

# **75<sup>TH</sup> EUROPEAN SEMINAR OF THE EAAE**

**E-COMMERCE AND ELECTRONIC MARKETS  
IN AGRIBUSINESS AND SUPPLY CHAINS**

## **New economics for the New Economy?**

by

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### **1 Introduction**

There is much evidence that the widespread use of the Internet in the advanced societies of the West is inducing deep changes in the economies. The result that is emerging has been named "information economy", "knowledge economy", "digital economy", or simply "New Economy".

Agriculture has not been the vanguard of this change but agriculture is quickly catching up and the diffusion of the Internet in commercial agriculture is impressive. In south-west Germany, for example, about two thirds of the commercial farms have Internet access (Doluschitz and Pape, 2000); in the USA 52 percent of farms with sales of more than US\$ 250,000 were online in 1999 (NASS, 1999) and 42 percent of commercial farms in Australia used the Internet in mid-1999 (Australian Bureau of Statistics, 2000). Given the continuing rapid diffusion of the Internet it is safe to say that Internet penetration in commercial farming has crossed the threshold of 50 percent above which Paul David expects a technology to have a significant impact on productivity.

Change in the economy arouses the interest of economists, particularly if that change challenges established economic concepts and theories. Several writers on the New Economy have claimed exactly that and they have questioned the ability of established economics to explain and predict the changes that are happening in the economy under the impact of the Internet.

This brings me to the two purposes of my essay. My first purpose is to direct attention to some new concepts that have been suggested by analysts and prophets of the New Economy and that may be relevant to New Economy agriculture. For this purpose I first summarize in the following section the perceptions of a small sample of New Economy visionaries. I then present several characteristics in which the New Economy is expected to differ significantly from its predecessor and I discuss the relevance of the characteristics for New Economy agriculture. In the fourth section I argue that only a small number of New Economy characteristics – intensified competition, information content of products, and transaction costs - warrant special attention by agricultural economists.

## 2 Visions of the New Economy

New Economy punditry was a flourishing trade before the crash of the dot.com stocks in April 2000. In a rare pause of reflection, one member of this trade remarked, "Right now there appear to be more prophets than profits on the Net" (Tapscott, 1996, p. 26). However reliable, the perceptions of the general public are often more profoundly impressed by the visions of pundits than they are sharpened by the analyses and commentaries from scientists and scholars. The purpose of the following summary of the visions of a small sample of New Economy pundits is to provide the backdrop for the discussion of specific characteristics of the New Economy.

The cast of pundits that I have selected comprises Don Tapscott, a consultant, speaker, and writer, Kevin Kelly, writer and editor of *Wired Magazine*, W.J. Mitchell, Dean of the School of Architecture at MIT, and M.L. Dertouzos, Director of the MIT Laboratory of Computer Science.

### 2.1 *Tapscott's Digital Economy*

For Tapscott (1996, p.13), "Networks are the foundation of the digital economy and the Age of Networked Intelligence" and he sees us at the dawn of "... an age that is giving birth to a new economy, a new politics, and a new society. Business will be transformed, governments will be renewed, and individuals will be able to reinvent themselves - all with the help of the new information technology" (Tapscott, 1996, p. 2). Tapscott has no doubts that the New Economy will be a digital economy: "In the old economy, information flow was physical ... In the new economy, information in all its forms becomes digital" (Tapscott, 1996, p. 6). But he warns us not to confuse the New Economy with a service economy: "... it is a misnomer to call the new economy a service economy. Industrial production and agriculture will continue to be central as long as humans need to eat, be housed, be clothed, and be mobile" (Tapscott, 1996, p. 15). Nevertheless, "... more and more of the economy's added value will be created by brain rather than brawn" and Tapscott includes agriculture in this trend: "Many agricultural and industrial jobs are becoming knowledge work" (Tapscott, 1996, p. 7).

### 2.2 *Kelly's New Rules for the New Economy*

For Kelly (1998, p. 5), "The new economy is about communication, ... communication is the foundation of society, of our culture, of our humanity, of our individual identity, and of all economic systems. This why networks are such a big deal."

Central in Kelly vision is a distinction between the "world of the soft", that is "the world of intangibles, of media, of software, and of services" and the "world of the hard", which is the "world of reality, of atoms, of objects". Kelly (1998, p.2) challenges his readers, "If you want to envision where the future of your industry will be, imagine it as a business built entirely around the soft, even if at this point you see it based in the hard". Agriculture will not be spared the challenge as, "Farming ... and other traditional occupation will continue ... But the economics of farmers and friends, in their own way, will obey the logic of networks..." (Kelly, 1998, p. 6).

Kelly is convinced that networking will allow new economic organizations to emerge and he predicts, "Unimaginable forms of commerce can now coalesce in this new economy. We are about to witness an explosion of entities built on relationships and technology ..." (Kelly, 1998, p. 6). The key attributes of Kelly's New Economy are three: "It is global. It favors intangible things - ideas, information, relationships. And it is intensely interlinked " (Kelly, 1998, p. 2).

The governing principle of the New Economy is the logic of networks, "Understanding how networks work will be the key to understanding how the economy works" (Kelly, 1998, p. 10-11)

and the elements of that logic, in Kelly's idiom, are

- Embrace the swarm
- Increasing returns
- Plentitude, not scarcity
- Feed the web first
- From places to spaces

This is not the place to explore in any detail the principles of networks that Kelly has put forth. By and large Kelly emphasizes the importance of network effects, the decentralized nature of large-scale computer networks and their ability to self-organize. At times Kelly's vision strains credulity, for example, when he suggests, "... in the new economics the supply increases as price goes down" (Kelly, 1998, p.55) or when he turns Simon's (1971) insight of the scarcity of attention in the information society into hyperbole, "the only factor becoming scarce in a world of abundance is human attention" (Kelly, 1998, p. 59).

### *2.3 Mitchell's bit sphere*

Mitchell foresees a bit sphere - "a worldwide, electronically mediated environment in which networks are everywhere, and most of the artifacts that function within it (at every scale, from nano to global) have intelligence and telecommunications capabilities. It will overlay and eventually succeed the agricultural and industrial landscapes that humankind has inhabited for so long" (Mitchell, 1995, p. 167). Reasoning by analogy, Mitchell foresaw the emergence of portals and virtual exchanges, "Just as the ancient polis provided an agora, markets, and theaters for those living within its walls, the twenty-first-century bitsphere will require a growing number of virtual gathering places, exchanges, and entertainment spots for its plugged-in populace." (Mitchell, 1995, p. 167)

As a professional architect, Mitchell is sensitive to interactions among spaces, in particular to the interaction of the bit sphere with the material world. He writes, "It would be easy to miss the point ... concluding that cyberspace economic activity operates autonomously in its own realm - disconnected from material, place-based operations. ... In fact, the electronic linkages of cyberspace largely serve ... to 'connect agriculture and manufacturing with the consumption of goods and services, and with the management of organizations and institutions of society'. The emerging results seem to be a complex interaction between established, geographically located urban and regional economies and the increasingly powerful effects of long-distance, almost instantaneous information flows within worldwide virtual communities" (Mitchell, 1995, p. 138).

### *2.4 Dertouzos' Information Marketplace*

Dertouzos envisages the economy as an "Information Marketplace" that he describes as "a twenty-first century village marketplace where people and computers buy, sell, and freely exchange information and information services" (Dertouzos, 1997, p. 10). This marketplace "is built on a shared infrastructure made up of all the information tools and services that enable its many activities to function smoothly and productively" (Dertouzos, 1997, p. 15-16).

Unlike the locally confined village market place, the Information Marketplace "... is closer to a bustling metropolis" (p. 15), and it "should make it possible for anyone to buy, sell, and exchange his or her goods without having to register or be controlled by a central authority." (Dertouzos, 1997, p. 34)".

Dertouzos distinguishes between two kinds of electronic commerce: The larger of the two "... involves handling the information needed to trade physical goods" the smaller one is direct electronic commerce which involves information goods that "... can be shipped directly through the Information Marketplace" (Dertouzos, 1997, p. 193). Furthermore, Dertouzos expects tighter links between production and marketing and more customized production of expensive products. Finally, telework is a distinguishing difference between the past and the Information Marketplace because, "We can't make automobiles or produce goods at our homes. But we can certainly create information and sell our office work" (Dertouzos, 1997, p. 45).

### **3 Attributes of the New Economy and their relevance for agriculture**

With the backdrop in place, we can now proceed to identify specific characteristics that the New Economy allegedly has or will have. The list provided here is certainly not complete. To provide order, I have grouped the characteristics in those that relate to production, markets, management and organization, and to government intervention.

#### *3.1 Mass customization and information content of goods*

Two themes recur in visions of production in the New Economy. One is the declining importance of mass production and the increasing importance of mass customization. The other theme is the concept of "weightless products". An example of mass customization are cars that are produced to buyer specifications. Weightless or intangible products are those whose physical manifestations, if there are any, are unimportant for the users of the products. Some authors consider weightless products to dominate the new economy. "Concepts, ideas, and images - not things - are the real items of value in the new economy" writes Rifkin (2000 p. 5). Others emphasize the coexistence of tangible and intangible products. Dertouzos (1997, p. 236-237), for instance, suggests, "... real goods and services are not divided cleanly into physical and informational; each will usually have a mixture of these components. In fact soon the world of business will start talking about the information content of the various products and services they sell."

It would be wrong to consider the two attributes as irrelevant for agriculture because many agricultural products are physical ones and they are usually mass produced. But what is true for most is not necessarily true for all. Some agricultural products are produced to buyer specification in contract agriculture. This form of agricultural production is spreading in many parts of agriculture and it is likely to receive a strong additional impetus from GPS, GIS, and electronic animal identification technologies (Schön and Auernhammer, 1999). Furthermore, few, if any, agricultural products are valued by their physical attributes alone and most are valued for both physical attributes and information content - cattle arrive at the slaughterhouse with various tags attached to them and eggs are dearer when they carry labels informing buyers that the eggs have been laid by happy hens that lead an ecologically correct life close to mother nature.

#### *3.2 Lower transaction costs*

The New Economy is heralded to be friction-free. In the context of an economy this term is meant to describe markets with drastically reduced transaction costs and few would doubt that the commercial use of the Internet reduces transaction costs. Usually, such claims are substantiated by data which show, for example, that the transactions costs of banks have fallen dramatically by introducing online banking for their retail customers, or by reference to some well known firms that claim to have saved x% of purchasing costs by using the Internet. I have no reason to doubt

the statistics. But the data are grossly incomplete because they always reflect only the transaction costs of one party to a transaction and the changes in transaction costs to the other party are ignored.

### *3.3 Wider market boundaries*

In the global markets of the New Economy space is expected to be irrelevant because space does not matter on the global Internet. Confidence in the eventual global extent of the Internet is usually justified on the grounds of "Metcalf's Law" according to which the value of a network to its users is approximately proportional to the square of the number of its users (Shapiro and Varian, 1999). Although superficially plausible, "Metcalf's Law" is not supported by the lessons learned from the growth of its network predecessors in history – the postal system, the telegraph, and the railway – and it contradicts "deLong's Law", that is the observation that the most valuable connections tend to be made first when a network is built (Krugman n.d.).

The irrelevance of space is a result of the way by which network users are incorporated into the Internet. In the old economy space separates people, delays communication, and causes costs of transportation to increase with distance. In the cyberspace of the New Economy, in contrast, "... the necessary connection between buyers and sellers is established not through physical proximity but through logical linkage" (Mitchell, 1995, p. 139), which are assumed to be direct, instantaneous and effortless.

For goods whose markets are constrained by communication costs, near zero communication costs and near instantaneous data transmission will dramatically extend the size of the relevant market. The size of the markets for agricultural products, however, are more often constrained by transportation costs which are unaffected by digital networks. The Internet will therefore not do away with von Thünen.

### *3.4 Better market information*

Stigler (1961) reminded us that information costs resemble transport costs. When the costs of either are not trivial, we do not take long trips and we choose to be imperfectly informed. The Internet drastically reduces the costs of acquiring information but it leaves our ability to attend to and absorb information unaffected. Nevertheless, unless marginal costs of attention increase drastically, lower costs of acquiring information are likely to result in better informed market participants and some authors have put much hope in the impact of cheaper information on market performance. Caincross (1997, p. xii), for example, expects, "Many more companies and customers will have access to accurate price information. That will curtail excessive profits, enhance competition, and help curb inflation, resulting in 'profitless prosperity': it will be easier to find buyers, but hard to make fat margins."

It is not clear at present whether trading on the web will actually lead to an increase in available market information. Experiences with early versions of shopping agents suggests that some sellers strongly resent direct price comparisons and attempt to prevent price information from spreading. Furthermore, several agricultural web market places keep transaction information private. If this practice spreads, market information in the New Economy will not improve much and may be no better than in the old economy.

Available evidence of the impact on market prices of e-commerce provides no support for high hopes for significantly reduced price dispersion on networked markets (Smith et al., 2000). More encouraging are results from an empirical study by Brown and Goolsbee (2000) who found

evidence of an information spill-over from the web to conventional markets. This spill-over led to lower prices on the conventional market although the good was only thinly traded on the web.

### *3.5 Intensified competition*

In his book "The Road Ahead" Bill Gates (1995, p. 138) opined, "Small business arguably have been the greatest beneficiaries because low-cost hardware and software have permitted tiny outfits to compete with large multinational corporations." There is little point in scrutinizing the costs that firms incur to be present and become noticed on the Internet; according to most standards they are not low. More importantly, however, Gates confuses competition and rivalry in a market with being present in the same arena. It is not at all clear why the chances for the tiny outfit to survive competition by the multinational corporation is to be higher in the New Economy than in the old. The contrary is more likely to be true and recent research suggests that the chance of the tiny outfit to survive competition by the large company are slim.

Theoretical research (Ogus et al., 1999; Maurer and Huberman, 2000) and empirical research (Adamic and Huberman, 1999) of the distribution of visits to web sites indicates that competition among web sites for the scarce attention of web users tends to produce power law distributions where a very small number of web sites commands most of the attention and where most sites are visited by only few web users. If the behavior of buyers and sellers on the Internet also follows such power law distributions, networked markets are likely to become winner-take-all markets. Such markets are difficult to contest, participating in such markets is unattractive for most sellers, and rivalry fizzles out.

### *3.6 Avoiding the middleman*

Bashing the middleman is an enduring pastime of enemies of the market and some may hope that the New Economy is the final act in the exorcization of the middleman. Tapscott (1996, p. 56), for example, expects, "Middleman functions between producers and consumers are being eliminated through digital networks."

Markets without middleman are a pipe dream because middlemen provide services that are as necessary in network economies as they are indispensable in the old economy. Aggregating demand and supply, providing trust, facilitating transactions, and matching buyers and sellers are typical activities of old and New Economy market intermediaries alike. Dertouzos (1997, p. 239) made the case against disintermediation clear: "... simply connecting producers and consumers of information services with one another via the Information Marketplace does not eliminate the brokers any more than putting all the world's sellers and buyers in one location would eliminate the intermediate wholesalers. The pandemonium would be unprecedented." Like Dertouzos, Kelly (1998, p. 100) also foresees a New Economy where middlemen thrive: "Network technologies do not eliminate intermediaries. They spawn them. Networks are a cradle for intermediaries." The arguments by Dertouzos and Kelly are supported by an empirical study of market intermediaries from thirteen industries by Bailey and Bakos (1997) who concluded, "Contrary to the predictions of disintermediation, the movement to electronic markets does not seem to result in the elimination of intermediaries, as electronic markets will require intermediation services, albeit in ways that differ from traditional physical markets."

### *3.7 Digital money*

In the late 1990s electronic money was expected by many to supplant paper money and still now Rifkin (2000, p. 35) believes, "Money, too, is dematerializing in the new wired economy."

Measured in terms of value, electronic money transfer since long dominates cash payments. In e-commerce transactions that involve sales of goods and services rather than financial instruments digital money has, however, not yet replaced conventional means of payment. Most B2C-purchases are paid with a conventional credit card and B2B-purchases are usually billed to the buyer. Apparently the use of digital money is not a defining characteristic of the New Economy and I shall not consider digital money any further.

### 3.8 *Free of government intervention*

Although the Internet is a creation of the military-scientific complex of the 1970s, the first wave of Internet citizens had high hopes for keeping the Internet a government-free zone. The libertarian ideology was perhaps most vividly expressed by John Perry Barlow (1996) in his "Declaration of the Independence of Cyberspace":

*"Governments of the Industrial World ... I ask you .. to leave us alone. ...  
... I declare the global social space we are building to be naturally independent of the tyrannies you seek to impose on us. ...  
... Cyberspace does not lie within your borders. Do not think that you can build it ...  
.... We are forming our own Social Contract. This governance will arise according to the conditions of our world, not yours. ...  
... Your legal concepts of property, expression, identity, movement, and context do not apply to us.  
... We believe that from ethics, enlightened self-interest, and the commonweal, our governance will emerge. ... We will create a civilization of the Mind in Cyberspace."*

The Declaration was not heeded by governments. In the EU, for example, we already have a substantial body of regulations governing the Internet and in some countries the Internet is censored. It is not even clear that it is desirable to keep the government out of the bit sphere. Some authors (e.g. Lessig, 1999) have argued strongly in favor of certain kinds of government regulations to counterbalance technological developments that threaten freedom and privacy on the Internet.

Agricultural e-commerce is unlikely to remain a government free zone. As agriculture becomes ever more entangled in a thick mesh of EU and national agricultural, food safety, and food quality regulations, we have reason to expect that the regulatory zeal of agricultural, ecological, and consumer protection interest groups will spill over into New Economy agriculture.

## **4 Implications for agricultural economics**

Limited time and space prevent me from discussing in detail the implications for agricultural research of all the New Economy characteristics listed in the previous section. Instead I apply a triage to the eight items so that I can focus on the important ones.

Three items – extended market boundaries, market disintermediation, and digital money - can be readily dismissed because they do not apply or are unimportant in agriculture. Two items – improved market information and government regulations - require no further attention because they can be readily studied with conventional theories and research methods. Hence, we need to be concerned only with the implications for agricultural economics of intensified competition, the changing concept of goods, and transaction costs.

#### *4.1 Intensified competition*

The intensity of competition is usually indicated by reference to the number of sellers or buyers in a market: many sellers make competition perfect, one seller is a monopoly, two is a duopoly, and three is what? Furthermore, we are usually concerned only with equilibrium outcomes of various forms of competition and not with the process that results from the rivalry of competitors.

The conventional approaches to the study of market competition are ill suited for analyzing market processes that involve several buyers and sellers. Innovative multi-agent models are, however, able to simulate complex market processes (e.g. Epstein and Axtell 1996) and they have been used to generate endogenously market organizations that resemble empirical distributions of visits to web sites (Ogus et al., 1999). Multi-agent models have gained some foothold in agricultural economics (e.g. Balmann 1997; Berger 2000) but they have not yet been applied to investigate New Economy agricultural markets. I would, however, not be surprised if some smart Ph.D.-student is already doing exactly that.

#### *4.2 Redefining the concept of goods*

Economics is concerned with the production, exchange and use of goods for the satisfaction of human wants. However, it is not always clear what goods are. If economists are bothered at all with providing an explicit definition, many define goods in physical terms. This is satisfactory in some but not in all instances. Consider the case of beef: A steak from a Bavarian steer in November was considered by most consumers a very close substitute to a steak from a steer slaughtered in Argentine. Then came the BSE-scare in Germany and suddenly a steak from a Bavarian steer is no more a close substitute for an imported steak.

Nothing has changed in the physical composition of Bavarian and imported beef. But much has changed in what people in Germany currently think about domestic and imported beef. Beef, like all goods, is, in Hayek's (1948) idiom, a "teleological concept" and can be defined only in terms of three concepts: "a purpose, somebody who holds that purpose, and an object which that person thinks to be a suitable means for that purpose." More simply expressed, "... things are what people think they are" (Hayek 1948, p. 49-50) and some people consider Bavarian beef no longer as food.

Many goods carry two types of information: the natural appearance of the good and symbolic information attached to the good. In the New Economy, information technology has caused the costs of providing and transmitting symbolic information about a good to fall considerably in relation to the costs of transmitting natural information with the good. The change in relative costs is a strong incentive to judge the quality of goods on the basis of the symbolic information about the goods and not on the basis of its natural appearance.

Whether people judge a good on the grounds of its natural information or on the grounds of its symbolic information would be of no concern if the two information sets were always identical. They are not. Some information about a good cannot be reliably communicated as symbolic information, for example extraordinary texture, smell, or taste. More importantly, however, symbolic information is detached from the thing to which it refers and its veracity may be corrupted either during production or transmission. Under such circumstances assuring the integrity of the product information chain becomes much more important than optimizing the efficiency of the physical product supply chain.

### 4.3 *Measuring transaction costs*

Transaction costs is a popular term threatened by a widening gap between its use in theoretical arguments and the efforts to measure them empirically. In order to explain who adopts and promotes e-commerce in agriculture, it is necessary to know whose transaction costs are reduced – that of the seller, the buyer, or both – and by how much the costs are reduced. Furthermore, quantitative measures of transaction costs are necessary to explain the impact of the Internet on the choice of coordination mechanisms – markets, vertical integration, or contractual arrangement supported by interfirm information systems.

Estimating changes in transaction costs only for one party in a transaction is a serious deficiency in agriculture because the impact of the Internet on farmers' transaction costs is smaller than the the impact on the transaction costs of dealers. To be able to buy and sell on the Internet both dealers and farmers have to invest considerably in computer hardware and software as well as in human brainware. Once these investments have been made the variable costs of a transaction on the Internet are near zero for both parties. The reduction in average costs of a transaction are, however, larger for the dealer who can spread the fixed costs of Internet trading over a much larger number of transactions than the farmer. For some farmers with high investment costs, low transaction frequency, or both, trading over the Internet may even result in higher average transaction costs.

Unfortunately, transaction costs are hard to measure and I do not know of any serious attempt to measure the costs of New Economy transactions in agriculture. The measurement problem should not be insurmountable. It would require that some consensus emerges on (a) how to define transaction costs in operational terms and (b) what methods to use for their measurement. As our profession has managed to achieve some consensus about the definition and measurement of production costs there is hope that, given time, we will be able to do the same for transaction costs.

## 5 **Closing remarks**

Asked how he would characterize the New Economy, Lou Gerstner of IBM responded: "I resist the idea that there is a new economy - something that is separate and distinct from some other economy. ... There's been far too much catchy ideas like this so-called New Economy.. (Gerstner, 2001). Gerstner is right to the extent that we should not get carried away by unfounded enthusiasm and claims about the New Economy. Nor should we become complacent. If my remarks have helped to put into focus some issues arising from the New Economy that warrant attention by agricultural economists I have met my objective.

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