

AVOCADOS AND THE INFORMATION AGE
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Summary

The information age is superseding the industrial age and is making far reaching changes to our lives and how we do business. The fast pace of change associated with this new age calls for flexibility and responsiveness in our commercial enterprises. This paper examines the information age, its implications for agriculture and the opportunities it presents to the avocado industry. Several case studies of how agricultural enterprises are embracing the information age are described, these explore a range of ideas that may be considered by the avocado industry. A number of useful Internet sites are described and their hyperlinks provided.

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Introduction

This is a huge topic. What I have set out to do in this paper is to make the reader more aware of the significance of this new age, explain a little about it, point out the effect it is having on business and suggest how the avocado industry may be able to use it to advantage. I also hope to whet your appetite with some examples of what is occurring, in the expectation that it will stimulate you to take a closer look at the opportunities that are out there.

Whether the information age is a blessing or a curse could be debated forever. What we do know however is that many barriers in time and distance are being eliminated by information technology. When change affects our lives we may go through a period of denial, then a period of resisting the change but eventually (sooner rather than later hopefully) we realise that it is here to stay and we learn to embrace it and look for the opportunities it presents.

What is the information age?

The “information age” is sometimes referred to as the “information revolution”, the “computer revolution” or the “information explosion”. A revolution is defined as a dramatic rearrangement of power and money about who comes out on top and who loses out. This is indeed pertinent to this new age.

Some definitions of the “information age” include:

1. The present era beginning, particularly in the 1980’s, with the rapid development and use of the microcomputer and development of electronic technologies for handling massive amounts of information and data and the convergence of computer and telecommunications technology (Anon).
2. The current revolution resulting from information-communication technology (Internet, cable TV, global telecommunications) that is providing people with more information than ever before, changing individual behaviour, what constitutes power, policy and business (Carseldine and Neal, 2000).

The “information technology age” has been described as the stage of technological development at which computer technology becomes central to the economic and social interactions of our society (Cleary, 2001).

The information age is characterised by better and cheaper communications, and greater ability to receive, store, sort and access vast amounts of information. This in turn has resulted in a world where change occurs much more rapidly. What is new today may be obsolete by tomorrow.

We are even being referred to as the “information society” based on the free flow of information as a central moral value. Here it is claimed that it is a moral duty of humans to exchange information and it is a primary goal of the government to facilitate it.

One could be excused for thinking that when we refer to the “information age” that information must be exclusively associated with new technology. However non-electronic information is still very much an important part of the information age. For

example a survey of producers in the USA in 1995 showed that reading, meetings and personal contact were the top three methods for receiving information (Figure 1). Donovan (2001) investigating how growers in Central Queensland like to get their information learned how highly growers rank social interaction. A recent study by A.C. Nielsen showed that in spite of all the hype about new media and the Internet, time spent with radio has actually gone up since 1997 and it is a better advertising medium than TV, print or the Internet (Pink, 2000).

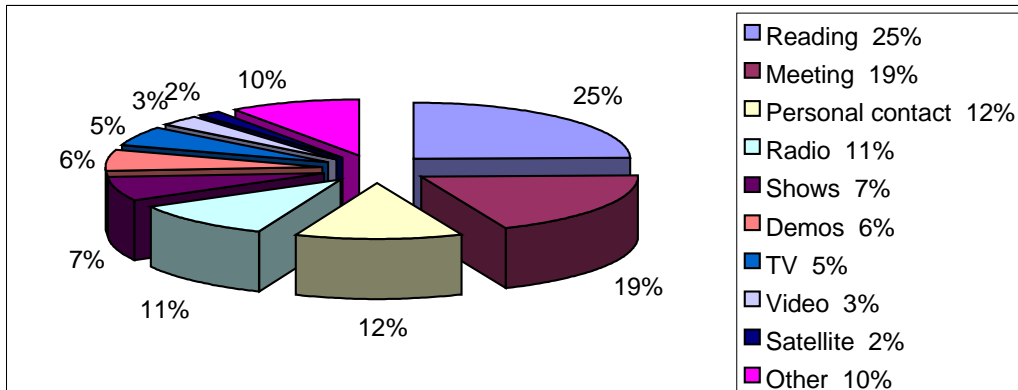


Figure 1. How growers in USA preferred to get their information in 1995

This paper however will mainly focus on the electronic phenomenon because that is the major force behind the new age. The following example is a microcosm of how new technology is affecting business, in particular it illustrates how economics and employment are effected.

Table 1: The Encyclopaedia Britannica story

Year	Staff employed	Comment	Cost of product	Turn-over
1989	2300	Hardcopy volumes	\$2000+	\$650 million
1991		Approached by Microsoft to publish their content on CD, Britannica turned it down. Funk & Wagnall did a deal with Microsoft instead and Encarta was published		
1992		Britannica put out a CD in competition with Encarta	\$1200	
1994		Britannica puts out a subscription based website	\$85/year	
1995		Britannica CD price drops	\$79	
1999	350	Britannica website	Free! Relies on advertising!	

For many companies (and professions) who were leaders in the industrial age, the change to the information age will be their demise unless they are able to radically change the way they operate.

The point is that information is becoming the new currency, the new capital, it is renewable, it is tradeable, it generates income. And to support this new age, education and continual learning is assuming greater importance than ever before. The future of your business will increasingly become a race between education and disaster. Instead of the “have” and “have nots” it will become the “knows” and “know nots” in the 21st century. Knowledge is the new currency – the key to business success.

Putting the different ages into perspective

Table 2: A view of the different ages (after Ho, 1994)

	Hunter gatherer	Agrarian age	Industrial Age	Financial Age	Information Age
When	Since the beginning of time	Began about 10 000 years ago	1700s to 1950s	1950s to 1990s	From 1990's (Note: first personal computer introduced commercially in 1971).
Focus	Survival	Working with the environment	Mass production	Bottom line (consumers controlled by industry)	Customer wants (consumers in greater control)
Success factors	Physical prowess	Control of land	Economy of scale	Return on investment	Responsiveness, flexibility.
Impact	Very little	Development of society	Higher standard of living	Conspicuous consumption	Global prosperity?

In the eighteenth century inventors learned to control steam, and humanity went through a period of transformation that we now recognise as the industrial revolution. Some scholars believe that the associated upheavals led to the rise of communism. Today we are witnessing the birth of another radically new age largely spurred on by the development of technology such as the microchip, optic fibres, communication satellites. Whilst our parents had to come to grips with the newness of television, 50 years on we can link millions of TV screens together over the Internet and exchange masses of information at the touch of a finger.

The information age represents a sudden increase in the individual's power to think and organise. The information age does not replace but overlaps the growing, extracting, processing, manufacturing, distributing and consuming of material things. The fundamental concept is that new ideas are the basis of economic prosperity and of the general well being of society. What impact will this new age have on society? How can we prosper in this new age? What impact will it have on the way we conduct our businesses and on the environment?

How is the information age changing society?

The information age is affecting many parts of our society, business, education, entertainment, health care, and even war!

In 1991, for the first time, US companies spent more on computing and communications equipment than on industrial capital goods (Angell and Heslop, 1995). Knowledge capital and intellectual resources have become at least as important as their physical counterparts in the creation of economic value and the distribution of wealth. By ever expanding the access to information, technology is liberating the customer and the power of knowledge from the traditional "gatekeepers".

Even if you don't own a computer or have never used the Internet, the information age is changing the way you operate. If you use a credit card, use an Automatic Teller Machine (ATM), book airline tickets, watch the news on television, keep tabs on the stock exchange, dial interstate or overseas then you are a part of the information age.

Many educational institutions, especially universities, are now providing much of their teaching material via the Internet instead of on paper. Successful companies and organisations are becoming learning organisations. Hence the futurist, Eric Hoffer's comment ". . . in times of change it is the learners who inherit the future. Those who have finished learning find themselves equipped to live in a world that no longer exists." Change is happening at an ever increasing rate and in order to keep up we need to adopt a philosophy of continual learning. There is great potential for using the Internet for educational purposes to further your own professional development. For farmers the Internet as an educational medium helps overcome time, cost, distance, weather and production demands.

In 1992, the electronic games company Nintendo had a greater turnover in sales than Toyota and Nissan. In the same year the US video games market made more money than all the box office receipts of every Hollywood movie.

Even the recent collapse of the Soviet Union, which excelled at the production of oil and steel but strangled the flow of information, can be viewed as part of a global trend towards democracy and decentralisation brought about by this information revolution. The transistor, the microchip, and the personal computer have empowered individuals and small groups at the expense of the fearsome power blocs of the Cold War world (Riordan and Hoddeson, 1997).

A minority group in Mexico, the Zapatistas, achieved world wide recognition and support not so much through their guerilla tactics but through the Internet. Supporting websites sprung up as far away as Japan and Finland. A few months ago the Zapatistas received recognition from the Mexican government and marched peacefully into Mexico City.

After the 1999 USA bombing of the Chinese embassy in Belgrade and the recent incident with the USA spy plane in China, computer literate citizens of both countries began to wage their own war on the Internet. Hackers started to break into the other country's websites (especially government websites) and spread computer viruses. A recent news item reported that over 100 US websites have been defaced by pro-

Chinese hackers, they include sites of the US Navy, National Institutes of Health, US Department of Labour and the California Department of Energy.

You can start to see how the information age is giving power to the individual!

Estimates of the number of people currently connected to the Internet vary from 349 million (Computer Industry Almanac), 379 million (Nielsen/NetRatings) to 407 million (Nua Internet Surveys, 2001) and forecasts of use by the end of 2005 put the figure around 765 million (Computer Industry Almanac).



Figure 2: Estimate of the number of people connected to the Internet in Jan 2000 (242 million in total vs. 378 million one year later, an increase of 56%)

“Information overload”!

In order to make effective decisions we need information, but there is a crisis associated with this new age. There appear to be two aspects to this crisis:

- the sheer volume of information being produced.
- the short lifespan of much of this information.

The volume of scientific and technical information is perhaps doubling every 20 months. To put this into perspective imagine your local library building doubling in size every 20 months! A problem we face today is not restricted to generating relevant information but preventing ourselves from drowning in it! Theobald (1987) calls it “infoglut”. Naisbitt (1982) said we are often “drowning in information, but starved for knowledge”. Easy access to all this information is not without its downside.

Just as significant as the growth in information, is the fact that the information is becoming redundant in a shorter time. The value of what we learn is always slipping away. This includes knowledge about technology, markets, suppliers, distributors, currencies, interest rates, consumer preferences, and all other business variables (Gill, 1994).

Facts, information and knowledge

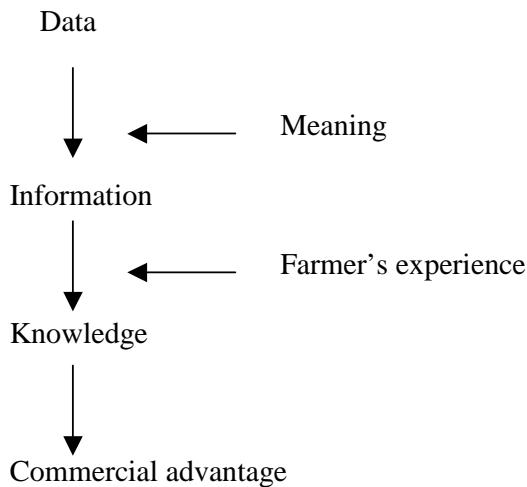
We are encouraged to believe that more and faster access to information will make our lives easier, happier, and more meaningful. But in doing so we may be mistaking data for information, and information for knowledge. Undigested information is no information at all, but it creates the fiction that you have accessed it (Wurman, 1989).

Take a minute to consider the differences between data, information and knowledge.

Data - known facts

Information - contents of a message, something told, items of knowledge

Knowledge - understanding of a particular subject, awareness or familiarity gained by experience.



In the information business there are three types of activities (Wurman, 1989):

- transmission of information
- storage of information, and
- understanding of information

In the information age we have become incredibly good at the first two, but what about the third one? Without an understanding of information the whole effort is pretty pointless!

We need to be aware that the information explosion does NOT automatically transform into a knowledge explosion. One of the greatest challenges is how to transform information into structured knowledge.

Turning “information” into useful “knowledge”

Information/knowledge shouldn't be measured in kilograms of paper or megabytes of information but in its usefulness to people. Wurman (1997) has recognised the growing need of a profession he calls an “information architect”. His definitions of this professional include:

- The individual who organises the patterns inherent in data, making the patterns clear.
- A person who creates the structure or map of information which allows others to find their paths to knowledge.

- The emerging 21st century professional occupation addressing the needs of the age focussed upon clarity, human understanding and the science of the organisation of information.

This is essentially the role we have adopted in putting together products such as the AVOMAN software and the Agrilink Avocado Information Kit.

Figure 3 below is an illustration from Wurman (1997) and demonstrates how the “information architect” transforms a list of data into something we can quickly and easily understand and gain knowledge from. For “information architects” how they package the information for their potential clients is very important.



Figure 3. By the use of diagrams, maps and colours the “information architect” has converted a list of numbers and place names into a meaningful pattern of useful knowledge that can be easily understood. This example shows the weather page from an American newspaper ‘USA Today’.

In the past we have measured productivity by the quantity of things that are given out, now we are starting to recognise the value of quality and simplicity (Wurman, 1989). Optimists consider that the “information age” will gradually transform to the “knowledge age”.

Finding the information we need

We increasingly have immediate access to information electronically. So to be effective we will need to filter and screen the incredible amount of information, we will need help to select key information and derive meaning/knowledge from the complexity. We shall have to learn how to:

- access and use complex knowledge systems
- evaluate knowledge bases and their appropriateness for application to specific problems
- to learn through critical thinking and reflecting

This a new field, however electronic tools are being developed that help select information that is more relevant to our needs. “Web-bots” (electronic robots) are being developed that allow you to customise your web searches using “artificial intelligence” to find the information that best answers your query. Of particular interest, will be the development of so-called “intelligent agents” which can locate suppliers of a product and return useful comparative information.

The information age in business and agriculture

The role of computers in business is no longer seen as a high tech filing system or typewriter. It can now be used in almost every aspect of modern businesses, some examples of these applications are:

- production
- automation
- quality analysis
- stock control
- making and taking orders
- seeking information
- communication between branches/companies
- advertising
- and much more.....

Rural businesses use the Internet for:

- e-mail
 - on-line banking
 - bill paying
 - customs clearance
 - market research
 - product information and promotion
 - document delivery
 - on-line sales
 - industry promotion and support
 - business-to-business trading
 - supply chain management
- (Papandrea and Wade, 2000).

For Australian agriculture new information systems such as the Internet have the capacity of overcoming the tyranny of distance, of connecting producers directly with consumers, of placing highly specific information immediately in the hands of users and greatly enhancing communication (Cribb, 2000).

We can capitalise on events through the power and speed of information. The number of visits (“hits”) to vegetarian food websites more than doubled following the Mad Cow Disease and Foot and Mouth disease outbreaks in the UK. Imagine what you could do to long term avocado sales if you established links with these organisations and their websites!

A piece of equipment that may become useful for growers is the “Personal Digital Assistant” (PDA). A PDA is a portable palm- or pocket-size computer serving as a data recorder, note pad that may incorporate voice or handwriting recognition, date

book, modem, fax and printer. It allows data to be collected in the field which can later be electronically transferred to your office computer, saving time, double-entry and transfer errors. Surveyors use them to enter measurements in the field, later downloaded into their office computer which has software to interpret the data. Another use is by car rental companies to expedite rental returns. The agent enters registration number, mileage, fuel gauge reading etc whilst in the car park then electronically transfers the information into the company computer on return to the office. Recent models can even do away with a connecting cable when transferring data to the main computer, instead they send the data to the computer via an infra red beam. PDAs can even exchange electronic business cards, for example at a conference delegates would beam their electronic business cards to each others PDA, instead of exchanging cardboard ones! This has the advantage of automatically filing the other persons e-mail address and website in your e-mail address book.

The AVOMAN and MacMan team (DPI, Nambour) is investigating where PDAs would have a useful role to play in conjunction with the AVOMAN and MacMan software. Principally the idea would be to save time-consuming double entry of data which also carries with it the risk of transcription error. For example in the packshed you could record tray numbers and other consignment details into your PDA (instead of onto paper) then electronically download the data into your AVOMAN software on the office computer. This could also apply to taking records in the field such as irrigation hours, tensiometer readings, weather details, harvest records, orchard measurements and so on.

The Quicken software company, that brought us QuickBooks, has developed software called QuickTrack to be run from your PDA so that whilst you are away from the office you can create invoices, manage stock takes, check supplier details, connect to bar-code scanners and so on and then download all the information into QuickBooks on your main computer with a push of a button at the end of the day or week.

On the production side, systems are now available that can automatically read soil moisture (say every 10 minutes), record it in a software program that is connected to an irrigation controller and at the appropriate moment automatically switch on the irrigation for the required duration. Using a mobile phone this information can be viewed by the farm manager even if out of the country. Changes can be made by the manager to the irrigation schedule if required and relayed to the controller back on the farm.

Connecting with others

Irrespective of where you are, whether its Carnarvon in West Australia or Te Puke in New Zealand, electronic communications allow you to communicate cheaply and quickly. Options include e-mail, chat rooms, list servers, bulletin boards and news groups.

Table 3: Some of the options for corresponding using electronic communications

Type of Connection	Example	How it works
E-mail	Bloggsj@bigpond.com . Joe sends a message to Sam.	You send a letter to one or more people at the same time, only you don't have to buy a stamp or find a red post box, you can do it all from your computer and it will reach anywhere in the world in minutes. Its cheaper than "snail mail" and you can attach electronic documents, pictures, spreadsheets, even short videos.
Chat room	Farmwide.com	Like a telephone conversation with one or more people but instead of hearing their voices you read each other's messages on your screen as they are typed.
List server	Aussie-Avo-Net	The same as e-mail but your message goes to all the subscribers on the list. All subscribers can read the message and any replies that are generated. Good for seeking opinions on technical matters or just getting a message out about something.
News group	Software companies have them to facilitate problem solving amongst users.	You post a message on an Internet site which others read and may respond to, also you can peruse previous messages and replies. Different from a List server because here you have to look up the Internet site to see the correspondence.

Marketing

To succeed in business, decision makers must keep abreast of the continuously changing wants and needs of clientele, and motivate them to purchase their product (Bazik & Feltes, 1999). There is a "demassification" occurring in the market, consumers are becoming more personalised in what they buy. By expanding the access to information, technology is liberating the customer from the mass market.

Today's customers have access to more information, they are demanding more information about products, they are more sophisticated, they have higher expectations and they want to exercise their freedom of choice. They want customised products and services and they want them now! Take milk for example, 30 years ago there was one type to choose from, now there are dozens. Full cream milk, skim milk, low fat milk, "Lite" milk, high calcium milk, high protein milk, high cream jersey milk, several brands of soy milk, goats milk, to name a few.

The Panasonic Bicycle Company in Japan turns out 11 million variations of bicycle designs. The Ingersoll Milling Machine Company can produce 25 000 different part designs, mostly in lots of one to support its world dominance in the global market for specialised production machinery.

Growers need access to information more than ever before because their business environment and markets are constantly changing. In order to know where to direct their efforts growers need to be aware of relevant global trends:

- consumer needs and demands are changing, and they are changing more often.
- consumers have more power, they are becoming more fussy in their needs and rather than the “one size fits all” product, consumers are searching for almost customised items (reference the bicycle example above).
- consumers are becoming more environmentally and socially conscious.
- consumers want more information about the food they buy, they want to be assured that it is safe, they want to know how it has been produced (eg. have chemicals been used, has it been grown organically), they want to know if it is good for them, they want to know what it will do for them nutritionally.

Consumers are demanding product choice, variety, convenience and year round availability. The need for good market intelligence is growing, we can only sell products if we know what products people are willing to buy. Agriculture is becoming more market driven and specialised and knowledge is becoming the key to generating wealth. These days consumer needs can change almost overnight.

Companies now pay big money for information on consumers, their buying habits and so on, this is so they can get more cost effective advertising/marketing. In this way they can target specific products at a group of people more likely to buy them.

Electronic commerce (E-commerce)

Electronic commerce over the Internet is a new phenomenon, but is growing rapidly. Electronic commerce at its simplest is the use of electronic means for the conduct of commercial transactions, at its broadest, however, it is also a way of approaching business processes and business systems with a view to maximising efficiency in reaching a potentially global customer audience (Groves and Da Rin, 1999).

The Internet is the world’s biggest cross border marketplace. You can establish a website at the cost of a few hundred dollars and use it to promote your organisation or products, and potentially reach about 380 million people across the world!

People these days expect organisations and companies to have a presence on the web in the same way as they’d expect you to have a business card. The website does not have to have a lot of information on it, as long as it contains contact details and what products and/or services the organisation provides.

For buyers: electronic commerce on the Internet provides advantages of both convenience and cost. Competitive pressures arising from electronic commerce have the potential to reduce costs to buyers generally. For Australian farmers, this beneficial impact on their terms of trade would be magnified by a wider choice of suppliers placing competitive pressure on suppliers of goods and services (Groves and Da Rin, 1999).

Below is an example of an agricultural machinery company that uses the Internet to provide information about equipment it has for sale. The website allows you to specify what you are shopping for (Figure 4), and for each item found provides details including digital photographs (Figure 5).

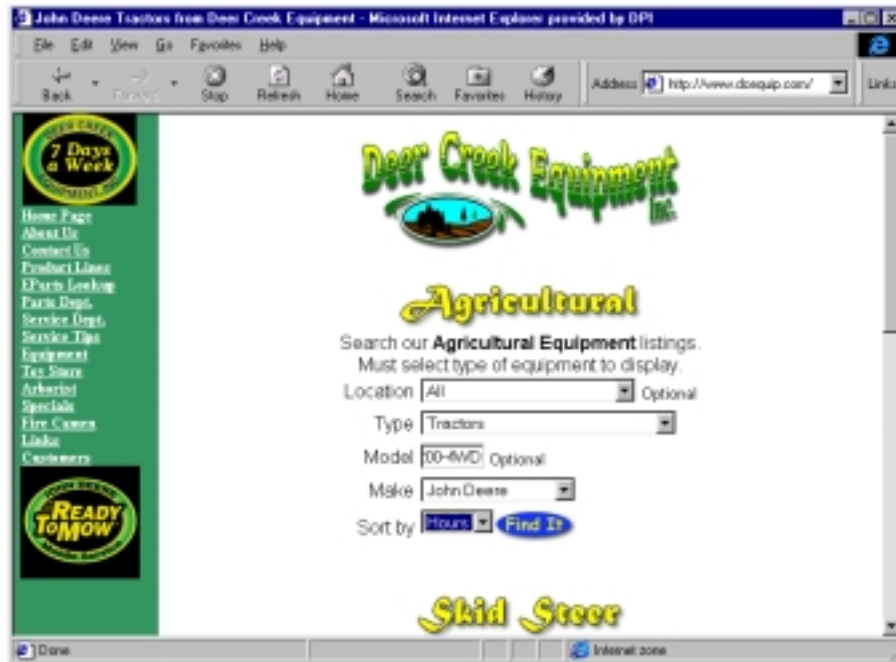


Figure 4. Specifying the tractor you are looking for.



Figure 5. One of the results of your tractor “hunt”.

For sellers:

Electronic commerce can reduce distribution and marketing costs markedly. It enables marketing to a global marketplace, many for the first time. These advantages are particularly relevant to businesses, including some farm businesses, operating in rural Australia. It provides opportunities for much closer connection with customers, and for re-organising businesses to provide more effective customer service (Groves and Da Rin, 1999).

There's a lot of talk about consumers buying goods off the Internet but in fact recent reports show that only a minority of commercial websites are, to date, profitable reflecting the highly competitive marketplace and a loss of efficiency in some parts of the supply chain, eg in scale economies in transportation, there are also concerns over security and privacy. Business-to-business ("B2B") Internet transactions on the other hand have overtaken business-to-consumer ("B2C") transactions and this trend is set to grow, it was worth US\$177 million in 1999 and is expected to reach US\$1 trillion in 2003. Business-to-business commerce is focussed on the pursuit of more efficient processes of supply and distribution.

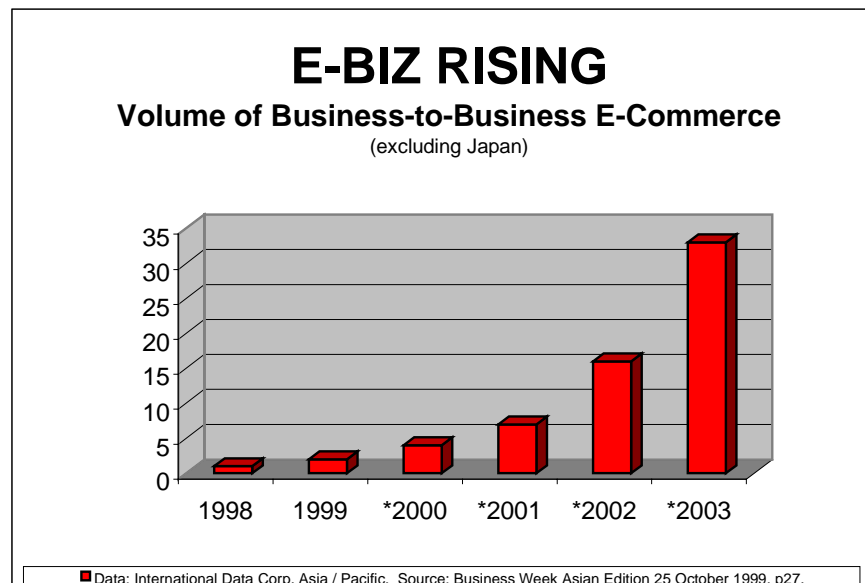


Figure 6. Expected growth in business to business electronic commerce

Electronic Commerce Opportunities for Australian Farmers

It is important that the Australian farm sector be in a position to take advantage of the possibilities provided by electronic commerce. The Internet will be of advantage to Australian farm users where it provides:

- useful information for farm management decisions
- cheaper supplies of goods and services
- remunerative marketing opportunities
- off-farm income opportunities.

While there are examples of all of these in operation at present, the main benefit of the Internet to date to Australian agriculture has been in its information provision and communications possibilities (Groves and Da Rin, 1999).

Web-based selling of agricultural produce would be boosted by the development of electronic “venues” matching buyers with sellers, either directly or through brokers.

Some case studies of how agricultural businesses are using the Internet

These case studies present a cross section of how information technology (in particular, use of the Internet) is being used by a number of rural businesses. (Apart from the information on the Californian avocado industry this material was derived from Papandrea and Wade, 2000).

Californian avocado industry

From the California Avocado Industry’s “AvoSource”, Senior Vice President of the California Avocado Commission (CAC), Tom Bellamore (2000) spells out his view on Internet marketing. “Internet marketing is no longer the marketing tool of the future - it’s the marketing tool of the present. The rapidly increasing acceptance of the Internet makes it imperative for us to have a solid Web presence that not only strengthens our other offline marketing and advertising efforts, but gives the California avocado industry a competitive advantage in this new and immensely powerful media.”

CAC understands that to succeed in business, decision makers must keep abreast of the continuously changing wants and needs of clientele, and motivate them to purchase their product (Bazik & Feltes, 1999).

CAC is at the leading edge when it comes to Internet marketing and communications. Their website, www.avocado.org, is one of the most popular food sites on the Internet, with over 400,000 hits per month and 40,000 consumers registered to receive recipes and other avocado information via e-mail. The site has become an invaluable resource for media, foodservice representatives, retailers, shippers, handlers and, of course, growers. From recipe searches to crisis communications, it’s evolved to be one of the most powerful marketing tools in their arsenal.

CAC is working hard to further develop their Internet marketing presence. One example is the development of regional retailer promotions. CAC is working with specific supermarket chains and major retailers directly in the on-line environment to create joint promotions intended to build new, consumer databases that can be used for customised message delivery. By learning more about the buying habits of California avocado purchasers, CAC will be able to use the Internet to target specific audiences who are most receptive to receiving new recipe ideas for California avocados. For example, if consumers indicate that they recently purchased baby food, CAC can e-mail recipes for using avocados as baby food to those customers. This kind of pinpoint precision gives them a powerful marketing tool and invaluable insight into their consumer targets and how to reach them more effectively.

They are also continuing to build their e-mail recipe subscription program, on-line banner advertising, sweepstakes, and promotions. They are also exploring new and improved links with health, nutrition, and cooking-related websites that will increase the number of on-line visitors their site receives, and offer increasing value by providing targeted, personalised information.

Computer Aided Livestock Marketing (CALM) Services

www.auctionsplus.com.au

CALM Services was established in the mid 1980s to provide electronic sale (simultaneous online live auctions) by the description of a range of live animals. The system allows commodity transaction, price setting and legal change of ownership without the seller, buyer or product having to come together in the same location. Photographs taken with digital cameras are available for viewing online together with descriptions of the animals for sale. For producers the website has significantly reduced the time and cost of buying and selling livestock.

Freshport mediated banana supply chain

Freshport is a secure Internet based information exchange system for the transfer of information along a supply chain. Using the Internet, members of a common trading group or “community” are linked together via an electronic “hub” operated by *Freshport*. For example *Freshport* is working with the Banana Growers Federation Co-operative Ltd based at Murwillumbah in New South Wales. The project involves the automation of transactional data and associated documentation used by operators in the supply chain. The primary aim is to collect industry data and improve linkages between growers and merchants and improve their management information and control systems. The project involves 1000 growers, 250 merchants and 13 loading depots, transport companies and market unloading services. Previously all logistical and transactional processes were conducted manually, at each point in the chain faxed documents had to be recorded and new documents generated for fax transmission to the next point in the chain.

McMahon Global Foods

www.mcmahon.com.au

This company is an exporter of dairy foods to all regions of the world. Its sales have grown from \$2.7m in 1993-94 to \$24.5m in 1998-99.

For McMahon the Internet has become an essential tool for business communication:

- e-mail has largely replaced telephone and fax as a means of contacting and communicating with clients
- communication costs have been reduced substantially
- quality and efficiency of communications with customers has been enhanced
- its ability to respond to enquiries particularly those requiring prompt response has been greatly improved.

McMahon has had a website since 1997, however it is interesting to note that it does not provide a facility for online ordering of products, this is a reflection of the nature of its business. The website nonetheless plays a very important part in the business and it is used primarily to:

- promote the company and its products (descriptions, specifications and availability) in a worldwide market
- provide information on its operations and the Australian dairy industry
- facilitate communications with existing and potential customers and receive feedback from them.

The company has sought to maximise the exposure of its website by registering it with all the major Internet search engines and international trade directories and has also provided Korean and Mandarin versions of its website. Its primary motivation in setting up a website was to establish an international presence on the Internet. The site was to complement its trading activities and as a point of contact for potential new

customers. The website gives the company a “feeling of substance” and projects a solid image which they believe is valuable in generating enquiries that can lead to new sales, a lot of people don’t realise it’s a small company.

McMahon is linked to the National Australia Bank online marketing services and to the Australian Customs Service which facilitate services including:

- international market information including foreign exchange rates
- international funds transfer
- state-of-the-art technology linked to the Australian Customs Service which allows shipping documents to be produced quickly and accurately
- a link with the bank’s International Service Centre which enables the company to manage export and import letters of credit and collection transactions.

McMahon uses software such as Quickbooks for financial management and Ozdocs to prepare export documentation.

McMahon considers modern communication services as a major factor in its ability to conduct a multi-million dollar export business from a small country town in Victoria.

Olives Australia

www.oliveaustralia.aust.com

This company was established in the mid 1970s. It produces and sells olive trees, promotes the industry, conducts research, sells specialist tools and equipment, manufactures olive products, processes olive oil and is an information provider to the industry. They created their website in 1997 seeing it as an opportunity to reduce information provision costs. For Olives Australia the website has:

- helped develop its profile
- enhanced its ability to provide the industry with information
- put the business in contact with a number of customers
- reduced the time and cost involved in responding to queries.

Olives Australia estimates that its website has generated sales of almost \$1m since 1997 and credits it with about 10% of its current sales.

Their greatest difficulty is finding the time to maintain and update the website. This is a common problem for owners of websites.

Point-of-sale product information

A new concept in providing the visitor to the supermarket in-depth information about the produce they might buy. This particular example is from Japan so you won’t be able to read the text but look at the pictures and you will get the idea. The produce has a sticker with a reference number or bar code on it, which, when entered into a conveniently located computer in the produce section, takes the consumer directly to a website about the product. This particular example shows a map locating the area in which it is grown, a picture of the grower, a history of the vegetable’s growing history, when it was picked and so on and a link to pages which show how the food is best prepared.

Vip2.nfri.affrc.go.jp-dadacha-search.asp

Futurists think that the more knowledge is provided with goods or services, the more valuable those goods and services are likely to become (Neal, 2000).

Wamuran Co-operative Ltd

www.wamuranco-op.com.au

The co-operative was established in 1932 by a small group of fruit growers. They established their website in 2000. The primary aim for the website was to extend the co-operative's marketing and promotional efforts. E-mailing orders, instead of phoning them through, increases customer's flexibility as they do not have to wait until the store opens to place orders. The store believes that e-commerce will become an essential element of business operation and sees its website as the first major step in its longer term development. However because of the traditional conservatism of its agricultural clients and its market, the transition to e-commerce is expected to be gradual at a pace that the farmers are comfortable with. One of the main benefits at present is that it can distribute its promotional information more widely and can communicate with customers and suppliers more efficiently and cheaply.

Where is it all headed?

Trying to make predictions is a risky business, people have tried in the past and been horribly wrong, for example:

"I think there will be a world market for about 5 computers." Thomas J Watson, Chairman IBM.

Carseldine and Neal (2000) have attempted to paint a picture of the world in 2010. "By the year 2010, the world will be wired more tightly. Fibre optics networks will abound, satellite transmission will be old hat, and we'll have moved to smaller, more independent/dependant communities existing within a shrinking, global community environment. Most homes will have computers and countless new, powerful inexpensive, useable electronic products. Video phones and mobile phones will abound and a new generation of computers will be remarkable."

Information is expected to become ubiquitous, before long we will be taking it for granted in the same way as we now take electricity for granted. Changes to broadband technology will mean we have more convenient access to the Internet, we won't have to sit down at a computer, we will be able to access it from anywhere via a hand held link such as mobile phone or a new type of wrist watch.

The first consignment of a "wombat, black soil and Christmas-bush proof" fibre optic cable has arrived in Australia that will be used connect all major centres. Just one fibre in this cable is capable of transferring data equivalent to 200 CDs in one second (www.nextgennetworks.com.au).

An Australian company has just developed an Internet search engine capable of simultaneously searching through documents on the Internet written in different languages (www.isys.com.au). Software already exists that will automatically translate selected information into the language of your choice.

What we expect to see is increasingly integrated technology, increased use of wireless technology, the ability to access all the services you currently get from your computer via your mobile phone. The third generation computers (known as 3G) will be able to transfer information at greater speeds, fast enough to allow real time transfer of voice and video. Computer chips will be embedded in more and more equipment (like they are in cars today).

How will avocado growers get their information in the future?

The good news is that there will always be a need for farm walks and field days, still a need for well presented hardcopy information (produced by professional “information architects” of course) and a need for consultants and advisers. However we can expect that software and the Internet will feature more and more as a means of recording and accessing information, promoting our products, communicating with others and trading.

The networked world allows lower cost, faster delivery time, greater convenience, greater contact with many more persons and easy and quick access to information and data not readily accessible by conventional means (Anon, 2000).

Conclusions

One of the few things that is certain these days is change, and change is happening at an ever increasing pace. The world we live in is interconnected, unpredictable, and complex. The future will bring increased complexity, diversity and uncertainty. That is why the need for information will become more intense.

As producers in the 21st century we need to be aware of the importance of being continual learners. To maintain a competitive edge we need to learn about changes in the marketplace, about regulatory changes, about developments in production and handling technology, and much more.

Today’s customers have access to more information, they are more sophisticated, they have higher expectations and they want to exercise their freedom of choice. They want customised products and services and they want in-depth information about them. And don’t forget . . . the information age is giving a lot more power to the individual, so ignore them at your peril!

Primary industries will need to adopt technology that will improve production efficiency, and our products will need to become “value-added” with “embedded” knowledge in such areas as nutritional and functional qualities.

As producers of avocados we need to be constantly in tune with what motivates today’s customers. We know that consumers want more information about their purchases. We have a good story to tell about avocados, it is an excellent product, healthy, convenient and easy to prepare. We can use the information age to our advantage!

Remember also to keep the focus on information and knowledge in perspective!

It was Albert Einstein who said . . .

“Imagination is more important than knowledge”

APPENDICES

Appendix I. Some useful Internet sites for avocado producers

1. *Avocados*

Agrilink

This website provides information and an ordering facility for the Agrilink Horticultural Information Kit series. These kits are produced by the Queensland DPI and the latest one to be released is the avocado kit. They are hard copy publications which set out to provide the core information growers need to know about growing, harvesting and marketing a crop. They are easy to use and understand, and use plenty of illustrations.

www.dpi.gov.au/Agrilink

AVOMAN

A smallish site but a presence explaining what the aim of the project is, what the AVOMAN and AVOINFO software are about, contact details, a message board for forthcoming industry events and news about the software, a facility to e-mail the project team directly, back copies of the newsletter, a link to join the Aussie-Avocado-Net discussion group (currently 60 members) and an order form for the software.

www.dpi.qld.gov.au/avoman

California Avocado Commission

An excellent example of a well designed and diverse site intended not only for growers (information about irrigation scheduling, fertilising, weather, grower services, conference proceedings and so on) but the whole spectrum of consumers (kids and adults), and traders. It also has nutritional information, recipes and even curriculum material for primary schools. It appears to be a successful avocado promotional site, for example it has 40 000 consumers registered to receive recipes and other avocado information via e-mail.

www.avocado.org

To get the proceedings from the “Brainstorming 1999” conference in California:

www.avocado.org/growers/proceedings

To get an update on the research being conducted in California go to the site reporting on the California Avocado Research Symposium 2000. This includes an update on a project comparing Lamb Hass with Hass (incidentally, preliminary results strongly suggest that Lamb Hass should be treated as a distinct variety in handling and marketing):

www.avocado.org/growers/symposium

California Avocado Society

Information about growing and marketing avocados, crop estimates and links to publications including back copies of Yearbooks.

www.west.net/~lsrose/cas

Mission Produce (avocado packers in California and Mexico)

Not a big site and it doesn't do much or tell you a great deal but importantly it is a presence where you can get an idea of the business they are in and get further contact details.

www.missionpro.com

New Zealand Avocado Growers Association

Another attractive site with information, a kids site, links and contact details.

www.nzavocado.co.nz

Organic avocado, "Pikarco"

An example of a speciality market site, put up by a farm or small organisation that markets organic avocados on the Internet from Florida

www.pikarco.com

South African Avocado Growers' Association

An attractive site with information about the organisation and contact details. A flashing button alerted visitors to their symposium earlier this year, press the button and you were presented with the conference program and a means to register. Perhaps the proceedings will be available here soon?

www.avocado.co.za

University of California (Riverside), avocado section

A big site with some interesting and quite useful information for example quite an extensive section on different avocado varieties and another on avocado phenology (growth cycles) and current research on the topic:

www.ucavo.ucr.edu

UCR phenology:

www.ucavo.ucr.edu/phenology

UCR varieties:

www.ucavo.ucr.edu/varieties

2. *Other sites of interest*

Agribuys (USA)

This company is a supply chain integrator for the global food industry. Agribuys offers Internet-based solutions for demand planning, transactions, logistics, receiving and payment. Agribuys claims these solutions improve the way organisations carry out transactions, use information to make decisions and nurture relationships with their supply chain partners.

Marina Kotsianas (CEO) says . . . "We wanted to fundamentally improve the way that food goes from farm to market around the world. We wanted to have a huge impact on the way the industry works. We foresaw a time when all the inefficiencies in the food procurement process would be eliminated when buyers and sellers did not have to worry about the low-level, clerical activities that took up most of their day, such as chasing outstanding invoices, faxing quote requests, taking orders, issuing pick-up numbers."

www.agribuys.com

Climate information highway – The Longpaddock

A large range of climatic decision-support information produced by Climate Impacts and Natural Resource Systems, Resource Sciences Centre, is available here.

www.dnr.qld.gov.au/longpdk

Directory of Australian rural websites.

www.ruralnet.com.au/AgriWeb/Agbsites

Equipment sales

The following is an example from USA but it will give you an idea of the concept. For example you can view pictures and details of tractors that match your specifications (see Figures 4 and 5 above).

www.dcequip.co

Farm online

Network of agricultural news from around Australia from leading rural newspapers and magazines. Includes a list of properties for sale in rural Australia, job vacancies and a list of classified advertisements. It also features a calendar of events, rural bookshop and a database of rural businesses, trades and services. In addition it conducts on-line reader polls on topical issues.

www.farmonline.com.au

Farmwide (Australia)

Weather, events, commodity prices, links, training, rural news, chat room, bulletin board, e-mail discussion group and more.

www.farmwide.com.au

Freshchain

A new site attempting to enable users to communicate easily and rapidly with each other and with their customers and suppliers locally, nationally and world-wide. Plans to conduct e-commerce for fresh produce.

www.freshchain.com.au

Grocery shopping for SE Queensland

Grocery shopping for those living in SE Queensland where you can do your grocery shopping and have it delivered to your home and yes, avocados are on the list.

www.aussieshopper.com.au

Golden Circle Ltd

Golden Circle Ltd is an Australian food processing company owned by members of the pineapple industry. The site is designed for growers, consumers and students.

Using a password growers can log in and get their weights and reject levels for deliveries, their soil and leaf analysis results, place free “classified advertisements” and more. A good example of a site that provides a valuable service to its growers.

www.goldencircle.com.au

Horticulture Australia Ltd

Provides access to research, development, extension and marketing information for Australia's commercial horticulture industries. Includes many useful links.

www.horticulture.com.au

ProduceOnline (USA)

This company claims to bring together buyers and sellers from around the world to get the best deal for all participants. "ProduceOnline is ideal for innovative firms that want to grow their business and increase profits including:

- retail grocery chains
- buying co-operatives
- brokers
- wholesalers
- grower-shippers

ProduceOnline was developed for the leading edge thinkers in the produce industry who seek to gain a sustainable competitive advantage buying and selling produce over the Internet. Firms that utilise ProduceOnline can substantially lower their transaction costs, access better information for decision making and professionally interact with other industry leaders."

www.produceonline.com

Queensland Fruit and Vegetable Growers site

Contains information about the organisation, news, contacts, information for schools and links.

www.qfvg.org.au

Rainman

Australian Rainman Version 3 on CD is an excellent PC package for anyone who has to manage our variable climate or who wants to understand the causes of this variability. It has direct application for farmers, graziers, business people, consultants, scientists, educators and students. For more information and to order go to:

www.dpi.qld.gov.au/rainman

Rural Industries Research and Development Corporation (RIRDC).

Australian government organisation that specialises in funding emerging rural industries and new rural opportunities. Includes access to some useful reports that were referenced in this paper.

www.rirc.gov.au

Appendix II. Useful Internet tools

Free Internet tool

Copernic 2001 Basic is a powerful search tool that:

- Simultaneously searches the best search engines
- Provides fast results ranked by relevance
- Avoids duplication and dead links
- Reduces significantly your research time
- Offers instant translation of search results
- Lets you save your search results in various file formats.

More advanced Copernic products are available and offered for sale.

www.copernic.com

Search engine

A fast and efficient search engine.

www.google.com

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