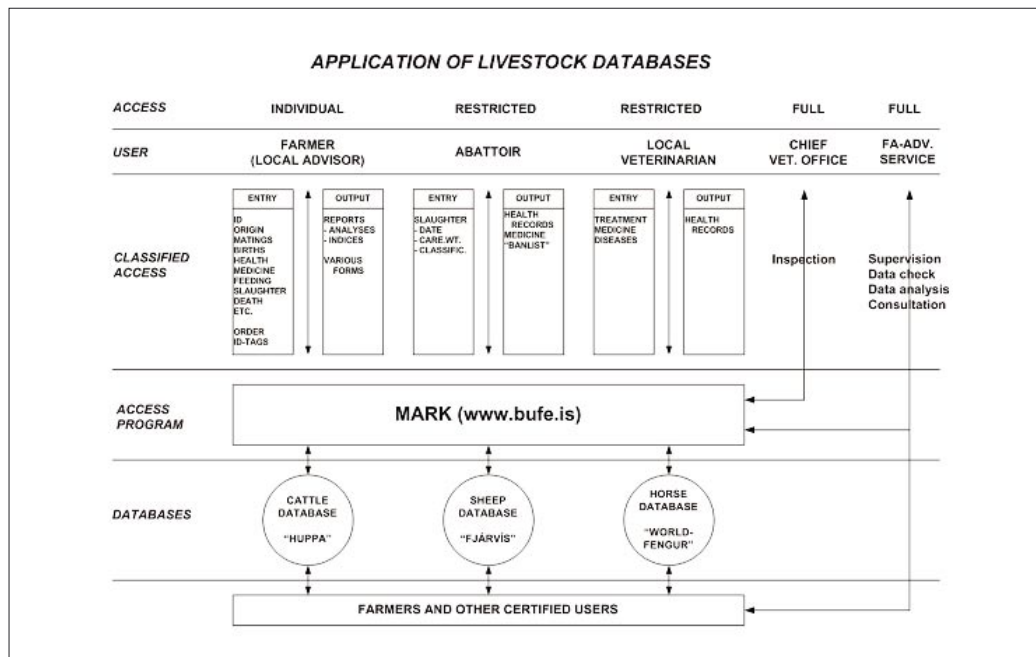
World-Fengur is the most advanced central data base program owned by FA. It was designed to serve breeding associations internationally as well as individual farmers in Iceland and presently serves breeding associations in 14 countries. There is a strict access control and an international standard for data entry, namely FIZO. Unique ID numbers had to be established for all horses, breeders and owners and standardized codes for all data stored in the base. While there is just one data base, it is managed in sections, one belonging to each country, and it is the registrar of the respective breeding association who is responsible for fulfilling the registration rules. Horses born outside Iceland can only be registered if their ancestry can be traced to Iceland (i.e. pure-bred Icelandic) and, thus, they all must find links to the Icelandic "core-base".

World-Fengur now accommodates comprehensive information on some 300.000 Icelandic horses in 22 countries. Subscribers are 2.500 in 16 countries.

In 2002 a new regulation was ratified in Iceland making individual identification of livestock compulsory, initially cattle, horses and pigs and subsequently sheep. This involves as well compulsory recording of ID, origin, movement, health, use of medicine, slaughter / death etc. very much in line with corresponding EU regulations.

FA takes care of all the record keeping, using the existing data bases for each species, but a special central access program, **"MARK"** was designed and is being developed to take care of all necessary registration and outgoing reports. MARK is developed for the Ministry of Agriculture in cooperation with the Chief Veterinary Officer.

Here again, the access control has to be very strict. One of the main objectives of the system is to secure traceability of animals and their primary products. For instance, once the system is fully operational, the veterinary inspector of a particular



abattoir will be able to look up health and medical records for animals that have been booked for slaughter in the respective abattoir. It will be the responsibility of the local veterinary officer who treats each animal to register that treatment if it is subject to a certain withdrawal period prior to slaughter or milk delivery. An attempt is made to illustrate this interplay in the accompanying diagram.

Last year, some facets of the dairy cattle base were opened to farmers over the Internet via the program "HUPPA", which is based on the same principle as described before, and presently a new sheep system "NET-FJÁRVÍS" is being test run among a selected group of farmers and will hopefully be fully operational next year. That is a complete system incorporating all requirements of the national sheep breeding program, a voluntary quality control system that is in place and the recently imposed ID-registration system. A major step forward is that the abattoirs will register carcass weight and classification of all lambs instantaneously after slaughter, which allows the farmer to work out results from progeny or performance testing schemes without delay and incorporate the results into new breeding indices.

The first obstacle encountered by those farmers testing the new system is the lack of speed in entering data in long series, e.g. after weighing several hundred sheep, writing down the ID's and weights and then wanting to "pump" the data into the computer; then there is an annoying time lag following the entrance of each character. This can not be entirely blamed on slow Internet connection but is to some extent an inherent shortfall of the program, for which a solution is being sought. Independent of this, while partly solving the problem, the system is being adapted to read data series from a palm (hand) computer which is a handy terminal for data transfer, whether by manual punching or by reading electronic ID-tags, weighing scales or other monitoring devices.

## Future development

So far, the Internet programs have only been developed for the pre-existing livestock databases as has been described. Much work remains to improve and advance these systems. Furthermore, we see a wider potential in this technique and are beginning to plan the construction of two new central databases. Firstly, there is a base for farm accounts to serve two purposes: (a) To provide a better tool than we have today to for analysing individual farm accounts, for management planning and to strengthen financial advice. (b) To improve the collection of agricultural statistics in general. Secondly, FA is negotiating with a private firm that has taken digital aerial photos of nearly all inhabited land in Iceland, to get access to such photos of all farms. If this materializes these photos will be centrally stored and combined with a program that can trace boundaries and

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calculate areas of individual grass fields or other definable areas and store all relevant information for each piece of land. This system would take over, and very much improve the function of the current NPK-program that was previously mentioned.

## Summary and conclusion

We have in this paper briefly described the development in data management and computer services offered by the Farmers Association of Iceland to members and local advisors. This development, to great extent, originates in a massive collection of livestock production and breeding data over many decades that was gradually computerized.

The emphasis in recent years has been on making the best possible use of the databases by designing Internet-accessible computer programs for reciprocal flow of data and analysed information between the base and the user. The benefits of this are undisputable in accelerating all flow of information and simplifying all data management. Thus, it is clear that this technique was the prerequisite for the international cooperation around the horse data base World-Fengur, which has proved very successful and serves as a good marketing tool as well as a studbook of origin for the Icelandic horse. As for the new sheep system, farmers in Greenland are already exploring the possibility of making a contract with FA about taking up the same recording system and buying all computer work from FA in Iceland. There are no borders between countries on the Internet. Similarly, we see the great benefits from getting direct data flow in to the system from sources like abattoirs and veterinary services and, no doubt, this can and will be developed much further.

However, we must always be aware, when opening up central data bases with data from many private sources, in some cases of sensitive nature, that access control must be very strict and in accordance with official standards.

Finally, and not least importantly, the central Internet programs that we have described generally require high speed Internet connection, and this can be problematic, particularly with services aimed at remote rural areas. The sensitivity of this depends greatly on the amount and structure of the data that needs to be transmitted.

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# Verkkokaveri “The Net Mate” Information Service Promoting eBusiness for SMEs

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TIEKE Finnish Information Society Development Centre has a key networking role as a neutral and non-profit organisation. It promotes the efforts of its public and private sector members to create viable tools and expertise for use in the information society.

TIEKE’s membership mirrors an entire spectrum of Finnish society and all key players in the information society, totalling to more than one hundred organisations and companies. Members represent business enterprises who develop, manufacture, market, and support ICT products and services, as well as companies and organisations who deploy ICT in their operations. Also several ministries and public agencies, some of them directly involved in the promotion of Information Society development, have joined TIEKE’s membership.

TIEKE’s main functions reflect the rapidly changing ICT environment in being flexible to change course from time to time according to need. As of today, TIEKE’s main focus is on the development of networking and interoperability.

## TIEKE and eBusiness

TIEKE promotes eBusiness in Finland and internationally. It provides expertise and services both to companies and individuals. The aim is to provide standards, practices, and policy for the international eBusiness of the future.

In addition to promoting and developing international trade procedures, TIEKE works in eBusiness and eTrade advancement projects and acts as an expert and promoter of information transactions between companies (EDI). Our operation includes development projects as well as the provision information services.

TIEKE’s principle is to distribute information collected through networks of experts openly and equally to all interested parties. In addition to the free services, TIEKE offers a few information services, which require a password and have membership fees. The interest groups of electronic commerce are ICT-experts, business developers, small and medium sized enterprises, and individual citizens.

## Verkkokaveri

Verkkokaveri Information Service aims to promote new ICT tools and services for SMEs. The goal is to promote the usage of ICT and to try to motivate SMEs to develop their ICT skills. Also networking and eBusiness are promoted in the Verkkokaveri Information Service. The service is free of charge. Verkkokaveri also brings forth other services aiming to help SMEs.

The service is provided by TIEKE and The Employment and Economic Development Centre together with a large network of experts. The service is financed by the Ministry of Trade and Industry and the European Social Fund.



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The service is available at the moment only in Finnish: [www.verkkokaveri.fi](http://www.verkkokaveri.fi)

**Verkkokaveri Information Service contains:**

- General information on eBusiness and subsidized services for SMEs
- Answers to frequently asked questions (FAQ) about eBusiness
- E-mail newsletter about current developments in the field
- Data bank containing CASE examples of the SMEs adopting ICT
- Guidebook for SMEs on how to use ICT
- Information about ongoing projects that help SMEs

## DataBank of SMEs' IT experiences

DataBank contains IT experiences by small and medium sized companies. The data collected into the DataBank will serve as examples on how SMEs can benefit from, and enhance their business with, information technology and electronic data interchange.

## Bring Your Experiences to the DataBank!

Any SME may submit its own information independently or authorize their contracted IT service providers to do it on the company's behalf by using the electronic forms available in the DataBank's website. Before submitting case information, it pays to visit the DataBank's website and study especially the model Case of the Month. Submitting information is easy. Just provide the following information:

- Company information
- Intended aims
- Completed procedures
- Gained benefits
- Tips for other SMEs
- Company logo / pictures (optional)

## Nation Wide Visibility

The DataBank serves as a tool for the SME Advisors serving in the nationwide chain of Employment and Economic Development Centres. Thus, the presented cases in the DataBank ensure the IT service providers with high visibility and an outstanding opportunity to market their services among SMEs, those planning IT implementation as well as those taking their first steps in the use information technology. Presented cases assure the potential customers of the given IT service provider's knowledge of the SMEs' specific needs and expertise they have in carrying out the project.

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## Well Executed IT Project is a Valuable Reference

All participating IT service companies are free to use the DataBank as a reference to demonstrate their know-how in implementing a successful IT project. Fruitful partnering with a satisfied customer and seamless cooperation between both parties serve as unbeatable testimonial of know-how!

## Up-to-Date Image for SMEs

An SME able to demonstrate its IT expertise conveys to its operating environment an image of a modern company profile: customers and other partners will see the company as an outstanding example of an up-to-date and competent IT user. A comprehensive DataBank also serves as a valuable tool for SMEs to further their operational IT capacity.

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# Anywhere, anytime? The Northern challenge to ICT developers

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Let us start with examples of situations experienced presently in remote northern parts of Scandinavia:

1. Adults living in remote villages are recruited by regional development organizations to participate in distance education projects. The new ways of promoting competence development that are offered through Internet are to be tried out. In the students' evaluations as the projects end, they conclude that at the times when it would actually have been most suitable for them to log on to the course sites, they did not have Internet access. Alternatively, the activity level among the students fades out after a while, and when the reasons are investigated, the same circumstances are found to be the root.

No Internet access at the time you want it – what is the problem? In the context of northern Scandinavia not necessarily that the connections that exist are unreliable, but probably to a larger degree that they do not exist in the places where people actually are when they could have spent a moment or two by the computer. Ms. Marianne Wollman, computer professional and owner of the small firm Reindata in Kirkenes, has noted this problem in education projects among Sámi reindeer herding communities in Norway. It is easy to imagine how during long hours just waiting, keeping watch over the herd or being stuck in a hut for days during a snow storm offer moments, when spending time doing course tasks would have been convenient; rather than when coming back to the village or town and there are so many things one has to get done before going out again.

2. On a cold winter day an editor in London calls a researcher in Luleå, whose presence at a conference will be covered in a publication. The editor asks for help to reach Lena, a photographer whose pictures were used in the researcher's presentations during this conference. The publisher wants to use one of the pictures in the publication. Of course an agreement for that purpose must first be reached with the photographer herself. The editor is getting desperate. "I have tried her home number *and* her cell phone number for weeks, and sent numerous e-mails. Now the deadline is almost here, do you have *any* idea of how to find her?"

It showed that at the time Lena was in the mountains with her snow mobile, gathering reindeer. Thus, she could not be reached by any means. Lena is a reindeer herder as well as a photographer and a guide. As many inhabitants in rural areas Lena makes her living from combining a variety of self employment and employment in often quite disparate branches. Some of her income is dependant on her spending time in wilderness areas. In the example told above, she did come back shortly after the editor had called, before the deadline, and thus earned some income from the publishing rights for the picture, as well as an international reference to her portfolio. But it was a matter of days. A simple e-mail in more convenient time would have lessened the risk of loosing this opportunity, and made the editor's life a bit easier. In this case a few days delay in the e-mail service would not have mattered, compared to weeks of no response.



Picture 1. Reindeer herding. Photographer Lena Kuoljok-Lind.

3. A local political party contacts the Swedish National Rural Development Agency. The party requests an investigation regarding the access to infrastructure and public service, for a population which they specifically represent in their municipality assembly, namely reindeer herders. Within the party it has been noted that, although a basic aim is to promote the interests of reindeer herding families in local decision making, it has shown difficult for the reindeer herders themselves to represent the party in the assembly, or otherwise participate in the political processes in the municipality.

The reason to the observed problem which the party members have found is that, as they are travelling in unsettled grazing areas much of their time, reindeer herders have virtually no chance to follow the political processes close enough. Documents, inquiries etc. that are basis for meetings are not available to them prior to the meetings, they have limited chances to participate in the party's preparatory discussions in between the meetings or even to take leisurely contacts and chat about the current topics. And so forth.<sup>1</sup> It appears as the possibility to download cached web pages when the opportunity occurs or periodically send and receive e-mail, could make a difference to this situation.

## The challenge

Access to the Internet is today acknowledged as a major tool for economic, social and democratic development. Without doubts, the capacity to establish communication and deliver information, virtually irrespective of time and place, is one of the qualities of what we currently know as Information and Communication Technologies (ICT). Still, the existence of a "digital divide" blurs the rosy picture. In his "IT challenge to Silicon Valley" of 2002, UN Secretary General Kofi Annan addressed the "digital divide", and stated that:

"The new information and communications technologies are among the driving forces of globalization. They are bringing people together, and bringing decision makers unprecedented new tools for development. At the same time, however, the gap between information "haves" and "have-nots" is widening, and

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<sup>1</sup> The contact resulted in a report by Information Officer Mats Elg, "Service and infrastructure at the Saami summer sites" published by The Swedish National Rural Development Agency in 2002. The report is available as pdf at <http://www.glesbygdsverket.se>.

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there is a real danger that the world's poor will be excluded from the emerging knowledge-based global economy.”<sup>2</sup>

In general discourse, the digital divide is referred to in terms of South vs. North, where the north is the well-off part. True as this may be, there are varieties also within these two categories. We speak then, about divides within the divide. A closer look at the “North” reveals how, for instance, regions in the far north and the Arctic face a problematic situation. With all respect to the fact that the regions of the far north are generally integrated in wealthy nations, and to the difference this makes compared to the digital divide problems facing the South, many inhabitants of the so to speak “northern parts of the northern countries” are de facto among the “have-nots” of the digital divide. Among the have-nots of the very north we find those families among the Arctic Indigenous peoples who remain the traditional life style, together with a wide spectrum of non-Indigenous residents and locally based industries. To actually reach the potentials of enhancing democratic participation, prosperity and good quality of life for the far north, that may lay in the creative use of ICTs, the low population density, wide unsettled areas and unique cultures put demands on connectivity and access in quite other terms which are offered for urban and settled areas. As we suggest with the choices of examples above, one reason for requests on ICT access being challenging, is that important economic as well as social processes and events regularly take place in unsettled environments. At the same time the inhabitants and industries of the far north must be able to interact with is a society which built on quite other premises. The deep meaning of relations to wilderness and unsettled areas to inhabitants of the far north is perhaps best described by the fact that these areas are crucial for passing on cultural values, skills and tacit knowledge between generations. This goes for the Indigenous residents, but also for the non-Indigenous and mixed families who in many northern areas make the majority. Also these people who “normally” live and work in cities and little towns choose to relocate to unsettled areas when possible and for certain occasions.

For ICT services to be of genuine relevance, they must be available when people need them, are able to make use of them. This is common sense. In the far north case, this condition means, among other things, that



**Picture 2.** *Hunting is a traditional part of Northern lifestyle. Photographer Lars Öderyd.*

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<sup>2</sup> Source: <http://news.com.com/2010-1069-964507.html?tag=lh>, see also <http://www.unicttaskforce.org/>

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access should be available at the places where people actually are when from their perspective the time is right for making use of it. Thus connectivity is a key issue; connectivity and access – and in the meaning of access we put in factors such as costs.

## The potential

The three examples we set up as introduction to this paper, indicate that technical as well as business models for the far north need to be developed for a sustainable development of the very northern regions of the world. In this set we see, inspired by Kofi Annans challenge to Silicon Valley, a Northern challenge to ICT developers. A difference in the northern challenge to IT developers, as compared to the challenges phrased by the South, is that when it comes to funding and other resources meeting, the challenge is a matter for instances within our own nations, more than the international community. In the case of those EU members such as Sweden and Finland, the challenge is also a matter for the EU. This is why the challenge is here described as a challenge put by the North. Indeed, few capitals are situated in the Arctic, excluding, of course, Brussels. The far north challenge stems from north of the capitals, north of the centers for our nations and EU.

“But what you are talking about is already possible, so what’s the deal?” someone might say, referring to that satellite connections are (supposedly) available everywhere. While innovative use of satellite connections is certainly a part of what Arctic residents are now heading for, we find that in scenarios that truly constitute the heart of usability, such as described in the three examples referred in this paper, satellite connections mean costs that everyday people cannot afford.

After establishing this, the next question could be: “If the access problem cannot be solved even by (the omni present) satellites, is there any realism in discussing these matters at all?” We think so, but also that finding successful solutions is a matter of attitude more than anything else. Generally, the issue of improving infrastructure and ICT access in rural and remote areas is apprehended as a matter of cost – how much are governments willing to offer in order to maintain an acceptable standard of living also in the remote areas of the rich nations? Seldom, it seems to be expected in the public debate, other than that money being invested in infrastructure in the remote areas will end up in year after year of undertaking and subsidiaries for running the networks. Also, we track certain impatience and expectations that the one and only solution must arrive, that it will in one stroke solve the problem and take the full burden away, before it is worth dealing with the problem.

Being what can be labeled “ICT developers” ourselves, we are of another opinion, and expect that investment will be rewarded, specifically at this moment of time. Our optimistic expectations have to do with timing. What we envision, is not investments in infrastructure imitating that developed for urban areas, but in original and user oriented research and development, including demanding scenarios such as suggested in the three examples above. The key is that new connectivity technologies are presently evolving, that build on dynamic and mobile structures rather than the fixed infrastructures, that have hitherto been the sole option for every-day users. Among these technologies we find 802.11, 802.16, Delay Tolerant Networking, Peer-to-Peer, digitalization of mobile phone systems such as the 450MHz band, innovative use of satellite connections. Some of these technologies are commercialized while some other still require research, development and testing.

Thus, participating at this point of time will open doors to truly forming solutions to one’s taste, and to being masters of the systems in some sense, as opposed to barely being consumers paying for what may be offered at the market. This paper is not the place to refer in detail these new mobile technologies and how they carry potentials for the remote northern areas. But Peer-to-Peer technologies, for instance, allow users to operate in areas with little or no Internet connectivity, without having access to centralized servers. The distribution

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of information is obtained by adding information locally, and then sharing this information with peers whenever possible. This means that when a device (e.g. handheld PDA, mobile phone, or other form of a mobile computer) discovers the possibility to communicate with a peer, it will “automatically” do so. A “peer” in this sense may be someone coming into vicinity, or it may be a stationary outpost of some sort, where other mobile peers are likely to pass by.



**Picture 3.** Remote areas require special ways to access, not only concerning Internet..

## SNC and CroCoPil

The shift in technology regime from fixed to dynamic and mobile connectivity may mean more than “just” getting better ICT access. A potential appears for rural and remote areas to get involved and actually take a lead in forming the new technologies and the requirements which they are to meet. In this equation, the users and their cooperation is the running point. The reason is not solely a matter of fairness, but also of technical and innovative quality as they are likely to put up the authentic and complex problems that will eventually spur authentic development. The dynamics between use and development is well known. In accounts for the history of the Internet and ICTs, for instance, the fact that users and developers have often been the same people is put forth, as one of the factors explaining the progress and success of these innovations.<sup>3</sup>

For making use of the potential offered with the technology shift as described above, the EU Interreg III A project CroCoPil was developed in 2004/2005, and started in 2005. CroCoPil is short for Cross-border Co-operating Pilot Network. The project is based on user driven requirements and user involvement in order to test and evaluate new and existing solutions. At the core we aim to use evolving technologies to stretch Internet access towards the very limits, via exchange and pilot cases set up as cross-border co-operation networks in remote locations of northernmost Scandinavia. Norut IT and Kirkenes Kompetansesenter Norway, Luleå University of Technology, Sweden and Kemi-Tornio Polytechnic, Suomi-Finland make the basis, and together we bring in an array of “demanding” user groups, including residents/civil society, small businesses and industry. Our hopes to succeed in the CroCoPil project, as well as our expectations that the model can be used in wider circles, stem from own experiences in earlier projects. To show how these experiences have evolved and the shape they have taken, we shortly describe the Sámi Network Connectivity (SNC) example.

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<sup>3</sup> See e.g. Manuel Castells, “The rise of the network society”, Blackwell Publishing 1996.

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Sámi Network Connectivity is on the one hand a project which is lead from Luleå University of Technology in Sweden and that runs 2004 – 2006. On the other hand it is also a networking concept. This, in fact, is its true basis. Originally, SNC evolved from an initiative to develop women’s entrepreneurship and influence in Sirges Saami Village; *Kvinna i sameby* (KIS). Translated to English the title is “Woman in the Sámi Village”. The KIS project leadership contacted LTU, with a number of questions including technical issues as well as an urge to analyse social patterns that put women on the marginal in the herding community. An array of research opportunities opened from the contact, including that of ICT access, and the interest to address the issue of Internet connectivity was raised. The connectivity opportunities in the area where the Sirges reindeer herders operate<sup>4</sup> are limited and unpredictable as there is no wired infrastructure in the area, only inconsistent wireless infrastructure, and satellite coverage that is expensive and intermittent. The SNC approach, which was first presented in early 2002, is based on the concept of Delay Tolerant Networks, in an Opportunistic Routing system using a mix of 802.11 hotspots and mobile relays. The project touches on several technical areas. Some of these areas still require research while others require innovative application of existing technology.

The strategy has been based on creating a duality between user participation and frontline standard in technology development. The latter is achieved through profound communication within what can be labelled the Internet development community. From start SNC development was integrated in the Internet standards organisations, specifically the Delay Tolerant Networking Research Group within the Internet Research Task Force. Still, we want to point out that in the SNC concept, the social ethos and principles are as important as technical sophistication.

*SNC summary - What do the SNC group aim for?*

1. Develop a system that provides robust connectivity at low and maintainable cost in the communications challenged areas where our partners herd their reindeer.
2. Robust connectivity will make implementation of ICT meaningful in their businesses (reindeer herding and supplementary), make new types of business development based on ICT use possible, and help in various aspects to maintain and even re-establish the life style connected to their Sámi nomadic culture, which remains as norm but is today very strained.
3. The SNC shall be developed in such a way that local people will be able to run the system as it is ready. Thus technology transfer is an aim.
4. The technology transfer will include promoting commercial exploitation of the connectivity system and production of software and hardware technology for the emerging type of connectivity SNC represents, in existing and new enterprises of various sizes.
5. In each step of the process it is possible to take action which ensures that something is gained locally and among the Sámi. SNC shall and must have such a character.

Among the results reached this far, we can mention an Internet draft, Probabilistic Routing Protocol for Intermittently Connected Networks (<http://www.sm.luth.se/~dugdale/publications/draft-lindgren-dtnrg-prophet-00.txt>), Internet Hot Spots being set up in the user community in the Jokkmokk area (e.g. [http://web.it.kth.se/~iw03\\_msi/index.htm](http://web.it.kth.se/~iw03_msi/index.htm)), and one or two locally owned high-tech business start-ups being on their way. To this list, a number of academic papers and also further research opportunities beyond SNC itself can be added. Conventionally, gender equality projects are not expected to lead to these kinds of results. In reviewing the SNC results, however, the project’s origins must not be passed by. They expose how thinking conventionally on either gender or location may lead the wrong way – along the road where opportunities are lost.

With this, we thank for your attention and refer to the project web pages: [www.snc.sapmi.net](http://www.snc.sapmi.net) and <http://www.cdt.ltu.se/~ZCROCOPIIL>.

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<sup>4</sup> The area includes national parks such as Sarek and Padjelanta.





**Picture 4.** Woman and children of the Spik, Kuoljok and Vannar families in Sirges Sámi Village, Jokkmokk, Sweden, taking a rest at Ulldevis by Norwegian border. Photo: Lena Kuoljok Lind.

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# SMEs behaviour and ICTs: building 'culture' into evaluation and intervention

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## Abstract

Policy statements supporting the roll-out of Information and Communication Technologies (ICTs) to micro-enterprises in rural areas contain many visions of being "smart and successful" SMEs. It seems obvious from such rhetoric that SMEs should be part of this evolving, competitive digital age, and that adoption of the technologies and their applications is therefore a natural business decision for any SME. However, findings reported from a number of sectors show the picture to be far more complex, such that 'evolution' from pre-digital to digital does not necessarily represent business sense for rural SMEs. This paper describes *research in progress towards building an evaluation framework which begins to incorporate socio-cultural components of decision-making in relation to ICTs*. I begin by outlining some of the research findings which inform, and underpin, this framework, and I then describe ICT models which can be developed further to enable the inclusion of those "cultural arbiters" (or filters) which shape SME responses to, and interactions with, ICTs in rural areas. The findings draw on work in Scotland, and the in-progress development research is partly-funded by an Equal Project Development Partnership (Scotland): "Widening Access in Smart Communities: Supporting rural and urban regeneration using current and emerging broadband ICT: a realistic evaluation study".

## Policy drivers & context of expectations

The terms "Information Society", "Digital Age" and "Knowledge Economy" are increasingly viewed as appropriate to describe the backdrop to 21<sup>st</sup> Century living. The largely metropolitan trend towards "24/7 connectivity" at high speed, facilitated through a range of Information and Communication Technologies (ICTs) and their associated infrastructures, are increasingly seen as the norm. There is, according to some commentators, an apparent ubiquity of access to always-on, high-speed, computer-mediated communication (CMC) through broadband-enabled email, websites and portals. This, in turn, skews channels of information and service provision towards online media. As stated by the OECD (2001), "The Information Society and the New Economy, based on virtual networking and knowledge oriented activities, are rapidly becoming a reality..." (p.15). The implications of this connected, international 'society' are highlighted in many European documents relating to *eEurope* and now *i2010*, for example:

"As the knowledge-based economy advances, the exclusion from ICT becomes more and more a barrier to economic, employment and social opportunities and to using public services. Disadvantaged areas and groups are at higher risk of lagging for various reasons including low income and poverty, lack of ICT infrastructures, awareness and training opportunities, or difficulties of access because of disabilities. On the other hand, ICT can overcome barriers of distance, distribute more equally knowledge resources, and generate new services... Thus, the risks of the digital divide need to be transformed to digital opportunities by actions focused at disadvantaged groups and areas." (European Commission, 2001, p.17).

Thus, remote and rural areas are said to benefit disproportionately from ICT usage, primarily because of the distance-shrinking and social inclusion potential of such media (Cairncross, 1997). Further, Grimes & MacLeod (2003) state that:

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“the Internet, and associated advanced services, have the potential to liberalise spatial barriers by way of e-commerce, and reduce the real costs of public service delivery through e-government. It can facilitate access to business networks, and reduce the transactional cost of information exchange. (pp. 2-3)

They highlight the EC rhetoric (1997, p.55) that ICTs lead

“naturally to a focus on the new growth and development opportunities in those regions which have traditionally been hardest hit by geographical development barriers” (EC, 1997:55).

And that further, The Committee of the Regions noted the significance of these developments in its response to the European Spatial Development Perspective (ESDP):

“Advances in communications technologies will...bring major changes in the siting and nature of economic activity...The ESDP rightly sees ICT as a means of overcoming the adverse impact of geographical remoteness on business start-ups” (COR, 1999).

At Member State level, for example in Scotland, we can see similar expectations of ICTs, not only in terms of overcoming geographical challenges, but also in terms of establishing a “digital revolution” where Scotland, and the UK, are centres of excellence and innovation. The following examples are illustrative. In *A Smart Successful Scotland* (Scottish Executive, 2001), the vision for the business sector is that:

“We are living through a revolution in digital telecommunications, affecting how most Scots and most businesses work, communicate and succeed. If we are not connected we shall not compete. **Embracing the Digital Age is not an option but a necessity for success.** And it has already arrived. Meeting the challenges of raising productivity, encouraging entrepreneurship, raising skill levels and connecting globally, will create a self-reinforcing upward spiral of growth. We need Scottish based businesses to be more creative and better informed about global change. We want the workforce to be better skilled and have a capacity to learn and re-learn and to be better informed about job opportunities. We want those detached from the labour market to be better placed to take up economic opportunities. We want widespread digital connections to speed information flow around Scotland and back and forth between Scotland and the world.” (p.7)

The Executive continues with the following statement:

“Our approach to globalisation must not be to resist change, but to embrace it. We need to be globally connected, integrating the Scottish economy into the world economy. We need to tell the world about Scotland and tell Scotland about the world. This will enable us to learn from abroad and earn abroad. To enable the improved flow of products, technologies and ideas in and out of Scotland, the measure of achievement will be making Scotland a globally connected nation.” (p.9)

To achieve this connectivity and innovative activity, the Scottish Executive recognise a learning and skills agenda, where “every Scot is ready for tomorrow’s jobs”:

“Our vision is of a high skill, high wage economy with a higher employment rate across many parts of Scotland. *In an age where knowledge is a key competitive weapon*, skills and learning need to be at the heart of the Network’s activities... Businesses must not to cling to old ways but to ensure all industries are using new technologies” (pp.9-10; emphasis added)

When referring specifically to the need for more E-Business, the Executive outlines the “challenge” and the “levers of change”:

“The CHALLENGE: E-business innovation, in existing as well as new firms, offers us a major opportunity to modernise our economy. E-business not only improves the efficiency of existing structures and supply chains; in many cases it leads to a transformation in the nature of those industries. In the business to consumer area E-business can deliver the so-called “double win” from outsourcing work (and thus cost) to its customers and at the same time improving customer satisfaction. The LEVERS: Using business advice and support, to improve the awareness and take

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up of E-business amongst Scottish companies in order to accelerate business take up, accelerate supply development, create the right environment for change, and support the development of the right skills.” (p.13)

When considering rural areas, and the need for high-speed, high-quality digital connectivity (in order for SMEs to be part of the Knowledge Economy), the Executive states that:

“Information and communications technology can reduce the constraint of peripherality and enable the development of a less geographically centralised economy ... there is real potential for the use of technology to make significant difference to many of the services and employment opportunities available to our rural communities.” (p.14)

When addressing businesses in rural areas further, specifically under the heading of “*The Way Forward: Framework for Economic Development in Scotland*”, we read the following:

“The CHALLENGE: Scotland can be a leading digital nation – not only a digital economy but a digital society. In so doing we would become one of the best places in the world from which to trade electronically. But success demands that Scotland is at the cutting edge of accessible, ubiquitous and competitive connections. This includes tackling the challenges of connectivity for more remote rural or disadvantaged urban locations and addressing digital exclusion. LEVERS: Collaboration by ... the Executive and commercial players... to promote on-line business models and help ensure that all Scots can benefit from emerging digital technologies. Their role will be as enabler, to ensure the widest possible dissemination of digital technology.” (p.15)

The above vision is consistent with Executive expectations of ICT from 2000, where the first Scottish Strategic Framework for E-commerce (2000) stated:

“The Internet is dissolving conventional boundaries. It is removing the restrictions of geography and time...[I]t is reconfiguring the economic map, opening access to a truly global economy. The business playing field is being levelled”. (cited in MacLeod & Grimes, 2003)

It is the conclusion of a number of authors, however, that these visions are not being realised to the extent initially expected. Grimes (2004) for example, observes that “It is clear, however, that despite the conviction of policy makers in relation to the potential which the digital economy may present to rural enterprise, and despite the obvious considerable efforts made by development agencies to promote and operationalise these policies, *the diffusion of sophisticated uses of the Internet in the form of e-commerce in rural Europe is moving quite slowly for a variety of reasons*” (p.1, emphasis added). Further, Cruikshank (2005) states that: it is clear that many SMEs are not taking advantage of this apparent opportunity”, citing Drew 2003, who comments “surveys in several European countries show that SMEs have been slower to adopt e-commerce than their larger counterparts” (2005, p.66). Further, Wagner *et al* (2003) comment that: “despite technology facilitating improved business practices in terms of developing electronic markets, electronic data interchange and Internet commerce, a number of SMEs have not taken advantage of this new mode of carrying out business” (cited in Cruikshank, 2005, p.66). Further, MacLeod and Grimes (2003) conclude that:

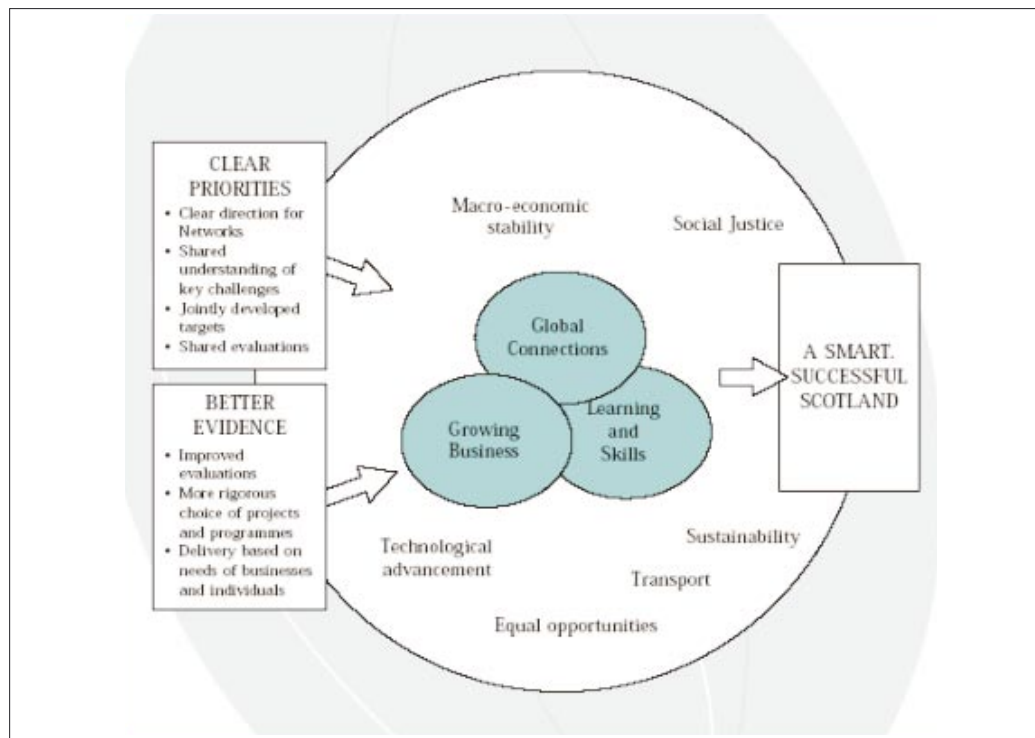
“One of the major weaknesses of much of the research in this area to date has been the absence of solid empirical analysis of the reality of how businesses in rural areas are coming to terms with such new opportunities. Policy formulation has been based, perhaps more on theoretical assumptions which may be difficult to justify, than on a close appreciation of the reality of challenges facing businesses in rural areas to exploit whatever opportunities that might be associated with the new technologies.” (p2.)

In order to debate and evaluate these discrepancies between vision and outcome, we need to identify, and synthesise, some key findings from research into SMEs and ICTs.

## Variable SME engagement with ICTs

Findings reported from a number of sectors show the picture to be far more complex than a simple willingness to adopt and progress. Thus, there is a need to investigate why an ‘evolution’ from pre-digital to digital does not necessarily represent business sense for rural SMEs.

Using the Scottish Executive’s vision for SMEs in a digital future, we can see some move, at least in their publications, towards considering a range of issues which includes, for example: “a shared understanding of key challenges”, “jointly developed targets”, and “delivery based on needs of businesses and individuals” (see Fig 1 below).



**Figure 1.** *A Smart Successful Scotland (Scottish Executive, 2001, p.18).*

So, what do other authors say are some of these key challenges, targets, and needs of the small businesses sectors?

## Differentiating between initial, and ongoing, ICT adoption

Davies, March & Evans (2004), in their exploration of SMEs in Wales, detail the business case and subsequent benefits of a broadband Internet connection and the barriers to further exploiting the potential of broadband within the business. “Our findings indicate that SMEs experience difficulty in maintaining the momentum behind the substantial benefits delivered by the initial quick-wins of adopting broadband. On implementing broadband they experience an immediate surge of acceleration which is subsequently slowed or even stopped” (p.7). Their research shows that there is a growing caution among businesses, particularly micro and small businesses, towards *further investment and expansion* of eCommerce; that businesses are re-evaluating their information and communication technology (ICT) strategies and seeking a return on existing investments. Specifically, they find that the “lack of knowledge/skilled staff” continues to be a significant barrier for SMEs

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and smaller businesses find it much more difficult to implement and so benefit from more sophisticated deployments of ICTs. (p.1). Further:

“Once they have gained these first-order benefits the SMEs appear to be unable to move to the next order of business benefits. This inability is comparable to applying a braking mechanism which decelerates, and even halts, progress towards realisation of the true potential of broadband.” (p.5)

They argue that - when evaluating SMEs’ adoption of ICTs - there is a need to analyse all aspects of the organisation, generating “an understanding of the impact of the desired changes and a means of embedding those changes going forward.” (p.5). This is because “the greatest business benefits of ICTs will be achieved as businesses make more sophisticated use the technology, however the greater the sophistication the greater the extent of organisational change, and therefore the skills required to manage that change.” (p.5)

Davies, March and Evans (2004) therefore stress that, rather than training in ICT-specific skills, SMEs need “training, coaching and hands-on support in business change management to enable them to use broadband as a catalyst to re-engineer their businesses... By employing business change capabilities they believe that they will create truly customer-centric businesses and in doing so will see a step change in the benefits that are delivered by broadband.” (pp.5-6).

This differentiation between initial and ongoing adoption and adaptation, is a point raised by Cruikshank in his paper (2005) reviewing SMEs in Scotland, stating that a better understanding is needed of “both ends of the e-business adoption scale, namely SMEs newly adopting e-business and SMEs making sophisticated use of e-business” (p.67). In concluding his paper, he argues that:

“It is important to distinguish between adoption and continuance. It is not sufficient for an SME to adopt e-business; exploitation is the key to success... a more realistic approach needs to be portrayed in order to ensure continued adoption and avoid disillusionment... The main benefits of e-business are not in the early stages of adoption but rather in the more sophisticated applications, such as online business processes. E-business needs to be exploited in the context of the overall business and not seen as something different” (p.85).

## Change agents and their role in increasing adoption

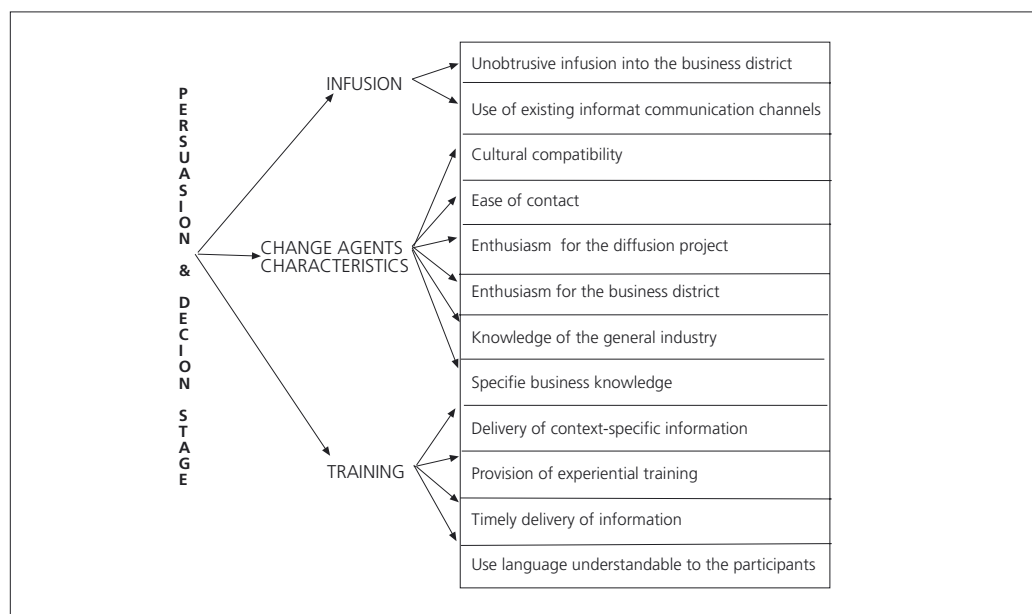
One way to understand such complexities as added value of continuance (and not just adoption) is the integration of “change agents” within the diffusion and adaptation of ICTs. Berranger, Tucker & Jones (2001), in their paper about a geographic cluster of arts and creative SMEs in England, identified and examined the role of “change agents” (people) in increasing SME-uptake of the Internet. Specifically, they:

“revealed that the unique way in which the change agents became infused into the local community had a significant impact on fostering mutual trust that led to successful Internet adoption. Furthermore, we demonstrate that the provision of customized training programs by the change agents was a critical success factor. Finally, we reflect on the successful diffusion projects and identify the characteristics of the change agents that were instrumental in ensuring Internet adoption.” (p.197)

They cite Rogers’s diffusion of innovation theory which defines change agents as “individuals who influence clients’ innovation decisions in a direction deemed desirable by a change agency”. They set the scene of the SME’s context as:

“Communication issues between technology diffusers and first-line adopters are ... neglected. From the technology supply side, there is a bewildering variety of information sources. Furthermore, the use of technical jargon and the rapid pace of technological advancement serve to increase the level of complexity and uncertainty faced by micro-businesses.” (p.200)

In this situation then, change agents act as “knowledge providers” whose responsibility it is to lower the knowledge deficiencies of potential ICT adopters (p.201); there are five elements of their interaction with SMEs viewed as critical to success: (i) effort in contacting clients; (ii) contact timing; (iii) orientation to client needs; (iv) compatability with client needs<sup>1</sup>; & (v) level of empathy with clients. These attributes are felt to be particularly important when considering ICTs and the Internet, due to information overload, so “by understanding the needs and problems of his or her clients, a change agent can selectively transmit to them only information that is relevant” (p.201). The authors’ perspective supports the assertion that adoption of technology is a **socially-embedded process**. Their synthesis diagram identifies those key elements within this social context which were successful to the change agents’ actions with SMEs:



**Figure 2:** Characteristics of change agents as critical success factors in the innovation diffusion process (Berranger, Tucker & Jones, 2001, p.206).

At the time of the research, when SMEs had adopted the Internet due directly to the intervention of the change agent, the findings show that:

“the interviewees now generally regarded the Internet as a strategic resource. This was a major change in perception from the start of the project. It shows the difference in perception from the general view about IT as an administrative and operational tool [13, 20, 26]. Benefits were also related to a better knowledge of the technology. This is a function of the training being tailored to the needs of participants as opposed to being set as a rigid agenda. All participants expressed increased confidence with the technology.” (p.14).

It is interesting to compare this with the other findings reported in this section, about how ICT resources can largely be viewed as operational rather than strategic in nature. Further, the “fitting” of resources to SME needs and norms is supported. This finding also links with Beekhuizen, von Hellens & Siedle’s (2005) research into SME adoption of ICTs in Australia, where they highlight a similar issue concerning strategic vision and horizon:

“...it is the responsibility of the small business owner/ manager to recognise opportunities and threats within their chosen target market... Studies suggest that “the reactive or proactive approach of owner/managers to rapid technological changes in the marketplace is crucial to ICT adoption and implementation” and that “managerial commitment and perceptions of ICT benefits are key features

<sup>1</sup> Knowledge of clients’ attitudes, beliefs and social norms is necessary if the change processes are to be noulded to clients’ needs. (p.201)

in this process”. Within the context of SMEs, there is often a need to respond very quickly to the changing needs of a very dynamic environment and industry. Organisations lacking this leadership are disadvantaging themselves. Management skills and relevant experiences become vitally important to the decision-making process relating to the timely adoption of new technology” (p.3).

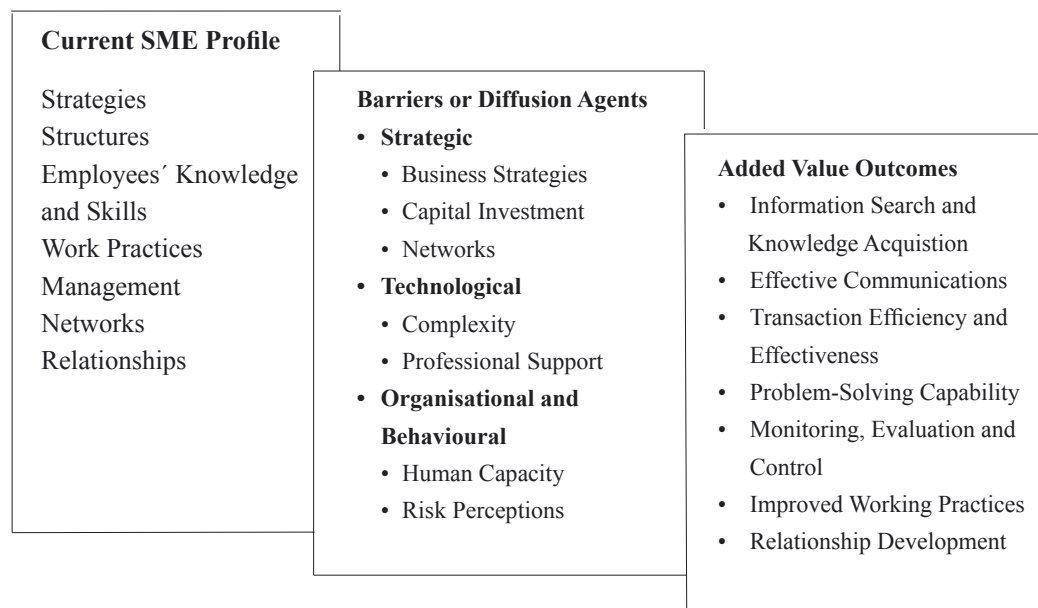
## Barriers to SME adoption of ICTs – from the literature

### Generally-recognised barriers<sup>2</sup>:

The OECD’s (2004) Report (undertaken by the Working Party on the Information Economy (WPIE), and carried out in co-operation with the Working Party on SMEs and Entrepreneurship) summarizes that, across the OECD countries:

“There is a wide range of reasons why SMEs do not make more active use of the Internet and ebusiness. Reasons vary widely among sectors and countries and are most commonly related to lack of applicability to the business, preferences for established business models, and the kinds of electronic transactions SMEs are involved in or wish to introduce (B2B or B2C). Common barriers include: unsuitability for the type of business; enabling factors (availability of ICT skills, qualified personnel, network infrastructure); cost factors (costs of ICT equipment and networks, software and re-organisation, and ongoing costs); and security and trust factors (security and reliability of e-commerce systems, uncertainty of payment methods, legal frameworks).” (p.19)

Similarly, Ritchey & Brindley (2005), summarise the barriers to ICT adoption by SMEs in the following figure:



**Figure 3.** *ICT adoption in SMEs, Ritchey & Brindley (2005, p.207).*

The authors state that:

“The empirical evidence and conceptual developments ... all seek to explain the relatively slower progress of ICT adoption by the SME sector. Accounts focusing on the technological dimensions, the organisational knowledge and the factors associated with the extant organisational systems, procedures, processes and structures provide only a partial explanation. The importance of risk and uncertainty, the need to recognise both internal and external relationships, the ways in which other agents or networks can influence these relationships and the importance of building trust within such relationships are further explanatory variables influencing the rate of adoption.” (p.209)

<sup>2</sup> See also Dixon, Thompson & McAllister (2002)



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**Barriers to e-work/teleworking by SMEs:**

Di Nicola, (2003) reports on the e-GAP consortium, which ran five parallel surveys in selected Regions in Finland, France, Italy, Hungary and UK (plus a comparative investigation in Japan), looking for variables that might influence the SMEs to move towards new methods of e-Work. The findings highlight that:

“essential technologies for e-Work development seem to be still not very widespread, as in the case of intranets and collaborative tools. Entrepreneurs state that the main problems, introducing new technologies, are the lack of time for training, the resistance to changes and the generational gap.” (p.7)

Specifically, with regard to the adoption of teleworking, Di Nicola notes that:

“From an organizational point of view, the degree of innovation seems to be low: project work is not widespread in the interviewed SMEs; management is still very hierarchical and the only widespread form of flexibility is related to new forms of labour contractual arrangements. Moreover, the most common management model is direct supervision and visual control of work: that is why working site-off is not yet a common practice and it is used mainly by managers and sales force.” (p.7)

**Barriers to e-commerce by rural SMEs:**

MacLeod & Grimes (2003), in their research as part of the AsPIRE European Project, found that the most frequent barrier towards developing an e-commerce strategy was that SMEs felt it was not an appropriate model for their type of business:

“These findings agree with other similar surveys of SMEs, which have concluded that digital technologies are perceived to have little to contribute to the business of SMEs, as they are unable to return commercial benefits”(p.12)

Secondly, they found that SMEs highlighted lack of knowledge and the cost of implementation, more than security fears, lack of technical support, size of customer base or difficulties with the company bank as barriers to e-commerce development. Small and micro-sized firms with limited resources felt constrained about making significant investments in strategies which have few clear indications of financial returns. Limitations also extended to releasing time and labour for training in ICTs, therefore perpetuating the problem of a lack of knowledge and skills. (p.13). Thirdly, this led in turn to the widespread use of external consultants for implementation of ICT and e-commerce strategies. The scarcity of skills for e-commerce development in peripheral, rural regions is well documented (Parker, 2000; Gillespie *et. al*, 2001). A lack of back-up services locally means firms are required to source external consultants, but at higher costs. (p.13)

**Further “rural” SME issues:**

Grimes and MacLeod (2003) highlight the fact that “online” worlds cannot be disconnected from the supporting and necessary infrastructure of offline worlds:

“while there is a growing appreciation that ICTs can contribute towards transcending the limitations of small rural market areas, investments in ‘hard’ infrastructures such as road and rail continue to be priorities for many rural firms in facilitating communications in their regions.” (p.15)

There are, of course, variations in rural SME responses to ICTs, and it is not intended to imply a uniformity of response. For example, Grimes (2001) in his literature review for the AsPIRE project, highlights first a study of rural SMEs in England, where Berkeley *et al* (1996) found significant disparities in the adoption of ICTs as a result of variations in: infrastructure, investment costs, business size, sectoral distribution, and awareness and training. A separate study found that firms were taking on ICTs at varying rates and for different purposes, with the variations being dependent on sector, size and owner-manager attitudes (Blackburn and McClure, 1998). Further, a study looking at the diffusion and adoption of new technologies among small firms of less than 150 employees in five regions of the UK, found that decision making by the owner-manager was the main reason for low levels of adoption by small firms, with owner-managers adopting the technologies where they saw these investments having a positive impact on the development of the firm (Southern and Tilley, 1999).

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In addition, low levels of adoption were associated with decision makers not seeing the reason to plan for IT, while high level users eased the technology into the firm through well implemented planning decisions. The study found that ‘the internal drive for ICTs requires a refined conceptualisation of the way the technology ultimately fits with the perceived business path’ (Southern and Tilley, 1999, 150). When technology expertise worked alongside business expertise, this led to greater levels of ICT adoption.

Finally, a study of 330 SMEs in a number of remote and accessible rural districts in three English study regions, which examined the relationship between innovation and the introduction of new technology, concluded that a remote rural location affected levels of innovation in firms (Smallbone and North, 2000). The need to overcome local constraints appeared to induce some firms to become more innovative than they would otherwise be. With respect to the use of the Internet by rural service firms, however, a remote rural location appears to have been a barrier to innovation. They suggest that additional costs of delivering effective business and technology support in areas where business densities are low, is slowing down the diffusion and adoption of new technologies. Lack of awareness of the advantages of the Internet may lead to remote rural areas falling further behind and becoming more marginalised.

## Improving SMEs uptake of ICTs

Fulantelli & Allegra (2003), outline a number of key elements to improve small companies’ awareness of ICT potentialities. Their observations are based on the findings of two extensive European projects addressing these issues, and can be summarized as: **firstly**, developing a full awareness of the huge potentials of ICT is the starting point for every attempt to introduce ICT-based processes in a company:

“Forcing the introduction of technology is one of the main reasons behind the failure of several attempts of the SMEs to become e-business organizations or simply to use ICT effectively for new services. The path to full awareness should move from introducing concrete and short-term benefits for the companies, followed by the presentation of more general and long-term advantages. Furthermore, by bearing in mind that the introduction of ICT in SMEs can bring a real modification in the way of working, the introduction of ICT-based processes should take into account the specific culture of the company: the background of the entrepreneur and/or the managers is important as well as their openness to innovation”. (p.4).

**Secondly**, ICT-based solutions should be introduced gradually: “sudden transformations risk to fail against unaware and unready business organizations.” (p.4). **Thirdly**, the issue of adequate training and support must be realized, since:

“one of the main difficulty for SMEs in exploiting ICT potentials is the lack of awareness of the benefits to be derived coupled with little or no specific training on ICT (both at application and methodological levels). The smaller the enterprise, the greater this problem becomes, since most small companies are not using information technology for their activities (apart from specific accounting services, and little more).” (p.4)

Finally, the author conclude that training should be ongoing, and should not only address technical issues, but also socio-cultural ones, since new trusted networks and links will need to be established and maintained in different ways:

“training on the socio-relational and cultural aspects is extremely important to develop awareness of the social implications of the introduction of new tools and methods of work and to perform the necessary organizational changes.” (p.4)

This conclusion links with the findings of Ritchie & Brindley (2005), who observe that:

“Information and communication technologies (ICTs) can significantly impact the market-oriented dimensions of products and services as well as manufacturing processes, working practices and

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management practices. ICTs can generate increased levels of uncertainty and put pressure on the firm's knowledge and skill base, individual roles and relationships, particularly in SMEs." (p.205).

These observations are further supported by Erumban & de Jong (2001):

"Hence, the socio-cultural ambience, perceived values, institutions and political atmosphere might influence the perception of the individuals within a society in a certain way and hence will impact the adoption decisions, along with the generally perceived economic factors. Rosenberg (1972) himself acknowledges that, "...in fact, the number of variables—social, legal and institutional as well as economic and technological—which might retard the diffusion process is virtually limitless" (Rosenberg, 1972 p. 29). Hence, it may be argued that the crosscountry variation in technology adoption is not only due to economic conditions but is also due to the prevailing social conditions." (p.3)

In concluding the paper concerning the low diffusion of teleworking amongst SMEs, Di Nicola (2003) states:

"the reason for this low diffusion must be researched in the effect of organizational cultures more than in technical problems. In fact, the inclination towards telework doesn't change in significant ways together with changes in technological equipment. This centrality of the cultural issues, raise, in our opinion, the need for future EU funded projects to focus even more on the approach of people to ICT, dedicating every effort in investigating the cultural aspects of new technologies." (p.8)

## Towards an evaluation framework: concepts and models

The above illustrative review of policy and of literature relating to the digital economy, and SMEs' adoption of ICT developments, leads to some key issues coming to the fore. If we accept the above research which highlights the multi-dimensional aspects of ICT adoption by SMEs per se, and then overlay this with "rural factors", we are faced with a range of issues which then need to be taken into account when devising an evaluation framework to assess the effects of ICT policies and programmes for SMEs. This is echoed by MacLeod & Grimes (2003), who argue that we may need to shift the analysis further, so that we can incorporate:

"...a shift away from technologically determinist and 'infrastructuralist' approaches to those that place a greater emphasis on soft infrastructures which relate to facilitation, networking, untraded interdependencies, social conventions and institutional thickness... The awareness of the need to bring about a series of socially (not necessarily economically) driven transformations in rural areas... towards creating the environmental conditions that can encourage local entrepreneurs to participate in the digital economy..."(pp.3-4)

The following models, which examine related and highly-relevant aspects of ICT deployment, are now briefly examined, to see what additional guidance can be gained for the subsequent phases of evaluation framework development.

## Models to underpin evaluation framework development

Firstly, McCown (2002a & 2002b) proposes seven characteristics that attract people to the sustained use of ICTs, in relation to Technology Acceptance Model: (i) Relevance, & therefore (ii) Motivation to use the resource; (iii) Adding value; (iv) Local information; (v) Quality; (vi) Credibility; (vii) Ease of Use; and Usefulness. These 7 points are based on two decades of research into the "problems of user resistance", where the two key variables of perceived usefulness and ease of use are long-recognised as central to user acceptance (2002b, p.186).

McCown also introduced the “construction of relevance” concept (2002a, p.4), where the relevance of the online resource is co-constructed between stakeholders, in order to ensure that it retains meaning and added value for all concerned (rather than being a top-down ‘solution’ to a perceived ‘problem’). This also means that it is fulfilling the user’s and public agency’s objectives – as users and producers of the online resource (2002a, p.7)– see below. McCown also highlights this “construction of relevance” as a process, during which the credibility of the resource is established. Thus, there are added benefits, in that not only is the product of added value to multiple stakeholders – so it the inclusive *process* that underpins its generation. Of critical importance here is the following statement:

“In this ‘mutual understanding’ relationship, intervention intent shifts from educating and persuading to recognition of and respect for other ways of viewing the world... Intervention emphasis shifts from *prescribing* action to *facilitating* learning in actions” (2002b, p.180; emphasis in original).

Another useful pointer from McCown relates to users’ preference for simplicity, for example:

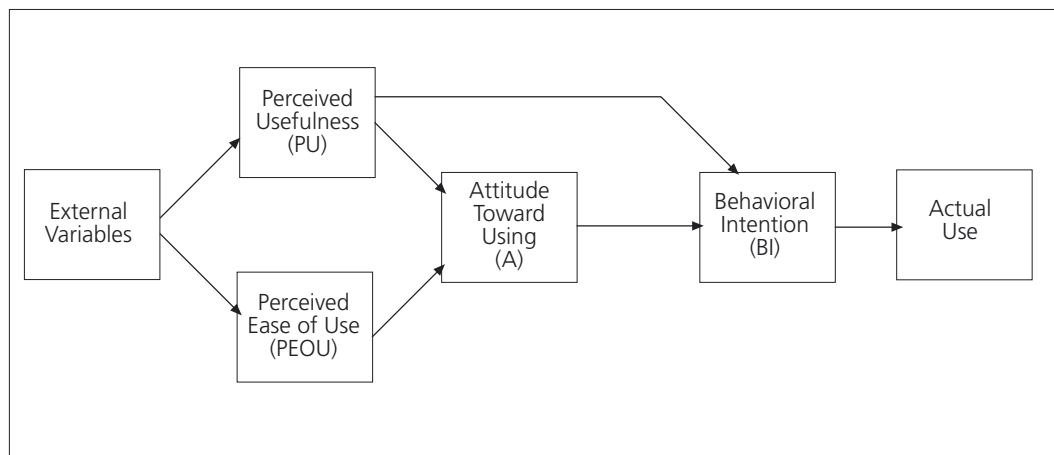
“Even when a DSS (decision support system) is adopted, farmers strive to achieve the designed benefit with minimal use of the formal instrument” (2002b, p.185).

Linked with this is the observation that use of the resource is not always consistent over time – there will be occasions when users need the information, the additional knowledge, the expertise, and times when they make no use of the resource whatsoever. This has been researched within the Technology Acceptance Model, and McCown (2002b, p.192) summarises the main argument as follows:

“... there is a *periodic* use phenomenon illustrated by the response of a farmer to my question to him, “Why don’t farmers use DSSs more?”. Answer: “*You need a doctor when you’re sick but not when you’re well*”... Farmers’ interest is high when they are wrestling with a change and the new uncertainties change brings.... (so) a farmer’s use history can be expected to be a *series* of use periods distributed in time, each trialling a specific management *change*, and each with a unique learning history” (p.192, emphasis in original),

The **Technology Acceptance Model (TAM)** is an information systems theory that models how users come to accept and use a technology. The model suggests that when users are presented with a new software package, a number of factors influence their decision about how and when they will use it. The main ones are:

- **Perceived usefulness (PU)** - This was defined by Fred Davis as “the degree to which a person believes that using a particular system would enhance his or her job performance”.
- **Perceived ease-of-use (EOU)** Davis defined this as “the degree to which a person believes that using a particular system would be free from effort” (Davis, 1989).



Source: Malhotra, Y. & Galletta, D.F. (1999), p.2.

**Figure 4.** Technology Acceptance Model (TAM) (Based on Davis et al. 1989).

The **Technology Acceptance Model** (TAM) (Bagozzi et al., 1992; Davis et al., 1989) assumes that when someone forms an intention to act, that they will be free to act without limitation. In the real world there will be many constraints, such as limited ability, time constraints, environmental or organisational limits, or unconscious habits which will limit the freedom to act (Bagozzi et al., 1992). Bagozzi, Davis and Warshaw say that:

“Because new technologies such as personal computers are complex and an element of uncertainty exists in the minds of decision makers with respect to the successful adoption of them, people form attitudes and intentions toward trying to learn to use the new technology prior to initiating efforts directed at using. Attitudes towards usage and intentions to use may be ill-formed or lacking in conviction or else may occur only after preliminary strivings to learn to use the technology evolve. Thus, actual usage may not be a direct or immediate consequence of such attitudes and intentions.” (Bagozzi et al., 1992)

Earlier research on the adoption of innovations also suggested a prominent role for perceived **ease of use**. Tornatzky and Klein (1982) analysed the relationship between the characteristics of an innovation and its adoption, finding that compatibility, relative advantage, and complexity had the most significant relationships with adoption across a broad range of innovation types. The sum of this research has confirmed the validity of the Davis instrument, and to support its use with different populations of users and different software choices. Malhotra & Galletta’s (1999) paper extends this work further, to include “**Social Influences**”. Their conclusions are that:

“Social influences play an important role in determining the acceptance and usage behavior of new adopters of new information technologies... **First**, decisions about adoption of new information technologies are often made by top executives at the corporate headquarters or by the top executives in the information systems divisions. Such decisions often do not involve the individual end users in the process. Left out of the decision-making process, users are not personally invested in the use of the new information systems. **Second**, the users may also lack an in-depth understanding of the capabilities of the new information systems thus resulting in less than optimal utilization of the functionalities afforded by the systems. In such scenarios, users often act in compliance with the top managers’ instructions, and their attitude is not derived from identification or internalization with the use of the new technologies. However, as suggested by our findings, social influences that generate a feeling of compliance seem to negatively influence users’ attitude toward use of the new information system. In contrast, users’ personal investment in use of the new systems and their better appreciation of the capabilities of the system would yield internalization and identification that have a positive affect on the attitude toward system use.” (pp.8-9)

Further, the **ICT and Relationship Transformation Model** (Ritchie & Brindley, 2005) incorporates three complementary perspectives when analysing SME adoption/non-adoption of ICTs:

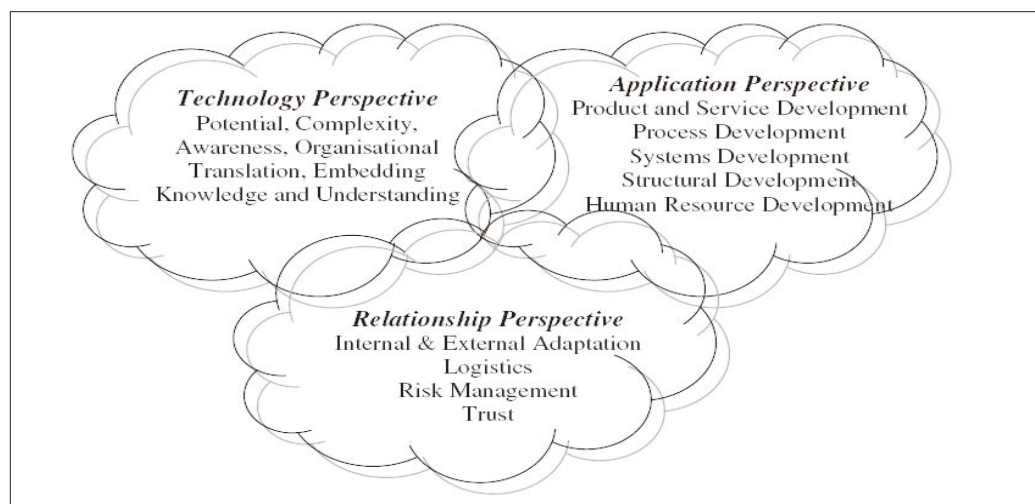


Figure 5. The ICT and Relationship Transformation Model, Ritchey & Brindley 2005, p.209

The authors outline case studies to support the need to take account of these three aspects when evaluating ICT adoption or rejection by SMEs. This will enable full account then to be taken on the effects of ICT adoption and how these must be “digested” by an SME:

“The challenge for SME management is twofold. **First**, the need to develop and implement strategies designed to change attitudes and embed a culture of preparedness to adopt ICTs throughout the SME, supported by appropriate human resource development plans. The key constraints are the availability of the required knowledge and skills within the SME and the organisational slack to commit the necessary resources to achieve these outcomes. **Second**, there is a requirement to recognise and overcome the inevitable concerns and uncertainties resulting from ICT adoption, combined with importance of promoting new approaches to relationships both internally and externally to accomplish this.” (p.216)

Finally, Dixon, Thompson & McAllister (2002), in their literature review focusing on the complexities of SMEs and ICT in England, propose that it is necessary to support models that allow for complexity of adoption, and specifically for the fact that adoption is not one-off, but is cyclic and multi-stage. The following two figures are extremely useful from their paper:

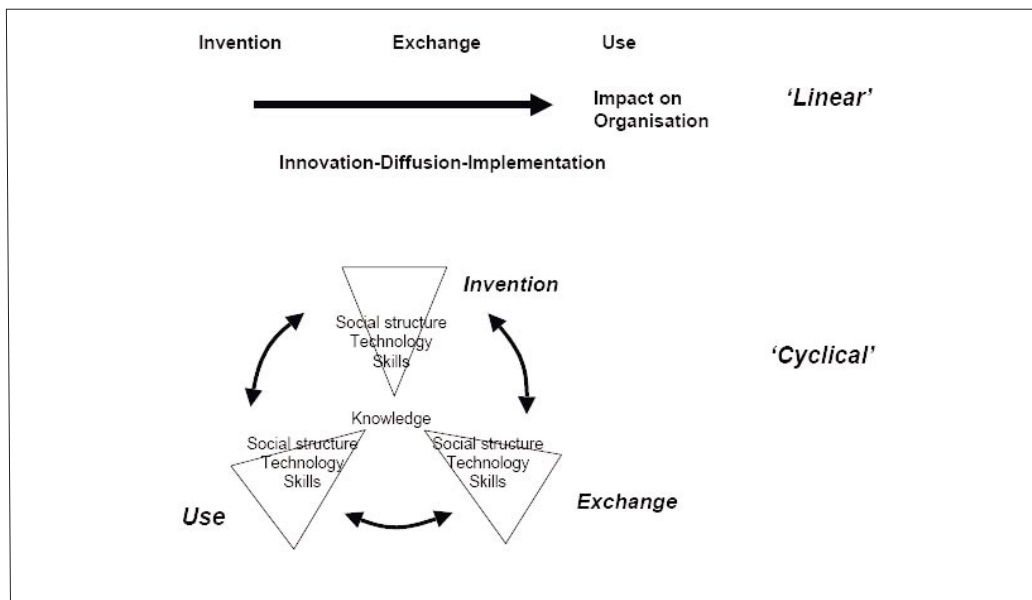


Figure 6. Two contrasting views of technological change (after Scarborough and Corbett, 1992)

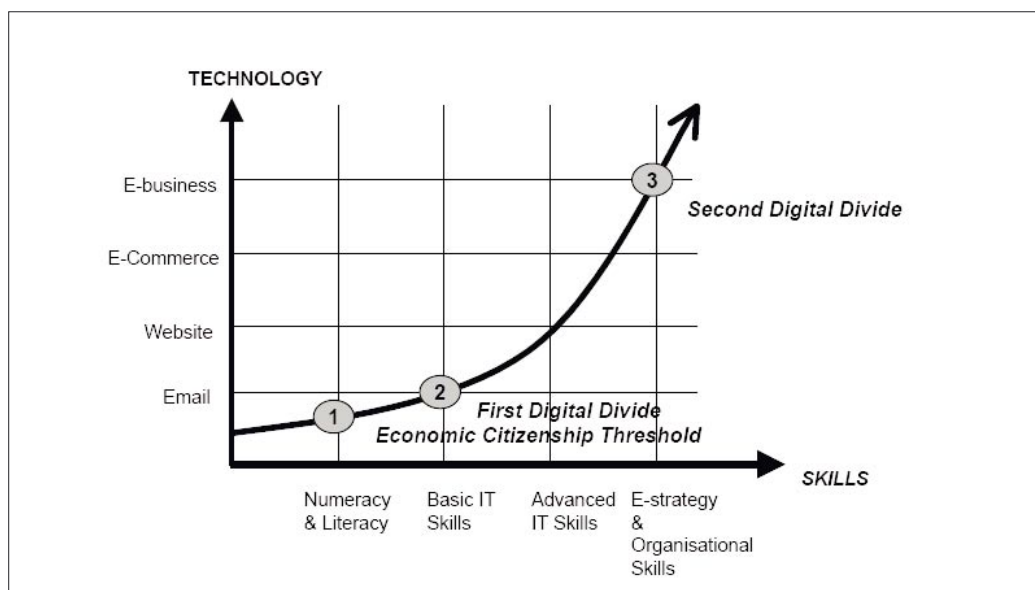
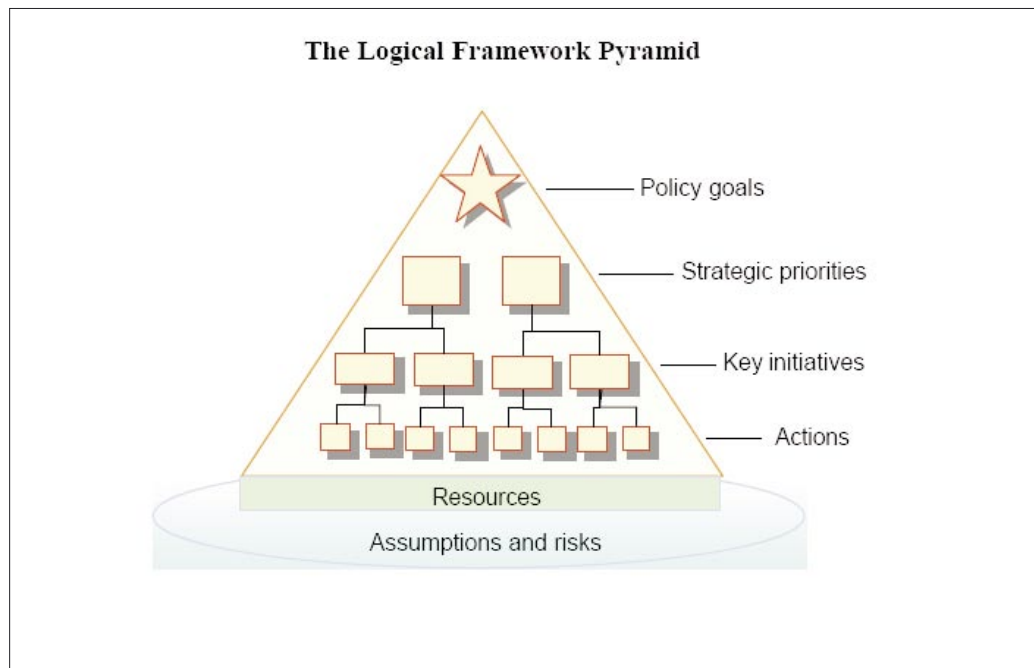


Figure 7. Local Futures model of ecommerce developments in SMEs (the 'e-SME' curve)

These two figures support (and further elaborate) the research of Davies et al (2004) and Cruikshank (2005) reported above.

## Evaluation frameworks

If we examine the above complexity from the literature review coupled with the brief outline of the key thinking and models on sustained ICT adoption, we can see that – in order to address the socio-cultural components of SME behaviour relating to ICTs, we need to develop sophisticated frameworks which can encompass complex and dynamic findings. This contrasts with the proposed “logical framework pyramid” for Evaluation, from the World Bank, which implies a linear process - with high mutual understanding between actors - from Assumptions through to Goals. The World Bank does concede that some tailoring of such a framework to local circumstances may be required:



Source: World Bank (2005) Monitoring & Evaluation - E-Strategies Toolkit.

“Whatever the level of the e-strategy pyramid one may wish to consider, each and every one of the indicators selected is potentially a basis for an M&E component. However, for reasons of practicality and in order to account for local specificities, an efficient M&E approach will often have to be designed and implemented in a customized fashion.” (p.15).

A more reflexive evaluation framework is proposed by OECD (2004), following on from their SMEs and Entrepreneurship evaluation framework proposed in 200 which comprised 7 headings:

1. **Rationale:** The justification for the policy.
2. **Additionality:** The net added value of the programme
3. **Appropriateness:** The extent to which the programme addresses a clearly identified market failure.
4. **Superiority:** Whether the programme is more effective than other possible programmes addressing the same goals.
5. **Systemic Efficiency:** The extent to which the programme interacts positively and negatively with other government actions.
6. **Own Efficiency:** Whether the programme is cost effective in achieving its objectives.
7. **Adaptive Efficiency:** The extent to which evaluations lead to the implementation of programme change.

Such components allow us to consider both the evaluation of (i) SMEs policies (e.g. at national level) *for* SMEs, and “policies” or programmes for ICTs *by* the SMEs themselves.

In 2004, the OECD then propose their “six steps to heaven” evaluation framework:

Table 1. Six Steps to Heaven: Methods for Assessing the Impact of SME Policy		
<b>Monitoring</b>		
STEP I	*	Take up of schemes
STEP II	*	Recipients Opinions
STEP III	*	Recipients' views of the difference made by the Assistance
<b>Evaluation</b>		
STEP IV	*	Comparison of the Performance of 'Assisted' with 'Typical' firms
STEP V	*	Comparison with 'Match' firms
STEP VI	*	Taking account of selection bias

**Figure 8:.** OECD (2004).

These six steps are in turn underpinned by the “COTE” model, outlined as follows:

Apply the “C.O.T.E.” framework to SME policy:

- Clarity and Coherence of SME policies require a clear rationale for policy intervention and statement of purpose. The various parts of government: interacting with SMEs to facilitate their development should ensure that their efforts are consistent and co-ordinated.
- Objectives of SME policies should be clearly specified. Examples would include the creation of new firms, the growth of existing firms or promoting enterprise among target groups in the population.
- Targets should be specified in measurable ways to facilitate evaluation of the extent to which objectives should have been achieved.
- Evaluation of policy; which must be based on clear policy targets, should be the most important test of its effectiveness.

Again, the OECD proposal does not, yet, address the complexity of the factors outlined in this paper, or of the understanding of ICT adoption from models in other arenas. It will therefore be necessary to develop a more refined evaluation framework, to support the inclusion of the above findings. This is the focus of the next phase of the research. The models currently being researched are those by: Patton (**Utilisation-focused Evaluation**), the frameworks for evaluating **Community Development Initiatives** (Scottish Community Development Centre, and developed from **LEAP** – Learning Evaluation and Action), and the **self-evaluation frameworks** which have been developed in Finland through the LAGs under LEADER and LEADER+ in Finland (pers comm:Marja-Liisa Tapio-Biström, MTT, Helsinki).

## Concluding comments

In this paper, I have outlined the **policy drivers** towards a “smart economy” which is competitive and leading-edge, and where SMEs will be integral to regional and national developments in the knowledge economy



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and i2010. Secondly, we have also been able to see the range of **factors and key observations concerning SMEs' adoption and non-adoption of ICTs**, including: distinguishing between adoption and continuance; the role of change-agents in shifting SME mindsets from operational to strategic advantages of ICTs; the range of barriers to ICT uptake which are well-documented; and the three strategies for improving uptake (full awareness of ICT potential, introducing ICTs gradually, and socio-relational and cultural training for SMEs). Thirdly, we have learnt from **ICT-based models**, particularly the Technology Acceptance Model, the importance of Social Influences, the ICT and Relationship Transformation Model, and the “cyclic” and “stepped” models of ICT developments in SMEs. Finally, we then contrasted these multi-layered perspectives with the reductionist and linear approach proposed by the World Bank, and OECD model which presumed a coherence and logic which is not necessarily prevalent in the SME-world.

We are now faced with two exciting challenges. Firstly, to build an evaluation framework which is living, and which reflects the realities of rural SME experience in all its variety. And secondly, to deliver, sensitively, realistically and incrementally, the appropriate ICTs which will support SME use of external information to help with their decision processes. These are both possible, and we have – in the review above – some extremely useful foundations for success in addressing these two challenges.

## References

- Bagozzi, R. P., Davis, F. D., & Warshaw, P. R. (1992). Development and test of a theory of technological learning and usage. *Human Relations*, 45(7), 660-686.
- Beekhuizen, J. von Hellens, L. & Siedle, M. (2005), “Cultural Barriers in the Adoption of Emerging Technologies”, Griffith University, Brisbane, Australia.
- Cohen, A.P. (1994). *Self Consciousness. An Alternative Anthropology of Identity*. London, Routledge.
- Cruikshank, D. (2005), “A review of e-Business in Scotland in SMEs: trends & issues”, *Scottish Affairs*, Vol 53, Autumn 2005.
- DAVIES, A.J., MARCH, D. & EVANS, B. (2004), “Breaking the High-Speed Barrier: Inhibitors to Broadband Exploitation by SMEs”, paper presented at the e2004 Conference.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319-340.
- Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science*, 35, 982-1003.
- de Berranger, P., Tucker, D. & Jones, L. (2001), “Internet Diffusion in Creative Micro-Businesses: Identifying Change Agent Characteristics As Critical Success Factors” *JOURNAL OF ORGANIZATIONAL COMPUTING AND ELECTRONIC COMMERCE* 11(3), 197–214 (2001)
- Di Nicola, P. (2003), “ICT and e-Work in European SMEs.” University of Rome.
- Dixon, T., Thompson, B. & McAllister, P. (2002), *The Value of ICT for SMEs in the UK: A Critical Literature Review*. College of Estate Management, University of Reading, UK.
- Drew, S. (2003), “Strategic uses of e-Commerce by SMEs in the East of England, *European Management Journal*, Vol 21 (1), pp. 79-88. (Cited in Cruikshank, 2005, p.66).
- Erumban, A.A. & de Jong, S.B. (2001), *Cross-country differences in ICT adoption: A consequence of Culture?* University of Groningen.
- Fulantelli, G. & Allegra, M. (2003), *Small company attitude towards ICT based solutions: some key-elements to improve it*, *Educational Technology & Society* 6(1) 2003
- Grimes (2004)
- MacLeod & Grimes (2003) *Connecting rural SMEs to the digital economy: some empirical evidence from Ireland and Scotland*. Paper presented at ESRS 2003, Sligo, Ireland.
- Malhotra, Y. & Galletta, D.F. (1999), *Extending the Technology Acceptance Model to Account for Social Influence: Theoretical Bases and Empirical Validation*, *Proceedings of the 32nd Hawaii International Conference on System Sciences - 1999*

- 
- McCown, R.L. (2002a), "Probing the enigma of the decision support system for farmers: Learning from experience and from theory", *Agricultural Systems*, 74, pp.1-10.
- McCown, R.L. (2002b), "Changing systems for supporting farmers' decisions: problems, paradigms and prospects", *Agricultural Systems*, 74, pp.179-200.
- OECD (2004) Promoting entrepreneurship and innovative SMEs in a global economy: towards a more responsible and inclusive globalization. Evaluation of SME policies and Programmes. <http://www.oecd.org/dataoecd/6/5/31919294.pdf>
- OECD (2004), ICT, E-BUSINESS and SMEs
- Ritchie, B. & Brindley, C. (2005), "ICT adoption by SMEs: implications for relationships and management", *New Technology, Work and Employment* 20:3
- Robson, C. (2000), *Small-Scale Evaluation: Principles and Practice*, London: Sage Publications.
- Rossi, P.H., Lipsey, M.W. & Freeman, H.E. (2004), *Evaluation: A Systematic Approach*. 7<sup>th</sup> Edition. London: Sage Publications.
- Segars, A. H., & Grover, V. (1993). Re-examining perceived ease of use and usefulness: A confirmatory factor analysis. *MIS Quarterly*, 17, 517-525.
- Tornatzky, L. G., & Klein, R. J. (1982). Innovation characteristics and innovation adoption-implementation: A meta-analysis of findings. *IEEE Transactions on Engineering Management*, EM-29, 28-45.
- Wagner, B.A., Fillis, I. & Johansson, U. (2003), "E-business and e-supply strategy in SMEs". *Supply Chain Management: an International Journal*, Vol 8(6), pp. 3430354. (Cited in Cruikshank, 2005, p.66).
- World Bank (2005) *Monitoring & Evaluation - E-Strategies Toolkit*.

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# The benefits of Online Community for Small and Medium Enterprises

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## About the author

Amanda Burgauer has worked with online communities since 1996. She is the founder and Managing Director of Sharedbase Ltd, a Scottish company that aids businesses, voluntary organisations and the public sector to maximise the benefits of Internet technologies, especially online community.

## About Online Community

An online community is a group whose members are connected by means of information technologies, typically the Internet. With the uptake of these technologies by Small and Medium Enterprises (SMEs), online communities are emerging whose members share the problems and challenges of running a business.

Studies conducted by Sharedbase over the past two years have included surveys, desk research and face-to-face interviews as well as the management of a dynamic online community for SMEs. This research shows that the members of these communities perceive the benefits of membership as cost saving, sales-enhancing, motivational and educational.

This paper will outline the research results and focus on the processes, successes and failures of one particular online community, while drawing additional ideas and examples from a global perspective.

## Introduction

We are surrounded by communities that combine face-to-face and distributed modalities. Sharedbase's research includes the examination of interactions among SMEs using distributed methods, particularly online community. Instant messaging, e-mail, blogs, wikis and message boards are some of the media I use both personally, to stay in touch with people whom I used to live near, and professionally whether with clients, suppliers, employees, peers or competitors.

In my professional life, I run a rurally-based SME that manages to "punch above its weight" by leveraging Internet tools and other media to support engagement with clients, stakeholders and many others. Part of our services to clients includes showing them how they can leverage these same technologies, particularly through the use of online community.

## Landscape

SMEs are constantly under pressure to deliver to their customers, engage with suppliers to produce the most cost-effective and suitable arrangements, keep up to date with global developments in their sphere of interest

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and even decide on technology purchases for their organisation, as well as constantly seeking to find new customers and expand their client base. In an era of ever-increasing specialisation, small businesses with limited resources try to compete with large multinationals that have access to more resources.

This puts great pressure upon the managers and owners of SMEs, each of whom has to understand all the aspects of his or her business and for whom time is always an issue. When a business manager doesn't know vital information, it can have disastrous and costly effects on their business. In a larger organisation, there is always someone to turn to who either has the relevant expertise or who knows where to find it. In an SME, this can be much more troublesome.

SMEs need to identify when their business has changed. From start-up to mature company, the skills and processes required can evolve in different ways and the knowledge that the founder held at inception may not be enough to kick-start the business to the next level. A lot of traditional business support focuses on starting a business rather than guiding it through its desired evolution. Many SMEs are moulded by market forces (and especially cash flow!) into a direction that may not be sustainable long-term.

Running an SME can also be lonely. It's not always appropriate to discuss issues with the staff or take a worry home to a family dinner. Having a peer support network is something that is expected within larger organisations, but is rare for the owner of an SME.

With the wider adoption of ICT, more and more SME owners and managers are using the Web as their primary research tool and are turning to online sources for both information and support. This is particularly suited to the small business owner as the advice is available 24 hours a day, not just during traditional working hours, allowing him to concentrate on customer interactions during core business time.

A starting point for many SMEs is a favourite search engine or directory. Typing "small business support" into Google produces 626,000,000 results – quite a lot for the business owner to wade through! Some of the links shown in the results are government sites, but how is an SME owner to evaluate the credibility of the others? Search engine ranking is supposed to provide relevant results, but often produces listings that show the technical and marketing ability of a particular site rather than its usefulness.

Using the Open Directory Project (DMOZ <http://dmoz.org/>) allows the SME owner to reduce these listings to those from a certain geographic area, for example, drilling down through Top: Regional: Europe: United Kingdom: Business and Economy: Resources: Small Business produces only 34 listings which is much more manageable, but produces issues of bias and should alert the user to the fact that there is a lot of information not available in that search.

In real life, if we want to know something, we tend to ask our friends and family. The value that we place on their advice tends to be affected by the respect we have for them and by our perception of their knowledge in a specific area. This first port of call is only extended when they don't have answers (or perhaps when they don't tell us what we want to hear!).

Yahoo! Groups (<http://groups.yahoo.com>) is a free online service that allows individuals to share their common interests through millions of groups by either e-mail or on the web. These groups cover a wide range of interests, from knitting to insurance risk management and can provide information and access to knowledgeable people. There are 10,014 different groups just in the Small Business area, in many different languages. Unfortunately, it takes time to find out which are active and have not been invaded by promoters of multilevel marketing schemes (MLM) and the quality of responses is not high.

E-Bay ([www.ebay.com](http://www.ebay.com)) is a sales channel for many SMEs, particularly those in the B2C sector. E-Bay sellers are encouraged to support one another, both in using the site and in running their businesses. This online community utilises discussion boards, live chat and user reputation to help people find relevant information

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and assess its value. This is a vibrant community where participants can get fast responses, for example a recent post asking for advice about business cards received 18 responses within a few hours.

Online Community is more than just a web discussion board. Usually individuals are invited to join a community and provide some information about themselves in a “member profile” that will be available to other members. Outsiders will not see this information, nor indeed in many communities can they access most of the content. Reputation is as important online as offline and many online systems, like Amazon and Ebay, allow other users to rate either a contributor or their contribution. Even where these systems are not formalised, regular participants get to know who posts coherent, interesting information (and is therefore worth reading or meeting) and who tends to be focused around one topic or self-promotion only.

The generosity of many participants is remarkable. Offers of free services, sharing of business information and provision of material that would take weeks to compile are all common in the best online communities, even among competitors. The online community that I will discuss in detail is one that I have managed for the last 5 years.

## Now-Business

Originally conceived by a Scottish businessman, Gordon MacIntyre-Kemp Now-Business has 7.600 members with a core subscriber group of around 1,300. The project ran for 4 years, using a combination of e-mail, web discussions, file-sharing areas, directories, member content and, in the beginning, networking events.

It was quickly established that Scottish SMEs welcomed the opportunity to participate in discussions and debates, share their experiences and ask for advice.

<b>Feedback from networking event</b>
100 % of attendees rated their overall impression of the Networking event as excellent or good
100 % of attendees rated the Networking event concept as excellent or good
99 % of attendees rated the level of interaction/networking as excellent or good
Over 532 business introductions were generated during the one hour event
84 % of attendees said they intended to collaborate with 2 or more people they met
31 % of attendees valued the potential resulting business as greater than £10,000
Over £1 million worth of potential business leads generated in just 1 hour
Attendees described the Networking event as “exhilarating”, “inspiring”, “worthwhile”, “very useful”, “fantastic”, “excellent”, “challenging” and last but not least, “fun”!

\* Statistics and comments based on feedback collected from one offline networking event

The members are mainly owners of small to medium sized businesses, with some sales executives from larger companies participating as a way to promote their offerings to the SME market. The launch of the network, or online community, with face to face meetings allowed individual interactions and made the community seem “real” to its members. Having built a core subscriber base where trust existed, it become easier to expand this to new members.

The geographic location of the subscribers is mainly Scotland, with participation from as far away as Australia, utilising the social bonds of existing members to create interest and attract new members. Even where regular participants have moved country, they continue to participate. The membership varies from

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small software companies like New Broom on Skye to jewellers and bakers in Fife to a marketing company that has relocated to Spain.

Because the online community software is standards compliant, it can be accessed through any web-enabled device, such as personal computers, phone or handheld, like a Palm or Blackberry.

Members are encouraged to submit articles in a Top 5 Tips format that allows an expert in a particular field to get recognition for his or her knowledge, while informing other members. The subject matter of these includes:

- Destressing/Creativity
- Employment Law
- Marketing your Business
- What to do before contacting a web designer
- Usability and accessibility – the law says your website must comply
- Tackling the Way You Look at your Business
- Personal and Professional Success

And a myriad of other topics.

These short pieces have proven very popular and are contributed on a regular basis by different members. Some more substantial pieces of work have also been contributed as PDF downloads which are available to members only. The site has a library that contains topic folders full of information. One of the most popular is the Advertising and Marketing, with the following being a sample of the documents provided:

- **Five Marketing Mistakes to Avoid** Chris Cardell of Cardell Media explains that while there are few generic marketing ‘must do’s’, there are definitely some marketing disasters that all businesses should avoid.
- **How to develop your USP** Mark Henderson of MPH Marketing discusses how you can identify and communicate your Unique Selling Proposition.
- **Better Sales and Marketing** Robert Harrison of IBM discusses the need for better sales and marketing skills in Scotland

*“Your articles keep me up to date with technology issues, latest marketing ideas and even employment legislation. Well-written and succinct articles by respected experts offer some real pearls of wisdom.”*  
- Simone Nelson, New Broom Software

The interest in this section reflects the opinion voiced by the members that sales and marketing is one of the weaker areas within their organisations, but other sections are equally as popular.

Another area is the Contracts Notice Board, where members can post invitations to tender or other contract information. This was regularly one of the most visited areas on the site, causing one member to comment:

*“The Contracts Board on the site is brilliant. It provides an excellent opportunity for winning new business” – Michelle Hamill, WSI*

The main area of participation is through the discussion forums, which can be either by e-mail or the web. A human moderator approves all messages before being published and delivered to subscribers by e-mail. This ensures that postings abide by the “forum rules” and prevents objectionable content or advertisements being sent to subscribers.

*“A single question to the Business Improvement Forum can be worth more than the cost of an entire year’s Stakeholder Membership!” – Craig McDonald, NKD*

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*“No other online discussion forum comes close to achieving the sense of community, vibrancy or knowledgeable content.” Chris Munro, Kendlebell*

The breadth of the discussions is extensive, with members asking for advice on a wide range of topics from legal advice to IT support to business plans, as well as occasional discussions on topics such as the economy, politics or general business environment. One of the most popular topics in the last few years was “Perception of Scottish Business”, in which 37 people took time to explain their views in detail, not only of the current perception, but what should be done to change it.

A popular recurring topic is about business banking: an issue that seems to affect most SMEs in an era of global banks. We have three main Scottish banks that historically held all SME accounts but now appear to be less interested in the SME market. We have run an annual survey for the last two years and the results show that a fantastic 90% of respondents would consider changing their bank – a far cry from Scotland’s traditional approach to business banking.

The survey collects the experiences from SMEs with all their current banking partners and collates that information for all members to share. Thus an SME looking for good online services with no need for cash handling could use the survey to find a recommendation that will be different for someone with different needs. This type of information is what members tell us they want to know: critical to the business and not easily found elsewhere, the information is an unbiased collation of customer experiences. This is very different from the type of advice available in traditional business support agencies, as they have a mandate to remain impartial and cannot recommend a particular company or organisation.

Calls for recommendations for a particular type of service are regular posts on the list, with an average of 5 replies to the list and 12 replies directly to the poster through e-mail.

This helps to cut down the time and research required by the SME owner, whether looking for a provider of exhibition stands, a good courier service or Apple Mac support, all of which have been posted in the last year.

All recommendations to the list have to come from a third party: self-advertising is not allowed (although participants are allowed a small signature in their message). Also the Business Directory that forms part of the online community allows companies that have provided 3 client references to have an enhanced listing once the references have been checked.

Other interesting threads discuss applying for trademarks and patents. The list has several lawyers who are active participants and who contribute free advice regularly. This includes debating exactly what is and what is not necessary to protect ideas and designs, giving businesses a good understanding of the steps they might like to take.

The list is also used for sourcing funding from grants and investors. Here’s a sample listing from one day’s new topics:

[1022] Banks again 24 posts to this thread.

[1021] Environmental impact reduction grants 11 posts to this thread.

[1020] Credit check - your help needed 10 posts to this thread.

One of the important aspects of this discussion forum is that it can be accessed by e-mail or through the web. Despite the large investment made by the Scottish Executive in promoting broadband use, many SMEs (and most outside the urban areas) still are using dial-up technologies. Some figures put the true number of rural SMEs using broadband as low as 5 %. Since the list allows people to download all the messages into their e-mail and read and compose replies offline, this is a large incentive to participation.

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The list also allows members to unsubscribe from a specific topic, while continuing to receive other messages. So, for example, if an individual really doesn't want to hear any more discussions about banks, he or she can unsubscribe from "Thread 1022 Banks again" in the example above while still receiving all other mails.

Likewise someone who wishes to limit the number of e-mails received can read messages solely on the web or by RSS, replying by filling out a web form. It is this flexibility that encourages participants to continue as they control how and when they interact.

## Conclusion

The Online Community has been a successful tool for business and the members want it to continue. Although the format will change slightly to accommodate new features that have been requested by members, including Jobs Boards, the list will continue along with more specialised discussion groups. Members will be able to request a discussion group and manage it themselves, while the main community site will allow smaller SMEs who have problems managing their own web presences to have a "microsite" within the main site for a nominal sum.

This will have the effect of creating a "business park" where smaller organisations can benefit by joining together to create more impact while still having an independent site. This new effort, to be called SharedBiz (Shared Business Network) will launch on May 1, 2006 and we look forward to seeing the membership grow beyond Scotland.



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# Supporting ICT in SMEs in Northern Germany – experiences and examples

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## 1. Short description

My case will show you our experiences to support ICT to rural SMEs regarding my participation in two different ICT projects (Interreg IIIB North Sea: [www.ikt-fuer-kmu.de](http://www.ikt-fuer-kmu.de) and Leader + project [www.eb-ets.de](http://www.eb-ets.de)) since three years. I would like to inform you about

- the different ways to approach companies
- how to get in contact with them
- the difficulties to reach the companies
- what kind of different companies we support
- what can be done after the first interview with the company
- the weaknesses and threats in the companies and
- the obstacles.

## 2. Introduction and background

The Interreg IIIB North Sea project starts in September 2003 with partners round th North Sea. Main aim of the project is the strenghtening of the region by spatial and structural changes to form a balanced region. The tools to reach this aim are IC-technologies. In Northern Germany the focus of the activities ist the West Coast with the counties Dithmarschen and Nordfriesland, it can be characterised by some key words: many sheeps, more cabbage the people, many farmers, high unemployment, more older than younger people. This part of Schleswig-Holstein is not so well developed as the East Coast.

To give an overview about the complexity here are – only a few – sub-goals of the project:

- Improving the access of SMEs in rural and semi-rural regions to IC-technologies and their use with the aim of reducing the urban-rural disparities.
- Development and implementation of an assessment toolkit for checking ICT-use in local SMEs.
- Execution of surveys to determine the need of SMEs with respect to technical equipment, organisation and education.
- Awareness-raising: Creation of incentives to use modern IC-technologies (i.e. Online-Banking). Taking into consideration the economical, technical and organisational aspects and education.
- Reduction of restraints to use the technology and by that bringing new technology into use in the whole region
- Development of transferable tools to assist better use of ICT by SMEs at the local level.

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- Reduction of (entrepreneurial) restraints to use IC-technology and by that bringing new technology into use in the whole region.
  - Transfer and integration of 'best-practice'-solutions into the SMEs incl. support in technical and organisational questions.
  - Providing training opportunities, distance-learning and on-site-support; by that closing the 'digital gap' and preventing 'IT-Analphabetism'.
  - Implementation and operation of a technical platform by which SMEs can receive and exchange information, perform eBusiness, co-operate electronically with their partners and obtain access to knowledge and support (technical SME-Center); involving local authorities and installations.
  - Offering web-space on the technical platform (Internet-based "SME-Center") to the enterprises in order to give support to B2B contacts amongst the participating regions, especially for e-procurement and e-commerce.
  - Creation of possibilities for SMEs and households to purchase and operate PCs and periphery at reasonable cost incl. access to the Internet.
  - Creation of value-added by using the special competences and researches of the transnational partners in the execution of analysis and integration of the measures. In addition to that learning of the transnational partners about the subject of the project and especially the transnational exchange of 'best practise' is an important factor for the successful completion. This level cannot be reached without transnational partnership.

As you can see the aims are very broad and different. This is while the project was merged from 5 different proposals out of different regions in Europe, so every partner has a special (and different from the other partners) focus within the work in the project. The aim of every partner is to improve the transnational partnership and to identify "best practises" for the transnational exchange.

The other project is located in the "Eider-Treene-Sorge-Region" (the region is named by three different little rivers and is a small part of the counties Dithmarschen and Nordfriesland). The main focus in this project is to look for the possibilities to improve the electronic processes – especially in the frame of Electronic Business and Electronic Commerce - in the small and very small enterprises. So the project is equal to the region and enterprises: very small, but very interesting.

The goals in detail:

- Supporting the regional economy to use e-business and e-commerce applications in a active and effective way
- To improve and individualize standard ICT applications
- To bind together new or existing processes in the company with the help of ICT

The target group in this region is very limited by numbers, so the approach was very difficult. You will read some more in the next chapter.

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### 3. Activities and results

As the Interreg IIIB project is supported by the University of Stavanger the first activity was the development of a questionnaire. The goal was to use the survey for the definition of the individual needs of the companies in the different regions and to get a database for a comparative study within the North Sea region. It was planned that every region has to collect filled questionnaires from 100 companies. The result of the first approach in some regions – especially in Schleswig-Holstein – was a full catastrophe: From 1,800 addresses – selected out of 7,000 – only 10 returned. A second approach with a shorter questionnaire was much better, but it was necessary to carry out a personal approach by phone and e-mail. This was the first concrete result of the project: We must keep in mind the mentality of the people living at the West Coast – they are much more taciturn than others in the country and mistrust everything new. Nevertheless we've got 50 questionnaires as one part of the study. The second result was coming up out of the personal visits of these companies: They don't know what they don't know! So very often the first question to us was: "What are you offering to my company?" (Perhaps it is not necessary to explain the situation, but if you are the first time in your life in this company – how shall you know the special needs regarding ICT of the company??).

To describe the results of the project (it is still running) will blow up this paper. In general we can say that the attitudes to the projects are very different, the requirements of the companies are very different and the solutions are very special and individual.

### 4. Lesson learned; suggestions and conclusions

- Both projects are very helpful and valuable for the companies; the money is well invested by the EU.
- Be careful by using questionnaires!
- Try to approach the companies in different ways: Use the stakeholders and the rural networks to get in contact.
- Visit the people in the companies and explain your personal support structure.
- Show them examples of your work and try to link these with the problems of the company
- Try to explain the advantages of ICT in a personal way.
- Sample solutions and even best practises will mostly be based on enterprise specific demands.

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# Tilakunto / benchmarking tool – business information to farms by using agricultural databases

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Good farm management has to be simple and clear. Production planning, implementation and result evaluation as well as continuous improvement must have goals. The entire production has to be thought of as a part of the food chain. Farm competitiveness evaluations have shown that the biggest challenge lies in strategic planning of the enterprise. This task requires numbers and information on the enterprise's results, so that clear goals can be set. Achieving good results, calls for continuous follow up on production processes and the whole enterprise's results, as well as comparison to the results of similar enterprises.

ProAgria Association of Rural Advisory Centres and ProAgria Rural Advisory Centres have combined multiple databases, whose databases include information on rural enterprise's primary results. The figures from the different databases can be combined into one view, which is called *Tilakunto* (=Benchmarking Tool in Internet).

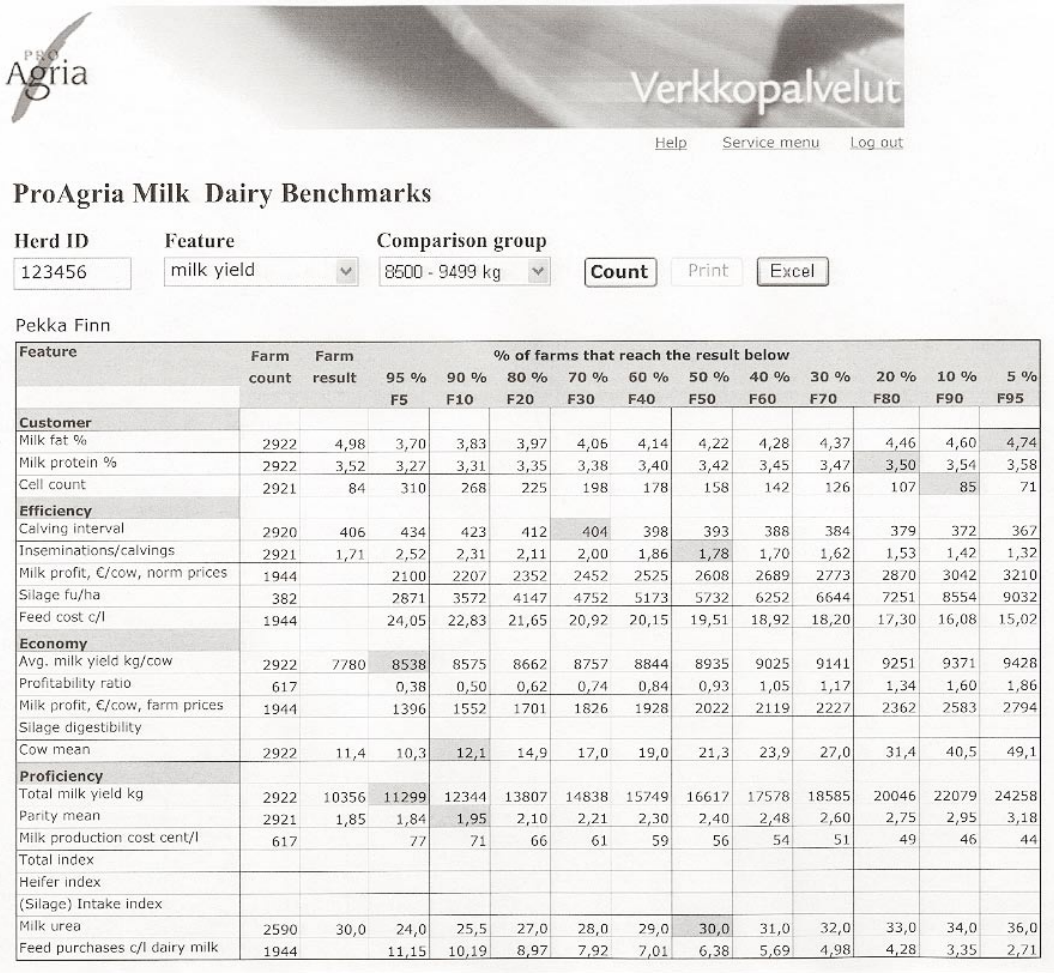
First processed Benchmarking Tool is ProAgria Milk Dairy Benchmarks. The timetable of that tool is:

- In 2003 an excel summary table
- In 2004 a new access to data via the web: farm based results and mean results from all dairy farms now available
- In 2004 new options: the comparison groups can be chosen according to milk yield, herd size or profitably ration
- In 2005 the annual goals of individual farms are saved and are shown in Benchmark result tables
- In 2006 more new options:
  - Results of dairy production from the past 5 years in the summaries
  - Comparison groups can be selected based on results from dairy production, plant cultivation and economy of the dairy production, plant cultivation and economy of the farm

Next step is to build Benchmarking tools for plant production in years 2006–2007 and for pig production in 2007–2008.

*Tilakunto* Benchmarking Tool –report and action plan is the most developed in milk production services. Information on the enterprise can already be collected from various different datawarehouses, and this source data is expanded continuously. Realizing these services on dairy farms is greatly aided by the fact that production result coverage is very good, around 80 % of all milk production. This way also the client base has grown very quickly.

The data in the datawarehouses varies greatly in terms of history and age, for example, data on dairy farms production results has been collected for over 100 years, whereas data on farm competitiveness has been collected only recently. As more and more of this information is being processed electronically, primary issue has been to build a common key field to all the different data systems so that data can be combined as desired.



Picture1. ProAgria Milk Dairy Benchmarks, an example from views

Databanks behind *Tilakunto* Benchmarking Tool are coming to include results such as financial data, animal production data, crop production data and scorecard type data on primary managerial functions such as results from competitiveness evaluation and data on production quality and environmental factors.

The results from these different datawarehouses can also all be analysed separately from each other, aside from the aforementioned *Tilakunto* Benchmarking Tool. This way more detailed information on such factors as economy, production process efficiency and product quality can be achieved. The fundamental factor in production improvement based on scorecard type data is to provide the customer with figures from which he or she can easily determine his or her improvement in comparison to the results from the best enterprises. The fastest and the most efficient way to improve production is to compare production statistics to those of the top enterprises. In the future it would be very useful to produce comparison data from other countries as well.

*Tilakunto* Benchmarking Tool entity is a part of existing methods to improve enterprise competitiveness.

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ProAgria has combined client services into balanced entities where all the areas of development for an enterprise are considered.

ProAgria in brief

- Line of business: rural business development consultation through agricultural advisory services, new business advisory services, animal breeding, artificial insemination and IT services.
- Customers: over 85 % of Finnish farms
- Personnel: 1 437
- Member-owned organizations
- Extensive membership in the rural sector

ProAgria has, among other measures, accomplished the following steps to improve rural enterprise competitiveness:

- Management education, with over 20 000 entrepreneur participants in total
- Management process designs, over 1 000 new clients per year
- Management auditing, about 1 600 per year
- Datawarehouse data, including yield analysis on 12 000 farms/year, plot database on 60 000 ha/year and financial database on 1 000 farms/year
- Plans, including 13 000 cultivation plans per year and 3 500 investment and financial plans per year.
- 500 developmental conversations per year
- Peer group activities, including quality clubs and 550 ProCultivation farms per year.
- Competitiveness evaluation on 100 farms per year

ProAgria's information systems and their usage have drawn also international interest. At the moment there is, for instance, a joint operation with new EU member states to improve advisory databases and their usage.

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# Lost in cyberspace?

## Website performance among furniture firms located in rural areas of Norway

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### Introduction

This study is a discussion of firms' motivations of using ICT-strategies, performance level and development also including details about content based on an overview of the status of e-commerce among the furniture industry in Norway. This industry sector is mostly located in rural areas and characterized by small and medium sized niche producers operating in national as well as international markets. The empirical evidence has been based on the investigation of their websites. This data was collected in mid 2005, excluding firms located in larger urban areas. Due to lack of registration or operative web-addresses our list was reduced from 144 to 107 companies. Further retail companies and kitchen/bath/wardrobe producers were left out, and the net result was a list of 64 furniture manufacturers.

### ICT and firm performance - a presentation of categories and how this may effect business

There are in principle three ways in which ICT adds value to the activities of firms. First, technology may enhance organizational efficiency in all parts of the value chain including those parts that reach beyond the boundaries of the firm. This tool makes it easier to exchange information, to cooperate and to coordinate the production between individuals, units and organizations. ICT is useful for collecting information about innovations, markets and regulations. The whole process of searching for suitable suppliers, comparing prices and quality, is far simpler when facilitated by ICT, and suppliers can be more aware of clients' requirements through the development of customer profiles. Software programs may be used to control resource flows, stocks, production and distribution processes. Online communication does also make it easier for rural SMEs to interact with experts that may be located elsewhere. In practical terms, a firm's supply chain will contain a mixture of firms located in different places; every firm will rely on a distinctive combination of local, regional, national and even international relationships. In fact, ICT is strengthening existing ties in many business relations – for others it may be an efficient tool stimulating co-operation with new partners. ICT can for instance be used when cooperating on activities as finance, training, technological developments and marketing to gain economies of scale and scope strength which usually are associated with large companies.

Second, ICT alters the relationship between customers and firms; the relationship can be more interactive even to the extent of permitting the development of customized products and services. Clients and suppliers are able to invest in shared integrated ICT-systems that enable real-time exchanges of information about stock levels, logistics, design detailing, and alterations to the technological detailing or function of a product. The latter is especially important where firms are part of a complex production system in which they are contributing elements of a much more complex product. Through the use of ICT service and sales processes can be coordinated in a way that resembles a single integrated supplier, something which might be quite crucial to match the requirements of large and complex contracts. In such cases it is essential that all parties to the supply chain are integrated by the adoption of a shared ICT-platform. The incorporation of ICT into a supply chain

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enhances information flows and contributes to the development of long-term relationship. It also locks firms into a supply chain as well as excludes firms as it may reduce the number of additional firms that have the ability to join the supply chain. Lock-in may initially be beneficial, but may also result in pressure to reduce the cost of parts supplied by any one member of the supply chain. Doing business over the Internet can be either complementary to traditional market channels or represent a whole new line of business. ICT gives a global reach, but may at the same time require a more carefully credit-management. The trust needed for trade can be created by personal relations or through using formalized credit check systems. Another alternative can be to move the responsibility over to the logistic service providers which deliver the goods to the customer only when payment is received.

Operating in cyberspace does also represent possibilities for the creation of new linkages and virtual communities between producers and consumers. Network forms of organization or virtual firms provide an alternative way to grow a business. Small firms and even individuals are able to overcome the constraints of location and capacity by becoming part of a virtual firm. Clients benefit from drawing upon a breadth and depth of expertise that is available from a continually evolving flexible network of members of the virtual firm. The virtual network also permits the rapid creation of a flexible web-based corporate identity. "Members" of the network benefit from resources (expertise, reputation, services) that have been developed and are managed by other firms as well as retaining flexibility. The development of virtual organizational forms is a part of an on-going process in which the boundaries between firms are rendered invisible or become increasingly blurred and complex. Sometimes it is important for a firm to show the outside world that it is a part of a cluster. To have a "good address" and presenting this cluster on the web is a way of signalling this resource position to rest of the world. At the same time marketing and shared infrastructure can bind these parties together.

Third, ICT is a part of the tool-kit that a firm can deploy to project itself as an attractive company. Websites may become a part of a firm's branding and marketing strategy. This way of presenting the business may also be one way of projecting a firm's power in the marketplace that can be read by potential business partners as well as private or public investors. The firm may, for instance, highlight the global nature of its activities by providing information about sales volumes, profit levels, exports, overseas offices and key customers. The firm may also provide photographs of buildings that symbolize size and modernity and success in business. This type of marketing activity concentrates on highlighting the positive aspects of a firm's image. Firms' relations to spatial symbols/labels is expressed by their marketing strategies including the way they present themselves on the web. Spatial elements of firms' websites include physical address, accessibility, map, site and spatial references on web-addresses. The levels range from local to global and are sometimes clearly articulated, in other cases more abstract or tacit. For some rural firms the content of the websites might also be a way of promoting the local culture. Place-based products capture individuals' attention, capture them to position in relation to their established maps of place based meanings, associations and references. In this way, place-based or place-positioned products attempt to capitalise upon consumers' existing knowledge and assumptions. Promoting the geographical origin can add the little extra to a product or service, as some consumers know that certain addresses represent certain qualities.

Some firms do for instance project local connections through the presentation of picture of the production process and some instances with references of local suppliers. Other firms want to avoid community links because they are worrying that the content is not updated or that the language quality is poor. On the other end of the scale are firms that instead of being associated with a particular place have developed an identity as global players or networked organizations. Information about export volumes, international markets and the location of production or sales offices are displayed to emphasise the companies' international orientation. This can be done by publishing images of foreign locations, maps, pictures and place names on the web. A strategy to present the major customers on the website might be right for some firms to signalize power and reputation, whereas others might consider this type of information to be a secret that should not fall in the hands of the competitors. The geographical label can be an important element in the way a firm markets itself and its brand. This may also be a help to customers in their navigation on the net. The promotion of geographical origin is also a clear response to increased globalisation.



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## A short summary of the empirical results of the study

The conclusion provides some reflections to the way content and the role of website performance vary due to variations along different dimensions. The main results relate to how performance on the web adds value to products and services either to exploit the potentials of existing trade or by reaching their customers, business partners, investors or the general public through the way they present themselves on the web. The main results can be summed up this way:

Most pages are either set up for the communication between different furniture producers, or for the communication with the retailer chains. This priority might represent a problem since the consumers surfing for furniture ideas do not have insight about these priorities but have instead high expectations of finding information that is relevant to them in their navigation between styles, producers and products. There seems in general to be a relatively clear correlation between company size and how advanced the website performance is.

The target and content of the pages seems by and large to have missed the interplay between online and offline communication sources and various sales channels. Furniture initially found on-line can in principle be more closely inspected and be bought after visiting a store where this product is on display. With e-commerce sales options on customer could also have experienced that furniture found in a store can be ordered directly on the Internet. These two ways of selling could also be combined, but hardly any of the furniture producers covers both possibilities. In fact only three firms did have e-commerce (4.7 %) options on their websites.

International trends in design and decoration in homes as well as more public places highlight the importance of forming horizontal connections between different categories of goods. This should in fact mean that focus should be moved from the firm perspective and logistics within the value chain to links that are more in line with the direct interest of the consumers. In line with this the content presented on the web could combine different goods e.g. furniture and clothing showing variations in style, colors and different fabrics.

This product mix in promotions is a trend that is already quite common in magazines, but much less common among the websites of the furniture producers we have analyzed. Having interactive pages allowing the customers themselves to furnish could have been an interesting option.

As much as 39 % of the websites have no links, 17 % had international links and the rest 44 % had links either just representing links in their community or links to other addresses within the country. Figures from the industry as a whole show that the export from Norway is around 12 % of the value added. However there are also several producers that sell a majority of their products abroad. Still, only ¼ of the web pages are multiple language pages. In fact this content with only presenting info in Norwegian indicates a “Nordic Intranet” with websites of little value to those not understanding this language. The chances of having an a more internationally oriented website (eg. text in foreign language) did show a relative clear correspondence with size.

The final comment in this summarized conclusion is about presentations of the spatial identity on these websites. Three different strategies related to references to location on the websites have been identified. One is to neutralize and almost hide the information about the location, the second is to lay more stress on the national identity or global reach than give details about location and history connected to the production, and the third is to more clearly proclaim the location of the firm, using it as an advantage, for example by stressing that they are part of the main furniture cluster in rural Norway. Some of the web-pages describe the community and landscape where the production is located, some make a point of their location in Norways major furniture cluster with long traditions within this sector, but most are quite neutral about promoting location. Few local links are further evidence in this same direction.

The industry has also a common portal with a picture of a rocky mountain to illustrate the solidity and modesty of their products which is also mentioned in text on this page. It is at the same time a neutral picture that

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does not favor any of the producers but clearly represents neutral ground. This scenery is also quite far away from the large consumers' markets in the European cities which probably are the main arenas for where the furniture trends are developed.

This somewhat mismatch between webpage content and priorities of producers versus the interest and needs of consumers that we have identified through this study can mean that these pages are of little promotional value and rather represent information that is more or less lost in cyberspace.

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# Theories on Communication of Innovation: Factors that may affect ICT communication performance

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## Abstract

ICT as an advisory tool has to compete with other information sources to communicate with rural entrepreneurs. The objective of this paper is to present two theories concerned to the factors that affect communication performance. The first one, the Message Reception Theory explains the process of selection, understanding and memorizing of a message. The main variables related to these processes are related to the message and its source, the receiver and the environment. The second one, the Human Practice Theory tries to explain which variables people take in consideration when adopting a new practice. Some recommendations for improving the use of ICT as information and advice tools are presented.

## 1. Introduction

Despite of a sharp increase in both demand and offer of information and knowledge, the human capacity to assimilate and process information has not increased at the same rate. Consequently, much of the information that is considered to be useful to people is not assimilated. Moreover, many experts suggest that the capacity of human knowledge assimilation is still far from being reached. According to them, the main limitation is the way in which information and knowledge are transferred (communication and social issues) and is not related to human physical capacity.

The communication process itself is a selective process, in which not all the messages manage to be assimilated, understood and applied. This process can be compared to a 'multi-filter', in which messages are selected, and only a few of them manage to complete the process, and the final product at the end of the process is never the same as the initial one. Using this comparison of the communication process as a 'filter', each level of the filtering machine would be equivalent to one variable that affects the communication process.

ICT as an advisory tool has to compete with other information sources to communicate with rural entrepreneurs. In order to provide efficiently information and advice to rural entrepreneurs, advisers have to be able to communicate efficiently. To achieve this objective, a general understanding of communication and human practice theories is very helpful. There are communication strategies to improve the learning process (Jensen, 2005). As we will see in coming sections, efficient communication is not just about transferring information, but also about contributing to an action. The objective of this paper is to present a model that explains which variables influence the communication process and why humans do what they do. The main definitions used in this paper will be presented in section 2. Afterwards, the theories and the variables influencing the communication process will be presented and compared. Finally, some recommendations that could improve the efficiency of ICT as tools for delivering information and advice will be made.

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## 2. Definitions of terms

*Advisory service* is when a person takes the initiative to seek assistance of an advisor in solving management problems (Leeuwis, 2004).

Among the many sources of information, there are those that are mediated (i.e. not passed directly from sender to receiver, but through a media), such as a letter, a book, a newspaper, a tape recorder, a video, etc. When we use the term *Information and Communication Technologies* – ICT, we are not referring to all the media available nowadays, but more restrictedly to recent computer technologies. Some examples of these technologies are the Internet and the mobile telephone. In this paper ICT will be referred as those computer technologies that can be used to exchange information and to communicate.

*Communication* is a common word used in everyday conversation, and consequently can have many definitions. It can be referred to as the technologies we use to exchange messages, such as the telephone, letters, newspapers, or it can be referred to as the message or information transferred. Wood (2004) defined communication as “a system process in which individuals interact with and through symbols and interpret meaning”. For our purposes, this definition will be adapted to “*a system process in which individuals interact with and through symbols and interpret meaning, in order to promote an effect on the information receiver*”. This definition allows adding the analysis of the communication performance of ICT tools for delivering information and advice.

Before giving a definition of communication *performance*, it would be important to highlight some points related to it. The term *performance* in this paper is related to the capacity of a communication to achieve its expected effect. In other words, the message expectation determines its performance. To simplify it, message expectations will be divided into two groups, information assimilation effect and learning effect. When a message expectation is just to provide information, this will be called ***information assimilation effect*** (e.g. to inform an entrepreneur about the existence of a new harvesting technology and how it works). In this kind of message, the objective is just that the receiver understands the message and assimilates it. Thus, it will be classified as a good performance if entrepreneurs can understand and assimilate it. However, if a message expectation is not only to inform but also to lead a person to act in a certain practice, then this message is called ***learning effect***. Learning through communication is only complete when the receiver (e.g. a student or an entrepreneur) takes the action and applies the knowledge he/she has learned. Humans can learn through two processes, information assimilation and experimental learning. In both processes an action has to be involved (see Keeton, 1976). Thus, using this last expectation (learning effect), communication will be only considered to have a good performance if it contributes to an action.

Since the objective of an advice is to promote an action/practice change, we are going to use the learning effect as a parameter to evaluate the communication performance. Therefore, the communication is successful when a message is assimilated, understood, and also can contribute to an action. It is important to emphasise that a successful communication does not necessarily need to cause an action/change, but to contribute to it. As we will see in the next section, there are many sources of information and knowledge used by entrepreneurs. Advice through ICT is only one of them. Entrepreneurs usually take an action based on many sources of information, instead of just one piece, from one source. They usually check whether their sources are reliable.

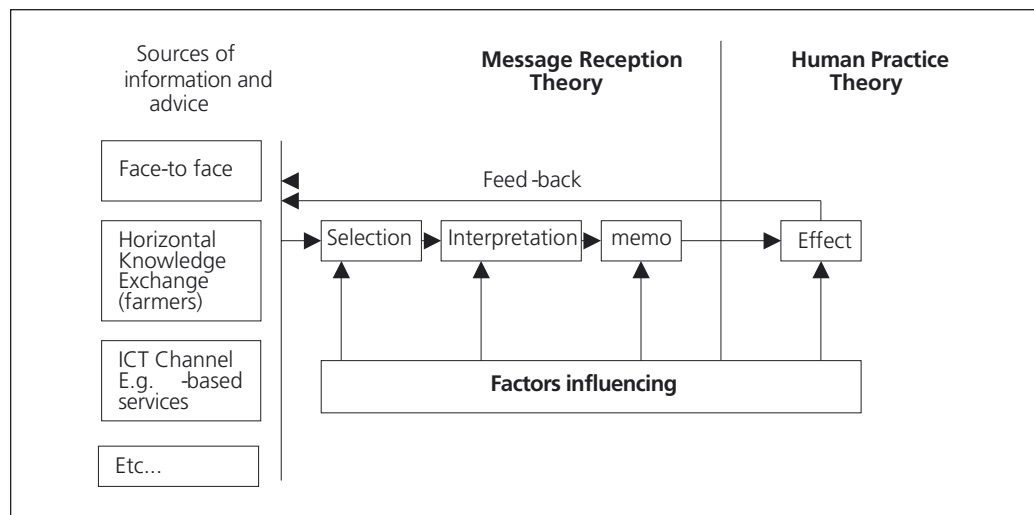
*Human practices* are all the actions that are repeated over time. Thus, one simple event can not be considered as a practice. In other words, practices are “*human patterns of actions or regular activities*” (Leeuwis, 2004). The practices can be a conscious or an unconscious action. Many actions can be considered as common routines, such as using a tractor, management of pests, and selling of products on the market place.

It is useful to understand some communication theories. In the next section, present theories in communication and human practices will be presented. They overlap and complement each other.

### 3. Theories on the communication process

As mentioned above, the communication for providing advice does not just involve the transfer of information, but also the contribution to an action. In order to understand the whole communication process, from message selection to effect, it will be divided into two processes in: the first one, a message is received and understood; in the second, the receiver processes the information, according to his/her own knowledge, environment, experience, etc. and takes an action. Each of these processes is explained with a different theory.

Figure 1 summarizes the communication process proposed in this paper. It does not show the many variables that influence this process, but only shows the general steps of the process. The model starts with people being offered information from many sources, such as face-to face contact with advisors, neighbours, other farmers, and ICT channels of information, among others. Among the many messages offered, the people usually select only one message per time. Afterwards, this message is interpreted and memorized. The interpretation of a message depends on many factors related to the receiver, the channel of communication used, the message itself, etc. (see section 3.1). If a message manages to pass through these steps, it is possible to say that it has achieved the expectation associated with the *information assimilation effect*, cited in the previous section. However, in one way or another, messages can influence actions and produce some effect. The impact that this will have in a human practice depends on many technical, economic and social factors, which are presented in the section 3.2.

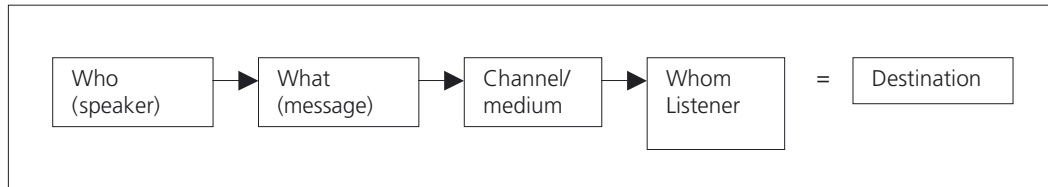


Source: Adapted from Ruben & Stewart (1998), and Leeuwis (2004).

**Figure 1.** The ‘filtering’ process of communication.

Before presenting the theories, it is important to introduce three specific characteristics of communication. First, communication is a process rather than a defined event. What has happened in the past influences the present, and what happens in a certain time may have repercussions in the future (Leeuwis, 2004, Wood, 2004, Ruben & Stewart, 1998). Second, the communication is also systematic because it does not work isolated from the social system but inside it. In other words, the communication occurs in one environment composed not just of the physical and human but also of other people, that can influence the communication process. Third, human communication depends on symbols. Symbols are a rather abstract, arbitrary and ambiguous representation of things. They are abstract because they are not directly related to what they mean. For example, the word “cat” has no direct relation to the animal cat. For a person who does not know English, the word “cat” may have no meaning. Symbols are connected to referents only by indirect, agreed-on conventions of how to use words. Symbols are arbitrary because they stand for things, but they are not themselves a concrete thing. “*Symbols are like maps, they represent the territory, but they are not the territory*”. Symbols are ambiguous, because their meaning is not clear and they can vary in different contexts (Wood, 2004: 80). These three characteristics explain the big potential of misunderstanding in the communication process.

One of the first models of communication was the called the ‘objective’ model. In this model, the message was transferred from the senders to the receiver through a channel (sound, image, olfactory, etc.), and then decoded by the receiver in the exact way as it was intended (see figure 2). However, this model has failed to explain the common misunderstanding of messages during communication. Since this model, many other models have been created to explain communication. Nowadays, it is commonly recognized that messages can be misinterpreted.



Source: Lasswell, cited by Ruben and Stewart, 1998.

**Figure 2.** Lasswell's model of communication

### 3.1 Message Reception Theory

The process of message reception is active. It “involves attending to and transforming environmental messages into a form that can be used to guide behaviour” (Ruben & Stewart 1998: 85). Ruben and Stewart (1998) in their book, *Communication and Human Behaviour*”, divided the process of message reception in three steps: information selection, interpretation and memorization.

#### 3.1.1 Selection

The environment is constantly sending messages, such as thunder, a dog barking, an email received, a wife calling etc. Individuals can rationally process only one message at a time. Thus he/she has to select one message and give exclusive attention to it, referred to as *selective attention* (Ruben & Stewart, 1998). Therefore, different message sources are constantly competing to get the receiver’s attention, and ICT is not an exception, having to compete with other sources.

#### 3.1.2 Interpretation

Interpretation can also be called the construction of a meaning, in which a person gives a meaning to the received message. The meaning a person gives to a certain idea, event, object etc. depends on their experiences. Because each person has different experiences, it is not possible that a message can have the same exact meaning. Richards (1926, cited by Wood, 2004) argues that meanings vary in different context. In a specific context a message can mean one thing and in another it can mean something completely different.

It is important to notice that, even after having selected a message, a person can lose his/her interest to it and change to another one. It can occur before the end of the process.

#### 3.1.3 Memorization

Information enters the brain system through one or several communication modes (visual, audio etc.). After having selected a message, a person gives a meaning to those symbols. Subsequently, information is stored in the human memory system (Ruben & Stewart, 1998). Human memory is not like a video tape recording all the information that passes through us, but it is rather a dynamic system, which is constantly changing. It is influenced by many factors, such as the background context, date of encoding, emotions, hormones, neurogenesis and specific

signaling stimuli (Jensen, 2005). An important factor that influences what we memorize is the usefulness of the information. The information that is seen as not useful has very low probability of being memorized.

In a very simplistic way, it is possible to divide human memory into two categories, short-term memory and long-term memory. The short-term memory stores only the relevant information, and for a short period of time, about 10 to 30 seconds (Jensen, 2005). When the same information is used several times, e.g. a telephone number, it is then stored in the long-term memory. The information stored in this memory can be recalled after a long time, days, months, and sometimes years or the whole lifetime (Ruben & Stewart, 1998). However, people do not only memorize words, but also events, experiences, skills, motor abilities, etc. Jensen (2005) describes two pathways of memorization, “explicit” and “implicit,” also known as “declarative” and “non-declarative.” Explicit learning may be either semantic (words and pictures) or more episodic (autobiographical, or a personal rendition of the memory versus learning about it second or third hand). The implicit memories include reflexive memories and procedural, or motor, memories.

### 3.1.4 Critics to the Message Reception Theory

The Message Reception Theory, also called ‘objective’ theory, is criticized in two ways; it does not take into consideration the influences of the social network and power relation. As it was mentioned before, ICT tools are not the only source/channel of communication used by entrepreneurs, which implies that the interpretation constructed by people may be influenced, directly or indirectly, by others. The second shortcoming of this theory is that this ‘subjective’ model, focuses only on the cognitive process and exchanges, without taking into account the operation of power present in everyday life (Leeuwis, 2004: 123). As Leeuwis says:

*“The model fails to explain how the construction of meaning is influenced by politics, social relationship, struggle of resources, social interests and aspirations of various kinds, even if communicative intervention practice shows that such factors play an important role in shaping people’s perspective and meanings”.*

Ruben and Stewart (1998) were aware of these limitations, and identified many factors that may influence the communication process. These factors are presented highly condensed in the next sub-section.

### 3.1.5 Factors that influence message reception

Ruben and Stewart (1998) identified 25 factors that influence message reception. These factors are related to the receiver, the message, the source and the environment (Table 1).

**Table 1.** Factors affecting message reception

<p>RECEIVER’S RELATED</p> <ul style="list-style-type: none"> <li>• Needs</li> <li>• Attitudes, beliefs, values</li> <li>• Goals</li> <li>• Capabilities</li> <li>• Uses</li> <li>• Communication style</li> <li>• Experience and habit</li> </ul>	<p>SOURCE</p> <ul style="list-style-type: none"> <li>• Proximity</li> <li>• Attractiveness</li> <li>• Similarity</li> <li>• Credibility and authoritativeness</li> <li>• Motivation and intent</li> <li>• Delivery</li> <li>• Status, power, and authority</li> </ul>
<p>MESSAGE</p> <ul style="list-style-type: none"> <li>• Origin</li> <li>• Mode</li> <li>• Physical character</li> <li>• Organization</li> <li>• Novelty</li> </ul>	<p>ENVIRONMENT</p> <ul style="list-style-type: none"> <li>• Context and setting</li> <li>• Repetition</li> <li>• Consistency</li> <li>• Competition</li> </ul>

Source: Ruben and Stewart, 1998

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### *Factors related to the receiver*

The factors related to the receiver that influence how individuals interpret the message are: needs, attitudes, values, goals, beliefs, capability, use, communication style and experience habit.

Individuals pay more attention to messages that can satisfy their *needs* than to those messages that do not. The needs can be divided into two groups, basic needs, e.g. food, shelter, physical well being and sex, and *motivational needs*, e.g. social contact, reality exploration and comprehension, socialization, diversion, entertainment, maintaining and developing our identity and self concept (the need to be socially recognized). People usually are more favourable to those messages that support their view than non-supportive messages. In other words, *attitudes, values and beliefs* play an important role in determining which messages will be selected and how they are interpreted.

Chandler (1998) suggests that individuals fear using new technologies (e.g. channels of communication, such as computers) because they believe that these technologies would destroy some of their human values, such as loss of freedom, individuality, creativity, intuition, love, humour or some other human value or quality which is seen as central to human identity. Personal *goals* will increase the exposure of the individual to messages related to his/her goal, and will increase the individual contact with people interested in a similar activity. The *capabilities* (i.e. intelligence, previous experiences with a particular topic or area, facility with the language, etc.) have an important impact on the kinds of messages we interpret and how we interpret them. For example, a person that is not used to reading scientific articles or articles with technical terms is not likely to read messages that involve such terms and structure. Although a person has the intellectual potential, the lack of familiarity with the technical terms would affect his/her interest, and comprehension, not to mention the retention (Ruben and Stewart, 1998).

The *use* of the message is also important. Individuals will prefer messages that they can see giving direct use for them to those messages without applicability in their lives. For an example, an entrepreneur that produces milk products would probably be less interested in technologies of cotton production, because this information is not useful. People's habits and preferences influence their *communication style*, e.g. a shy person would prefer more mediated communication (books, computer, TV, telephone, etc) than verbal and inter-personal communication styles (Ruben and Stewart, 1998).

### *Factors related to the message*

Some characteristics of the message such as the origin, mode, physical character, organization and novelty also influence the selection, interpretation and memorization of a message.

People get the information they need from many sources or *origins*, such as trying to recall our own knowledge (i.e. thinking alone or also known as intrapersonal communication), asking other people through face-to-face contact, etc. They can also get the needed information from mediated sources, such as books, by telephone, from television, CD roms, mobile phones, etc. Usually, people have preference to some sources rather than others. The first source of information people usually use is their own mind, called a "self create" message. If they are satisfied with the information they already have, there is no need to go further. Otherwise, they will probably turn to other sources. For example, an entrepreneur who has a sick cow will first try to recall his own knowledge and experience of the disease. If he can not solve the problem, he will search for books, Internet, neighbours or/and call to a veterinary.

The *mode* of the message refers to the form it can take such as written words, spoken words, a picture, a smell, a tactile, etc. Some of these modes are more easily memorized than others. In addition, different modes are stored in different parts of the brain, and are more easily recalled than others. The memorization of that information based on semantic messages (e.g. messages that used words, symbols abstractions, video, text-books, computers, written stories, figures, pictures) is very limited in time and capacity. These messages are harder to be recalled, and have low impact. On the other hand, the information based on episodic messages (e.g. events of daily experience) uses different modes of communication (smell, tactile, audio-visual), and it is stored in many parts of the brain at the same time. This kind of information is associated with location and



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events; consequently it is much easier to recall, having much higher impact on the learning process (Jensen, 2005). How the information is *organized* can have a big impact on what people select and memorize. People are more likely to pay attention to information presented at the beginning of a text. The same may be valid to a webpage design.

How the information is organized on the page can influence the people's interest for the message and influence the easiness with which people can find the information (Hansen et al. 2005). Although there is evidence that the unusual messages are more likely to get our attention, there is no much information about how novelty influences the selection, interpretation and memorization of electronic messages received through ICT media.

#### *Factors related to the source*

Some sources of information are more persuasive and influential than others. According to Ruben and Stewart (1998) the influential power of a certain source depends on its distance, attractiveness, similarity, credibility, authoritativeness, motivation, delivery, status and authority.

People prefer those sources of information that are closer to them, because it usually implies less time, energy and money. However, ICT is making the distance between sender and receiver less important than it was before these technologies were available (Ruben & Stewart, 1998). They are also more likely to select those messages that are more attractive, socially and physically.

The *appearance* also influences the way in which messages are interpreted and memorized. People are more likely to pay attention to sources they feel identify themselves or they feel *similarity* with. Some examples of similarity are common experiences in the past, age, location of origin, educational background, productive activity, etc. (Lakhani, 2005). They are also more likely to pay attention to reliable knowledgeable and experienced sources. Lakhani (2005) suggests that being recognized as a "guru", an expert, increases sharply the probability that people will open their minds to new possibilities. This happens because experts are more easily trusted and believed.

How people perceive the source's *intentions* can also affect its selection and interpretation. For example, if a person perceives that the intention of a message is to sell a product he/she does not want or need, this person will probably give no attention to the message (Ruben & Stewart, 1998). Finally, *power* and *authority* can have important influence on messages ability to persuade (Lakhani, 2005). The extent to which the source is capable of dispensing rewards or punishments for selecting and interpreting messages in a particular way – is also influential in information processing.

#### *Factors related to the environment*

The situation people are in, e.g. a party, in the office, church, workplace, etc, at the moment they receive a message, influences how it is interpreted. The way a message is interpreted also depends on the social environment we are engaged in. For example, if all neighbours of an entrepreneur are against the use of genetically modified crops, the entrepreneur will be less likely to adopt this kind of crop to avoid social punishment (Ruben & Stewart, 1998). This factor will be better explained in the Human Practice Theory, section 3.2.

### 3.2 Human Practice Theory

The communication experts have been questioning the subjective theory, because it failed to explain the influences of the social network and power in the communication process. Leeuwis' model tries to explain the human practice, and helps to answer the question: 'why people do what they do'. Figure 3 shows the factors that people take into consideration when deciding whether or not to adopt a new practice. He suggests that practices are not only influenced by the knowledge of people, but also by the social and physical environment that surrounds them, and how they perceive their self-efficiency. He identifies five main 'groups' of variables

that influence the human practice, evaluative frame of reference, perceived self-efficiency of the environment, social relationship and social environment, and feedback. His model is presented in this section.

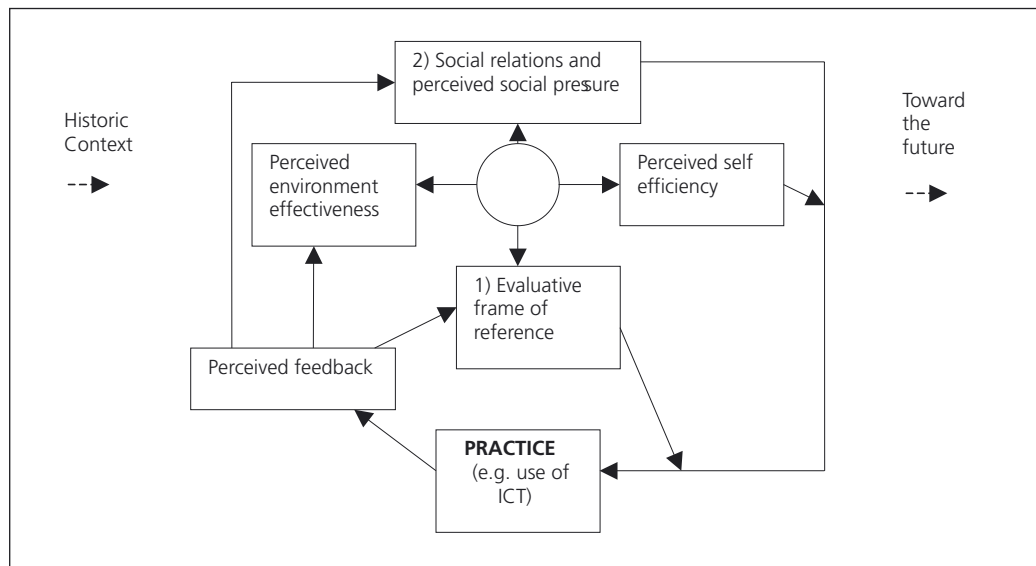


Figure 3. Human Practice model. (Leeuwis 2004)

### Evaluative frame of reference

The first variable suggested by Leeuwis is what he calls “*evaluative frame of reference*”. It is the basis for the reasoning, the knowledge that people use to take decisions (i.e. the way in which they explain facts and events, their personal theories). People’s practice depends on (a) their perception of the consequences of certain practices, (b) the perceived probability that this consequence would happen, and (c) whether they value such consequences in relation to their aspirations as negative or positive.

#### *Perception of the consequences*

Rural enterprises, such as agriculture, industrial production, services etc. are complex activities. Entrepreneurs know that even small changes in their practices could have consequences. Thus, before adopting a new innovation they make an (conscious or unconscious) evaluation of the consequences that this adoption would have. This evaluation considers technical consequences (e.g. required inputs, required change in land distribution etc.) as well as socio – economic consequences (financial cost involved, extra labour force required, impact on social relations, etc.). For example, the adoption of a new machine to collect milk will be based on his/her previous experience, and other sources of information (Internet, neighbours, advisors, etc.) related to machines and collecting milk. Entrepreneurs will expect: an extra economic cost in purchasing it, an extra cost on maintaining this machine, an increase in income, lower labour costs, an increase in milk quality etc.

The way in which entrepreneurs evaluate the consequences is not necessarily the same as scientists. Actually, it should probably be different, since both have very different knowledge and experiences. What is important is that entrepreneur’s practice, adoption or rejection of innovation (or messages) depends on how they perceive the consequences of these practices at various levels and domains of their lives.

#### *Perception of the probability that consequences happen*

Leeuwis (2004) suggests that there are many aspects that have to be considered in managing rural enterprises. He affirms that it is not enough to look at the technical aspects, such as machines, physical infrastructure, etc., it is also important to look at the economic variables, such as income, cost, cash flow, financial requirements, among others. Furthermore, entrepreneurs also take into consideration social issues, such as relationship with

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friends, the community and family. Before changing their practice, for an example, adopting a new technology, they will consider the risks of this innovation over the three dimensions; technical, economic and social. The risk assessment is not an easy work. It depends on many factors such as frequency of consequence occurrence, visibility, magnitude and directness and duration of the consequence.

#### *Valuation of consequences: positive or negative*

After determining the consequences and their probability of occurrence, entrepreneurs would classify these consequences as positive or negative, desirable or undesirable, according to their aspirations. For example, if an entrepreneur's aspiration is to increase his income, and a proposed technology would have as a consequence a higher profit, entrepreneur will value the change as positive.

Entrepreneurs can have four types of aspirations and interests: technical/economic, social (including political), cultural and emotional. The first one, the technical/economic aspiration, would be, for example, an entrepreneur's aspiration to reduce costs of using fertilizers. The second one, the social aspiration, would be the adoption of certain practice because it would improve his/her relationship with family members, neighbours, traders, farm labourers etc. The third one, the cultural aspiration is related to people values and norms. Organic farmers, for example, believe that the environment is in equilibrium, and they are not expected to use any fertilizer or pesticide because it would break the equilibrium causing big damages to their production and lives. The last type of aspiration is referred to as 'emotional' interests. The emotion that the person is feeling at the moment, anger, peace, love, appreciation, etc, can influence how the person values the risk. For an example, if a person is feeling fear, it is more likely that he/she could overestimate the risk as negative. In, addition, the knowledge used to evaluate the consequences, risks and aspirations are questioned. Even people may question their own knowledge. In order to adopt this knowledge, it has to be checked or tested before, e.g. by on-farm experimentation, checking other sources etc.

### **Perceived effectiveness of the environment**

Even the less sophisticated practices require a *network of support relationship* (i.e. network infrastructure). For example, the adoption of a milking machine requires a credit system, a seller, repair shops, etc. Thus, entrepreneurs, before changing their practices, evaluate whether they have the appropriate organizational infrastructure (Leeuwis, 2004). However, some enterprise practices do not only require an effective support network, but also cooperation between entrepreneurs. For example, there are investments such as the broadband infrastructure, which may be viable only if a minimum number of farmers adopt it at the same time, so that overhead costs can be shared. This cooperation is called 'public good' dilemma, in which individuals are supposed to contribute to the acquisition/maintenance of public services, such as roads, electricity, broadband, irrigation system etc. Thus, entrepreneurs' practices are not only shaped by their perception of the network support (infrastructure), but also their perception of the effectiveness of the commitment of other individuals to certain issues.

### **Perceived self-efficiency**

Entrepreneurs' practices are also shaped by the way their self-efficiency, their capability to do something is perceived. Practices require not only physical resources (cash, labour and land), but also skills, competence and valid knowledge about them. If entrepreneurs can not see themselves as able to have one of these required resources, they will probably refuse a new practice.

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## Social relationship and social pressure

An influencing factor that is usually underestimated by communication workers is the social relationship and social pressure. People around entrepreneurs shape their behaviour and practices. Leeuwis divides social pressure in three dimensions: a) the perceived desires and expectations from other actors (in relation to the practices), b) the resources mobilized to persuade practices and c) the valuation of expectations, resources and relationships.

### *Perceived desires and expectations of other actors*

Entrepreneurs are not alone, thus their decisions are not free from social influences. People around them, such as relatives, neighbours, local leaders, religious leaders, communication workers etc, sometimes with different interests and knowledge, usually try to influence their practices. For example, if the national government wants farmers to adopt techniques of soil conservation, it will try to use the extension agents to put pressure on farmers in order to change their behaviour.

In order to make their voices heard, social actors make use of resources, 'rewards' and 'sanctions'. For example, a government in order to persuade a farmer to change his/her practices, may apply fines ('sanctions') or provide financial incentives to those who adopt it ('rewards'); a religious leader may exclude those who apply pesticides from his groups ('sanctions'), and may highlight those who adopt 'good practices' ('reward'), etc.

Finally, entrepreneurs make an evaluation between the technical, socio and economic consequences of a practice, with their aspirations. They make a valuation between negative sanctions and positive rewards and compare it with their aspirations.

## Feedback

After adopting a new practice, people usually evaluate it, based on their experience and outcomes, called feedback. Feedback provides information to evaluate this new practice to assist decisions to continue with it or not. This process of action and feedback is like a cycle, in which an action creates feedback that can change that action.

**Box 1:** Summary of communication theories mentioned above:

### **A) Message Reception Theory**

Process steps:

- Message selection
- Interpretation
- Memorization

### **B) Human Practice Theory:**

- 1) Beliefs about consequences
- 2) Interests and goals
  - technical and economic goals and interests
  - social goals and interests
  - cultural aspirations
  - emotional aspirations

3) Resources available (how people see their ability to mobilize resources)

- physical resources (financial, land, etc)
- skills and competence
- trust in their knowledge (credibility)
- ability to control risks
- agro-support network
- community organization

4) Social Pressure

- desires and expectations of others
- rewards and sanctions mobilized by others
- balance between rewards and sanctions

## 4. Recommendations for ICT as information and advisory tools

- 1) ICT as a tool to provide information and advice can work in two ways, widening people's evaluative frame of reference and improving perceived self-efficiency for dealing with specific situations. Widening the people's frame of reference means increasing their knowledge and their options regarding certain topic, technology, etc. In addition, information can also improve how people see their own capabilities, skills and competences to deal with certain issues.
- 2) To have an efficient communication, we have to be aware of the fact that each human is different. They are not only genetically different, but they also have different knowledge. This different knowledge is a consequence of the different experiences and information to which they have been exposed during their lives. These differences in knowledge together with their different physical, social and political environments (contexts), contribute to misunderstandings in communication. Thus, it is extremely important to be aware of what these differences are before the start of the communication process. It is important to know the receivers' (rural entrepreneurs) background, their life style, their experiences, knowledge, the environment in which they are enrolled etc. Knowing the receivers' perspectives allows us to predict the communication effects, so that the communication strategies can be adapted to this perspective.
- 3) Communication involves different modes, such as audio, words, visual etc. Written texts and linguistic communication in general are harder to memorize than a combination of this mode with other modes. Thus, it is recommended to use different communication modes (e.g. video, graphs, pictures etc.) to improve message memorization. Graphs, videos and computer software help not only the interpretation process (making it easier to understand), but also help the memorization.
- 4) Events, such as a field-experiment, field-trip, have higher impact on the memorization process than language related messages. In other words, knowledge memorized through events is more likely to be learned than knowledge from other sources, such as written messages. In order to have a higher communication impact, it is recommended to combine.

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## References:

- Argyris, C. and Schön D.A., 1996. *Organizational Learning II. Theory, Methods and Practice*. Addison-Wesley Publishing, Reading.
- Giddens, A., 1992. *Sociology*. By Polity Press in association with Blackwell Publishers.
- Hansen, J. P., Hansen, N. F., Horning, A., and Schultz, E., 2005. *Landmand.dk a personal portal for farmers*. Paper presented at The 5<sup>th</sup> Conference of the European Federation for Information Technology in Agriculture, Food and Environment & The 3<sup>rd</sup> World Congress on Computers in Agriculture and Natural Resources, Vila Real, Portugal, July 25-28, 2005.
- Jensen, E., 2005. *Teaching with the Brain in Mind* (2nd Edition). Alexandria, VA, USA: Association for Supervision & Curriculum Development, 2005. p 125.
- Keeton, M.T., 1976. *Experimental Learning: Rationale, Characteristics, and Assesment*. Jossey-Bass Publishers, San Francisco.
- Kolb, D.A., 1984. *Experimental Learning: Experiences as the source of learning and development*. Prentice-Hall, Englewood Cliffs.
- Lakhani, D., 2005. *Persuasion: the art of getting what you want*. John Wiley & Sons, Inc., Hoboken, New Jersey. Canada.
- Leeuwis, C. 2004. *Communication for Rural Innovation: Rethinking Agricultural Extension* Oxford: Blackwell Science.
- McLuhan, M. & Fiori, Q., 1967. *The medium is the message*. New York. Random House. Cited by Wood, J. (2004) *Communication Theories in Action*. Thomson Wadsworth.
- Ruben, B.D., and Stewart, L.P., 1998. *Communication and Human Behaviour*. Fourth Edition: Allyn & Bacon Press. 396 p.
- Wood, J., 2004. *Communication Theories in Action*. Thomson Wadsworth. 374p.

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# Online education for establishing SMEs (Small Medium Enterprise) - case: YrittäjyysPaletti e-learning modules

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## 1. Short description

Helsinki School of economics has developed an Internet based knowledge bank called ePOLKU and e-learning modules. These form a comprehensive entrepreneur training package for establishing and start-up companies. This package offers entrepreneurs an easy access to vital business information.

The ePOLKU knowledge bank highlights challenges in setting up a business while encouraging innovation, responsible and predictive attitude in all areas of business operations. YrittäjyysPaletti e-learning modules on the other hand consists of modules covering specific assignments, additional material index, discussion forums and group assignments

This project underlines the cooperation between Helsinki School of Economics and Helsinki University in the area related to running business as co-operatives.

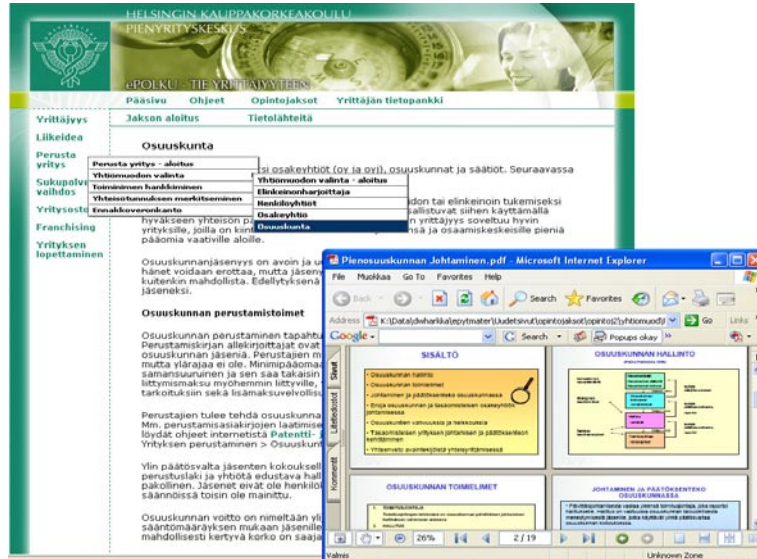
## 2. Introduction and background

There are a vast number of new entrepreneurs located in and operating from areas, where they cannot be reached with the traditional further education programs. Both time and place can also be constraints, which hinder the potential entrepreneur to pursue starting up a successful company or developing entrepreneur skills and knowledge.

In order to meet this market demand, and ensure better coverage of entrepreneur training, Helsinki School of Economics, Small Business Center decided to develop knowledge bank for entrepreneurs. It was funded by State Provincial Office Southern Finland as part of “Development of Entrepreneur Further Education material” –project (2002-2005).

### ePOLKU (ePATH) – an Internet based knowledge bank for entrepreneurs

The knowledge bank was named ePOLKU (ePATH). The material in the knowledge bank was compiled in cooperation with experts and trainers of Helsinki School of Economics Small Business Center, and external professionals in the area of entrepreneurship. Amongst others, Helsinki University, Ruralia Institute in Mikkeli provided valuable material for the co-operative section of ePOLKU.



View of ePOLKU – knowledge bank: content developed together with Helsinki University, Ruralia, Mikkeli

The ePOLKU enables easy access – a one-stop-shop – to important information when setting up and running a business. The content is updated and developed continuously (once in six months update is guaranteed). One of the key objectives of the knowledge bank is to offer information in such format that it is easily understandable as well as readable. This was achieved by using general website design guidelines, e.g. limiting the size of web pages to user friendly length and avoiding too many functionalities.

The main content of ePOLKU is related to the life cycle of running a business. It is categorized in the following topics:

1. Business idea and starting a company
2. Managing risks and introduction to business law
3. Marketing for SMEs
4. Finances
5. Leadership skills
6. Taxation for SMEs
7. Business Plan



View of ePOLKU –topics page



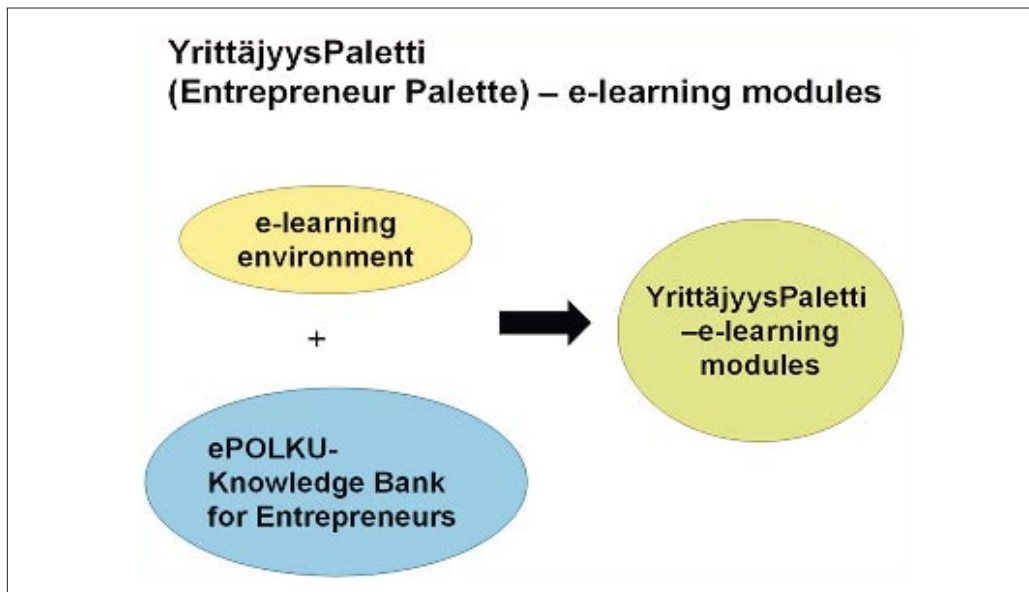
There is also an extensive, up-to-date list of website links and business literature, entrepreneur interviews and video clips. This material offers the user a change to gain better understanding of running a company, and evaluate their own entrepreneurial strengths and weaknesses.



View of ePOLKU - entrepreneur contacts page

## YrittäjyysPaletti – Entrepreneur e-learning modules

In order to provide more interaction to the learning experience, a set of e-learning modules were developed to complete a full training package for entrepreneurs. This package is called YrittäjyysPaletti (Entrepreneur Palette).



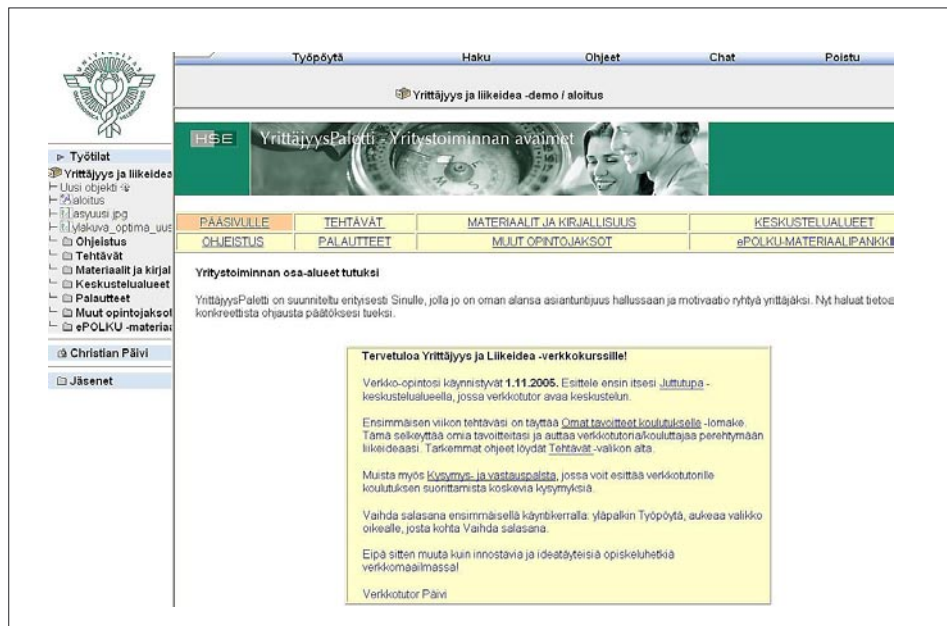
ePOLKU and e-learning environment

YrittäjyysPaletti consists of seven (7) modules, which follow the same topics as ePOLKU – knowledge bank. A Finnish e-learning platform, Optima, was used for this training package. It consists of module specific assignments, information of additional material, discussion forums and group assignments. Each module is

100% distant learning with scheduled learning tasks, tutor support and expert trainers. The tutors and trainers provide personal feedback to discussions or assignments.

e-learning modules cover among other things the following areas:

- Evaluation and analysis of business ideas and understanding of business planning
- Evaluation of entrepreneur skills and development needs of the business
- Introduction to different business types and procedure how to set up a company
- Understanding of the relevance of risk management and business law for SMEs
- Acquiring marketing skills
- People management
- Financial management
- Tax planning



Screenshot of the e-learning environment Yrittäjyyspaletti

YrittäjyysPaletti –modules have been run between May 2005 and March 2006 in total of seven (7) courses. ePOLKU –knowledge bank has been utilized in other courses and trainings within Small Business Center as well as marketed to other Mikkeli university consortium units in spring 2006 (Helsinki University, Kuopio University, and Lappeeranta Technical University).

### 3. Activities and results

The objective of the project was to design an easy-to-use entrepreneur information bank, which achieves the following:

- operates as a stand-alone information source for entrepreneurs
- provides support material for class room trainings
- supports e-learning courses consisting of modules in an e-learning environment (e.g. WebCT, Optima, Moodle...).

The project consisted of steps familiar from the product development in IT-field, i.e. planning, production, publication, implementation and conclusion. Most of the project work was done internally, except for external web-template design and some parts of the content. YrittäjyysPaletti is updated real time according to customer feedback when ever it is feasible.

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One of the key results is that there is a need for e-learning type of entrepreneur trainings. On the other hand, there is also numerous trainings in the markets which are free of charge (externally funded project) and they jeopardize already tested and user proven e-learning training packages. Continues development, updating and networking with other universities will ensure long life span for both ePOLKU-knowledge bank and YrittäjyysPaletti e-learning package.

## 4. Lessons learned; suggestions and conclusions

YrittäjyysPaletti- e-learning modules have been run between May 2005 and April 2006 for seven (7) times with good results. This training model has offered an alternative for establishing or already operating entrepreneurs to gain understanding of chosen topics, and explore opportunities while working for somebody else. There have also been a number of students who have been entrepreneurs for some time and want to refresh their knowledge.

Some key findings are:

1. ePOLKU-material bank related
  - regular updating essential (both content and links)
  - networking with other universities provides necessary diversity for the content
  - continuous search for new solutions for utilizing the high quality content guarantees longer life cycle for the bank
2. YrittäjyysPaletti - e-learning module related
  - less is more: too many activities distort students understanding of the course flow and hinder learning
  - having a topic related lecturer is a major value add in the markets where product concept copying is common
  - a key quality feature: daily tutor monitoring of the e-learning courses

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# Lissu – the interactive Business plan

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## 1. Short description

When starting up an own business you usually have to make some plans, budgets etc. Banks, investors among others have interest in these matters for their own decision. Everyone has usually an idea about how to build up a business idea. There was a demand for a common businessplan with easy access, and the possibility to give comments and a nice layout for everyone.

## 2. Introduction and background

In our region we demand an own business plan for everyone who applies for the so called startup money. It's a grant from the employment authorities to people who want to start a business of their own.

Most of our customers make their business plan by using a personal computer. However, the software programs they use do not always communicate with each other. Also emails and the use of diskettes are a virus risk. Consequently there were lots of problems in the communications between the customers and the advisers.

## 3. Activities and results

The Lissu business plan was invented to solve this problem. Lissu is an interactive Internet based business plan. Lissu solved the problems with different kind of softwares, viruses etc. Lissu also made it possible for our customer to make the businessplan where ever there is an Internet connection. Lissu made it also possible for others to have access to the plan. Representatives from banks, employment authorities, insurance companies among others can be connected to the plan.

## 4. Lessons learned; suggestions and conclusions

After using Lissu a year we have discovered many benefits:

- You can increase the amount of your customers
- You can have customers all over the world
- Your customers can always reach you
- You can increase the satisfaction of your customers and give them new contacts and possibilities

In the future we are updating the Lissu business plan.

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# Developing a Network for the Agricultural Sector to Exchange Knowledge - NASEK pilot project

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## Short description

This paper presents the NASEK pilot project and its main features. The project is founded by the EU Leonardo program. NASEK is a network for the agricultural sector to exchange knowledge and it includes international student exchanges. The outcomes of the NASEK project and the results of the student exchanges are presented in web pages.

## What is NASEK?

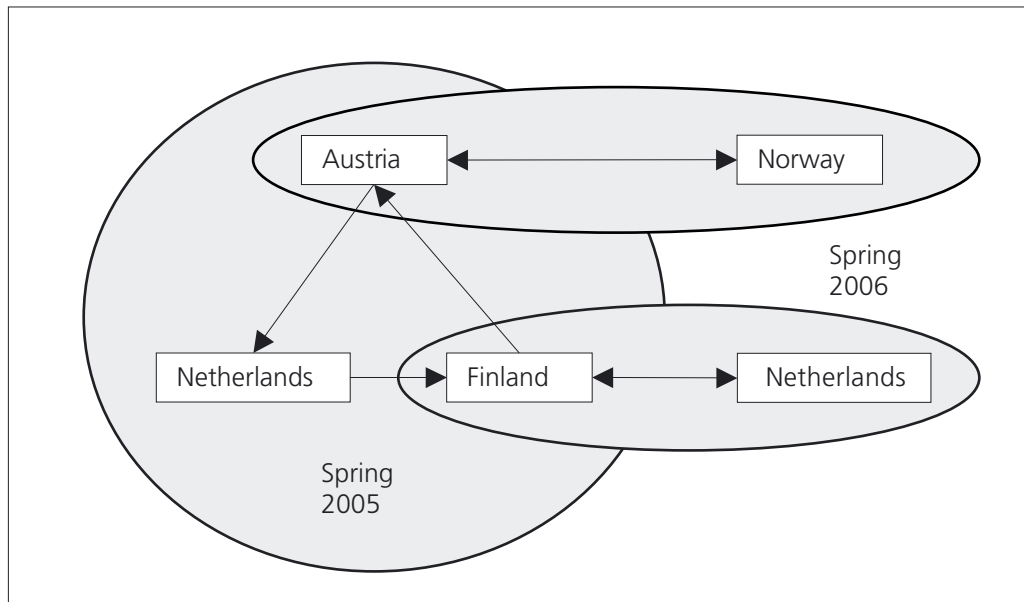
NASEK comes from the words a Network for the Agricultural Sector to Exchange Knowledge. It is a three-year pilot project funded by the EU Leonardo program. The target group of the NASEK consists of vocational and higher level students, their teachers and farmers all around Europe. Students, teachers and farmers from four different countries (Finland, the Netherlands, Austria and Norway) have participated in the project so far.

Other aims of the project are

- to develop a method for identification of actual needs of knowledge of farmers in participating countries,
- to improve international communication between students, schools, agricultural enterprises and agribusiness by a tool called the Virtual Project Headquarter,
- to build and maintain a web site for publication of research results of students,
- to create Learning Packages which are a back pack of information and guide for students participating in such a project,
- develop eLearning possibilities and problem based learning (PBL) in international context

And all this has something to do with agriculture and especially animal husbandry. The problems for the students have been chosen with a method called Knowledge Monitor, which has been applied for the actual farms. The students have been solving the problems by visiting the farms and getting to know farmers' way of doing things. The farmers have been able to participate the seminars organised by the students and they have also the possibility to see the results from the web-site which has been created by the students.

The actual student exchanges were implemented in spring 2005 and 2006. During the first round the student exchanges were organised according to a triangular model between three countries (see figure 1). The second round was supposed to include three new partners. We didn't manage to recruit so many new partners and the second round was implemented between Finland – the Netherlands and Austria – Norway (new partner).



**Figure 1.** The student exchanges during spring 2005 and 2006

### First exchange round

The students were divided in multinational groups where each group had participants from each country. Even though one country was absent during the exchanges the whole group participated in working. This was possible by using an Internet based learning platform called Verkkosalkku ([www.verkkosalkku.fi](http://www.verkkosalkku.fi)). This virtual teamwork will be presented later. Each of groups had one sub problem which was part of the main issue.

### Second exchange round

The Austrians were the only ones who got a new partner. Therefore it was decided that Austria would have a student exchange with Norway and Finland with the Netherlands respectively. These exchanges took place at the same time and the student groups were again multinational including participants from all four countries. Again the virtual teamwork had a big role.

### Third exchange round

The NASEK network will expand after completing the pilot project to several new partner countries. The negotiations with the possible partners from Italy, United Kingdom and Greece are going on. In addition the NASEK network can expand to other sectors than agriculture.

## Knowledge monitor

Knowledge Monitor was developed at the very beginning of the project. It is a tool for collecting the information for choosing the bottle necks and items to the development work. It was used in NASEK to find out the most problematic issues in everyday farming. The method was applied by interviewing a total of 60 farms from three partner countries, which were Austria, Finland and the Netherlands. The chosen problems for the student exchanges were 1) improving animal welfare and health in housing on a dairy farm and 2) the circle of minerals. By this way the problems were chosen with an analytical and systematic manner.

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## Virtual teamwork in international student exchange

One of the biggest challenges of the project was how to communicate within the student groups when one part of the group is not present in the same place. We called this communication virtual teamwork. One type of virtual teamwork is called collaborative learning where the knowledge of the group members is supposed to be almost at the same level. The teacher is not involved in collaborative learning and the group members share and rebuild their knowledge to create new information. Therefore, collaborative learning is based on the discussion of equal persons. (Häkkinen, P & Arvaja, M. 1999)

Problem based learning (PBL) is a way of learning which includes the idea of collaborative learning methods. PBL can be based on seven steps which mimic the natural behaviour of human beings. The seven steps can be described as follows: (Huusko, M. Jokinen, S. & Sarajärvi, T. 2001)

1. Clarifying the concept. The students will clarify what the topic means and find out the meaning of strange words and concepts.
2. Defining the problem. The students will find out the problems related to the topic.
3. Analysing the problem and brainstorming. The students will gather the information they have about the topic at this moment. It can be a list of words and small sentences related to the topic and it is not necessary to create any new information.
4. Problem analysis and systematic classification. The students will agree together the information that they need in problem solving. The result of this phase can be a mind map or such a tool which can be built up easily together.
5. Formulating the learning objectives. In this step students should have a common understanding of what information they still need to search. The learning objectives should be clear enough and all of the included terms should be clear for all of the students.
6. Self study. The students will work by themselves or within the group to gather the information needed and agreed in previous steps. Various sources of information can be used.
7. Reporting. The students might give a presentation or write a report as a solution for the problem. It is also important to evaluate the group work and give feedback.

(Huusko, M. Jokinen, S. & Sarajärvi, T. 2001)

Steps 1-5 are usually included in the first tutorial session and step 7 in the second one. The duration of the whole process can vary a lot. In some cases it may take a week to go through all of the steps and in some cases it could take a month.

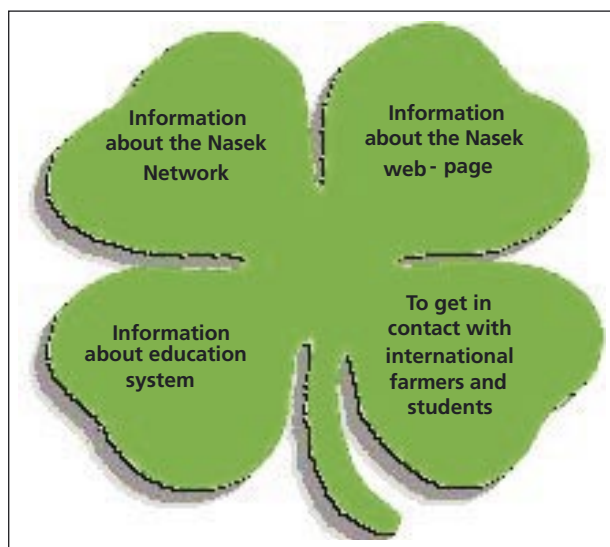
In NASEK the collaborative learning was a big challenge because the groups were at least in two countries at the same time. To solve this problem we used an eLearning platform called Verkkosalkku. Verkkosalkku is a Finnish web tool product which has been designed by the company called Mindcom Ltd. Verkkosalkku has been developed for several years and the Savonia University of Applied Sciences has had an active role in the development work. The program is widely used in Savonia.

There are several features in Verkkosalkku which can be applied in international virtual teamwork. The main working area during the student exchanges was the tool called **publications**. Each student group had their own publication area where they could include files and plain text. It is also possible to include discussions (mainly feedback) in publications area. This can replace operating directly on web-site. There is also a sepa-

rate **discussions** area in Verkkosalkku where we could for example organise student group meetings. The discussion in these kind of meetings can be messy and the role of the chairman is important. The minutes of the meeting could be printed out as a combined conclusion of the electronic discussion. It was also possible to use **chat** forum to support the meetings. The Verkkosalkku has also a **mail** which was a very important tool when keeping the contacts and planning the project.

## Virtual Headquarter

The Virtual Headquarter (VH) is one of the most important outcomes of the project. The VH is actually an interactive website for farmers, teachers, students and companies related to agricultural business. The VH will bring all these parties together in one place and they can share information. The main ideas of the Virtual Headquarter are presented in figure 2.



**Figure 2.**  
*The main ideas of the Virtual Headquarter*

As previously mentioned the NASEK will be a network for the agricultural sector and the VH will first provide some basic information on the network. The VH will have also a link to the NASEK outcomes web pages, where the results of the student exchanges are presented. This includes also a discussion forum around the results. There will be also a place where the students can find farmers and vice versa. The VH will include a database of international farms suited for a student's international practical training periods. The VH will provide a possibility to download so called Learning packages which will be presented briefly in next chapter. There are also links to interesting agricultural sites such as schools, research organisations and cooperating partners in agricultural sector.

## Learning packages

The Virtual Headquarter is also the place for the Learning Packages which can be downloaded from the VH. The Learning Packages are a back pack for a person who wants to join the network and wants to apply the methods used in the NASEK pilot project. The main idea is that anyone can get a clear picture via these packages of the learning methods and other ideas used in the project. For example a teacher who is building up an international student project can download the material and use it. The methods can be applied also for other sectors than agricultural.



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## Outcomes of the student exchanges

All of the results of the international student exchanges are presented on web pages which have been created by the students themselves ([www.nasekoutcomes.net](http://www.nasekoutcomes.net)). Therefore the results are available for all who are interested in animal welfare and the circle of minerals. The results and the solutions for the problems are very practical and they will include lots of information on differences in farming between the partner countries (Austria, Finland, Norway and the Netherlands).

The web pages are built up with a simple web page editor programmed by a Finnish company called Avence Digital Ltd. Every student had a user account and password for the software and the results were added to the pages on-line. The web page editor which we used is really simple and as we have experienced it takes around five to ten minutes to instruct the students for the usage of it. Almost everything is pre-programmed in the software and the students don't have to concentrate on for example types of the text (e.g. font size and type) and on the place and size of the figures. At the same time when the students prepare the web pages they have to concentrate on the structure and the content of the pages. Thereby it is not just publishing the results, but also learning at the same time.



## References:

- Huusko, M. Jokinen, S. & Sarajärvi, T. 2001. Ongelmalähtöinen oppiminen. Oulu university. [Referenced 24th March 2006]. Available: <http://www.oulu.fi/opetkeh/kehtoimi/PBL/wspbl.html>
- Häkkinen, P. & Arvaja, M. 1999. Kollaboratiivinen oppiminen teknologiaympäristössä. In book Etäpelto, A. & Tynjälä, P. Oppiminen ja asiantuntijuus. WSOY. Available also: [http://tievie.oulu.fi/koulutus-resurssit/artikkelit/hakkinen\\_arvaja.pdf](http://tievie.oulu.fi/koulutus-resurssit/artikkelit/hakkinen_arvaja.pdf)

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# Policies and legislation in developing e-learning possibilities for rural SMEs – preliminary results of the Euracademy Observatory project

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The purpose of this short presentation is to both describe the motivations and objectives of the newly starting Euracademy Observatory –project and to get an idea of the policies and legislation in the eight partner countries in relation to supporting the use of information and communication technology in the rural SMEs for training their personnel.

## Why this project?

It is no news, that rural areas suffer from a skills gap, limited access to training provision and low propensity to take up training - especially ICT-supported training. This puts the majority of their labour force (especially employees of small and micro-enterprises and the self-employed, including farmers) at a disadvantage, places rural businesses and jobs at risk and restricts job mobility. Rural areas also suffer from the “digital gap” that limits the potential of their residents for using ICT for Vocational Education and Training.

The Euracademy Observatory aims to build a body of information and knowledge through research on these issues and also map the lifelong learning needs of managers and employees in rural areas. At the same time it assesses the uptake or potential uptake of ICT-supported learning.

The Euracademy Observatory is a transnational project financed in part by the European Commission in the context of Leonardo Da Vinci’s Community Vocational Training Action Programme. It supports the creation of a resource centre and databank of research findings concerning the lifelong learning needs of SMEs, Micro-enterprises and the Self-employed in Rural Areas, and the role ICT can play in covering these needs. The Observatory will be set up by the European Academy for Sustainable Rural Development (Euracademy Association; [www.euracademy.org](http://www.euracademy.org)) and the University of Helsinki, Ruralia Institute, in cooperation with other universities, research institutes and non-governmental organisations in Greece, Belgium, Germany, Spain, Hungary, Poland and the UK.

During the initial phase which is funded by the Leonardo programme, the sampling frame, research methodology and tools will be established and piloted, with a view to repeat the research at regular intervals, i.e. every three years, so that updated information and comparative data will be compiled on a long-term basis, to aid the development of appropriate policies and measures for rural areas.

The beneficiaries of the Observatory include training providers, individual learners, especially entrepreneurs and employees of small or “micro” enterprises including the self employed, certification agencies, social partners, policy makers and researchers.

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## Steps towards setting up a viable Observatory

During the two-year project we will at first review policies and practices of ICT-supported lifelong learning across Europe, with a view to identify and promote “good policy examples” that provide models for action at national and EU levels.

That will be followed by conducting surveys of training providers, with special emphasis on ICT-supported learning, in 7 European countries, aiming to describe and document the characteristics of the learning provision in a variety of rural areas across Europe, targeting SMEs and micro-enterprises or the self-employed. An inventory of “best practice examples” will be produced on this basis and published.

We will also conduct surveys of training recipients in rural areas, aiming to identify their learning needs, their job and socio-economic profiles and evaluate the contribution of lifelong learning, especially ICT-supported learning, in their employment prospects, job security and mobility. A control group of people with similar socio-economic characteristics, working in rural SMEs or seeking work in rural areas will be also surveyed, to establish the characteristics of the “latent” demand for lifelong learning, and investigate constraints, such as accessibility to ICT, access to learning resources, attitudes and culture. The information collected from these two samples will supply the basic material for the “user statistics” and the related databank.

Setting up the Observatory on the Internet, as a long-term service to inform policy and practice, addressing training organisations, social partners and policy makers is an ongoing task from the very beginning of the project. The Observatory will be hosted in the address [www.euracademy.org/observatory](http://www.euracademy.org/observatory) and it will publish the research reports of the surveys, set up and continuously update databases of best practice, issue quarterly newsletters with summaries of the research progress and interim results, and publish comparative statistics. Also, the Observatory will start a library of relevant publications and will host virtual workshops and discussion fora on the subject of lifelong learning in rural areas.

In the partnership we have 7 organisations, that will form an Advisory Panel of “stakeholders” for the project. They are directly involved in the economy of rural areas representing SME Networks, Chambers of Commerce and Industry, Development Agencies etc, and they will act as a “sounding board” for the Observatory activities, providing feedback to the design and implementation of the research activities and the dissemination of their results. The panel will also act as a mediator, in order to spread the benefits of the project results to the end-beneficiaries of lifelong learning policies in rural areas.

As a part of disseminating the results of the project and to discuss the research results with training providers, policy makers and the social partners, Euracademy Observatory project will organise a Transnational Workshop in Athens in October 2006 and a Transnational Conference in Brussels in September 2007.

## Lessons learnt so far

Based on the draft national reports from five partner countries it is quite obvious that in all of them entrepreneurship is supported through different policies and the importance of increasing the diversified use of ICT by SMEs is emphasised as a part of improving their competitiveness on global markets and also in relation to promoting Information Society in general. However, the realisation of these objectives and the speed of introduction of new technologies vary widely between countries, regions, sectors, industries and enterprises.

Also the ideal of life long learning is incorporated to the policies and initiatives for supporting continuing education and training (CET), which is seen as an important tool for developing the work life skills and knowledge of the adults. Enhancing ICT-supported training - usually referred as e-learning - has become a current theme in discussions for educational policy and practise as well as it has influenced pedagogical aspects of education and training especially for children and young persons from the pre-school up to the master

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level studies. Though recognised, somewhat less concern is put to the policies and practices for increasing e-learning skills of adult learners and developing opportunities for ICT-supported learning for them either as a part of their work or of CET studies.

When it comes to the even narrower question of supporting SMEs to increase their utilisation of e-learning when training their personnel, special policies or legislation, research or statistics for that are difficult to find. This is not a surprising finding and it proves some of the relevance of Euracademy Observatory project as it will map out in more detail the present situation in the partner countries, describe the challenges for improving e-learning opportunities for adults in work life as well as follow-up the development in three year intervals after the project through the Observatory.

SMEs are a major force in Europe for providing work and maintaining local economies – especially in rural areas. In the partner countries of Euracademy Observatory, the number of micro- or small enterprises (including self-employed persons) is in average way over 50 % of all enterprises and more than half of them are located on rural areas; e.g. in Finland over 80 %. A typical feature for SMEs in general is, that they don't aim to expand their business and this relates also to the ways they respond e.g. to the challenges of competitiveness which again influences the ways they manage information flows, how they use external expertise and how new knowledge and skills are acquired.

If thinking of provision of any kind of training as an external expert service for a SME, a few quite common features are good to be aware of for understanding the preconditions of the relationship between training providers and entrepreneurs. On basis of research, it is clear, that the smallest firms (micro firms) hardly use the business (and expert) services, and solving of business problems is often related to knowledge and experience of the person who is making decisions in SME - usually the director/owner (e.g. Littunen 1994, Ruokokangas 1996, Storhammar 1996). So small enterprises are not inclined to approach training providers very easily and also the relevance of that is very much evaluated by the entrepreneur himself based on his present knowledge and skills. Also as noted in the country report for RuBIES –project (Matilainen et al 2005), (at least Finnish) SMEs are not proactive as for the acquisition of information and it is not sought for until it is needed (Kaipainen 1989). When information is needed, it's supposed to be quickly at hand, so again systematic training of personnel is not among the first solutions for information or knowledge needs. Instead sources like customers, other entrepreneurs, experts, publications, reports, researches and information in Internet are used (Sapman 1999.)

In addition to the possibly not so enthusiastic learning culture of the SMEs, in small rural enterprises the long distances and the fact that the production process binds the employees to their work are reasons why it is difficult for the personnel to participate in training or other development processes. Yet, as they are expected to keep up with the progress and be responsive to change, meaningful solutions to this problem could be provided by ICT supported education and training as it liberates from some hindrance of time and place (Karjalainen & Era 2001).

AECS report from year 1996 lists a few main advantages and disadvantages of distance training for small enterprises. Some of them are by now possible to overcome by using more advanced solutions combined with improved pedagogical approach as the special features of e-learning are better known now by the training providers. But some obstacles still remain the same and require attention and active cooperation from both the provider of the training and the SME trying to achieve best possible results.

As the main advantages are listed:

- Organisational aspects, such as flexibility of studies, decentralisation of the training process outside the training site, permanent availability of the courses or possibility to reach geographically scarce populations;
- Cost, since distance training implies important savings related to the lessening of travel hours

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to the training site, the reduction in transfer cost (travel, lodging, etc) and the possibility to train a large number of people from an initial investment in the course design. Though to achieve this stability or even decrease in the training costs, it is obvious that the contents should not change and the course should be widely used by a large number of learners;

- Teaching aspects, such as simultaneous transmission of contents to all students, adaptability to different habits and learning rhythms, possibility of a more customised training and individual attention from the teachers.

The main difficulties seem to relate to :

- studying in-depth certain training contents;
- exchanging of ideas and problems of isolation. This problem is partially solved by the new communication technologies;
- setting up feed-back mechanisms;
- obtaining certain training goals linked to social or practical abilities;
- low-skilled workers and low-motivated students to follow up the training materials;
- small existing supply of training materials not well suited to the enterprises' training needs, resulting in a need for purchasing tailor-made training materials that are much more expensive.

(AECS 1996)

SFEDI in UK gathered in 2004 in its research also some views of small businesses in relation to e-learning.

Three problems were cited:

1. lack of awareness about what provision is available
2. financial and opportunity costs linked to training activities, including time spent away from work
3. limited access to broadband for many small firms

Two resources were cited as being really useful:

1. a vetted directory of useful sites and resources
2. a knowledge of shared owner/manager experiences of e-learning that addressed common problems in appropriate language

These both studies show that if ICT supported learning is hoped to be a more common way of improving the skills and knowledge of the employees or entrepreneurs, there are still major challenges to be faced starting from the basic issues of constructing the needed infrastructure, acquiring the relevant hard- and software, learning how to use them and finishing to raising awareness of the possibilities for e-learning - this possibly relating to changing attitudes to more amenable towards training in general - and also creating an encouraging atmosphere for studying with the help of ICT in its various forms.

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## References

- AECS (Association of European Correspondence Schools), XV European Congress of Distance Training, Minutes Book (1996). In Rubio Hurtado, M., and A. Escofet Roig, *La Formación a Distancia en la Pequeña y Mediana empresa. Usos y Posibilidades* (Distance Training in SMEs, Habits and Possibilities), in *Capital Humano*, No. 118, 1999.
- Kaipainen, R. 1989. Pienyrityksen tiedontarpeesta ja tiedonhankinnasta Mikkelin läänissä tehdyn selvityksen valossa. *Kirjastotiede ja informatiikka* 3 (8), s. 81–86.
- Karjalainen, K. & Era, T. (ed.) 2001. oppimisen palapeli pienyrityksissä - kokemuksia asi-antuntijaverkoston ja tieto- ja viestintätekniiikan hyödyntämisestä. TELEMAC-projektin lop-puraportti. Helsingin yliopiston Maaseudun tutkimus- ja koulutuskeskus, Seinäjoki. Sarja B:22.
- Littunen, H. 1994. Uusien yritysten menestyminen: yritystoiminnan kriittiset alkuvuodet. Jy-väskylän yliopisto. Taloustieteiden tiedekunta. Tutkimuskeskus. Julkaisu no. 133.
- Matilainen, A., Suutari, T., Kattelus, P., Zimmerbauer, K., & Poranen, T. 2005. The Role of Information Technology in Mediating External Information to the Rural Micro Enterprises - National Literature Review University of Helsinki, Seinäjoki Institute for Rural Research and Training Reports 4. 71 p.
- Ruokokangas, M. 1996. Maaseutu ja pk-yritystoiminta – mahdollisuus vai mahdottomuus? Suomen kuntaliitto. Helsinki.
- Sapman, P. 1999. Raportti elinkeinoelämän tietopalveluselivityksestä Etelä-Savossa. <http://www.uku.fi/kirjasto/elef/mikrap1.html>
- Small Firms Enterprise Development Initiative (2004)
- Storhammar, E. 1996. Pk-yritykset yrityspalvelujen käyttäjinä ja asiakkaina – kokemuksia, ongelmia ja kehittämistarpeita. (SMEs as users and clients of business services) Jy-väskylän yliopisto. Keski-Suomen taloudellinen tutkimuskeskus. Julkaisuja 139.

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# Don't do it all by yourself - specialization and co-operation in service production

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This case is about challenges of producing electronic services in Oulu Region and Northern Finland. Same challenges can also be found in other regions. I will look the case mostly from the developers' and producers' point of view.

Electronic services seem to be answer in many complications in public and private organizations. We think that customers of electronic services are easy to reach, feedback is convenient to handle and most of all electronic service production is cheaper. In many cases this is true but only after long learning and serious re-organization.

## Practical strategy

In real world production of electronic services often appears to be more difficult than expected. Electronic services are expensive to develop, they need special know how and it is very hard to get everybody in organization to commit in electronic services.

Council of Region with key actors in the region prepared a strategy for electronic services in the public sector (9/2005). Aim was to raise awareness of electronic services and deepen the knowledge how to produce electronic services.

Strategy paper also contained practical guidance for municipalities and other public organizations:

- communicate about possibilities of electronic services
- commit all the actors in organization
- start co-operation between actors as soon as possible
- decision of prioritization and implementation of services
- designing of user interface
- implementation of first services
- completion of services
- information about the services
- user/customer training

In the next stage of strategy focus will be in more advanced public services. New strategy sets up a schedule for levels, where each subregion should be in coming years. Objectives will also be set how customers use the services.

## This is just the beginning

This is fairly good and common way of starting the process of producing electronic services. In practice it seems that this is only the first step for entering the field. In future co-operation and specialization play a much bigger role. The reason is that development of even single service, e.g. child care applications system, binds lot of work from the organization.

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Some of the most advanced municipalities noticed this contradiction very early and started to discuss about the co-operation in service production few years ago. The idea has been that each municipality is responsible for certain services and then very practical experiences will be exchanged. This way of action has worked quite well but if they go further, there has to be foundational structural re-organization at least systems related to data administration.

## Electronic services in Northern Finland

eNorth-Finland -project will be in the focus of developing electronic services in Northern Finland. The aim is to develop harmonized data systems in main cities which prepare the way for joint production of electronic services. Obstacle for close co-operation or partnership is that data systems are not designed for service production. Interfaces are mostly closed and compatibility with other systems is poor.

Planned actions in eNorthern-Finland:

- joint strategy for data administration
- creation of bigger data administration service units
- municipalities buy most of the services from the unit/units

In eNorthern-Finland -project the look is in the future. Ground work is being done in order to re-organize the electronic service production in biggest cities in Northern Finland. In the future cities will lay a plan for distribution of work in service production between cities. The cities are looking the way from co-operation to partnership with each other but also with private sector.

Produced services, of course, will mainly be directed to inhabitants in municipalities. SME's role is twofold, they will be partners in service production and they will use the services produced by public organizations.

## Conclusions

The electronic services are best to be produced together with several municipalities. Services tested in practise should be implemented in several municipalities, which gives the services a change to succeed. In time municipalities are very closely linked together. Co-operation happens in subregion or at regional level.

This formula fits only for advanced municipalities. Early stage of entering the world of one electronic services usually must be done within municipality. Local conditions are very rarely known outside the municipalities. Many municipalities use outside consultants, but commitment to implement services must come from people who live and work in the municipality.

Best content and technology is reached when production is done in partnership with public and private partners. Display of services is very important. If you don't find the right services you can't use them. Customers have to push the public organization to make bigger variety of electronic services. But we have to keep in mind that many times the back office of the service is under construction.



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# A concept of e-service for hop industry SMEs on international level

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## Abstract

There are considerable reasons in the hop industry that necessitate establishing an efficient information service also on international level. An initiative from the Technical Commission of the International Hop Growers' Convention (IHGC) to develop and introduce stepwise a decision support system (DSS) with embedded automation agents specially oriented for decision support in agribusiness has been launched with intention to support hop growers, hop merchants and brewers by their decision making in hop industry. The IHGC incorporates national hop producers organisations and hop merchants from 19 countries worldwide. In the paper some of the present and future activities of the IHGC information management are discussed.

## 1 Information management in agribusiness of the hop industry

Efficiency of agribusiness is crucially related to the satisfaction of a set of performance criteria describing product quality, production timing and cost, restrictions related to the personnel, as well as environmental and energy protection. Agriculture is becoming more and more commercialized, as growers are competing with other growers all over the world. The way to face these challenges is to widespread adoption of modern agricultural practices. However the use of these practices requires appropriately educated and informed growers [1].

There are two important reasons in the hop industry that necessitate establishing its informative, stable and functional information system. Firstly, hops are a classic internationally agricultural traded commodity. They are one of few internationally traded goods bought and sold on world markets without any major economic restrictions, which means on the real basis of supply and demand. And secondly, demands on production techniques, varieties, quality standards and preparation of export producing hops are changing constantly.

In 2005 the International hop growers' convention (IHGC) incorporated the 27 national hop producers' organisations and trading companies from 19 countries on all 5 continents [2]. To fulfil all the required market demands and remain in a world hop market competitive position information management activities are furthermore important for all export oriented hop industry SMEs. Hop production and hop market follow, like any other branch, an evolution in the field of ICT. Moreover, it appears to be one of the most well organized branches in agribusiness and thus having advantages to be in a leading group in the development of new agriculture information systems. Such systems connect production and market, growers and experts, stock and industry, thus providing a unifying electronic environment that may bring benefits to all implicated parts emphasising to the growers. With an ICT development, increasing interests of producers for their improved information management in the field of market data exchange and as a result of more precise market information demand, an idea of an IHGC e-service diversification has been launched.

## 2 Automation Agents of the IHGC Integrated Information Management System I(IIMS)

A question before making further steps was how to provide the required knowledge and information to hop industry business chain members and more important how to make this knowledge and information easy to exploit, even by growers who do not have high levels of ICT education.

One of the most powerful tools to avoid these difficulties is provided by the developed technological area of agro-informatics and concerns the exploitation of Decision Support Systems (DSS). DSS aim to monitoring various functions of an agricultural process and facilitating decision making by proposing scenarios towards satisfying the performance criteria and restrictions. DSS may perform several operations like monitoring the agricultural process, action planning and proposal of scenarios, processing of measurement data to extract information regarding the production cost and the product quality, fault diagnosis and alarm management.

The model concept of such an IIMS includes developing Automation Units in Decision Making, being implemented in the form of software agents, which may be incorporated in an abundance of commercial SCADA (Supervisory Control and Data Acquisition) products, in order to support agribusiness. These Agents undertake to execute actions, like monitoring the agricultural process, providing e-learning functionalities, fault diagnosis, e-commerce support, processing of weather information, etc. In this way growers are supported in the decision making regarding the actions that have to be undertaken for different stages of agribusiness, from production to commerce.

The included Automation Agents are the **Supervisory Agents** and the **Operator Agent**. The Supervisory Agents selected to serve the needs of agribusiness within the IIMS of a hop industry are the E-learning Agent, the Monitoring Agent, the Fault Diagnosis Agent, the E-commerce Agent and the Weather Information Agent. Their functionality aims to supervise different aspects of agribusiness, from production to commerce, and moreover to provide e-learning services to growers. The Operator Agent exploits information gathered from all the aforementioned Automation Agents in order to support the grower's decision making by proposing possible scenarios to the grower. The interconnection between the Operator and the Supervisory Agents is illustrated in Fig. 1 [3].

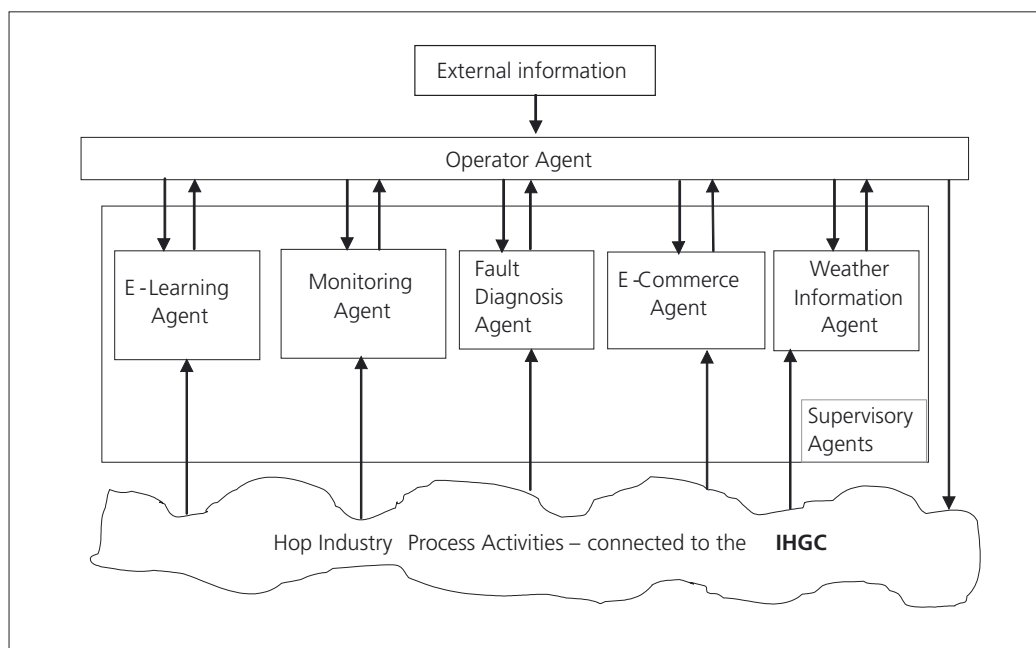


Figure 1: Interconnection between Agents in the Integrated Information Management System of the IHGC [4]

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The **E-Learning Agent** aims to educate the grower with regard to all the required information and knowledge concerning the production techniques, quality management topics (HACCP) and the commerce of the specific product. The E-Learning Agent comprises its historic module implemented by a database and a knowledge processing unit. The historic module contains all the required information background in order to make decisions concerning the agricultural process. The historic module stores measurements coming from the agricultural process and the weather, technical and scientific information concerning for example cultivation methods, plant diseases, special characteristics of each variety of the plant, effect of the weather on the plant, and market information (contracted quantities, available stocks...).

The **Monitoring Agent** plans to provide to growers, as well as the other Agents with all the necessary information regarding the current status of the process. To serve this cause the Monitoring Agent exploits the data level of the Operator Agent that collects information from the agricultural process sensors, like measurements of humidity and temperature, height of the plant. Then, these data are processed in order to derive information about the current status of the agricultural process, as for example the respective growth of the plant.

The **Fault Diagnosis Agent** aims to a timely diagnosis of any fault that may occur in the agricultural process, like plant diseases, harm caused by insects, malfunctioning of the irrigation system, problems caused due to weather conditions, etc. Fault detection is achieved exploiting the information provided by the Monitoring Agent and it is based on specific fault detection rules provided by the historic module of the E-Learning Agent.

The **Weather Information Agent** intends to support the decision making process regarding the issues that concern weather conditions. This Agent gathers information from meteorological services, which it combines with measurements from the site of the cultivation. Based on this information it provides short prediction of weather conditions. Moreover, the Weather Information Agent cooperates with the historic module of the E-Learning Agent in a twofold manner: first it exploits information from the historic module to support the weather prediction process, and second the information gathered by the Weather Information Agent is used to enrich the historic module.

The **E-Commerce Agent** aims to support the sales through Internet of agricultural products. Moreover, it can also support the grower in buying raw material through Internet. The E-Commerce Agents comprises also an intelligent unit that exploits the market information stored in the historic module, in order to decide whether each buying or selling action is profitable for the grower.

### 3 Hop market information exchange – within the E-commerce agent initiative

Since the concept of the IHGC Integrated Information Management System is getting stepwise a developed form the activities connected to Supervisory Agents have been mostly devoted to a theoretical background preparation and analysis of similar solutions in a sector of agribusiness. However, first touchable attempt on this issue within the IHGC has been made in the e-service portal solution connected to global hop market actions and events.

One of the important traditional IHGC activities is namely to make a global hop market situation transparent for growers. There has always been an intention of the IHGC to improve stepwise a model of a hop market data exchange among its member countries and relevant SMEs. Since their representatives attend already for decades the Economic commission meetings 3 times a year, they provide and make available in a written form figures and comments about the national hop industry situations according to the methodology of an IHGC market supply data collation [4]. A traditional hard copy table of the IHGC questionnaire was used for collecting standardised national market data on (i) commercial hop acreage in ha, (ii) new planted hop gardens in ha, (iii) production of hops in tons, (iv) production of alpha acid quantities in tons, (v) hop variety structure

in ha, (vi) contracted hop quantities in tons or % of production, (vii) quantities of unsold hops in tons or % of production and (viii) prices for hops divided into sport and contract as well as into aroma and alpha ones. As an output of the Economic Commission conventions followed usual summarised hard copy market reports prepared due to national hop market information of IHGC delegates as well as hop merchants' comments. Within these reports estimations about variety trends and price expectations are included. Although main hop trading houses participate the EC meetings, hop growers still missed in 2005 supplementary precise information about stock quantities by hop merchants, demand indicators by main international breweries as well as new hop product and quality management trends that would surely be of a great hop growers' benefit.

With an ICT development and increasing interests of producers for their improved information management in the field of market data exchange, the IHGC faced to new initiatives. As a result of more precise market information future demand - the idea of the IHGC service web portal has been lunched. Furthermore a partial demo version was prepared, tested and already used in 2005, where the usual hop supply data on national levels were brought as an input onto the common server, automatically processed, summarised within the table and thus available as information to the member delegates – according to an internal agreement.

A part of a new web site questionnaire input mask for an e-data collection on the IHGC level is presented on the Fig. 2. With a help of an input mask on a password basis, national representatives are allowed to fill in their hop supply data using a new standardised and by IHGC approved table form. By displaying various important hop market statistics users have a permanent view on their national as well as summarised and updated global figures and statistics. The official IHGC data from previous years are also available to be downloaded for delegates' convenience (Fig. 3). The access to the password-protected part of this site is up to now for the internal IHGC data collection purposes.

Hop Area	Year N-1	Year N (estimate)	Difference	Difference %
Aroma	<input type="text" value="0"/>	<input type="text" value="0"/>	0.0	0%
Alpha	<input type="text" value="0"/>	<input type="text" value="0"/>	0.0	0.0%
<b>Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0%</b>

New Hop Area	Year N-1	Year N (estimate)
Aroma	<input type="text" value="0"/>	<input type="text" value="0"/>
Alpha	<input type="text" value="0"/>	<input type="text" value="0"/>

TOTAL Hop Area	Year N-1	Year N (estimate)	Difference N-(N-1)	Difference %
Aroma	0.0	0.0	0.0	0%
Alpha	0.0	0.0	0.0	0%
<b>Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0%</b>

Production	Year N-1	Year N (estimate)	Difference N-(N-1)	Difference %
Aroma	<input type="text" value="0"/>	<input type="text" value="0"/>	0.0	0%
Alpha	<input type="text" value="0"/>	<input type="text" value="0"/>	0.0	0%
<b>Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0%</b>

Yield	Year N-1	Year N (estimate)	Difference %
Aroma	0.0	0.0	0%
Alpha	0.0	0.0	0%
<b>Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0%</b>

Figure 2. Questionnaire input mask for an e-data IHGC set [2]

Country	Hop Acreage N-1 (hectares)				Hop Production N-1 (hectares)			Total Alpha Prod (kg)	Hop Acreage N (hectares)				Hop Production N (hectares)			Total Alpha Prod (kg)
	Aroma	Alpha	Total	New	Aroma	Alpha	Total	MT	Aroma	Alpha	Total	New	Aroma	Alpha	Total	MT
Australia	3.0	436.0	439.0	0.0	3.0	1,269.0	1,272.0	156.7	3.0	533.0	536.0	0.0	2.0	1,427.0	1,429.0	174.2
Belgium	32.0	177.0	209.0	0.0	45.0	359.0	403.0	34.2	35.0	159.0	197.0	3.0	45.0	350.0	395.0	0.0
Bulgaria	72.0	149.0	221.0	0.0	92.4	210.6	303.0	28.9	72.0	149.0	221.0	0.0	98.0	225.0	323.0	32.6
China	0.0	2,516.0	2,516.0	0.0	0.0	6,545.0	6,545.0	444	0.0	2,282.0	2,282.0	0.0	0.0	6,000.0	6,000.0	420.0
Czech Rep.	5,662.0	177.0	5,842.0	103.0	5,215.0	312.0	5,527.0	175	5,355.0	205.0	5,836.0	278.0	5,850.0	350.0	6,300.0	250.0
Germany	9,019.0	7,537.0	17,563.0	1,007.0	11,509.0	13,841.0	25,350.0	1800.8	9,361.0	7,399.0	17,477.0	717.0	16,000.0	13,500.0	29,500.0	2,420.0
France	664.9	37.1	787.4	55.4	1,109.1	59.8	1,168.9	20	721.1	40.3	800.8	38.5	1,307.6	64.4	1,372.2	33.0
New Zealand	235.0	191.0	426.0	0.0	401.7	379.1	780.8	88.9	257.0	165.0	422.0	0.0	449.2	343.0	792.2	84.5
Poland	868.0	1,264.0	2,172.0	0.0	1,263.0	1,760.0	3,023.0	171.4	888.0	1,330.0	2,216.0	0.0	1,200.0	1,800.0	2,900.0	0.0
Portugal	0.0	37.0	37.0	0.0	0.0	57.0	57.0	5.5	0.0	37.0	37.0	0.0	0.0	57.0	57.0	5.5
Russia	352.0	248.0	630.0	30.0	225.0	142.0	367.0	17.2	303.0	212.0	555.0	40.0	213.0	127.0	340.0	16.8
Slovakia	350.0	0.0	350.0	0.0	375.0	0.0	375.0	12.4	350.0	0.0	350.0	0.0	350.0	0.0	350.0	12.2
Slovenia	1,498.0	105.0	1,652.0	49.0	1,150.0	178.0	1,328.0	78.8	1,467.0	92.0	1,612.0	53.0	1,823.0	142.0	1,995.0	0.0
Spain	0.0	730.0	730.0	0.0	0.0	1,413.0	1,413.0	142.8	0.0	730.0	730.0	0.0	0.0	1,413.0	1,413.0	142.8
UK - England	952.0	578.0	1,478.0	50.0	1,047.0	882.0	1,929.0	188.7	802.0	495.0	1,331.0	34.0	1,047.0	794.0	1,841.0	192.0
Ukraine	736.0	463.0	1,471.0	273.0	742.0	463.0	1,205.0	55.8	762.0	463.0	1,464.0	209.0	777.0	463.0	1,270.0	59.5
USA	4,820.0	6,694.0	11,214.0	0.0	7,718.0	17,094.0	24,750.0	2900	4,540.0	6,694.0	11,214.0	60.0	7,571.0	16,791.0	24,362.0	3,100.0
Serbia and Montenegro	130.0	244.0	378.0	4.0	84.5	180.5	265.0	13.3	47.0	198.6	245.6	0.0	70.5	357.5	428.0	22.8
South Africa	0.0	503.0	503.0	0.0	0.0	912.0	912.0	111	0.0	503.0	503.0	0.0	0.0	997.0	997.0	121.0
China - Hong Kong	188.0	2,836.0	3,024.0	0.0	289.0	7,081.0	7,370.0	477	188.0	2,281.0	2,469.0	0.0	289.0	5,831.0	6,220.0	413.0
<b>Total</b>	<b>25,330.9</b>	<b>25,042.1</b>	<b>51,944.4</b>	<b>1,571.4</b>	<b>31,286.7</b>	<b>53,075.0</b>	<b>84,341.7</b>	<b>6,958.2</b>	<b>25,151.1</b>	<b>23,997.9</b>	<b>50,602.5</b>	<b>1,453.5</b>	<b>37,192.5</b>	<b>50,961.9</b>	<b>88,154.4</b>	<b>7,469.9</b>

Fig. 3: Summarised hop market e-data [2]

## 4 Conclusions

Within the Economic Commission activities of the IHGC in 2005 the delegates welcomed an initiative for a formation of an improved system of market data exchange between 19 national hop industry associations. On one hand this improved information management in a form of e-service did upgrade previous Economic Commission activities with the data collection and did reduce possible individual calculation mistakes on a basis of hard copy questionnaires. On the other hand it enabled for the member national associations constantly the input corrections of the production and crop estimations and finally also a summary of updated figures - relating a global hop market situation. Also original and precise hop market information from the merchants' and breweries' side is expected in the future. This solution presents a contribution for growers in a necessary adjusting the hop supply to a hop demand on the global level.

The case taken from a hop industry in a frame of the IHGC initiative and running R&D projects [3] presents preliminary results of the Integrated Information Management System concept in the hop industry. Apart from the IIMS concept formation and first experiences in the development of the E-commerce Agent, further activities are also taking place within the E-learning Agent by preparing various modules of relevant e-contents in fields of Integrated Plant Protection, HACCP in agricultural production and Farm management.

An evolution of Information and Communication Technology is present in many forms also in agribusiness sector. It is estimated that future progress in the hop industry on the SME level is expected to come also from the results of the Integrated Information Management System.

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## Literature

Abdon, B.R., Raab, R.T. "Knowledge sharing and distance learning for sustainable agriculture in the Asia Pacific region: The role of Internet", New directions in a diverse planet, Proc. of the 4<sup>th</sup> Int. Crop Science Congress, 2004, Brisbane, Australia, [www.cropscience.org.au](http://www.cropscience.org.au)

International Hop Growers' Convention web site materials. <http://www.hmelj-giz.si/ihgc/> ( 11. March 2006)

Koumboulis, F. N., Tzamtzi, M. P. Pavlovič, M. Draft material of the projects: "Introduction and Application of Information Management E-Systems as methods for Asynchronous Distant Education and E-Commerce in Agribusiness" and the E!3219–AADSS, 2005.

Pavlovič, M., F. N. Koumboulis, F .N., "Methodology of an IHGC market supply data collation", Hop Bulletin, ISSN 0350-0756, vol. 11, pp. 17-24, 2004.

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# Access to finance and incentives – providing e-opportunities to agricultural enterprises

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## 1. Short description

MIDA Agricoltura (acronym of “Informative Model for the Request of Facilities in Agriculture”) is an informative service accessible via Internet at the address <http://www.mida.inea.it>, with the objective of providing complete and updated framework for financing instruments in favour of agricultural enterprises and information on current events and interesting news for farmers. The web site structure is based on a two levels access: a public area for the general public to gain general information and a reserved area containing more detailed and complete information about finance and incentives for agricultural enterprises. This service, that is now being implemented and updated (both technology and content), expects a further step towards a new structure allowing agricultural enterprise to find financing opportunities and to calculate funds at the same time: MIDA Opportunità.

## 2. Introduction and background

### 2.1 Basic facts about the Italian agriculture

According to recent surveys, 1.959.038 agricultural holdings were operating in Italy in 2003. The agricultural labour force is nearly 1,3 million (extra-familiar workers). 49% of the agricultural workforce is to be found in the South of Italy, while the other half is divided between North (37%) and Centre (14%). The number of holdings with livestock was 295.000 in 2003. The overall area allocated to agriculture and forestry was close to 15,4 million ha. The use of land for major crops is shown in the table.

Use of land for major crops

Total area ('000 ha)	30.134
Crops ('000 ha)	15.421
by (%)	
Cereals and rice	27,8
Sugar beets	1,6
Oil-seeds	2,1
Tobacco	0,2
Potatoes	0,5
Dried legumes	0,4
Vegetables	3,1
Fruits and citrus	5,9
Olive trees	7,6
Grapevines	5,4
Flowers and plant	0,1
Fodder crops	6,2
Other crops and permanent pasture	39,1

Source: EUROSTAT, 2001 LUCAS pilot survey, preliminary result

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Agricultural production has grown by 7,9% in 2004; the value added of agricultural sector grew by 11,5%. In Europe, one of the highest shares, in the total number of holdings, of holdings smaller than 5 ha, can be found in Italy (69%). There was a decrease in the number of various categories of farms in the last decade, with the exception of those with permanent crops (+5,4%). Census figures indicate a progressive rise in the average age of farm operators and an increased percentage of women as heads of farms. Agritourism has taken on great importance as a new role that agriculture plays in improving the general quality of life.

Statistics about Internet usage in Italy show that Internet users have grown in the last years, but their number is still low: only 17 million (12 million if we consider “Internet usage at least one time a week”), 30% of total population. The 2000 Census of Agriculture shows that the level of use of Internet in agricultural sector is very low.

## 2.2 Public’s role in agricultural sector

The agricultural sector benefits from public assistance, in order to provide aid to agricultural enterprises and to avoid agricultural land abandonment and rural areas decline.

In fact, if after the Second World War the agricultural policies aimed at self-sufficiency and at subsidising agricultural workforce, today governments are engaged in assistance to agricultural enterprises in order to guarantee food quality at fair prices and environmentally sustainable production, improve farmers’ income and life conditions and accelerate structural reforms. Moreover, the new approach of agricultural policies recognises the role farmers play in preserving rural and traditional landscapes, above all in the economically depressed areas. In fact, farmers take care of marginal and depressed territories and keep rural economies alive, also through alternative activities such as agritourism. So, in order to compensate farmers for the service they offer to the community, public policies has continued to fund agricultural sector, including rural development and the environment.

Agricultural sector is characterized of frequent crisis caused by climatic conditions and natural disasters, structures backwardness due to historical, political and social causes, farmers ageing, low tendency to innovation to improve business performance. Thus, enterprises’ redivitity remains at a low level and farmers don’t earn satisfactory income, above all in microenterprises.

Other aspects concern the business model of European agriculture: most farms are small businesses, often family-run, facing difficult access to market, and the small dimensions and fragmentariness of farms are typical features all over Europe.

Last, we have to consider the importance of European subsidies; in fact, the Common Agricultural Policy (CAP) once accounted for nearly 70% of the EU budget. Now it accounts for less than half of the budget and CAP reform has also changed the way EU supports its farm sector: the vast majority of subsidies will be paid independently from the volume of production and they will be linked to the respect of environmental, food safety and animal welfare standards. Main objectives of this intervention are to make EU farmers more competitive and market orientated, to provide income stability and to expand the range of activities funded from the budget for agriculture.

In Italy the financing of intervention instruments for agricultural sector annually absorbs a great amount of funds. Small and very small farms predominate in Italy; the greater part of them are family farms and farms are quite heavily specialised. A great part of incentives come from EU budget and national cofinancing. Special facilities on social insurance and taxation also play a major role.



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Main objectives of public intervention are: aid to farms, maintenance of a certain level of income, infrastructures, transformation and commercialization of goods. Facilitations linked to factors of production are predominantly used in Northern Italy, whereas reduction on social insurance and taxation are predominantly used in Southern Italy.

Funds cover a wide range of incentives: EU subsidies within the CAP framework and the Regional Operative Plans, rural development measures under the Rural Development Plans and Leader+, State aids, national actions in favour of specific groups of entrepreneurs (such as young farmers, women entrepreneurs, etc.), investments in innovation and machinery, incentives within the regional legislation, facilities on social insurance and taxation, public funds in case of emergencies, crop damage, etc.

Several institutional bodies are involved in the management of these incentives: European Union, national government (above all Ministry of Agriculture and Forestry Policies, Ministry of Productive Activities and Ministry of Economy), Regions, local authorities, agencies and organizations involved in grants management, social insurance institutions, etc.

## 2.3 On line information on funding opportunities

On line information sources on finance and incentives in favour of farms are numerous, but they offer information about a certain sector or territories:

- some Internet sites provide information to farmers producing certain goods;
- other sites provide information to farmers from certain regions (for instance the sites of regional departments of agriculture);
- some sites concern the entire nation, but they are simple repositories of legislation (the most important of them is the site of Official Journal of Italian Republic), without summaries, comments or guide to lecture content;
- last, other sites provide a wide range of information only on a certain kind of incentive: for instance we can find information on taxation facilities through the site of the Revenue Agency and information on social insurance facilities through the site of the National Institute of Social Insurance.

Thus, a farmer who needs information about existing facilitations and incentives has to visit at least a local Internet site (for information concerning his territory), a national site (for information concerning EU or national legislation) and a sectorial site (for instance for information on tax incentive legislation).

Moreover, farmers are often no expert users of the Internet; they can spend only a few time searching on line information and this information is not always available on the web. So, we can say that a single point of access to information on facilitations and incentives for farms could be a useful tool to help farmers in their strategic choices and in their better understanding of existing opportunities.

## 2.4 FADN: service for enterprises taking part in the data collection

The Farm Accountancy Data Network (FADN) is an instrument for evaluating the income of agricultural holdings and the impact of the CAP. This instrument provides information about economic condition on European farms through a data collection based on the same principles for all countries. Farms that participate in FADN are chosen on the basis of a sampling plan.

Responsibility and management of this informative tool in Italy are entrusted to the National Institute of Agricultural Economics (INEA). Moreover, INEA, instituted in 1928, is part of the National Statistical System (SISTAN) and act as referee for the Ministry of Agriculture and Forestry Policies, Parliament and Regions,

above all concerning analysis on agricultural and rural policies impact. INEA operates through a central office, located in Rome, and peripheral offices settled in every Italian region.

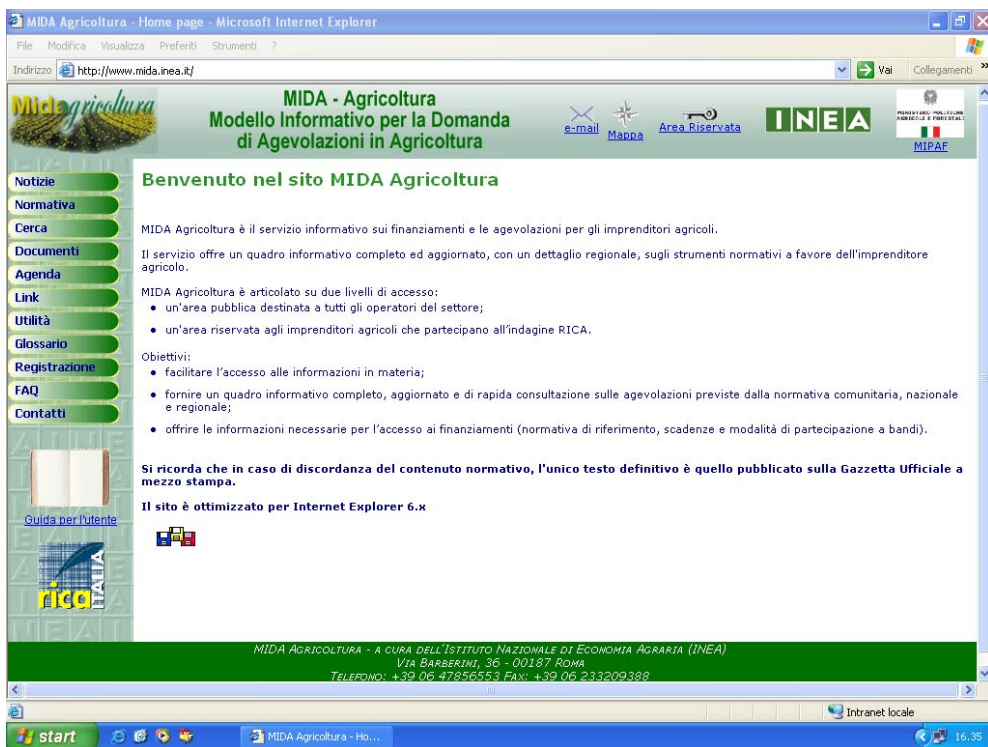
In order to foster the participation of selected enterprises in the FADN, an informative service on financing instruments in favour of agricultural enterprises has been developed: *MIDA Agricoltura*. Farmers who take part in FADN have access to the informative service using a password.

## 2.5 Objectives of the informative service

The informative service *MIDA Agricoltura* provides complete and updated framework for financing instruments in favour of agricultural enterprises and informations on current events and interesting news for farmers. The site aims to become a daily work tool, collecting information from different sources and providing them from a single point of access and in real time.

In particular, *MIDA Agricoltura* main objectives are:

- to provide users with an uniform, easy and efficient way to access information, even though they are not expert users of the Internet;
- to offer clear content, simple navigation and answers to farmers' questions on business opportunities, also through summaries, abstracts and comments on new legislation in favour of agricultural enterprises;
- to provide basic information and documents in order to access to funding (legislation, comments and guide to lecture, texts of call for proposals, guidelines and application forms, etc.).



*Mida Agricoltura - Homepage*

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## 3. Activities and results

### 3.1 Structure of the informative service

The informative service structure is based on a two levels access:

- a public area for the general public, containing the latest news and the sole titles of the legislation on financing agricultural enterprises;
- a reserved area dedicated to farmers who participate in FADN, containing more detailed and complete information about finance and incentives.

An Internet site has been created and implemented to manage this informative service; this site allows user to access content and services according to his preferences and interests.

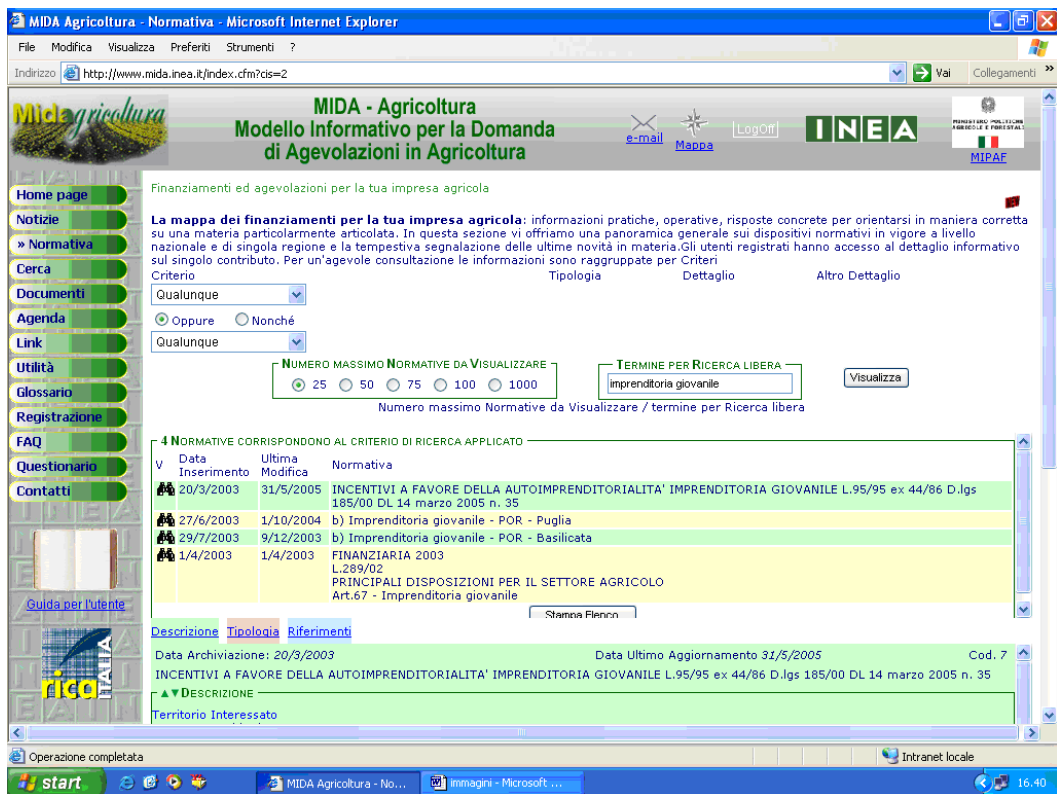
#### 3.1.1 Legislation

“*Normativa*” is the most important section because it provides access to the full text information on European, national and regional legislation on finance and incentives for agricultural sector. It is divided into: a public area generally accessible to all users that offers a general view on legislation for agricultural sector and a searching form to find the list of the sole titles of the legislation contained in the database; a reserved area, accessible to registered users, that contains all the information about current consolidated acts and subordinate legislation on financing agricultural sector. Information for registered users are structured in three papers:

- *Description* - a detailed summary of a legislative act, providing information on beneficiaries, type of incentive and funds, procedure of grant delivery, proposal scoring criteria, deadline for application and many other useful information to decide on the convenience of the incentive;
- *Typology* - form used to identify incentive typology group and to show classification criteria that lies beyond the legislation database (type of intervention, sector, eligible territories, procedure of grant delivery);
- *References* - contains all the documentation about legislative act, links to legislation files (included useful files for a better understanding of the intervention), other information about institution involved in intervention management (contact points and references), links to correlated web sites, terms from glossary used in the description of intervention, further useful information.

To make it easier to find information, the database is searchable by various criteria:

- keyword search shows all related results for the entered keyword;
- advanced search is based on predefinite selection criteria [type of intervention, sector, eligible territories, procedure of grant delivery], the same classification criteria that lies beyond the legislation database; this is a step-by-step guide to searching database, until user arrives to a clear definition of his interest field (for instance, a farmer who wants to buy new machineries can use dropdown menu to choose the options defining his interest field: from criterium “type of intervention” > he will choose the typology “Aid for investments” > and, at last, as a detail “Machineries/Plants/Equipments”). In order to increase efficacy of search the database is search able by two criteria at the same time (for instance, “type of intervention” and “eligible territories”).



## Mida Agricoltura – Legislation database

### 3.1.2 News

The section “News” contains the latest news on incentives for agricultural sector and on other important features for farmers. The latest news are accessible to the general public, whereas registered users, after the login procedure, can access the entire database of news and search the database using keywords.

An active function is developed in this section directly making a link between news related to the same topic; thus it is possible to create the temporal sequel of news on a certain topic.

### 3.1.3 Documents

The section “Documents” contains various types of documents edited by national and international institutions on important themes for the agricultural sector.

Documents are available in PDF format, with a short description explaining content of downloadable files. This section is an archive of digital documents related to the most important sections of the site; it is a public area in which both generic and registered users are able to see the same contents.

### 3.1.4 Agenda

“Agenda” contains scheduled events for agricultural sector, divided in the following typologies: Seminars, Exhibitions, Training, Application deadlines; it is possible to see details of a single event or the monthly list of scheduled events and also browse the calendar to see the list of events scheduled throughout the year (the days in the calendar show different colours for different types of events).

### 3.1.5 Link

“Link” pages contain a series of web links with a short description; there are several links to Internet sites that we believe will be of value to users.

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Web links are divided into different categories:

- National institutions - links to Internet sites that provide information about competences and activities of national institutions, with direct link to call for proposals for agricultural sector;
- National bodies - links to Internet sites that provide information about latest news and activities for agricultural sector;
- International institutions/bodies - links to Internet sites that provide information about activities, services, databases of European Union and other international Institutions and bodies;
- Services for user - links to Internet sites that provide information on agricultural features and services;
- Legislation - links to Internet sites that provide informations and legislative databases on European, national and regional legislation.

### 3.1.6 Glossary

“*Glossary*” contains useful terms commonly used in the agricultural sector. In particular, glossary contains explanations of concepts relevant to the field of study of legislation on finance and incentives for agricultural sector. The detailed summaries of legislative acts contained in the legislative database provide direct link to glossary terms, in order for user to understand technical language.

### 3.1.7 Other sections

Other sections of “*MIDA Agricoltura*” are structured according to the most important sections of the Internet site and in order to improve usability of web contents.

These sections are the following:

- “*Utilities*” (providing links that can be used to download utilities to unzip files, to read files in different format, etc.);
- “*Registration form*” (containing form that user must fill to obtain account and password for the reserved area; user have to provide FADN code of his enterprise in order to complete the registration procedure);
- “*Evaluation questionnaire*” (on line survey to measure and evaluate user satisfaction of the e-services provided);
- “*FAQ*” (frequently asked questions on the informative service “*MIDA Agricoltura*”);
- “*Contacts*” (references of the work group involved in the development of the e-service).

Moreover, the site is searchable by a search that shows all related results for the entered keyword.

At last, a User Guide is available; it is designed as an introduction to our service, showing all the basic functionality such as the best way to browse and search for information, and how to access the summaries or the full text of legislation. The guide is intended also for no expert users.

## 3.2 Work Group

“*MIDA Agricoltura*” is a complex service since it results from the collection of a lot of information from different sources. Moreover, information has to be detailed, updated and complete.

During the first phase of the project we concentrated on analysing national interventions and measures within the Regional Operative Plans and the Rural Development Plans, whereas in the second phase available information covers also regional legislation and European legislation in the CAP framework.

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The work group is composed of individuals committed to working together on a specific task, but geographically located in different places. The primary mission of the work group is to provide updated information to the central unit, located in Rome. Web site and content proofreading are managed by the central unit.

Work group members in the regional locations provide necessary links to territorial authorities involved in funding management, thus assuring that latest information can be accessed and published.

### 3.3 Web site visits

An important aspect for the success of the e-service is its promotion. In fact, web site is still in developing phase and visits from generic users are more than visits from registered users.

Registered users are actually above all work group members and experts involved in FADN, whereas farmers are still few.

## 4. Evaluation of the experience and future developments

### 4.1 The new version of the service MIDA Agricoltura

The site is constantly being improved and existing functionalities have been implemented to increase their responsiveness to the needs of the project.

In order to solve some accessibility and usability problems of databases and to develop new functionalities, a new version has been developed, using an open source Content Management System that allows to reorganize and improve both site contents and editorial activities.

Moreover, the new version provides a better web site content design and a clearer visualization of content, that in preceding version had less importance than the production and organization of contents (for instance, the new home page will display the latest news in a rolling box and not as static content).

The new version will also automatically produce a newsletter, in order to inform users about new contents and create an alert system.

An information request form will be available as an informative service for users who need further information on site content.

At last, we are also developing community tools such as the box of on line users, RSS feeds, forum, chat, etc., because in the future the service could develop into a collaborative community or a special interest group (content management system allows the introduction of community-building tools to personalize layout and functionalities of the e-service).



*Mida Agricoltura – New version “Latest news”*

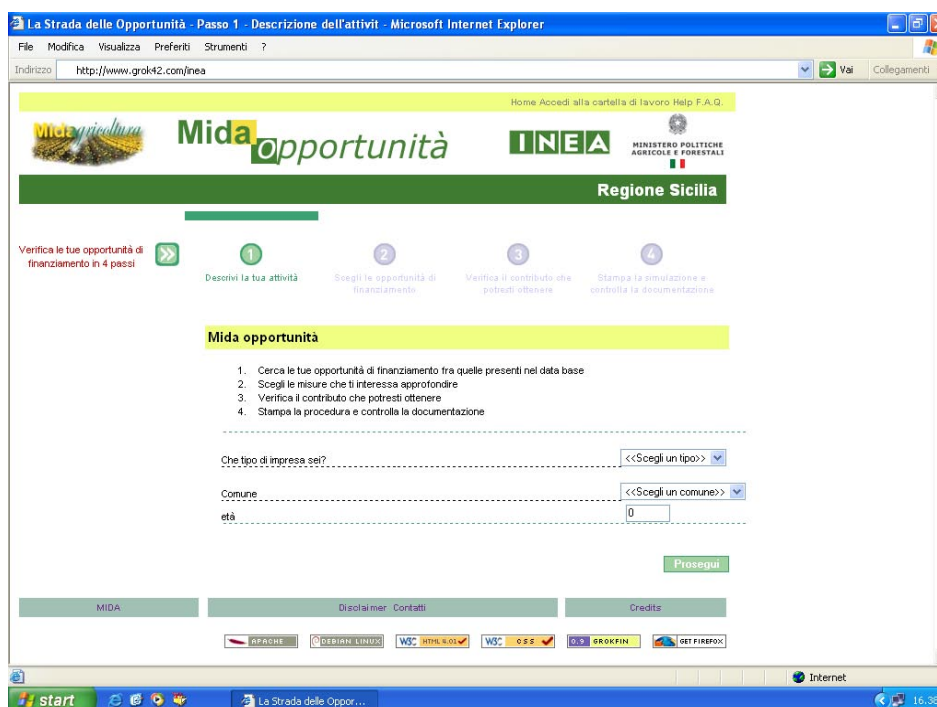
## 4.2 MIDA Opportunità

A more complex system has been developed during the last year: “MIDA Opportunità”. The new system assists users not only in obtaining information about finance and incentives, but also in searching the better opportunities for his farm and in applying for public interventions.

The system allows the calculation and simulation of incentives, in order to help farmer formulate business strategies and obtain a prefeasibility analysis. Thus farmer is able to better understand funding opportunities and choose between different alternatives before he spends time and money on consultancy or on a full feasibility study.

A step-by-step procedure assists user in choosing the better funding source and in calculating funds available. Searching result will give detailed and personalized consultancy about the existing incentives, the potentially eligible expenses and the amount of incentives farmers could receive. Simulation realized through this system is available in a synthetic report (for instance, a farmer who wants to know which kind of incentives he could receive can use dropdown menu to choose the options defining his farms and location > the system will show available incentives for his farm > user will choose one of the listed incentives > program will show other dropdown menu to achieve more detailed informations > and, at last, the system will calculate funds available. At the end user can print the synthetic report or save the simulation done for future consultation).

This system requires a more complex work from the editors point of view, but it is very simple from the users point of view. It is now available only for one of the Italian regions (Sicily). Due to the good results achieved during the testing phase, next steps will be the implementation of this system in order to include all the European, national and regional legislation providing finance and incentives to farms.



*Mida Opportunità - Homepage*

### 4.3 Communication and promotion

A Communication Plan will be developed and implemented after completion of the site's new version and of the new system "MIDA Opportunità", in order to identify and communicate strategically with possible key users and determine the information that they need.

Communication Plan will establish main promotional activities focusing on e-service promotion towards enterprises who took part in FADN and other agricultural enterprises interested in this informative service.

Promotional activities will be carried out throughout Italian regions, through INEA's regional offices, through experts working for FADN data collection, through participation in seminars, workshops and sectorial exhibitions.

This activities can be carried out in collaboration with other INEA's project interested in providing information to farmers.

Other important features are the relationships with Institutional bodies such as Ministry of Agriculture and Forestry Policies and Regions, through setting up a link exchange between sites with banner advertising.

At last, such as for other on line services, a strong promotional activity will be carried out through the website submission and promotion in the search engines and on websites concerning agricultural sector or funding opportunities for enterprises.



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## References

European Commission, CAP Reform and rural development on line documents: <http://europa.eu.int/comm/agriculture>

EUROSTAT, Agricultural statistics Quarterly bulletin, Special issue: Farm Structure Survey 2003, 5-2005

ISTAT, I principali risultati del 5° Censimento generale dell'Agricoltura, <http://censagr.istat.it>

Istituto Nazionale di Economia Agraria, Annuario dell'agricoltura italiana, volume LVIII, Roma, 2004

Istituto Nazionale di Economia Agraria, L'Agricoltura Italiana Conta 2005, Roma, settembre 2005

Istituto Nazionale di Economia Agraria, Rapporto sullo stato dell'agricoltura italiana, Roma, ottobre 2005

National Institute of Agricultural Economics, Italian Agricultural in figures 2004, Roma, September 2004

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