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# ***THE E-BUSINESS REVOLUTION***

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***THE E-BUSINESS  
REVOLUTION***

by

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# The E-Business Revolution\*

## 1. Introduction

My topic today is e-business, a topic which is not commonly addressed within the economics discipline because we tend to leave it to our colleagues in the IT Department. However, economists are finding this to be an important area in which we can apply our principles. Indeed, a number of those principles have already been developed in what we call the Economics of Information. But while there is a lot that the Economics of Information can bring to bear on this topic, e-business and the information revolution are forcing us to apply economic principles in ways that are surprising, new and exciting.

So in this afternoon's lecture I want firstly to introduce you, very briefly, to the world of e-business; then to talk a little bit about what is not new (as far as economists are concerned anyway!) about e-business; and then to address what I think *is* really new. I will focus on the principles that underlie e-business—so mine is not yet another talk about how to press buttons on web sites or the marvellous things that one can do on the web, as important as that is. I shall go to the best traditions of my discipline and, in due deference to the memory of L F Giblin, ask the questions that lie beneath the surface. But I shall attempt to answer the questions in ways that those of us who have never studied economics can easily understand.

During the Great Depression, L F Giblin was famous for publishing a series of 'Letters to John Smith' about the nature and causes of the Depression. He was always concerned to show how an understanding of economics could help people make sense of the circumstances in which they found themselves. It is in this tradition that I stand before you today. Whether I succeed, as Giblin clearly succeeded, you alone can judge. But I shall attempt to help us all to understand what's happening in our own times—in what is by any

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\* This is the edited text of the Giblin Lecture, prepared from an audio tape and edited by the author.

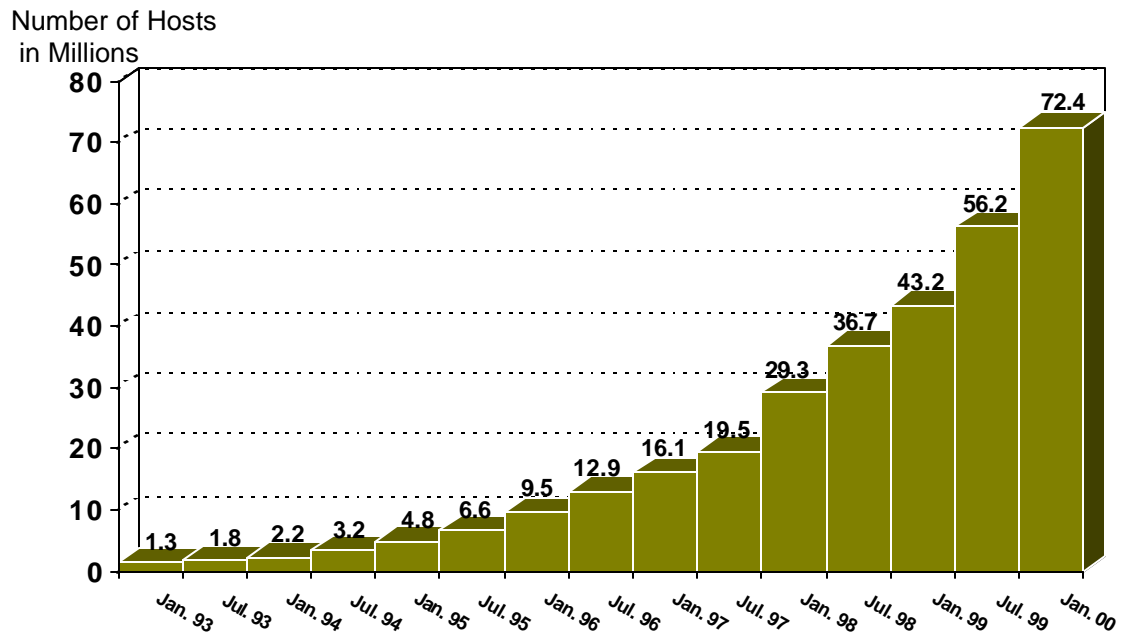
account a remarkable period of history. Well let's proceed. Let's talk about e-business.

## 2. E-Business

When people talk about e-business, they usually start by showing lots of pictures like this one:

# Figure 1: Number of Internet Hosts

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Source: <http://www.isc.org/ds/WWW-200001/report.html>

Notice the classic upward sweep of the exponential graph. On the left-hand-side, you will find January 1993. It is important to note just how recent this whole phenomenon of the internet and e-business really is. The origins of the internet date back to the 1970s. I can well recall as a graduate student excitedly receiving my first e-mail from a colleague across campus in 1978. The term 'internet' was invented in the early 1970s and stands for the 'inter-networking of networks'. But the use of the internet for commercial purposes and its rapid growth really

date from 1990 when a man called Tim Berners-Lee invented something we now know as the World Wide Web—that's when things really got going.

Well, it's not only a remarkable phenomenon, it's also in the news. One of the things I did before I came down to Hobart for this lecture was to have a quick look at <http://www.amazon.com/> just to see how many books there are that deal with this topic. Very quickly you find that e-commerce is a popular subject. There are in fact 338 titles listed.

## Figure 2:

# e-Business is in the News!

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- Number of books on Amazon.com about ...

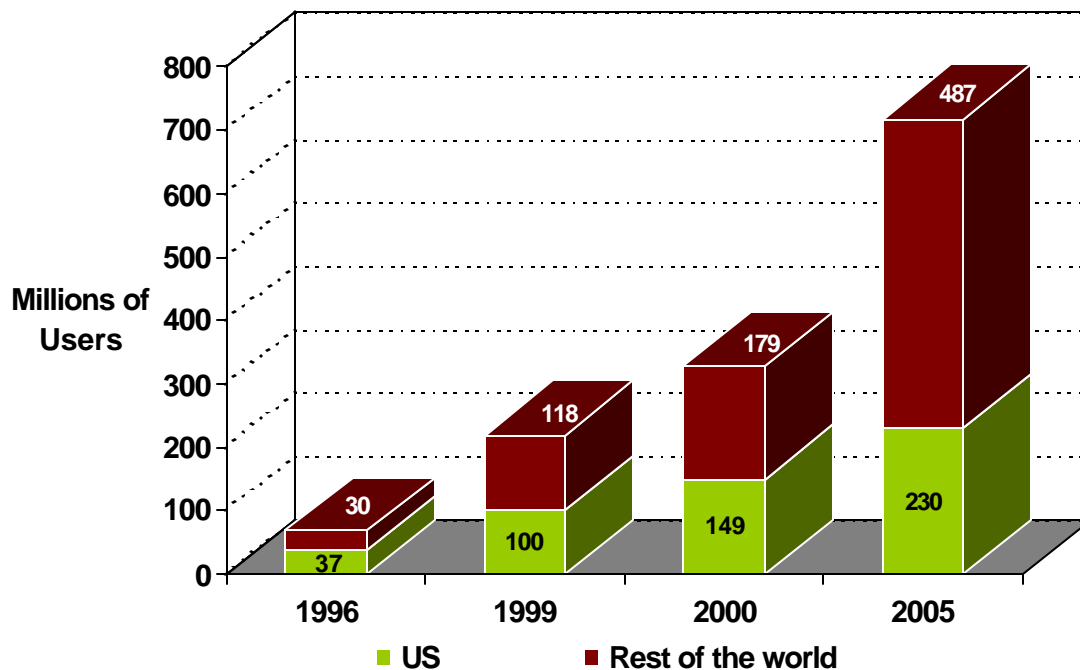
➤ e-commerce	338
➤ e-business	1,896
➤ Internet	6,695
➤ Sex	13,925

I can't claim to have read them all! But e-commerce is not as popular as e-business, remarkably enough, which has four or five times as many titles. The internet itself is even more popular but none of these subjects holds the enduring capacity to fascinate as those that appeal to basic human nature! (And this is something that e-business is NOT likely to change!)

The growth in internet usage is also interesting, as you can see from Figure 3:

## Figure 3: Growth in Internet Use

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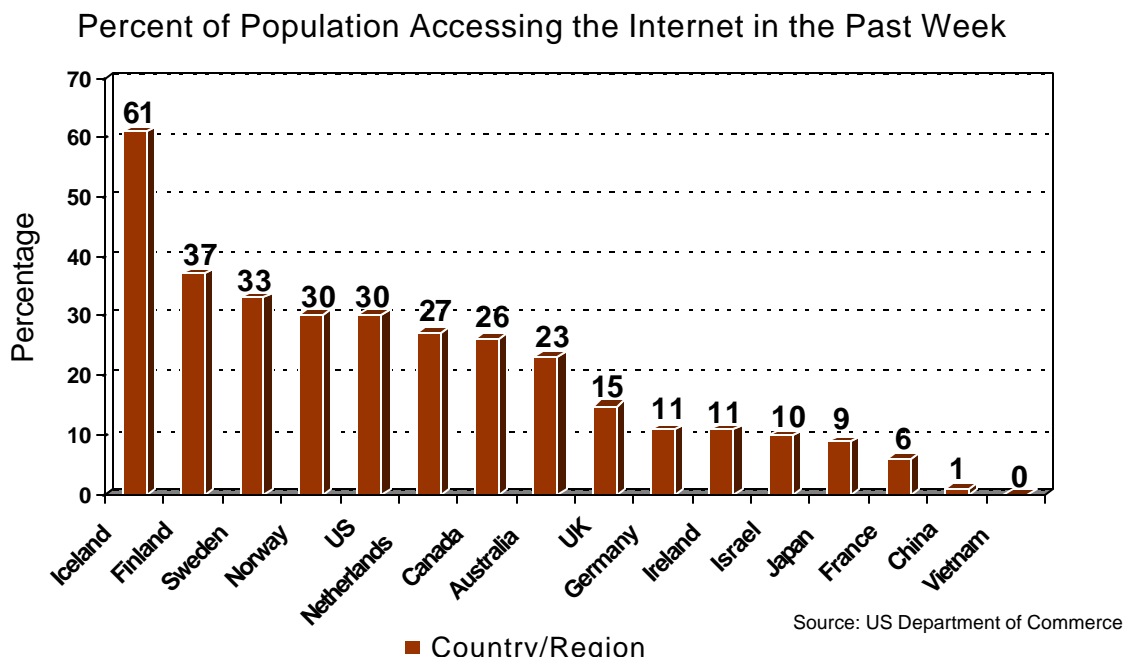
Here again is the upward sweep of the exponential graph, which one gets used to in this subject, and again starting at the very recent date of 1996. But notice what else is happening—the lower number is the number of users from the United States, and by the year 2005 you can see that just about every living human being in the United States of America (the population of the USA being roughly 250 million) will have access to the web. That’s the first thing to note. The second thing is what’s happening in the rest of the world. Notice that by the year 2005 the great majority of internet users will not be from the United States. At the moment the internet is dominated not just by the English language but by American culture. It

won't be long, however, before the dominant presence on the internet will not be North American, with all that means for language, culture and the sorts of things we find on web sites.

Internet access by country, pictured in Figure 4, shows you two things:

## Figure 4: Internet Access by Country

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First, North America, as you might expect, and interestingly enough the Scandinavian countries are those most heavily into internet technology. I guess there mustn't be much to do in Iceland on the weekend, or maybe at any time! But after the North Americans and Scandinavians—guess what—there's us! We're up there folks! We are as wired to the internet, just about, as the North Americans and the Scandinavians.

What about the Europeans? Well, you can see for yourself how fast the numbers fall away. The French are pretty much ‘behind the eight ball’, having backed ‘minitel’ technology rather than the internet—that’s changing, of course. Right down towards the right-hand-side are some of our Asian neighbours. Clearly we are ahead in our region. This would also be true, incidentally, if we were to include countries like Singapore and Korea.

Now that’s all changing rapidly and I don’t make the point to boost us up, certainly not relative to our neighbours. I’m making the point that Australia is as wired to this new world, and is as actively involved in the new technology, as are the world leaders—the North Americans and the Scandinavians. This is very good news for us. It spells the beginning of the end of the ‘tyranny of distance’ for Australians.

## Figure 5: Impact of e-Business

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Service	%	Service	%
Retail Stock Trade	60	Banking	16
Bill paying	36	Airline travel (B to B)	15
Software	33	Newspapers/Magazines	10
Adult Entertainment	33	Insurance	10
Mail/e-mail (B to B)	25	Radio	10
Greeting cards	25	Airline ticketing	8
Books	20	Music	7
Video tapes	20	Internet telephony (B to B)	5
Gambling	20	Internet telephony	5
Automobiles	20	Television	5
Mail/e-mail	20	Education	5

Source: OECD

What sorts of industries might one expect to see revolutionised by the new



technology? Figure 5, which is based on work done by the OECD, attempts to answer this question.

In every country, the trading of shares, retail stock trade, is heavily influenced by these developments. The end of stock broking as we have known it is a common theme. One only has to look at the rapid expansion of ComSec here in Australia, let alone E-trade and one or two of its competitors. The Commonwealth Bank's online trading scheme has been enormously popular. So too, increasingly, are on-line bill paying, software, adult entertainment (whatever that is!), e-mail, greeting cards, and so on down the line.

Now, since we are at the venerable University of Tasmania, it might interest my professional colleagues and, in particular, the Vice-Chancellor here, to note that education is on the list, but right down at the bottom. Interestingly, some people feel that the internet will put an end to education as we've known it. I have a slightly different perspective on that. My view is that, if it were true that universities were to be rendered obsolete by developments in information media, they would have been destroyed by libraries probably in the 13th or 14th century. But, as everybody knows, a great library is a complement to, not a substitute for the education process. Universities form themselves *around* information media; they are not displaced by them.

Of course, the way we interact with students in and out of the classroom will change—that's obvious—but the core of what we do is unlikely to be affected, in my opinion. The internet is just an enormous information resource which will act as a complement to the education business, not a substitute for it.

### 3. What's New and What's Not?

#### *Information as an Output*

Let's turn now from the facts about what has been going on to what's new and what's not new. It's reasonably easy to deal with what's not new about all of this, because as I intimated from the outset, the field of Information Economics is an old and distinguished field. There is quite a substantial literature in this area. What's not new is the idea that information is a good and that it can be bought and sold like other goods. It shouldn't surprise you to learn that economists start with this idea. We are inclined to turn everything into a commodity, as our critics claim, and that has its strengths and weaknesses. However, one of the things most people accept can be commoditised, that you can think about in the standard economist's framework, is information. That's not a new insight, and indeed the entire corpus of Information Economics is founded, one way or another, on that simple proposition.

While you can think about information as a good for which there is a demand and a supply, economists are not so naïve as to fail to recognise that information has special characteristics. It's not just any old good—it has distinguishing features and these features, three of them that I will mention to you today, are again well established in the literature. Moreover, they are features of information that we will see making their presence felt on the internet.

First of all, information is an 'experience good'. Experience goods are those funny animals about which you know very little until *after* you've consumed or experienced them. Taking a holiday to Bali, for example, is an experience good. You really won't know whether you've had a good time, which is what you are paying for, until you've been and come back. And it's not much good trying to get your money back afterwards if you don't have a good time!

Now is it impossible to sell goods like that? No, not at all. The market has dealt with this phenomenon for a long time. The three strategies which you find used by sellers of experience goods include previews, reviews, and reputation. When you have to sell a good that people need to consume before they know what it is like, it is helpful to give them a preview, as people who sell holidays do or movies. Reviews are another strategy—getting somebody else to say, ‘You’ll love it! Go for it! It’ll be the best decision you’ll ever make!’, that sort of thing. And reputation—establishing your *bona fides* as a seller of goods whose promises can be trusted.

Information is *par excellence* an experience good. If I have an idea, I have to give it away before I can convince you that it is worth paying for. And as soon as I have given it away, you have no incentive to pay for it—whether you think it’s a good idea or not! How do I deal with that? How do I prevent the information from being stolen?

There are lots of ways of doing that, including intellectual property laws and data encryption. This is not new but the scale of the problem on the internet *is* new. Successful e-business requires a solution to the problem of how to protect information from being stolen, while at the same time encouraging people to buy it. We should not be surprised to find the widespread use of previews, reviews and reputation on the internet. If you are selling over the internet, you will have to find a way to solve the experience nature of the information good or you will find yourself giving away expensive stuff for nothing.

Another classic characteristic of information is that it has some of the qualities of what economists call a ‘public good’. Unlike private goods, public goods are goods the market finds it hard to get its wrench around. Public goods don’t work well with the mechanism of the market and so the market produces too few of them or in some cases none at all. Information has at least one of the qualities of a public good—what economists call ‘non-rivalrousness’. What this means is that, like the children’s story of the magic pudding, no

matter how much you consume, there is always plenty left for everybody else. Information is like this. No matter how many people tuned into the Olympics in September—whatever the number was, double it—there was as much of the Olympic Games on television for everybody else to enjoy. The quality of your broadcast was not degraded by the number of people who were watching elsewhere in the world. That is an important characteristic of information, and it is one of the things that makes it hard to sell, because it is hard to work out how much any one person has consumed.

The other characteristic of public goods is what economists call ‘non-excludability’. This means that I can’t stop you taking what you want of the good. In the case of information, it’s a bit easier to solve the second of the two problems, by using things like cryptography or again intellectual property laws. An imaginative way to deal with the problem is not to solve it but to exploit its potential. How many times have you opened your in-flight magazine and out flops a CD? It might be something from an ISP like Ozemail or AOL. They want you to sign on, so they give the CD to you and say ‘take it away’. I call that the *Ant-Rid Strategy*—you know the stuff you put on the window sill and hope that the ants come and take it away. You want the ants to take it and, like the ISP, to share the give-away with their friends! Some smart people realise that it may be easier, and more profitable, to work *with* the problem of non-excludability rather than *against* it. In other words you can take this characteristic of information, its non-excludability, and turn it to your advantage.

Now none of this is new. People have been finding ways to overcome the public good characteristic of information for a long time. Putting information onto printed pages and enclosing them between cardboard covers of a book is a time-honoured way to turn ‘public’ information into a ‘private’ good. While the problem is not new, its incidence on the internet will be pervasive. Those active in e-business cannot avoid finding ways to work with or around the problems of non-rivalrousness and non-excludability of information.

The third distinguishing feature of information is that it is subject to economies of scale. I will have a bit more to say about economies of scale in a moment but to begin with let's remind ourselves what they are. Economies of scale on the supply side of a market arise when it is cheaper to buy things in bulk—things are cheaper by the dozen. This normally arises when there are substantial fixed costs of production—big lumps in expenditure which can then be worked off as you increase the scale of your activities, spreading your overheads. Information is subject to these supply-side economies. It takes an awful lot to create new information, new intellectual property. Ask any of my colleagues here and they will tell you what it is like—it takes a lot of blood, sweat and tears to get that book written. Once it's written, you can reproduce the information for a fraction of the cost of producing it in the first place. Nowadays on the internet, the cost of reproducing the information (posting it on your website) is basically zero.

Big fixed costs of production plus tiny costs of reproduction—that's what produces scale economies on the supply side. The world of information is replete with this effect. It's also replete with what economists call 'demand side' scale economies but more of them in a moment, when I move to what is new rather than what's not.

To summarise the story so far, what is *not* new is that information is a good, and that there are certain characteristics of that good that we need to think about when designing markets for information—that information is an experience good, that it has the features of a public good and that it is subject to supply-side economies of scale. We have had to make special allowances for the information good ever since information was traded, and information has been traded at least since Guttenburg invented the printing press.

But what *is* new is this—for the first time, the internet gives us the ability to exchange information on a truly *global* scale. And to do so at essentially no cost, certainly in a

developed country like Australia. The scale of activity allowed by the internet is truly global and the cost of having a global distribution capacity is basically zero—now *that's* new!

I gave a talk recently to some people who work for Carlton & United Breweries. As this is a great brewing State, you would be familiar with that particular industry! I asked these people, who were managing breweries around the world, to write down all of the things you need to have to run a global beer distribution network. Think about it yourself—a lot of physical capital is required to brew and distribute beer in more than a dozen countries, as CUB does. Now when they'd finished, I pointed out to them that, as an individual academic, I have a global distribution network for my academic papers and presentations which reaches into parts of the world that CUB has never dreamed of going—and it costs me nothing! That's the internet for you and that's *really* new!

Well, on the supply side, global scale means that scale economies become so powerful that you can essentially drive the marginal cost of production, or at least distribution, right the way down to zero. And that turns the traditional logic of scale economies on its head. When people think about supply-side scale economies, they think you have got to be big to be able to survive. But this is not true when global scale economies reduce unit costs of distribution effectively to zero. In such a world, big Carlton & United Breweries and little Ian Harper have exactly the same marginal costs of distribution—so the implication is not that you have to be big to survive but that *the big can co-exist with the small*. That's why on the internet you will find Barnes and Noble alongside specialist purveyors of books to obscure interest groups—people who are interested in the history of railway steam engines from 1789 to 1812. The new technology allows the little specialist bookshop to survive alongside Barnes and Noble. Why? Because their costs of distribution are the same, and getting big makes no difference to that.

Let me now come to 'demand-side' scale economies. Anyone who has ever taken a course in economics has heard about supply-side scale economies, but it hasn't been until

recent times that we have emphasised their near cousin, demand-side scale economies. We have known about demand-side scale economies for a long time but didn't talk about them much because, frankly, there weren't many significant examples around. You could talk about the fact, for instance, that people enjoy watching movies together or eating in a restaurant as a group—that's demand-side scale economies at work. Demand-side scale economies arise whenever someone's enjoyment or utility from consuming a good increases the more people who simultaneously consume the same good. You could go down and watch Jim Carey's latest movie by yourself and I guarantee that you would sit there stony-faced throughout the entire show. Take half a dozen of your friends or a theatre full of people and you roll around in the aisles. That's demand-side scale economies!

What the internet does is to greatly increase the importance of these demand-side scale economies. Why? Because they normally arise in the context of networks and the internet is the largest network we have ever seen—what's more, it's growing at an exponential rate. So if there are network effects out there, they are going to be exaggerated by the internet.

For instance, a network effect increases the value that I place on a good purely and simply because other people use it. Now I will be honest with you people—I used to be a Macintosh user. I loved my Macintosh. I thought my Macintosh was clearly superior technically to the IBM-compatible alternative. But only just the other day I took my Mac, I'm sorry to say, to the place where all good Macs go at the end of their useful lives—to the 'Mac-knackery'. With moist eyes, I held my Mac in my arms for the last time as I handed it over to the knacker and pleaded with him not to linger over his task ...!

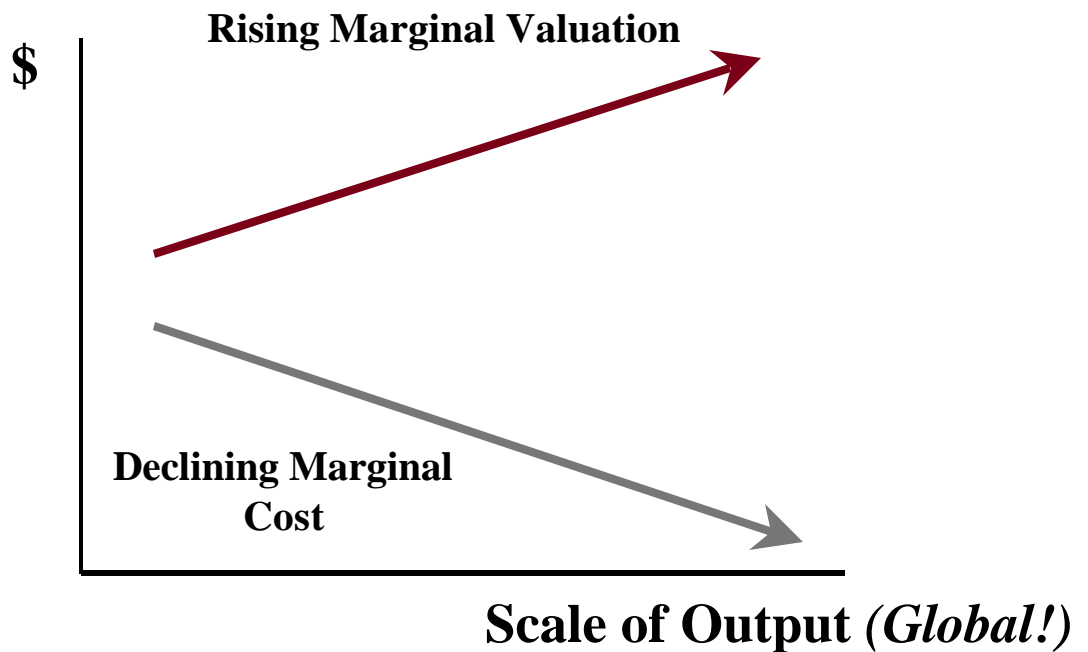
So why did I give my beloved Mac away? Well, friends, I got sick and tired of going to hotel presentations, and even to universities, with my Macintosh only to be told, "Oh. It's a Mac". And I would say proudly, "Yes, it's a Mac; your absolutely right; it's a superior machine ...", and the IT guy would say gloomily, "There's nothing I can do for you". Well

that happened to me once too often, and I had to bail out of Macintosh—which I still think to this day is superior technology—and go over to the IBM PC. Why? Because that’s where most of the rest of you were! And if I want to plug into the rest of the world, I have to be on the same platform as the rest of you. That’s what’s called a ‘network externality’. It hasn’t been so much of a problem up till now because the networking effects have been relatively minor but now it is a big deal. It’s a big deal because the network we are dealing with is a *global* network.

Let’s summarise that effect in Figure 6:

## Figure 6: Scale Economy “Jaws”

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Notice first that the scale of output we are dealing with here is genuinely global. It’s global scale out there and it’s going to drive marginal costs of production downwards—all the way down to trivial levels. What do you suppose it costs to produce the marginal copy of

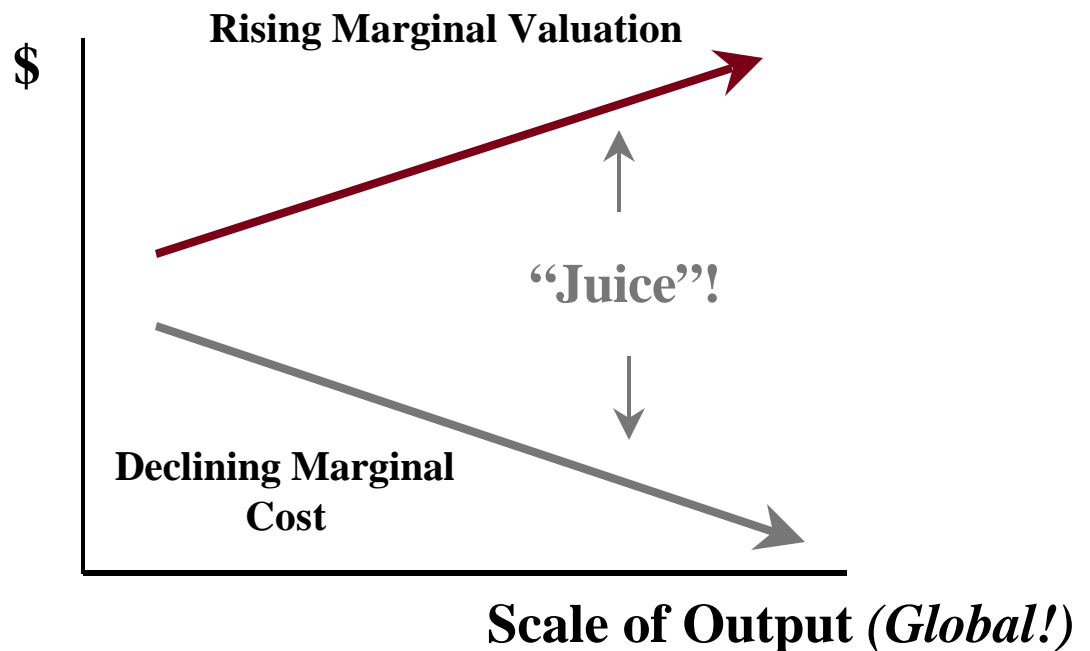


Microsoft Office? What does it cost Microsoft to copy and distribute software, particularly if it does so over the internet rather than in cardboard boxes? The answer is ... next to nothing!

On the demand side, in Figure 6, are the so-called network externalities. How much is people's valuation of the product affected by scale? Well, my claim to you this afternoon, Ladies and Gentlemen, as with me and my Macintosh, is that scale puts marginal valuation up. That is why Microsoft is where it is today. That company sells a product around the globe, and the more it sells, the less it costs to produce *and* the more people want it! It's that simple and that powerful!

## Figure 7: Scale Economy "Jaws"

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Economists have a technical term for the difference between marginal valuation and marginal cost—we call it *juice!* And that's what Microsoft squeezes out, and not just them. The internet world is a world in which you can combine declining marginal cost with rising

marginal valuation and make lots of money. It helps if you are the standard but this is not necessary. So long as you can roll out your product on a global basis, you have the potential to ride the “jaws” of falling cost and rising valuation. Now you know why internet stocks went wild. If you get this right, you could be a multi-billionaire. Just ask Bill Gates!

What about the market price? Why doesn't the falling marginal cost pull the market price down with it so that no-one makes much money? After all, this is what tends to happen in other markets with strong supply-side scale economies, like airline travel for example. The difference here is that there is more than one “strange attractor” pulling at the market price—one is pulling the price down but the other is pulling it up. Big industries with big scale economies have not in the past earned enormous profits like Microsoft. Why not? Because there has been one of these jaws, and not the other one.

So what stops the market price being dragged down to marginal cost? The answer is price discrimination. Now those of you who are not economists will think that this is a bad thing. But price discrimination, in itself, is not a bad thing, nor is it illegal. What *is* illegal in this country is price fixing, and so it should be. Price discrimination is not price fixing. Price discrimination happens every time you buy a discounted air ticket. Nor is price discrimination something that is associated with monopoly. The airline industry, at least internationally, is a very competitive industry and yet is a past master of price discrimination.

Various strategies will need to be adopted by firms in order to recover their fixed costs in an online world. They will be able to do so because rising marginal valuation gives them the power. So on the internet you will see an array of strategies designed to facilitate price discrimination, so that firms engaged in e-business can recover their substantial fixed costs. Not only will they have the power to do so, they will have to price discriminate or face failure.

You may be here today contemplating entry to e-business as a seller. Then my advice to you is this: make sure you understand what price discrimination is and get good advice on how to design a stratagem to price your goods on the internet. Otherwise you may not recover your costs and join the other 'tech-dead' at the bottom of the tank!

### *Information as an Input*

I have been talking about information as an output. Information can also be thought of as an input to the organisation of production. Here are a few more ideas that you might like to turn over in your minds—they are, I think, very interesting but they take longer to unpack fully than I have available today.

Information is a key input to the optimal shape of economic institutions. In particular, the increasing symmetry of information changes the way in which it is optimal to run organisations. This is another old idea. In fact, it reaches back to the 1930s to a famous economist by the name of Ronald Coase, who was eventually given a Nobel Prize for work along these lines. Coase asked himself the question: why is it that some production is organised on the basis of hierarchies—'command and control' sort of stuff—and yet other activity is organised on the basis of networks or markets or alliances—free contract. Why do some people work as employees doing what they're *told* by their bosses and others as contractors, doing what they're *asked* to do by their clients? What's the difference between the two?

Back in the 1930s, Coase identified the key difference as what we would now call, 'asymmetric information'. If information is not evenly shared between the parties involved in an activity, then a hierarchy will always be preferred to open contract because open contract leads to people being ripped off.

The quick way to summarise this is, “If you don’t understand, you will do as you are told.” It’s a principle we see active in all dimensions of life, not just commercial life. We never organise, for example, military fighting forces on the basis of open contract. In fact, every language has bad words to describe that. We talk about ‘mercenaries’ with distaste in our mouths—we do not believe that organising military defence on the basis of a market is a good idea. It is always organised using hierarchies.

Perhaps a more homely or familiar example is that of raising small children. You do not raise small children on the basis of open contract and network alliance. “Do not cross the road without being with one of your parents. If I catch you doing that, you will be punished. Do not do this; do not do that”. Now why? Is it because we want to exercise authority over the kids? No; in the end, it is about concern for the child’s welfare. It is in the child’s interests that we exercise command and control. It’s in the interests of the foot soldier that he or she is commanded to obey orders and not to question them. It’s in the interests of the parties concerned because they are asymmetrically informed.

As the child grows up into adulthood, of course, the arrangement changes. We then negotiate with our offspring, eye to eye, on an equal basis, as partners in a network or alliance—because we both share the same information set. I say to my son, “You know how much your mother would like to see you with us at Christmas dinner but I can’t order you. I am entreating you. Would you please show up on Christmas Day”. Then some way down the track, there will come a time when, through glasses misted over with age, I will look up to my daughter and I will say, “I’m sorry, sweetheart, but I just don’t understand”. And she will say to me, helpfully, with her hand on my shoulder, “That’s alright, Dad—just sign!!”. The wheel turns—if you don’t understand, you do as your told!

Well, what’s all that got to do with the internet? The internet is helping to reduce information asymmetry. It’s making it more likely that we are all equally well informed.

You've just had a very unpleasant report from your doctor. Straight onto the web you go to find out more about this disease. Let's see if this doctor really knows what he or she is doing. That's about alleviating information asymmetry. Go to the second-hand car market. You will never again deal with a second-hand car dealer unless you are armed with the information about the other offers that are available in town. That is information symmetry.

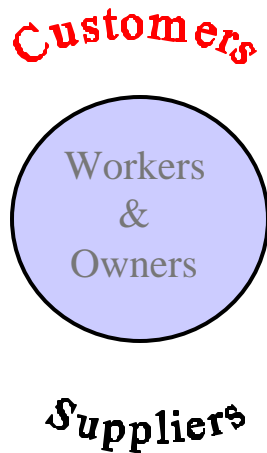
What information symmetry does is to replace the traditional firm with its hierarchy of workers and owners—insiders—with what I call the 'e-firm' where the relationships amongst the different parties are all based on open contract—and there is no longer such a clear difference between insiders and outsiders.

The best example of this is the famous internet company Cisco Systems. Cisco is a multinational—it has operations right around the world—and yet it does not have one employee. Nobody works for Cisco. What is it? Well, it's an e-firm. It's a network—a symbiotic alliance or network of customers, owners, workers and suppliers, each of whom has access to a massive pool of information about what is going on within the firm and operates independently. So what role does Cisco, the company, play? It drapes its reputation over this network and sets the rules of the game. Those who don't abide by the rules are expelled from the club. If you want to be part of this dance, part of this game, then you meet the standards which we police. That's what Cisco actually does. It's a new world!

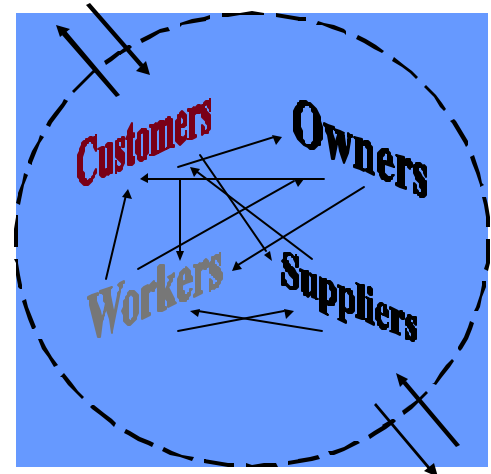
# Figure 8: New Economy “Firm”

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## Traditional Firm



## e-Firm



## 5. Conclusion

E-business *is* the future—it is set to grow at a rapid pace, especially in North America. It's going to enhance the service orientation of economies, and stimulate trade in services. This is all a great boon for us here in Australia, especially for you in Tasmania. This is going to make the world of services live, and for the first time in history allow us to overcome the tyranny of distance. Our exports of high-value-added services will grow. Knowledge capital will trade at international prices. You won't have to leave this country if you don't want to—you can participate in international knowledge creation at international prices from your little hide-away here in Tasmania. That's the good news.

Success, of course, will demand careful attention to pricing strategies—price discrimination will become very important. If you're in this business, you need to think

carefully about that. Traditional hierarchies will be challenged—an end to the multinational corporation and the beginning of a global market place in which people will co-operate to produce our goods and services. New models of business organisation based on free contract and alliance will prosper. For us as workers, it will be the end of the old ‘master/servant’ relationship and the beginning of contract and alliance—an opening of the door to the world of e-business.