

Knowledge Commerce: Succeeding in a Global Knowledge Marketplace

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This paper reviews trends in the knowledge economy, with particular emphasis on how organizations and nations, such as China, can commercialize their knowledge assets and intellectual capital. The rapid growth of Internet usage and investment in accompanying software and services has led to the emergence of new economic and business models. This is fundamentally changing the way in which goods and services are traded. The emergence of widely accessible electronic market places provides new opportunities to sell knowledge assets and knowledge-intensive products. Exploiting these to their full potential requires new thinking about packaging knowledge and new approaches to marketing. Analysis of trends and of the experience of the pioneers suggests strategies and guidelines that are most likely to lead to enterprise success. The paper concludes with a review of the challenges facing China as it aims to take its rightful place in this new networked knowledge economy.

The Networked Knowledge Economy

Many commentators now openly refer to a 'new economy', with characteristics of a post-industrial society as first elaborated a decade or more ago by writers such as Daniel Bell and Peter Drucker [1]. In this new economy the sources of wealth depend increasingly on information and knowledge resources and less on natural and physical resources. I refer to this new era as the 'networked knowledge economy'. It is networked since individuals, organizations and nations interact with each other globally. It is knowledge-based since in many developed countries is in services, over 70 per cent of workers, including factory workers, are engaged in knowledge work i.e. they mostly use brain power, not muscle power, in their daily work.

Some of the key characteristics of the knowledge economy are:

1. Development of 'smart' products and services e.g. the hotelier that 'knows' your preferences, even if you have not stayed there before, the fertilizer spreader that adjusts dosage according to plant growth, ground and weather conditions.
2. Higher value to weight ratios. For example, US overseas trade has grown 20 times in value this century, but the physical weight remains very similar.
3. Value in intangibles. For example, the market value of most USA and UK companies is five times or more than that recorded in their financial accounts (which only count physical assets like plant and machinery).
4. Trade in intangibles, ranging from financial products to designs and patents
5. Strong growth in information and knowledge industries e.g. software, education, management consultancy, online information services, biotechnology, as well as creative industries e.g. theatre, arts, culture, museums.

Another characteristic and one that throws out conventional economic logic is that the law of diminishing returns no longer applies. As knowledge is shared its value typically increases, since the owner still retains it. In fact, the act of sharing through dialogue usually adds value to originator.

Mega-Trends

John Naisbitt coined the term 'megatrend' to describe a fundamental underlying trend that shapes the future. His book *Megatrends* [2] identified ten trends, including the shifts from an industrial society to an information society, a national economy to a global economy, and hierarchies to networking. These trends are still evident today, but there are more important ones besides. Three that I consider especially important are:

1. The power of technology and especially the acceptance of the Internet as a key tool of business and commerce
2. Virtualization: the ability to work and trade over large geographic distances.
3. The emergence of knowledge as a key focus of policy and strategy

Of these, technology is undoubtedly the main driving force. The continual improvements in price-performance of computers and telecommunications continue to open up new and exciting possibilities in all spheres of human activity. Over the last few years one of the technologies having the most impact is that of the Internet. The Internet is not a new phenomenon. Many universities and researchers have used it since the 1970s. What changed in 1993 was its opening for commercial use, the advent of easy-to-use graphical interface browsers (originally Mosaic, now mostly Netscape and Internet Explorer). Its early commercial growth was fuelled by email, which overcame the constraints of time and distance. Thus busy executives, could deal with their messages at a time and place convenient to them. This was followed by the growth of the Web, which acts like a globally distributed library. It is a storehouse of distributed knowledge, packaged as web pages which are hyperlinked to related pages. Internet traffic is doubling every 100 days and investment continues apace in its infrastructure, software, applications and services.

The next megatrend, closely linked to the first, is that of virtualization. Since much of today's work is knowledge and information based, the pervasiveness of the Internet means that people do not have to go into shops or offices to work and trade. You can buy products and services from your desktop computer over the Internet, without ever leaving your home or office. Mobile phones and notebook computers have freed much work from the constraints of geography. People can communicate and share information and knowledge, wherever they are. It is estimated that nearly 10 million people in Europe now telework. This brings benefits to employers in terms of reduced office costs and organization flexibility, and to employees in terms of less travel and being close to their family. Some teleworkers are home-based, while others spend only some time in an office and may work from customer premises, telecottages (typically shared business faculties such as a converted barn located in a rural area) or in hotels or airports. I work entirely from home when not traveling and can develop and share my knowledge across the world, using my PC and 128kbps connection to the Internet. In the near future, we can expect to connect to the Internet at speeds twenty times or more faster from home, and at similar speed across third generation cellular networks. Virtualization also means that global organizations can create virtual teams, where different team members can remain in their current location while still working effectively together as if they were in the same place.

Knowledge management emerged as a focus of business attention in late 1995 [3]. Since then, there has been an explosion in the number of conferences, articles and books on the subject. Between 1997-8, over a dozen new journals and magazines devoted almost exclusively to knowledge management were launched [4]. Recent surveys indicate that over three quarters of the largest organizations in the USA and UK now have formal knowledge initiatives. Companies like BP Amoco estimate that they have saved over \$200 million by transferring knowledge of oil field best practice from one part of the world to another. Similarly, Skandia, once a small insurance company in Sweden is now a large and successful international company, helped by its focus on renewal and growth of its intellectual capital - its know-how, customer relationships, brands etc. At the national level, many countries now have knowledge initiatives. The UK, for example, entitled its 1998 economic competitiveness white paper 'Building the Knowledge-based Economy' with key themes of investing in capabilities, catalyzing

collaboration and promoting competition. Despite these examples, most organizations and governments, once they investigate how knowledge is contributing to their success, realize how little they "know what they know" and how ineffectively they create and exploit knowledge.

Taken together these developments mean that organizations and policy makers must rethink the fundamentals of how they operate. Transaction costs over the Internet are typically a tenth or less than the cost of comparable transactions face to face. You can access the best resources, both information and people, wherever they are world-wide. Knowledge and information can flow more freely. But we must learn how to harness it for its full potential.

The Knowledge Agenda

As noted above, companies in the West have adopted the knowledge agenda with alacrity over the last few years. What started predominantly as a north America, northern Europe and Japanese phenomenon has been taken up by organizations and nations around the world. A typical organization initiative will create a focus around knowledge as a dimension of strategy and operations. They will create a knowledge team, drawn from all parts of the organization, but in particular including information systems, library and human resource management skills. They may create senior executive position, typically a Chief Knowledge officer or Director of Knowledge and Innovation. Usually they will start by making an inventory of knowledge - where it resides and how it is used. They will invest in technology that helps sharing of information, usually an intranet or document management system. They will build easy to search databases of useful information, typical of best practices, a directory of expertise (who knows what) and an integrated view of market and customer information. Above all, they will create working environment where it is easy and natural to share informal knowledge that is not codified into databases. This informal knowledge, held in people's heads, usually comprises the bulk of the most valuable organization in the organization. Therefore effective management and motivation of human capital is a core ingredient for a successful knowledge-based firm or nation.[5]

From a careful analysis of the developments over the last few years, I have identified 10 macro trends that should influence the way in which any knowledge agenda or strategy for action is developed.[6]. These are:

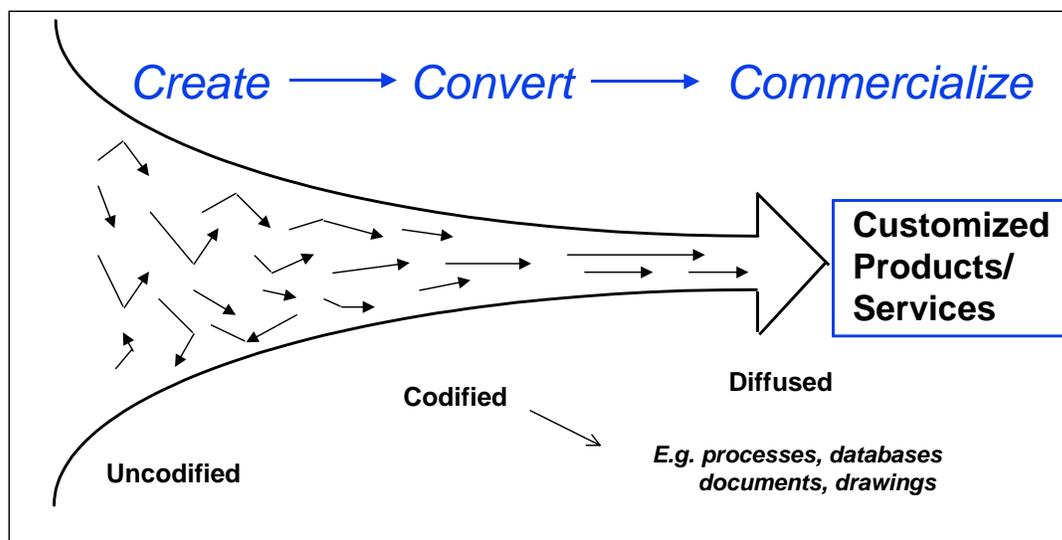
1. From a Dimension of Other Disciplines to a Discipline in its Own Right - knowledge management is already a subject of some degree courses; it will evolve as a profession in its own right. Expect to see many more Professors of Knowledge Management.
2. From Strategic Initiatives to Routine Practice - knowledge management will become an important aspect of every professional and manager's job.
3. From Inward Focus on Knowledge Processes to External Focus on Knowledge Businesses - companies will identify how their knowledge assets can be recombined to create new knowledge-based businesses. For example, an engineering/manufacturing company might create an engineering consultancy business.
4. From Best Practices to Breakthrough Practices - rather than improve incrementally, companies should strive for improvements of 10 times or more in key areas, such as time-to-market, functionality per unit cost.
5. From Knowledge Codification and Databases to Tradable Knowledge Assets. Although publishers have done it for some time, many other companies are now realizing the

opportunities from trading their databases e.g. fleet car managers and car reliability information.

6. From Knowledge Processes to Knowledge Objects - just as computer applications are going object oriented, so too will the application of knowledge. Knowledge will be packaged as objects (that might include an information record, a multimedia clip, and access to a person) that can be manipulated and transmitted in different ways.
7. From Knowledge Maps to Knowledge Navigators/Agents - maps are static representations of objects, and without extensive real-time map-making capability (which could happen in the future) we need other ways to find existing and emerging knowledge. These will be human brokers (people with know-where and know-who) and intelligent software agents.
8. From Knowledge Centres to Knowledge Networks - although aggregating knowledge and knowledgeable people at knowledge centres (such as libraries) gives critical mass, a more effective model may well be local nodes of expertise interconnected through human and computer networks i.e. the virtual knowledge centre.
9. From Knowledge Communities to Knowledge Markets - Communities, which bring together people who have shared interests, have proved an effective vehicle for knowledge exchange. But as knowledge acquires value, and becomes 'productized' as objects (Shift 6) these communities will develop payment mechanisms and other trappings of a market place.
10. From Knowledge Management to Knowledge Innovation. Knowledge management could well be a transition phase to something more fundamental. Management implies custodianship and managing what you know - innovation is creating something new and better. Hence ENTOVATION founder, Debra Amidon, has coined the phrase knowledge innovation. [7]

Among these trends there is a clear pattern emerging of exploitation knowledge assets, appropriately packaged, in the external marketplace (trends 4, 6 and 9).

Figure 1. The Codification of Knowledge into products and Services



Packaging and Commercializing Knowledge

Knowledge is packaged and commercialized in many ways. Some examples are given in Table 1. Many of these involve some form of codification from tacit knowledge to knowledge in more explicit forms such as documents databases and computer software. What starts as uncodified knowledge, often a set of ideas, is gradually shaped through dialogue and expression into something more tangible, such as a process description or a product design, that finally emerges as products for sale (Figure 1).

This is typically the result of aggregating many different elements of knowledge and applying a design and development process. Thus, scientific knowledge about the therapeutically effects of a chemical are encapsulated into medical drugs. The price of the medicine more typically reflects the value of this knowledge, rather than just the value of chemical ingredients.

Table 1. Examples of Knowledge Packaging

Type of Knowledge	Examples of Packaging
Scientific and technical	Journal articles, patents, products
Engineering	Designs, drawings, products
Procedural	Procedure manuals, computer software
Organizational	Processes, procedure manuals, computer databases
Know-How	Guidelines, best practice databases
Specific expertise	Expert systems
Factual knowledge	Books, directories

Much knowledge in organizations is neither explicitly codified nor commercialized. Thus many knowledge management initiatives identify important tacit knowledge, held by a few experts, that is capable of codification and would benefits many other people. Knowledge can be commercialized in several ways: selling it as part of an advisory service; developing mythologies as part of a

consultancy; developing training courses; converting it into information products such as databases or publications etc.

Much knowledge acquired or created in the development of a new product is not actually used. Yet properly codified could add additional sources of revenue. Thus an engineering company might commercialize some of this unused knowledge by applying minimal codification and selling its market research and design expertise to other companies. Likewise much new information is often obtained as a by-product of the core business. Thus car rental companies gain much useful information on the reliability of different cars, which they can analyze and sell back information to the manufacturers. Even when knowledge is packaged, it requires a special focus to turn it into commercial products or services. For example, academic scientific papers, by themselves, have low commercial value in the open marketplace (even negative financial value if you have to pay to have them published). However, their value when converted into consultancy services or new products can be enormous. It is essential to understand to what users of such knowledge attribute value.

Value and Volatility

In general, the greater the degree of codification of knowledge the more easy it is to reproduce and disseminate. Thus, the latest versions of computer operating systems and office software contain over a million lines of computer code, but are packaged onto a CD-ROM or downloaded over the Internet. Suppliers could charge a very high price for software (indeed some software packages do cost \$10,000 or more), to recoup their multi-million dollar development costs. However, a common strategy is to take advantage of the potential market and price low hoping to gain a far higher volume and overall revenues. This is also a driving strategy in many loss making Internet businesses, who believe that high market share will ultimately lead to profitable revenues. Valuing knowledge is much more of an art than science. Some common ways to enhance the value, and hence marketability of information and knowledge are shown in table 2.

Table 2. Ten Ways to Add Value to Knowledge

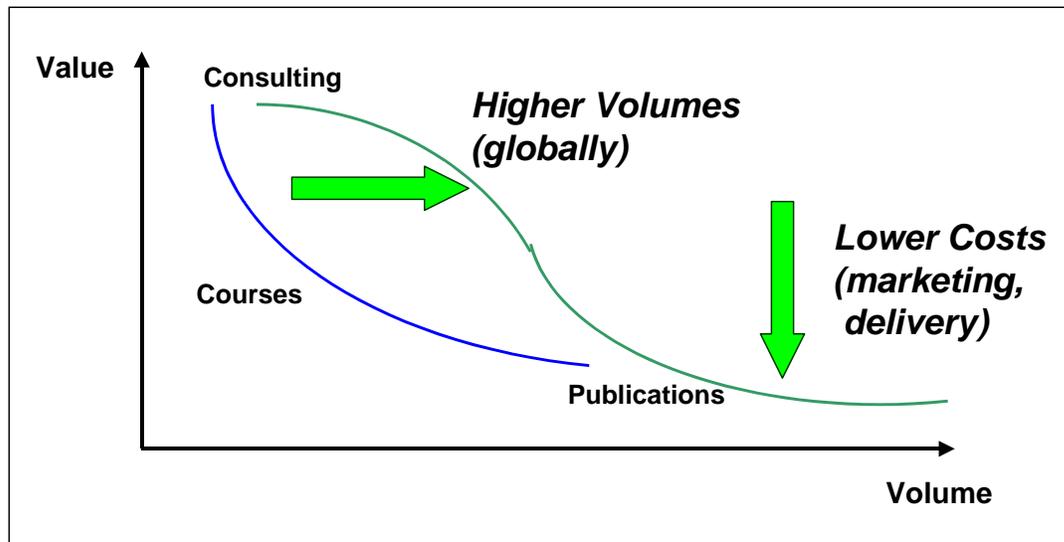
TIMELY	Different knowledge has different rates of value decay. Up to date knowledge generally commands higher prices, so time-to-market of perishable knowledge is crucial.
META-KNOWLEDGE	Knowledge about knowledge - directories, indexes. Hence Yahoo! that provides a categorized directory of the Internet is the most visited Internet site..
VALIDATED AND ASSESSED	It is accurate, reliable, credible, validated. Accreditation by a qualified third party e.g. a library, an independent assessor, will make people more willing to pay for it.
ACCESSIBILITY & USABILITY	The right knowledge is easy to find. There are pointers, tables of contents, indexes that guide users quickly to the relevant items. It provided in multiple formats for different applications.
CUSTOMIZED	Only that information directly relevant to the user is provided. The users needs are taken into account when supplying it. It is filtered and formatted; and needs minimum processing for specified application.

CONTEXTUALIZED	Guidelines for effective use are provided. This includes concrete examples of its application. Opportunities are given for users to share feedback with each other.
CONNECTED	There are many links to related documents and sources.
KNOW-WHO	Connections and contact details are also provided to people who can add further knowledge and insight.
REFINED	The knowledge is continually refined through use. Knowledge editors synthesize user feedback to keep the knowledge updated.
MARKETED	Marketing helps to create demand, thus increasing exposure and use that feeds back into higher quality and additional knowledge.

One of the anomalies of valuing information and knowledge is that the same item has different value to different people at different times. Thus, financial traders pay high subscriptions for real-time stock market and other financial prices, while 15 minutes later the very same information is free on the Internet. An item of technical knowledge is much more valuable to a firm that needs it to overcome a critical problem in their production line, than it is to another company without such problems. Value is also combinatorial rather than additive. Thus, combination A and B might be much more valuable than B plus C or the sum of the individual components. In many take-overs, one company might be willing to pay twice what others will, simply because of the structure of their overall product portfolio.

Generally commercialization means making a trade-off between value and volume. Higher value knowledge is generally specific to the context and generally involves human interaction. A consultant, for example, charges much more than the book he or she has written, since they are supplying the relevant knowledge from their vast store of expertise to the specific situation. But they cannot be as widely shared as their book!

Figure 2. How the Internet alters the conventional value-volume curve.



An important feature of the Internet is that it can alter the shape of typical volume-value graph (Figure 2) as well as boosting some of the value-added factors from table 2. At the high value end, consultants can be much more efficient, drawing on existing knowledge more readily. At the low-end, the low Internet delivery costs, means that prices can be significantly reduced, again stimulating higher volumes. There are other ways to exploit the Internet in commercializing knowledge. Some tacit knowledge can be packaged and sold over the web (as Arthur Andersen are doing with their Global Best Practices service.) In addition, suppliers can add discussion features such web conferencing, or simply opening email connections to the originator, users can enter a much more valuable dialogue. Online communities, for example, are one of the fastest growing areas of Internet usage, and are an important revenue generator for service providers like Geocities (now part of Yahoo!) and AOL. The challenge for originators is to find ways of getting paid for their on-line dialogue, an opportunity that emerging knowledge markets now provide.

Knowledge Markets

There are already many examples of trading different types of knowledge. There are established content industries like publishing and broadcasting. There are also people-based industries like management consulting (selling the know-how of their people) and recruitment agencies (trading in human capital) are examples. The more that uncodified personal knowledge is involved, the more the marketing has traditionally relied on developing face-to-face relationships. The development of knowledge markets on the Internet, though, is starting to change these traditional methods. For example:

1. Recruitment Agencies. These deal with the trading of human capital. How well individuals transfer their knowledge once 'ownership' has been transferred is another matter. Some recruitment web sites (aiming to automate links between companies and individuals) have folded, but others, like <http://www.careermosaic.com> have moved towards a specialist portal status, offering hints on writing CVs, giving links to recruitment fairs etc.
2. Management Consultancies. Their business is knowledge, but they are increasingly packaging it, both for internal use (on their Intranets and Knowledge bases) and externally, such as Arthur Anderson's Global Best Practices and Ernst & Young's ERNIE.

3. Problem Solving Brokers such as Teltech Resources of Minneapolis. They have a network of experts and a thesaurus of knowledge domains. As clients call in with problems a knowledge analyst can help find experts who can solve their problem. Like an expert 'answernet'.

There are in addition, other ways in which the Internet is creating vehicles for knowledge sharing and trading:

1. Electronic communities, many of which have a trading element, such as Geocities <http://www.geocities.com>
2. Online events, either synchronous (such as in a Webcast) or asynchronous, such as in the Knowledge Ecology Fair (<http://www.Co-I-I.com>)
3. Information providers offering 'knowledge' on a pay-per-view or subscription basis, such as Dialog or FT Profile or <http://www.newsedge.com> for general news
4. Auction or brokerage sites that link buyer and seller, and allow online bidding. As well as physical goods, e.g. <http://www.autobytel.com> and <http://www.agriculture.com> auction sites like eBAY (<http://www.ebay.com>) are just starting to offer people's time and expertise.
5. Access to specific expertise via the web and email e.g.
6. Markets in intangible products, such as financial futures, patent licences, copyrights etc.

A particular example of a new market in a specific form of knowledge is that of integrated circuit (IC) designing elements. In project Alba, supported by the Scottish Development Agency, companies like IBM and Cadence have built an online trading infrastructure, where IC designers can find out if certain functional designs exists, and if so buy license rights to use these "blocks of virtual intellectual property", rather than design their own.

These show a range of opportunities that have opened up, both for suppliers already trading in knowledge products and services, and also for start-up companies. This emergent field of knowledge commerce (K-commerce) represents a convergence of the Internet (used for marketing and delivery), electronic commerce (providing trading and payment facilities on-line) and the burgeoning number of innovative ways in which intellectual capital is being packaged.

Figure 3 shows a layered model of an Internet based knowledge products and services. Each layer represents many opportunities as does the connections across and within layers. Some of the exemplars of new companies exploiting the opportunities, and who have developed innovative ways of making money are also shown. Some examples:

1. Freeserve (UK) - an Internet Service provider, offering free access and through its portal (home page) access to a range of information and services (e.g. online shopping). In less than six months they have become the number 1 provider in the UK (overtaking AOL) with over 1 million subscribers. They gain revenues from three sources - banner advertisements, a percentage of each sales transaction, a share of the telephone line costs.

Figure 3. Layered Internet model showing new business opportunities (with examples)

User Services	Advisory, training, consultancy, web devt. e.g. NextEra, Jupiter, US Interactive, SciNet
Applications/ Markets	Communities, auctions, markets e.g. Priceline, Deja, eBay, Amazon, Chemdex, TKE
Enabling Services	Directories, payments, trading, advertising e.g. Yahoo! Sina.com, WorldPay, iqport, LinkShare
Software	Servers, multimedia, e-commerce e.g. RealNetworks, BackWeb, Tradex, Ecash
Infrastructure	Networks, satellites, telcos, ISPs e.g. Teledesic, Qwest, Freeserve, China.net

2. Ecash technologies - electronic cash that can be downloaded into electronic wallets for PC-to-PC digital cash exchange or downloaded into smart cards. Ecash itself absorbed a similar start-up Digicash.
3. RealNetworks - providing a range of software products around real time audio and video. By offering a basic product free of charge, they gain wide user base, and make money by charging for enhanced products and for the server software i.e. that used by the publisher rather than the user. Multimedia adds richness to knowledge assets.
4. Yahoo! Started by two university students who built a directory of key web pages, this has spread to become an international organization offering regional directories (including Yahoo! China), electronic mail services, a wide range of information services (news, maps, weather etc.) and more recently online auctions. It makes its money primarily from advertising.
5. LinkShare - has created a market for placing banner advertisements. It connects advertisers with web owners, providing facilities for rotating advertisements and providing detailed information to advertisers on page impressions and click through rates.
6. The Knowledge Exchange (TKE) - an information brokerage for computer problems and solutions. Helpful hints, white papers, and software code is categorised and sold over the network, with TKE taking a commission on sales.
7. Tradex - by codifying the knowledge to build ecommerce web sites, it provides modular platforms for business-to-business electronic commerce.
8. Deja.com - provides information on 17,000 consumer products together with related discussion forums. There are also facilities for users to provide feedback. Their ratings and comments are visible to other consumers with the top rated products being the most prominent. This provides targeted audiences for advertisers.
9. Priceline.com - This allows consumers to set the price they are willing to pay for a product. It is mostly applied to perishable products like aircraft seats or hotel bookings. It helps to create a more efficient marketplace. In its first six months of operation over 100,000 trades were made in this way.
10. Paperexchange.Com - creating marketplace for buyers and seller of bulk paper and paper products. It also includes job listing, equipment sales and resources.

11. SciNet Bioproducts - a virtual organization based on the biotech triangle (Braunschweig - Hanover - Göttingen) of Germany. It draws on its high expertise network of scientists, engineers, economists and lawyers to form specific project teams to develop bioactive proteins for specialist chemical manufacturers.

All these examples are examples of knowledge commercialisation in one form or other. At the enabling layers of the model (software and generic services) knowledge has been codified into innovative software and services (as in Ecash and Tradex). Market and technology knowledge has been combined in the examples of communities and the electronic marketplaces (as in the paper example for physical products, TKE for information based products and SciNet for know-how. It also provides mechanisms for more efficient exchanging of knowledge whatever the product (e.g. Deja.com). Generally the costs of entry are much lower at the higher levels of the model. Thus, while it costs \$ 5 billion or more to put a satellite network into space, many of the enterprises mentioned have been started by one or two people with very little financial capital. Whatever the industry, the Internet will change the way that their markets operate through better customer knowledge.

Knowledge Pioneers

As well as the pioneers mentioned above, two cases deserve more in depth analysis, since they give indications of how knowledge markets might develop.

Amazon.com

The story of this online bookseller has been told many times. As an online book store it holds 4 million titles, compared to 20,000 in a typical bookstore, is open 24 hours a day, and has a lower cost of sales transaction, and its sales success has triggered traditional booksellers into defensive responses. From the perspective of knowledge markets amazon.com illustrates several distinctive facets:

1. Accessible information from multiple perspectives - you can browse by subject, follow their suggestions, or search in traditional ways - directly from the front page.
2. Personalization - once registered, your details are kept on file and you can do 1-Click shopping.
3. Links - it suggests other books that buyers of a particular book have also purchased.
4. Validation, contextualization - other readers can provide their inputs to help you evaluate books on offer. I recently planned to buy an updated book by an author I was familiar with, but several reviewers suggested that an alternative book, previously unknown to me, was better suited to my needs. I took their advice and am pleased that I did.
5. Alerts - it will email you when a new book in your area of interest or by your favourite author has been published.
6. Associates programme - it has created a win-win situation where other people can gain referral fees by providing links into amazon.com's books.

In short, they have developed sophisticated ways of extracting customer knowledge and using this to customise their offerings and suggestions for individual customers. With no effort on their part, they have also created communities of interest, where readers can compare comments and if necessary communicate with each other (via email).

iqport.com

This is an example of a knowledge trading platform. It is a joint venture of, among others, NatWest bank, Lotus and Oracle. Describing itself as "the knowledge market for people in the know" it brings together several key elements into a single online marketplace:

1. A classification system and search engine, so you can search for knowledge assets that meet given criteria
2. Standardized 'knowledge wrappers'. Each knowledge asset is wrapped with information that classifies it, describes its size and format, identify intended audiences and gives other useful information for the buyer.
3. Supporting Guilds. These are organizations who specialise in aggregating and connecting specific classes of asset. For example, Futurzing.com is a guild that "facilitates global minds in shaping the future of knowledge wealth", while The Risk Guild proclaims itself as "the world's leading authority on risk management".
4. An accreditation system. Some assets, particularly more expensive ones, are accredited by guilds on a three star system. The guild employ subject matter experts to evaluate and 'brand' assets that meet suitable threshold criteria.
5. A pay-as-you go micropayments system. Many assets are relatively low value e.g. \$10. Since transaction costs are low, iqport.com can handle accounts for buyers, sellers and intermediaries, allocating revenues on sales between originators, guilds, and others. Originators typically get a much higher percentage of revenues than traditional publishing royalties.

An interesting feature is that the design of the underlying platform allows dynamic pricing. If a time sensitive asset is not selling well, its price can automatically be adjusted. Although most knowledge assets are chunks of information e.g. documents, guides, there are planned facilities to offer other types of knowledge. One guild, Bright "the network for smarter working" already has a structured discussion base and plans to offer online consulting and online master classes and industry specific communities. It has already built an impressive network of knowledge experts to support these activities.

The 7Ps of Internet marketing

Traditional marketing has for many years been focused on strategies developed around 3Cs and 4Ps:

1. Customers: what distinct customer segments are there? What are their need, both those that are expressed e.g. through market research and those that are unarticulated?
2. Company: what are our organization's distinctive strengths and weaknesses? What are our core competences and know-how?
3. Competition: who do we have to compete with for the customer's attention?

This analysis then leads to selecting appropriate market niches where the company has a distinctive competence and can trade profitably by developing appropriate

1. Products: the product and service portfolio
2. Pricing: setting prices or price bundles that achieve the right balance between volume and revenue
3. Promotion: making potential customers aware of the value of the product and positioning it for maximum value
4. Place; channels of selling and distribution to reach the target market.

Many of these core concepts carry over into knowledge markets but with some differences. Thus the products are generally more intangible. Therefore, potential customers must be given opportunities to learn about them in low cost ways. Examples might be a free trial period, a low cost precursor (such as a small workshop before doing a major consultancy study), a sampler e.g. an extract from a document. Pricing, as noted earlier, is much more subjective and depends on perceived value, which can be volatile.

When the main trading place (and often also the place of delivery) is cyberspace, a new set of Ps come into play. These are:

1. Packaging - the wide range of formats offer opportunities to package and repackage the same knowledge in different ways e.g. as a document, a piece of software, a consultancy service, an online asset. You will need to develop panache at the art of developing enticing, yet honest, online wrappers.
2. Positioning - with over 800 million web pages (and doubling roughly every year), and millions of knowledge products, you must carefully position your product to optimize the match between your strategic aim and your customers' needs.
3. Portals and pathways - these commonly visited websites (e.g. AltaVista, Yahoo!) are your shop windows to the world. You will need to identify specialist portals that your targeted customers return to regularly. For example, [Chemdex \(http://www.chemdex.com\)](http://www.chemdex.com) is an example of an online marketplace for buyers of life science products that uses a shared ontology to simplify the purchasing process for both buyers and sellers.) Find out how people are finding out about and reaching your site.
4. Page impression(s) - how people perceive your Internet presence is important. There are many well-known corporate sites that turn off users with fancy but irrelevant graphics and badly structured information. Providing useful information, easy to find, and a good visual design are key. By monitoring data on page impressions you can work out the most common paths through your site. [8]
5. Payment mechanisms - unless you are selling exclusively high value services, you will need to install secure payment mechanisms, that accept a variety of payment methods, or use a platform (such as iqport.com) that does this for you.
6. Progression - the on-line sales cycle is one where you gradually engage with your potential customer. First you need to get them interested with enticing and useful free information. Then you need to have them interact with your (or your databases) to find knowledge that is most relevant to them for a modest fee. Then through some online personal dialogue (e.g. via email) make them aware of more valuable products and services. And keep adding to your knowledge base, so that they keep coming back to find what is new - or sign them up for an ongoing subscription.
7. Performance - customer expectations for quality, responsive, value for money are continually increasing. You need to develop metrics for the performance of your Internet presence and the growth in your intellectual capital and how well it is selling.

One of the most effective ways of developing viable strategies, especially in this fast changing marketplace, is to closely monitor and learn from what others selling similar products and services are doing. The great advantage of the Internet is that it is easy to do much of your learning and competitor analysis online.

There is, of course, more to knowledge markets than packaging and trading knowledge on the Internet, but mastery of the Internet as a channel to market and potential delivery vehicle is essential for any organization wanting to maximize the return on their investment in knowledge.

Successes and Failures

What the earlier examples show is that the Internet makes it possible to trade many different types of knowledge in a cost-effective way on a world-wide basis. Succeeding in knowledge markets is a hazardous business. The pace of change is fast. The speed of development of Internet products and services is measured in days (typically 100 days) not months or years. Some very large organizations have put hundreds of millions of dollars into unsuccessful ventures. Many of those mentioned earlier may not make it to next year. As an example, Pointcast led the world in push technology (where users receive in background mode on their PC news stories filtered according to their interests). But two year later its offering was looking old and obsolete and the company was subsumed into Backweb. Europe Online, aiming to be Europe's leading Internet Service provider, backed by \$200 million from publishing house Bertelsmann and others, went into oblivion as America Online (AOL) surged ahead. Peoplebank, an online recruitment service, launched in 1996 with nearly \$10million investment and closed a year later. For every successful amazon.com (and even today they are not making a profit) there are several others who do not make it.

However, because electronic commerce will be so pervasive, and the world's telecommunications infrastructure makes global knowledge trading so viable, the risk of ignoring these developments, in terms of loss of personal and national prosperity, is even greater. Value will flow to where the best knowledge is, to those who best package and commercialize it for different user needs, and those who and those who trade it and provide the enabling mechanisms.

Successful trading and marketing of knowledge is a key plank of prosperity in the knowledge economy. Analysis of these successes and failures suggests that a viable knowledge market must have the following features:

1. An easily locatable marketplace, attractive to potential buyers e.g. via well know portal sites.
2. A good source of knowledge assets, either through the skills and knowledge of people, or through access to more exploit content.
3. A well organized knowledge schema - so that buyers can quickly visualize the context and understand what is available
4. Good knowledge wrappers - to quickly and accurately qualify whether what users find is what they really want
5. Mechanisms to sample (try-before-buy) or validate quality e.g. through accreditation.
6. A fair and transparent pricing mechanism.
7. Simple and easy payment mechanisms, including micro-payments for small value items (e.g. for the \$1 sampler)
8. Effective reward mechanisms, so that there are good incentives to individual end organizations to develop new knowledge assets and knowledge businesses
9. Ways of sharing knowledge between buyers and sellers, and different buyers. Providing community conferencing facilities is one way of doing this.

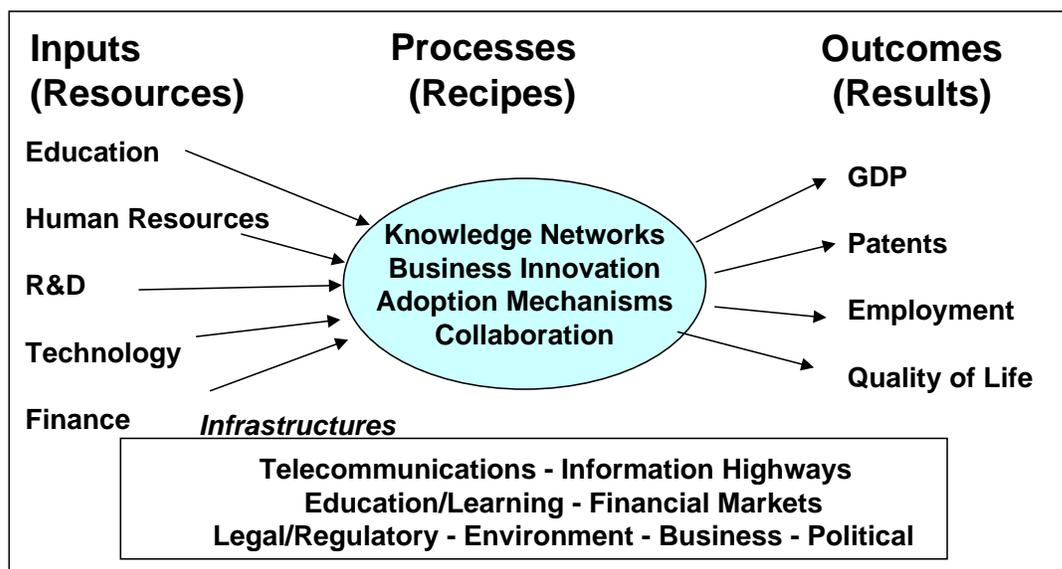
10. Customization based on prior usage or in depth knowledge of the customer's needs.

As noted earlier there are many opportunities for entrepreneurs in addressing these needs, and the next few years are likely to see a strong growth in these knowledge markets. Entrants into these markets will also need to address those factors that commonly cause failure in start-ups. It is important they are adequately financed, since product development invariably takes longer than planned - hence the value of venture capital networks in areas like Silicon Valley. They must also address any legal or regulatory hurdles - not so easy in the field of electronic commerce where laws often conflict and national laws are not in harmony with each other. Above all, they must manage the growth and the transition from a mode of ad-hoc operation to one of more formal management systems, when experienced managers may need to be recruited.

The Challenges

This fast developing knowledge economy poses many opportunities for wealth creation (in the US knowledge intensive industries are believed to be the main factor behind recent economic growth). How can individuals, organizations and nation states capitalize on these, and avoid the threats and risks. Analysis of successful regions, such as Silicon Valley and Austin in the USA, offer some useful pointers. They have strong innovation networks with local education and research, access to financial capital, access to business and entrepreneurial know-how (including commercialization know-how) and an appropriate technological infrastructure e.g. high speed access to the Internet. [9]

Figure 4. Knowledge Economy Model



At a national level the work of organizations such as the OECD, The World Bank, and the World Economic Forum are converging around some common success factors. What is important is to distinguish between knowledge inputs, processes and outcomes (Figure 4). Certainly a strong research base and highly educated workforce will be a key ingredient in creating knowledge-based wealth, but probably more important is having in place the right processes and infrastructures to convert it into goods and services. Hence, a globally oriented regulatory environment and innovation knowledge networks which bring together in collaboration the public and private sectors are key features in any

national policy agenda. It also needs to bring together the many different players in knowledge markets, from content providers, software suppliers, telecommunications operators and main users.

The European Union, for example, in its fifth framework program, has shifted its emphasis from earlier programmes where the emphasis was predominantly on technological research and development. Its recently launched fifth framework programme shifts the emphasis to “research at the service of the citizen and European competitiveness in a global framework”. [10] Activities within the programme are grouped into three themes:

- “unlocking the resources of the living world and the ecosystems”
- “creating a user-friendly information society”
- “promoting competitive and sustainable growth”

Within each theme are many collaborative projects that bring together the developers of research with user who participate in pilot projects. The UK's programme for building a knowledge-based economy includes 75 government commitments, including the development of entrepreneurial skills starting with schools, students and university researchers, the creation of an Enterprise Fund, and reducing unnecessary legislation that hampers entrepreneurs.

However, as the earlier examples indicate, it is individuals, business and community networks that are the real focus of action. Governments can only create suitable environments. It is the entrepreneurs and innovators who build the knowledge enterprise of the future and participate in global knowledge markets. They are the ones who stretch possibilities, who put what might seem like crazy ideas into practice. Not everyone is a born entrepreneur, but human inquisitiveness, and desire of challenge and success means that everyone has his or her part to play in supporting such entrepreneurial enterprises. They can participate in these new markets, and learn the tools and techniques to succeed. Demanding consumers stretch suppliers to new levels of performance.

The role of government is therefore be one of:

1. Leadership - creating the vision, developing partnerships
2. Creating a fair and meaningful regulatory framework, in harmony with international best practices
3. Being an 'intelligent' user - an example of the online economy in action
4. Stimulating entrepreneurship and new initiatives
5. Building essential infrastructures - ranging from education, telecommunications, financial investment etc.

Challenges for China

It would be presumptuous for me, on my first visit to China, to offer any detailed advice. The factors mentioned above all need addressing. From my initial perceptions China seems to have many assets that can help propel it into a leading position in the knowledge economy. Its heritage and skills at international trading will serve it well. It has cultural and scientific traditions that are renowned around the world. Its villages and communities provide stability and enterprise. Perhaps its greatest asset is its sheer quantity of intellectual capital - the large numbers of well-educated people, many with overseas education. However, this is merely an input in the knowledge economy. That's why the 'recipes' and the essential infrastructures need development - to convert it into high value outputs.

At the moment, this seems to be the area that China needs to address. For example, there is a very low usage of personal computers and the Internet compared to the USA and Europe. On the other hand, the sheer number of consumers online in the rest of the world, likely to be 500 million within the next

year or two, provides a market opportunity that is too huge to ignore. Already China's Internet entrepreneurs are rising to this challenge.

Developing the required recipes and infrastructures calls for harnessing the collective talent, knowledge and motivation of many individuals and organizations, both public and private. There are lessons and examples of how to do this from all over the world, including China itself. The key challenge is to tap into this knowledge, as indeed you are doing at this conference, meld it with your own unique talents, and create knowledge-based products and services that will help create a sustainable and prosperous world.

I wish you luck in this challenge, and look forward to exchanging and developing knowledge with you in online communities and knowledge markets.

Notes and References

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8. Some basic tips are given in 'the Good Web Guide' at <http://www.skyrme.com/guides.goodweb.htm>. Other tips and 'ten common mistakes' can be found at <http://www.useit.com/alertbox/> The free email newsletter 'Web Marketing Online' from <http://www.wilsonweb.com/marekting/> is also a useful source for Internet marketers.
9. The Austin model, and more examples of national and international initiatives are described in chapter 9 of *Knowledge Networking: Creating the Collaborative Enterprise*, David Skyrme, Butterworth-Heinemann (1999).
10. Details of the Fifth framework programme are at <http://www.cordis.lu/fp5/home.html>

About The Author

Dr David J. Skyrme is a management consultant and analyst specializing in knowledge management and Internet commerce. Following a first class honours degree and doctorate from Oxford University he spent 25 years in the computer industry. He held senior management roles in DEC UK, including UK Strategic Planning Manager and he created and managed a knowledge centre. He left Digital in March 1993 to set up his own management consultancy, now the UK business partner of ENTOVATION International. Typical projects include corporate knowledge management reviews, workshops and market analyses.

David is a leading international authority on knowledge management on which he speaks and writes regularly. Among his many ground-breaking publications are the in-depth management reports *Creating the Knowledge-based Business* (co-authored with Debra Amidon) and *Measuring the Value of Knowledge*. Recently published is his book *Knowledge Networking: Creating the Collaborative Enterprise*.

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