Land ahoy! Land?

A cautious market snapshot of the infocom-industry

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The ragged sails of the ship weave along the still-fierce waves of the sea. Sailors are busy cobbling together a new rudder, patching the sails, and repairing the damage caused by the storm. An exhausted crewman sits in the crow's nest, wearing his striped uniform and with his eyes on the horizon. At first he only sees a faint blur; he doesn't dare give the signal, perhaps it's only a cloud or a patch of fog in the distance. But as the ship sails on, he gets a clearer image - yes, those are cliffs and that yellow must be sand in the foreground. Finally he raises the cry: "Land ahoy! Land!"

"Land?" – the captain asks himself in his cabin. "That's all well and good, but what kind of land is it? There are no maps of this part of the world. That patch in the distance is as likely to be a tiny island as a new continent, or it might even a dangerous reef. What can we expect, for what should we be prepared? Will we find a quiet place to set anchor? Will there be food, water? Can the land be settled, is it fertile? Will there be room for everyone, or are we in for an extended struggle with hostile natives?"

After the storm

The info-communications industry has seen some difficult years. After the long boom of the 90s, demand for info-communications products and services fell back. Stocks began to plummet, investor confidence waned, and the captains of the industry were no longer in the headlines. The storm broke quickly, and in its wake were leaky companies with tattered sails, as well as people wracked with uncertainty.

The older industrial sectors weren't as surprised by the *recession*; they had been through this sort of thing numerous times. But information technology is a relatively young industry, and for many this was the first serious trial of their lives. Fortunately, youth also implies a readiness to learn. Most of the companies that survived the storm did the same as the old sea-dogs: they cut costs, reduced their capacities to be in line with shrinking demand, restructured or closed divisions that were losing money, streamlined their profiles, reduced their debts, and focused more on efficiency and productivity. And the richer ones looked around at the battered market with an eye to what can be easily and cheaply bought up, in order to build a bigger and stronger ship.

The fleet has been reorganised and the weak have sunk. A few illusions have been lost, some big lies have been exposed, and everyone has become a bit older and more experienced. These are ancient problems and solutions.

It appears that the storm has now passed. Land can be seen in the distance, and the sails that were torn down during the storm are hoisted anew. A fresh, cheerful breeze fills the canvas sheets.

The info-communications market is once again expanding, and many market players feel that they have recovered. The stock exchange is optimistic; prices are on the rise. People are showing a keen interest in products from the digital industries: they take their laptops with them in search of WI-FI cafés, they upgrade their computers, buy digital cameras, trade their mobile phones in for later models, sample 3G services, use broadband to surf the Internet, and install cable or wireless networks in their homes so that every family member can enjoy the bounty. Thanks to lower prices and products tailored to their needs, smaller businesses are pleased to find the world of e-business waiting with open arms. Larger companies are still somewhat wary of investing in major projects, but their desire to get the most out of their already-built systems means that they still give service providers a great deal of systems integration work. E-commerce indicators are improving, sometimes by leaps that catch even serious analysts by surprise.

Our imaginations and fantasies are once again being stimulated by technical novelties and innovations, such as "grids", utility computing, software on demand, web services, radio technologies that sometimes clash with and sometimes complement each other, and "smart dust", dust-like "grains" complete with sensors and transmitters which may someday replace the barcode. China, a key driver of the global economic boom, is showing massive demand towards the technology sector. "E-Biz Strikes Again!" trumpets the headline from an issue of Business Week this past May, and even the conservative and restrained periodical, The Economist, has made optimistic pronouncements about the future of digital industries. Following a three-year

freeze, four new Internet companies have appeared on the American stock market in 2004, and a further 24 have submitted the required documentation and are awaiting approval. Even more surprisingly, 20 out of these 28 companies are showing a profit, something that was true only for 4% of companies that made their IPO between 1998 and 2000. In 2003, these same 28 companies showed a 56% growth in income and a 490% growth in net profits compared to the previous year.

"Land ahoy! Land!" comes the cry from the crow's nest, and sure enough mountains are emerging, and the sandy shores are visible. "Land?" The captain mutters to himself. "What kind of land? Where is this ship going?" According to market indicators, the info-communications industry is once again on the rise, which is good news indeed. We can perhaps refer to the years of recession as a minor accident, a temporary slump after which things have once again returned to the right track. Market economies work in cycles: upswings are followed by declines, then by newer upswings. It appears simple enough - we need to weather the times of recession, get rid of the ballast and trim the lines, and after the storm has passed, hoist those sails and continue onwards.

Unfortunately, the alarming fact is that the actual situation differs from this. In all likelihood, the start of the new millennium has signalled the end of an era for this industrial sector. The new times ahead will require new strategies. We can continue sailing, but in a different manner than in the "golden age" of the 90s.

Riding the waves

There are a number of *models* available to help us understand the reshuffling, the cyclical movements, the repeating patterns and lasting trends. The models that are of use to us here are those that have something to say about the connection between the info-communications industry and consumer/users, about the relationships between supply and demand, in terms of indicators for both quantity and content/ quality. Some of these models are macroeconomic, while others are best applied in a more concrete way to help us understand the market movements of individual products or types of service.

There are some models that, by analysing the economic and social effects of the major *technological innovations,* (the steam engine, railroad, electricity, etc.), seek to find regularity and repeated patterns. According to Carlota Perez [8], an oft-cited Venezuelan researcher, waves of innovation can be broken into two major periods: the installation period and the deployment period *(Fig. 1)*.

As its name indicates, the *installation* period is the time during which the infrastructure for the new technology is established. Some concrete examples include the building of a network of railways; the equipping of factories with electronic motors; the appearance of automotive plants along with petrol and service stations springing up like mushrooms beside new motorways. The installation period itself can be broken up into two phases. During the first phase, the new technology incubates, seeking its place while its potential is not fully known yet. The second phase is characterised by a "big bang" that awakens general interest: entrepreneurs see the technology's "grand opportunities", investors open their wallets, a great deal of excitement is generated, and demand often exceeds supply. This is the period during which illusions and false hopes can appear. After all, the bubble must burst in time. Because of this, the installation period generally ends in a crisis.

Fortunately, the crisis is only temporary, and it doesn't signify the end of the wave of innovation. The second phase of the installation period can see irrational behaviour: an excess of wonderment at the new technology, inflated and foolhardy investment, blind gambling on the stock market. This "madness" actually serves and important function: it aids the quick development of the infrastructure built on the new technology. Tracks are laid at a lightning pace, machinery is replaced, roads are built, cabling is completed, and service providers are created. In a sense, the following crisis creates order. The weak are weeded out, overblown capacities are scaled back, the stock market calms down, and a more sober reality prevails.

During the installation period, businesses that build/ spread the new technology typically envision the wide open spaces of new hunting grounds before them, and they consequently focus on growth and raising capital, pouncing on scant resources. They want to sell, and care little for what actual use the thing they sell is put

Fig. 1.
Carlota Perez's model of the phases of technical innovation
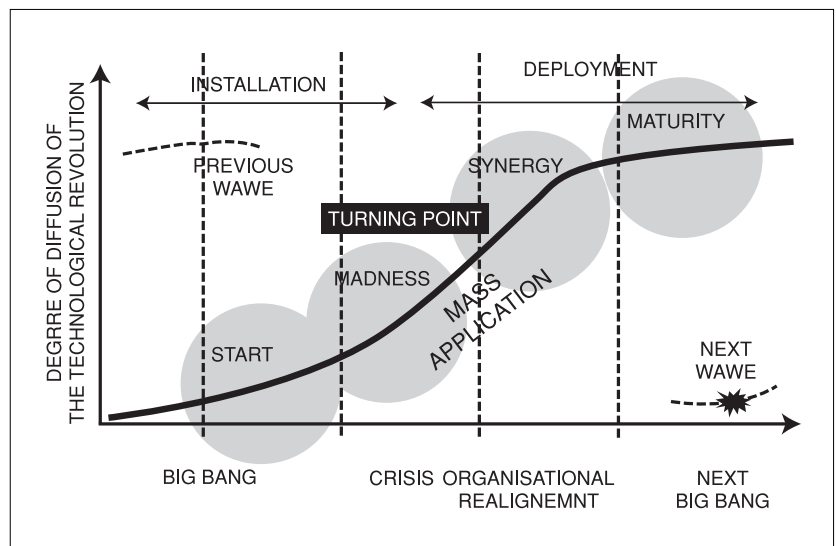
to, they care only for the next eager customer that pops up. Since interest is high it is easy to raise funds, and new businesses quickly multiply.

During the *deployment* period, the new infrastructure is largely in place. People, businesses, and various organisations are increasingly routine in their use of the technological innovations. After a time, the existence of the new infrastructure is regarded as part of the natural order of things: we think nothing of travelling by car, calling grandma in another city, or the fact that there is electricity in the wall socket. It's all ordinary, and cause for alarm only on the rare occasions when the system fails: when there is a blackout, air traffic is backed up, or the phone line is dead. It is only at this point that the wave of innovation truly reorganises economic and social structures, in a manner that is quieter yet deeper than during the previous period. Inexorably it becomes part of everything: factories, offices, homes, culture, the state, and politics.

Businesses are established that base their competitiveness on their ability to apply the technological innovation intelligently. A consumer lifestyle develops that utilizes the new infrastructure. New procedures and habits evolve. The issue of the day is no longer, for example, whether to quickly build a new railway line, but rather how to create a simple, standardised, and unified system of railroad use, or how production and sales can take advantage of the existence of the railway, or establishing where we should place the mines and factories and how large a geographical region we can select our workforce from. The question is not "how can we lay more cable underground and in the ocean", but "how can we encourage people to use their phones more often", and "how can the new technology be applied to education, business and governance?"

This deployment period is a longer process for the technology, its infrastructure, the economy and society. It is not as loud as the colourful and spirited world of the previous period, but the effects are longer-lasting and of greater consequence. This continues until the given technological innovation's wave dies out and something new takes its place.

The typical business during this period operates in a more consolidated market, since the crisis at the end of the installation period has decimated and reorganised the field. Growth slows, and the start-up fever abates. Consumers/users soon realise that the ball is now in their court. They are cautious and suspicious; flashy ad campaigns are less effective now. In this phase, consumers/users are developing their use of the technology, becoming increasingly creative with it, but they are also more deliberate, with an eye to balancing the usefulness of the technology against the costs. What interests them is not so much owning the technology, but *using* the technology. Whoever wants to sell a product or service needs to focus on its application, and guarantee its profitability. Efficiency and productivity are the watchwords both on the buyer-side and the seller-side. Buyers of the technology want to

be more efficient and competitive, and sellers can only turn a profit in this consolidating and maturing market if they rein in their expenses. Relationships are crucial, since at this point if a customer is lost, it is very difficult to find another to take his place.

If we observe the events of the recent past, we should come to the following logical conclusion: the *info-communications cycle of innovation* experienced an installation period in the 90s, has gone through its crisis at the end of this period, and the ship is now in the deployment period, making its way towards the less turbulent waters of adoption. One of the most important "products" of deployment and adoption, the "integrated, real-time, extended electronic business" [1], is developed during this second period. Its walls are built upon the foundation of the already-developed infrastructure. Info-communications technology fills the space step-by-step. First, individual tasks are automated via this technology, then entire functions and processes. After this, these isolated systems are integrated, followed by supply chains that connect multiple businesses [6]. The process seems unstoppable, and its long-term effects are unpredictable.

The deployment period demands different strategies and conduct than the installation period. *IT services* provide a good example of the shifts in emphasis and the transformation of strategies. This is an industry with an annual turnover of 520 billion dollars, yet which, in spite of the explosive growth experienced in the 90s, could only show a growth of 3% for each of the last two years. Sensing the limits of the market, small and large businesses in this sector have become rather ingenious in finding ways to increase efficiency and reduce costs, at the same time demonstrating what the technology is capable of. They seek cheaper labour, and move some of their activities to countries such as India (which has quickly and rather cleverly leapt at the opportunity); remote real-time control is now technically possible, spurring a wave of outsourcing. Inflow Inc., which operates as a data centre serving hundreds of clients can be found in a 2000 square metre building packed with humming equipment; one or two employees hover about, but everything is essentially automated. Packages are compiled for companies in various industries using Accenture software and services, after which the given packages can easily and quickly be customised.

Wipro Technologies, one of the crown jewels of the IT industry in India, has automated software-development processes and boasts of a program that can translate from six European languages into English with 99% accuracy. Its sister company, Infosys Technologies, built upon web-service technologies to create a standard library out of reusable software modules. When developers at the company are given a new task, they take these modules off the shelf and combine them to suit the particular demands at hand. Getronics, a Dutch company, has automated the pro-

cess of diagnosis and support for desktop computers, thanks to which they were able to cut their necessary workforce in half. Thanks to automation, certain server software installation tasks that previously took 5-10 days at IBM, can now be performed in just a few hours.

Though the technology is new, from an economic perspective the methods applied in the above examples are old. Even today, the businesses that manage to increase employee productivity are those that are able to exploit the advantages of mass production, standardise operations, use finished parts, find cheaper suppliers, carry over any advantages from one activity to the next, learn quickly, etc. These "basic methods" are employed by Chinese companies specialising in mass production as well as by flagship American and European companies, though in different ways and with different content.

IT services must take care not to cause problems for their customers when reducing costs and automating their processes. Fortunately, there is a convergence of interests here: efficient and cheaper service providers in turn allow their customers to be more efficient and cheaper and ultimately more competitive. To this end understanding the technology is not sufficient, since using the technology effectively requires human and organisational changes. In education as in application development, the question today is no longer "technology or business"; the people most in demand are those who are at home in both areas. It is no accident that IT and telecommunications companies are eager to climb up the value-chain beyond production and basic services to include high-level business consulting.

The *terms of a contract* can influence goals, attitudes, and expectations. For a long time, the trend was to bill for business IT consulting based on the hours worked. It was in the service provider's interest for ever more people to work on a given job. Nowadays the situation has changed. According to well-known market analyst company IDC, only 20% of today's consulting contracts are based on a traditional hourly rate, as compared to 85% just four years ago. Currently, fees tend to be performance-based. Service providers receive their fees if they manage to increase efficiency, if turnover increases according to plans, or if costs are reduced, and the number of consultants working on a specific job is irrelevant to the client.

According to Carlota Perez's model, madness, crisis, and sobering up predictably follow each other. The Gartner Group's well-known "hype cycle" implies something similar, but on the level of individual products or product ranges rather than on the macroeconomic level. Technological innovations generate great interest, which is kindled by manufacturers, marketing professionals, newspapers, consultants and conference organisers alike. After all this hype comes the inevitable disillusionment ("this isn't the panacea that will cure all my ills"). Realism follows the disillusionment ("well, it may not be the wonder drug, but it can be useful for treating this and this particular illness"). And finally, the innovation finds its place in the world. Carlota Perez's model, introduced earlier, demonstrates what happens when a technological revolution causes an entire industry to enter the hype cycle.

Changing customers

Geoffrey Moore's model [5] is also instructive, and its application can help explain a number of features of the info-communications market. According to the founder and president of the Chasm Group, the market adopts new technologies step by step *(Fig. 2)*. The individual groups adopting the technology differ not only in size, but in needs, expectations, and habits. They have different interests and can be inspired by different things. You may conquer one group, only to find that the same methodology is a complete failure with the next group. Those who do not take this into account and fail to change in time are trapped by their own success.

The first group to notice an innovation has but a few members. They are people who are interested in technology for its own sake, rather than in what can be done with technology. We are speaking about *technocrats*, enthusiastic and curious, whose tables and pockets are filled with all sorts of gizmos, but who are rarely decision-makers. The innovation only interests them as long as they are unfamiliar with it. Afterwards, they turn elsewhere and wait for the next innovation. Next in the process of adopting a technology comes those who see great *strategic opportunities* in the innovation, those who say "here's something that can put me ahead of the pack!" They think in terms of business rather than technology. They are daring and willing to take risks, but unfortunately they too are few in number.

Next comes a more populous group, the pragmatists of the *early majority.* They are not revolutionaries and are averse to taking risks. They wait for the technology to prove itself and for getting positive recom-

Fig. 2.
Geoffrey Moore's technology adoption model
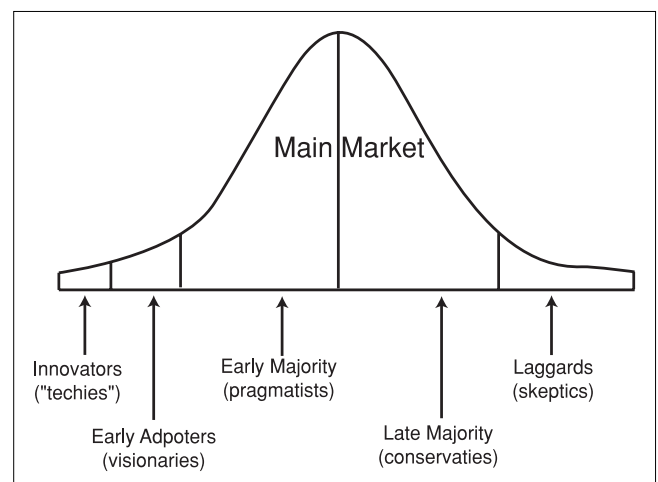
mendations. They believe their own eyes rather than "the hype". They are willing to learn and invest, but they do not want to be first at any cost. According to them, "the prairies are filled with pioneers with arrows in their back." They do not expect using the technology to result in radical changes or great leaps, and they prefer smaller and safer steps. They plan for expected profits, they are careful with expenses, and choose their suppliers carefully. They are numerous, and the first serious recommendations are likely to come from this group.

These recommendations are important, because the early majority is followed by the *late majority*. The typical member of this group favours inexpensive, tried-and-tested solutions. This group is won over by a technology's obvious benefits and ease-of-use. They wait patiently for the new technology to become a mass commodity, and then go shopping. They are wary of technology, perhaps even a bit afraid of it. They are reluctant to understand it, and would rather that the technology understand them. If they are frustrated, they quickly retreat and can lose their taste for the whole affair. They prefer simple, easily-understood solutions which they will stick to if things pan out. They don't want to build a generator in the basement, they want the electricity to come out of the socket: simple, cheap, and reliable.

If you still want to win more people over, the late majority is followed by a *laggards* group that you can set your sights on. It won't be easy. Members of this group question everything, and they will gleefully refer to failures (easy enough to find among IT projects). They will bring your attention to the often vast difference between the promises and realities of a technology. They frequently exclaim "the emperor has no clothes!" They are a tiresome lot, but there is much to learn from their observations, misgivings, and questions.

The classic marketing *lifecycle model* implicitly fits beside Geoffrey Moore's abovementioned model. It presents a simple, often-experienced pattern whereby the life of a product or product range sees a standard progression of phases one after the other: introduction, growth, maturity, and decline. It is easy to see the parallels between the two models. The freshly-introduced product at first only interests the technology-obsessed. Growth occurs as the visionary risk takers catch on, and expands with the early majority. The mature and proven market belongs to the late majority, and finally a few reluctant laggards may be won over.

And where is the info-communications industry as a whole in this adoption lifecycle model? Many indicators show that it is conquering the late majority, in the mature phase. The era of "garage-assembled" and difficult-to-handle machines is over. We were also witness to major strategic leaps: some of these visionaries sank in the storm, others (e.g. eBay, Dell, Amazon.com) are truly on the edge of modern technology. The early majority has already built their internal infrastructures, purchased and installed their systems, and, as mentioned, they are striving to increase their efficiency. Now is the time to win over the late majority, with a strategy and battle plan suited to a mature market.

The mass commodity rebellion

Mature markets are characterised by mass commodities, which is exactly what the late majority craves. Mass commodities are the basis and the engine of the upswing that followed the info-communications industry crisis, though this is not necessarily good news for everyone. However, market drivers such as consumer and small business products and services would never have developed without this.

A product that is to become a mass commodity must be standardised, inexpensive, easily replaced, easily learned, as well as compatible and connectable to most everything. And these happen to be the catch-phrases and developmental direction of the info-communications industry.

The leading product of the industry, the desktop computer, provides a good example of the process of becoming a mass commodity. In a relatively short time, the PC has become a standardised, easily installed, and simple-to-use product. Most run on the same operating system, the same microprocessors, and the same software. They can be connected to anything, especially one another, which was an early fundamental condition of the Internet. The prices have shrunk, and can no longer be considered a serious obstacle. They can be found in stores and plazas everywhere, just put them in your shopping cart.

The same thing is happening today to servers, work stations, as well as network and storage tools: the most popular of these are inexpensive, easily installed and upgraded. Google, the company behind the popular Internet search engine, bought its hardware off-the-shelf, based its system on older microprocessors, and used inexpensive or free open-source software. The newspapers are filled with the news of the huge sums saved by General Electric and Amazon.com with the purchase of inexpensive mass commodity IT equipment. Dell is positioning itself as a provider of computers for the masses and refocuses its cheaper product lines, while spending less on research and development that, for example, Sun.

One typical feature of the mass commodity orientation of the info-communications industry is "overdevelopment": products that are capable of far more that the average consumer expects from them. This explains why such leading companies as Google, GE, and Amazon.com can forego a constant push towards innovation and be satisfied with earlier generations of computers. Without the presence of "overdevelopment", Dell would be less successful as well, seeing as its cost-saving ploy is based on earlier technological innovation.

The concepts of "utility computing" [7] and "software on demand" are good symbols of a possible direction for mass commodification. In this way, with the participation of some significant players, the same thing may happen to IT as happened to water and electricity provision. Nowadays, nobody runs their own generator or waterworks when they can access a tap or electricity from a socket. According to the vision, future users won't purchase and install applications and systems for themselves, but rather rent a service from a "public utility" whenever they require something (for example, a customer relations management application). When the user begins using the product, the taxi meter starts running, and when the user turns it off the meter stops. The user need not worry about maintenance and development – just leave it to the service provider. This is an entirely new economic model than that of purchases and installation based on large investments and fixed budgets. There is a growing number of examples for this, including stock exchange hopeful Salesforce. com, Taleo and Right-Now Technologies who offer software over the Internet at roughly 65 USD per user per month.

The move towards mass commodities comes with some unpleasantness for representatives of the info-communications industry. Differentiation becomes more difficult, competition becomes more fierce, profit margins shrink and companies have to work much harder to achieve similar results. (Just look at the PC market: because of the simultaneous drop in prices, the boom in quantity meant only a small increase in turnover for manufacturers and retailers.) In spite of this, the process is self-perpetuating and unstoppable. The logic that we need to standardise, work with small units, make things compatible, avoid monopolies, distribute and spread everything throughout a wide sphere, and the ideas that we must be organised, that standard things must be handled in a standard fashion, etc. – all this is burned deep into the behaviour of the info-communications market, on the buyer-side and seller-side alike [11].

A typical response to cost-based competition and the move towards mass commodification is the urge to commence *factory-type operations,* which can be seen in many manufacturers and service providers. Take software development as an example. At the end of the 50s there were barely 20,000 software experts in the entire world. Today their number is estimated to be nearly nine million. Back when one had to work in machine language, writing software was a complicated and difficult process. Today, countless tools are at the disposal of software developers, making their work easier. As the software demands of companies become standardised and as software becomes increasingly modular, its development (at least a large part of its development) becomes increasingly like routine manufacturing. In this regard, software development migrates towards those parts of the world where such manufacturing activities are cheap and well-run. The global service model of Indian companies is predicated on this logic (e.g. Infosys, Wipro, Tata, and Satyam). Over the course

of a project the client must conduct the specific situational analysis, while the "manufacturing" is built up from modules by the inexpensive, well-organised, hinterland outfit...

"Land ahoy! Land!" – comes the cry once again from the crow's nest. It would be good to have a more precise map and to see more clearly, thinks the captain to himself. Then he goes to the bridge and gives out his orders. We'll see what happens. Come what may, we must sail...

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