

ICT Adoption as an Agricultural Information Dissemination Tool – An historical perspective

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In the enthusiasm surrounding the introduction of the “new technologies” in the early nineteen eighties, and their accompanying promises of serving all the citizens’ information and transaction needs, it appears that perspectives became somewhat confused along the way. Now, with the advantage of hindsight, it might be appropriate to reflect on the background to the birth of mass telematics with a view to understanding how we got to where we are today, and see what – if anything – has changed, and what can or should be done.

The technical environment

Considering that telematics in Europe entered the nineteen eighties mainly in the form of videotex technology, designed around an equipment configuration consisting of a videotex adaptor connected to the domestic TV set and a hand-held numeric keypad, its limitations and the problems facing both users and service providers can easily be imagined. To further confound the situation, there were three incompatible videotex standards operating in Europe – Prestel (UK), Teletel (France) and Bildshirmtex (Germany). This uninviting situation was further exacerbated by poor PSTN telecommunications systems and the absence of X25 networks in many European countries.

By the end of the eighties, France was the world telematics leader. However, its introduction was not without controversy and substantial opposition. Telematics had a protracted and difficult birth that looked very uncertain in 1980 when an anti-telematics lobby of lawmakers, newspaper publishers and politicians formed a united front. It was asserted that the introduction of mass telematics would lead to controlled information, loss of liberty, loss of jobs, undermine democracy and cause the death of the press. A technological issue was transformed into a political one and became a matter of a parliamentary debate. It wasn’t until a change of Government in 1981 that its “political” future was assured. A period of enormous public and private sector investment in the development of subscriber telecommunications, an X25 packet-switched network backbone and mass production of Minitel terminals followed. This massive infrastructural investment was initially promoted by claims that it would be largely compensated in savings from replacing the paper-based telephone directory with an electronic telephone directory terminal (Minitel) – an unfulfilled claim, as it transpired. The major problem facing advocates of the “new technologies” was the dilemma of the technology in frantic search of applications to drive the network in order to protect investments. It was a classical case of a solution looking for problems to solve.

However, by 1987 France boasted the highest rate of digitalisation in the world, the largest packet switched network (Transpac), the first commercial ISDN service, 3.5 million Minitel terminals (distributed free), 8,000 videotex services for professional

and personal needs and 60 million hours of connect time. In the agricultural arena there were some 100 services providing about 400 applications to 25,000 farmers.

Entering the nineties, the spectre of the Internet was not yet on the horizon. Videotex was still widely regarded as the telematic solution in European agriculture. The numbers of farmers using videotex services in 1989 were: France 80,000, Germany 5,000, Netherlands 3,000 – along with small numbers of users in other European countries. However, even with these advances, this was still a primitive time in terms of personal computers and their applications. Machines were DOS based – no windows, no “point and click”, and data transmission times were pedestrian. The “C” had not yet been put into IT.

Although the potential advantages of telematics-based information systems over the conventional methods of information dissemination were recognised in the late eighties (speed, 24-hour availability, timeliness of information supply, single source reference, digestibility, two-way communication, interactivity and transaction capabilities), they were seldom effectively exploited - apart from some successful niche services. In general, they were unsuccessful in achieving critical mass in terms of numbers of users or usage. The eternally debated question was - why?

What was wrong ?

The challenge would appear to be straightforward enough. Telematics as a medium should be examined in relation to competing media – the farming press, advisory leaflets, newsletters, books, radio and television broadcasts, etc., – and its strengths and advantages over the conventional methods of information dissemination exploited. It should then be a matter of identifying the critical information needs in the farmers’ decision making processes that require access to a computer-based information systems, their interactivity and computational power. Hey Presto - we should have developed telematic services that would have farmers beating a path to the doors of service providers. Not so - the predecessor to the dotcom graveyard is littered with failed attempts!

The procedure outlined above was seldom followed, particularly in public administrations. An institutional top-down approach dominated and there was a strong and unresisted temptation for service providers to open the flood-gates of information and treat videotex as an electronic book publishing medium. This creation of an information jungle, coupled with poor navigation processes, was a formula for failure. "Too much, too late" – with users being given what was available rather than what they needed – epitomised the approach. These practices contributed to the creation of user-hostility, confusion and frustration among end users and constituted major obstacles to the uptake of the technology and its associated applications. However, it was generally agreed among analysts that what was wrong with most services was unlikely to be related to a single identifiable factor but was probably due to a combination of factors that contributed to end-user resistance.

To appreciate an information service from the end-user’s viewpoint, the total “information environment” has to be considered - the overall interaction of user, hardware, software, information content, representation, telecommunications, support, training, financial aspects ... and so on! Too often information systems were designed and constructed by information specialists without regard to the skills, aptitudes or

educational background of the end-user. Their familiarity with the system and its operation, without interplay with the target audience, resulted in the production of user-hostile interfaces. There was a clear and obvious case for involving the intended end-user in the process of determining what was required in terms of information content, how it should be presented and accessed. The ergonomic dimension – improving the user interface and enhancing the user-friendliness of the information system – had been largely ignored.

Another serious obstacle to developing telematic services in the eighties was the very high cost of servers and videotex software. A medium size server cost in the region of 750,000 euro, not including annual maintenance and software development. There were no easy-to-use tools and it was necessary to implement and use "heavy" data base management systems. It was also difficult to enable users to access other services from one service since there were no gateways - no hypertext!

Today – what’s changed?

The ergonomic situation now seems far much better than in the eighties from the technical point of view. Both the designer and user benefit from mouse and windowing, from navigation tools and hypertext facilities, and from multimedia capability. However, these benefits do not in themselves guarantee ergonomically perfected information systems. The ergonomic issue is more profound than that. Dialogue design, search strategies, navigation etc., are a function of factors such as volume, heterogeneity and cognitive complexity of the information under consideration, and must take into account the educational, cultural and intellectual backgrounds of the targeted end-users. These complexities require a more fundamental resolution than that provided by the technical aids listed above; these widely available, easy-to-use website authoring tools in the hands of non-conversant “designers” are more likely to generate a mass of clutter and confusion - just surf a number of websites at random and you will be confronted by appalling examples of ergonomic butchery. This criticism is not exclusive to the agricultural ICT sector; it runs across the whole software spectrum and includes basic elements such as operating systems, internet security systems and help facilities.

Today, as it was in the eighties, the most critical task facing service providers is determining real user needs. Ideally, there should be demonstrable benefits to the farmer in cost, time and effort over the current way of doing things or in undertaking new activities.

Ever since the clumsy old days of videotex telematics the industry has been in active search of killer applications for agriculture – and this quest for Eldorado, largely unsuccessful, has persisted up to the present time. One of the difficulties facing users and providers concerns the perception of what comprises a killer application. It is not a single ubiquitous “all things to all men” solution for all situations. It is perhaps better to view it as a series of focused applications that can service a number of niche situations – a suite of “pick and mix” of applications to suit most farming situations. Many examples of compelling applications come to mind: Animal Registration, Milk Recording, Quota Management, Milk Analysis, Fertility Analysis, Bull Selection, Premia Planning and Applications, Herd Register; Grass Measurement and

Budgeting, REPS and Nutrient Management, Maps, Tracking of Inputs, Flock Register, Accounting Applications, Enterprise Analysis, etc.

There are also many examples of advisory and research bodies that offer web-based services, such as interactive on-line discussion forums that permit users to post topics for responses by other farmers and advisors; interactive programs to assist in managing the farm business; web based Decision Support Tools (dairy herd monitors, profit monitors, soil analysis results online, fertilizer recommendations, food assurance online, REPS mapping online, etc.)

Farm software relating to all these topics and many other farming systems is widely available. High performance PCs are at their lowest cost ever, data communications are better and cheaper than ever, ITC support and training is readily available ...! Times for farmers may be financially difficult right now but the provision of ICT infrastructure, hardware, software, support and training has never been more favourable. This begs the question: why don't more farmers adopt ICT on the farm? This question still remains to be answered.

There appears to be no clear vision about how the agricultural sector should develop in terms of ICT adoption in maximising benefits for the farming community. Much more coordination is required between agribusiness and the professionals serving the farmer (accountants, advisors, service providers) to achieve an integrated and harmonious approach.

The future?

As stated earlier, the most critical task facing service providers is determining *real user needs*. The farmer is under siege from so much interesting and generally useful information that it is difficult for him to utilise it in a way that will benefit him in practical terms. It will have to become more targeted, more personal. What really interests him most is his own data: *my* herd data, *my* calf registration, *my* soil sample, *my* payments! This is the key information. And this is where the holders of farmer information in electronic format - government agencies and large agribusiness - can accelerate the process of farmer involvement in terms of transactions and in building relationships to benefit both the farmer and the agencies/agribusiness.

A large incentive at farm level should come from the e-government agencies accepting electronic data input for the various schemes and regulations they operate, benefiting both farmers and public bodies in terms of speed of data submission, accuracy and speed of payments. Since data collection and data input is a demanding and intimidating task for the farmer, the capability of co-operatives and other agribusiness organisations to download the farmer's own data on to his machine for automatic input to a particular program for analysis should help drive the uptake of ICT at farm level.

Also on the positive side, the technology has by now become de-mystified and the awe with which it was viewed in the early days has been expurgated. A new generation of young people has emerged who have osmotically absorbed the new technologies. Mobile phone technology now caters for an even younger generation who have "thumb-driven" it into an SMS (Short Messaging Service) phenomenon, not a purpose envisaged by its architects. While we await developments in mobile

internet, a new alphabet and language have emerged to service this “CUL8er txt and ringtone generation” - acolytes of the non-voice revolution. As an indication of how significant this developments is, there are approximately 30 billion SMS messages sent globally each month, with the majority of that traffic occurring in Western Europe and Asia – a market dominated by youth. And these young people *are* the future!

As a complement to the “*my data*” dimension discussed above, perhaps we should, at this advanced stage of ICT development and its wide acceptance by small businesses and the community in general, consider a more holistic approach. Perhaps we should also be promoting ICT as a general solution for *life on the farm* rather than as just an exclusive solution for specific farm problems, i.e. for use in everyday household situations – internet for online banking, paying utilities filing tax returns and VAT payments online, checking train and bus timetables, booking hotels and flights, aiding childrens’ school work as well as for research, advisory and agribusiness applications and website searches, etc.; word processing and spreadsheets for farm and home business applications; email for business and social purposes. Plus farm software applications for the whole range of farming situations.

A word of caution

Notwithstanding the momentous improvements in the ICT environment in recent years, there is now a serious downside facing users that did not exist in the eighties. Exposure to the internet, particularly with the increased uptake of broadband, runs the high risk of abuse and of invasion of privacy from a panoply of menaces involving cyber-crime and cyber-vandalism: bombardment from junk mail, scams, frauds, solicitations, phishing, hoaxes, obscenity, porn, hacking, identity theft, credit card theft, information theft, defamation, extortion, hate, etc. In addition there is the serious risk of infection from worms, viruses, Trojan horses, adware, spyware, browser hijackers, desktop hijackers, etc, etc. The list is incomplete!

With Microsoft Windows under global assault, these are very real threats that did not exist in the early days. Although irritable to professional organisations that insulate themselves in high-cost firewalls and employ technical staff, they are much more threatening to farm, small business and household users who do not have the professional support and backup to recover from disabling attacks. The degree of protection provided by anti-virus and firewall software is imperfect, and the self-help support is often pathetically inadequate in the event of malfunction. Indeed, some protective functionalities can create conflicts with other utilities running on machines, causing system dysfunction. Such experiences for the inexperienced user create frustration and disillusion, particularly being without PC capability while trying to recover operability. Solutions to this increasingly threatening dimension must be factored into the services being offered to farm users.

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