

Towards the virtual economy

Ian Pearson, Futurologist, Aug 2007

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The birth of Cyberspace

Cyberspace was one of the great buzz-words of the early 1990s, when everyone in the IT industry was enthusiastic about the potential for meeting, playing, socializing, trading and working in virtual environments. We predicted a world where people would design and sell clothes for characters to wear in virtual worlds, where businesses would rent out space in virtual malls, and prime sites would sell for large sums. Since it didn't happen immediately, many people forgot all about it, and the term of cyberspace largely fell out of use and became passé. As such ideas were the foundations of some of my earliest predictions as a futurologist, I was beginning to despair that I had got it all wrong. BT and the BBC collaborated in 1997 on a project called The Mirror, which allowed thousands of people to share activities in a virtual reality environment, the fore-runner of on-line virtual environments such as Second Life and Habbo today. The industry dream has finally become reality, just a bit later than expected. Virtual worlds already present enormous business opportunities. People have been selling virtual objects, fashion and property for a few years, and the embryonic markets are starting to get noticed. Indeed, there are already signs that some early virtual environment sites are losing their fashionable status among young people, a sure sign of a maturing marketplace. Cyberspace has finally finished its gestation period and has been born. Yet it is still a mere baby. So where will this virtual economy go?

Ambient intelligence, smart environments

In a few years time, we will inhabit an ambient intelligent environment. There will be myriads of chips all around us, in building infrastructure, furniture, gadgets, clothes, foods, packaging, even on our skin and inside some peoples' bodies (for medical, cosmetic, sensory enhancement and security purposes). Chips in the environment or on our person will offer processing, storage, sensing identity and communications. The resulting smart environment will know who we are, what we are doing, where we are, to the nearest few millimeters, and all about us, subject only to our own preferences and privacy or security laws. Identity chips known as RFID tags (radio-frequency identity) will start replacing bar-codes in packaging over the next few years, and some will be used to add data to clothing, which might be intended for use by smart appliances in our homes – smart washing machines, dryers or irons. More likely, they will be used for sales and marketing purposes, allowing better stock control and sales processing efficiency. But these chips could be detected by shops well after the sale unless they are disabled, electronically linking the detection of a particular garment to the database records of the human being wearing it every time they go into that shop, or any other. Even though a shop might not know who the wearer is, the shopper can still be targeted by marketers just based on recognizing their trousers.

Digital air is a concept of using the full 3d space around us and adding digital data to the appropriate coordinates. Information can be tagged with a geo-location. Marketing information can float in a particular place, delivered to anyone walking through that space. Of course, it doesn't have to be the same all the time, it can be varied by time, profile, context or any other set of parameters. One of the more interesting aspects of this is that when the information is associated with a particular passer-by for whatever reason, it can be copied virtually onto their person, enabling the concept of 'sticky' data. This might then 'rub off' on other people that that person encounters. The marketing opportunities multiply enormously once we take into account the profiles of the numerous passers-by in a particular space, with their ongoing meetings throughout the day. The accuracy and power of marketing targeting could be increased enormously.

Of course, there is great potential for mixing digital games with augmented reality to provide further marketing opportunities. Discount vouchers could easily be pinned digitally to specific locations, and only exist at certain times under certain conditions, making shopping into something of a treasure hunt.

Augmented reality

Virtual reality is the use of computer generated images to allow people to wander around inside a computer generated world. Augmented reality is the overlaying of computer generated images or information in a person's field of view as they wander around the physical world. It is virtual reality inside out. Certain kinds of geographically overlaid information can be accessed via a mobile phone or PDA, but augmented reality will only achieve its potential when people routinely wear some sort of head up display. Such displays already exist, and are likely to take off over the next few years as people take games and videos with them more often. Once there, these displays can be used for email, navigation, internet access, games, video communications and of course augmented and virtual reality applications. Ambient intelligence is useful regardless of the interface type, but augmented reality might well be one of the main interfaces through which people use ambient intelligence. The scope for augmented reality goes much further than just visualizing ambient intelligence though, and the following sections explore some of the other related markets.

Digital bubbles and Socialisation

The smart environment could offer many advantages and disadvantages for people. Wireless web servers could be built into digital jewellery, radiating information about ourselves into the space around us as we walk around. This information could then be seen by others in their head up displays, Fig 1. Many people want to broadcast information about themselves, which they do on web sites today. Tomorrow a wireless web server, or 'ego badge' can do that on the go as part of digital bubble functionality. Ego badges allow people's personal information to be automatically analysed and correlated by computer. Our computers will electronically 'speed date' with every person we pass in the street, alerting us only when we meet someone whose profile matches to a point where we have both consented to an introduction, fig 2. This could be for social or business reasons. This can be fully context sensitive, responding to our emotional or medical state, as well as to whom the other person is. In some cases, the person nearby might act merely as a gateway to enable a contact to someone else in their social or business network.

Our digital bubbles will interact not only with then fixed environment, but with the bubbles of other people. They will exchange information with them, very selectively, and iteratively.

Some of the people introduced in this way may not exist at all, but merely be players in cyberspace, such as games characters, or chat room style alter egos. In the extreme case, a little girl's dolls may be introduced to someone else's dolls, even without the girls being aware. Virtual soap operas among virtual characters and dolls might emerge, with just an occasional human playing a cameo role.

Socialisation in virtual space is already a big business. This will transfer nicely into the 'real' world via augmented reality.

Of course, this digital bubble idea can apply equally well to objects and shops as well as people. Potential abuse by marketing departments will necessitate the filtering that protects us from the flood of unwanted electronic information coming at us from all angles. These bubbles will act as an electronic force field, and personal firewall. But of course we will want some information and want to communicate to some degree with the smart environment, so it must be a semi-permeable force field that allows information through it selectively. What we want and need depends heavily on context, so large amounts of AI, security and profiling technology will be needed.

Duality of appearance

Various sensors on and about our person will monitor our behaviors and physical characteristics, and respond accordingly. Our computers may learn and share some of our personality characteristics with other people's computers. An ego badge could alert us to other people that are likely to be of interest to us, whether for business, political, social or sexual purposes. A related device is the active contact lens, fig 3, which uses tiny lasers and micro-mirrors built into a contact lens with circuitry and power supply, to raster scan a high resolution image onto our retinas. This is called direct retinal projection. Of course, this will be accomplished much earlier in smart glasses format.

Any computer generated images could be superimposed on what we see in the real world. We would be able to modify how we see other people so when you meet people you could change how they look. Beauty will be quite literally in the eye of the beholder.

This brings us to the heart of how fashion will change. Suddenly we have to worry about our digital appearance as well as our physical appearance. And digital appearances can be infinitely diverse. We will not be limited by the properties of physical materials, or have to have the same appearance for everyone looking at us, nor even have the same appearance all day. Our appearance can be different to each viewer, and different each time they look at us. So fashion designers will need to design virtual fashions, and these will need to be dynamic and context sensitive. Dual appearance dictates dual fashion. Interactive fashion is an interesting possibility, where appearances of groups of people interact with each other. This will make groups visually interesting, and might also be used to mark out tribal indentities.

One of the functions that we might need in such a world is the digital 'aura generator', one of many functions built in to our digital jewellery, fig 4. This will act as part of the wireless web server that radiates our digital appearance into the nearby space. It is conceptually similar to the hologram generators that science fiction fans will recognise from Red Dwarf. The main difference is that it will make us look different to different people. People will use a range of tools to customize their digital appearances for the many digital worlds in which they will interact. One of the tools people may

use to customize their digital appearance is the digital bathroom mirror, fig 5. This would be an interactive device that allows someone to see their digital appearance, and to edit it using various graphics tools and virtual make-up until they are happy.

Fashion for the virtual world will undoubtedly evolve different rules and conventions. Even without any of the physical constraints of the real world, design cultures will nevertheless emerge. How will people choose to display themselves when they have an infinite choice? Will appearance fashions come and go more or less quickly in cyberspace? How much will they depend on age, gender, race and so on? Sadly, details of these future cultures are far beyond my ability to predict. All that is clear is that when anything is possible, only some things will be done.

One thing that is obvious is that people will use digital appearance to market themselves in business terms as well as socially. People's visual appearance is ultimately just another marketing platform. The prospect of seeing people in Tesco's with adverts playing on them is not attractive, but is likely. T-shirts often do exactly that today with static logos, tomorrow they will use video and interactivity too.

Dual architecture

Duality of appearance will also apply to architecture, where buildings may appear one way in the physical world, and have a whole range of digital appearances in the augmented reality and virtual environment worlds, fig 6. These new worlds will need to be designed, and new tools that use artificial intelligence, coupled to local manufacturing, are likely to mean that much of the future design can and will be done by ordinary people themselves – it doesn't have to be done necessarily by professional architects or designers. But how much this affects the market for professional designers will depend on how much relative skill and creativity they really have, as well as on how much effort people can be bothered to invest in designing themselves.

Dual architectures will interact strongly with the economy, especially in marketing, but also in areas such as security, transaction processing and provision of virtual marketplaces. Geographic areas of towns and cities, shops and malls could be used for specific purposes simply by adding virtual overlays, without any need for change of the physical environment. There are already examples of physical hotels that provide physical meeting places for business interaction associated with the virtual worlds. We will see many more such ventures. The boundaries between real and virtual will blur greatly over coming years.

Invisible as the new black

As dual architecture emerges, invisibility will become the peak of cool. There is likely to be a whole new architectural style based on hiding appearance in the virtual world, using plain or conservative buildings that suddenly become visible in the duality view, but only to selected people. They will remain invisible to those not in that select group. The branding potential for this is huge. Buildings will be designed deliberately to be extremely plain in the physical world, and also appear to people in the dual world as very plain unless they are in the select target group, such as members or the 'right' customers. The buildings will be therefore almost invisible to people outside of this select group. That only some specific people can see the 'true' hidden identity of the places and the proper appearance will make them highly desirable.

A similar effect can exist in the audio world, which of course is also potentially virtual. The elite might hear information as they walk around that other people will not hear.

Virtual environments

As we get used to digital fashion on the high street, we will also begin using virtual environments for communications. Any environment can be digitally emulated by a computer, and we can meet other people in these environments. They may also be inhabited by machine personalities too. Again, these environments have to be designed, as do the many processes and rituals that will be used.

Active skin might make it possible to record the nerve signals associated with any sensation and to replay those signals later to recreate the sensation, fig 7. Imagine recording a hand shake, or a kiss. In fact, this nerve linking technology allows sensations to be treated like any other computer data. They could be modified and enhanced, transmitted across a network or translated into another kind of sensation altogether. We could have a much closer link to our computers than we have today. And because these sensory signals can be processed and modified, there will be some areas that are open to meddling by designers. We could redesign the human sensory system, or that of our pets. We could make distributed senses, so that you can experience something that someone else is experiencing. We could certainly design our virtual partners, including their synthetic personalities in the future to match our wildest fantasies. And of course we can blend any mixture of real and virtual sensing into real sensation.

In principle, any physical sensation is just a series of nerve signals, and this could be initiated by the computer as a response to any physical act. So just as form is decoupled from function in our gadgetry, so even sexual response could be totally decoupled from stimulus in principle. An orgasm could be triggered by typing a capital O on your mobile phone, or sensations could be included as just another emoticon in a text message. In fact, Samsung have already released a mobile phone that allows a range of different vibrations to be included in messages. Linking directly to the nervous system is far away but is a natural progression of this type of service.

Virtual environments are a whole new domain for human activities, and many of the markets that exist in the physical world will have echoes in virtual worlds, fig 8. We will certainly see a lot of virtual shopping malls, virtual tourism, meeting places, fantasy games and exploration, creativity enhancement, relaxation and therapy, as well as virtual replicas of the real world. Interesting places in virtual environments will attract visitors, so they have a real commercial value, as is already being demonstrated by sales of virtual real estate. Although cyberspace is infinite, human creativity is limited, so there will remain a premium on those sites designed by people with the most lucrative imaginations. There will be a large mass of mediocre cyberspace, which people will generally ignore in favour of those areas that are more compelling.

Marketing

Of course companies will make very good use of virtual environments, dual architectures, augmented reality and digital bubbles. These offer much more attractive, more personalized, better targeted channels to customers than the broadcast marketing we mostly see today. Digital bubbles will work very well with pull advertising, giving customers information that they actually want when

they want it. This will reduce the annoyance level from advertising while increasing success rates. Many companies are already analyzing the potential of this field.

Navigation

It was obvious from the earliest days of superhighway concepts that people would need ways of finding things so companies would flourish if they offered good search or indexing tools. The value of both Google and Yahoo now proves this. Both virtual environments and augmented reality will need search and navigation tools too, and the nature of these will be a combination of geographic navigation and information search, as well as reputation. Navigation companies such as Tomtom will compete with mapping companies such as multimap and streetmap, search companies like Google and reputation-based and community-based sites such as ebay, but of course there will be many other competitors too. Mergers among these will result in some very powerful companies indeed that span markets in both physical and virtual worlds. The physical interface to such tools could be either via head up displays or via active skin, using video tattoos, displays printed directly onto the skin surface or onto thin stick-on polymer membranes, fig 9.

On the other hand, it is entirely possible that navigation could be based on open source tools, with the reputation and community being owned by the web community itself. There need not be any large companies at all to make it work, in principle. However, history repeatedly shows that markets that start off as community ware quickly become captured by professionals. People will always want to use a better product, better products are made by more skillful people, and most skillful people eventually capitalize on their skills. Virtual markets are still governed by real economics.

Where people will retain the power is in the grass-roots nature of reputation. Ebay lists reputations so that new buyers and sellers can decide whom to deal with, and those reputations come from previous users thereby cultivating levels of real trust that can't be produced by simple marketing. The next Google (or possibly one of the next things Google does itself) will be a company that enables searches to be qualified by trust and reputation. Because of the lack of real sensory presence, trust and reputation are even more important in cyberspace than in the physical world, and they ultimately depend on real customer assessments. So the customer remains king, but the world will still be owned by big companies. No change there then!

Meeting places

Getting people together so that you can sell to them is one of the areas of virtual environments that is already maturing. It is obvious from the first days of the web that 'eyeballs' count. Keeping those eyeballs on a site was the main goal of most web designers and is now the main goal of virtual environment designers. People are competing heavily to provide the most attractive places for people to hang out, so that they can sell their presence to people who want to market to them. It is just 21c advertising. Simplistically, the virtual environment substitutes for the time people used to spend watching TV adverts.

Since many people adopt many different personae on-line, the value of their presence does not just depend on the person, but which instance of their various personae they are in at the time. Multiple identities for each person must therefore be supported on marketing databases. Also, shared identities and group identities, roles and transient identities must be taken into account.

On-line meeting places designed around virtual environments appeal to different users. Habbo for example is aimed at 10-14 year olds, while Second Life is aimed more at young adults and Facebook is slowly migrating now from a student site to a young adult site. This differential targeting aligns well with normal marketing practice. Another social networking site, Myspace, owned by Rupert Murdoch, is designed around personal profiles, avatars and simple chat rather than rich pseudo-geographic environments. Other virtual environments appeal to people in different geographical regions.

Like many other areas of culture, there are fashions for such sites and some of the early socialization sites are already passing their fashion peaks. Youth culture is especially volatile and sites will come and go in popularity with this group very quickly.

Where is the money?

Understanding the market opportunities in the virtual economy starts with recognizing that a virtual environment can really be a whole parallel world. The same ways that people make money in the real world have echoes in virtual worlds.

In fact, starting with basic human needs, physical security, clothing, food and accommodation will remain mainly real world domains. However, the upper layers of Maslow's hierarchy of human needs offer great potential, fig 10. Self actualization does not have to involve a physical real world process, nor socialization, status or even sex (to a point). In fact, achieving high peer group status without the overheads of having to maintain an expensive boat or car is an attractive possibility. Even the embryonic virtual environments of today have proven that people are prepared to pay handsomely for totally virtual things that fill the same deeply ingrained psychological needs.

Platforms on which people can build their businesses are an obvious source of revenue, fig 11. Platforms can be at various abstraction levels, from the basic network and server infrastructure at the bottom to ready made virtual shopping malls or auctions with all the commerce tools already plugged in at the top. People can therefore enter with various levels of expertise, selling stuff on someone else's market stall, or designing, implementing and running the markets themselves. Owning environments is therefore a good way of controlling a whole sub-economy and selling platforms and tools at every abstraction layer above. Security, cash, provision and even design of currencies, with management and currency conversion are obvious emergents.

Social spaces, where people meet and socialize, are one of the main components of virtual worlds. Although socializing does not in itself generate money, allowing people to find each other, profiling people, introducing people to potential partners, providing dating services, and advertising or providing other services to people while they are there.

People can be attracted to particular spaces because of appearance, content, access to services or activities, or access to other people, or any mixture of these. There is heavy competition to provide exciting environments to attract people, such as nice islands, beach fronts and so on. Sought after spaces such as beach fronts also give people a means to show status. Skilful property development and marketing can make such properties valuable.

Premium locations will attract more visitors and can therefore attract more advertising and service revenue. People already get paid to hang out in premium places just so that their owners can sell

their presence to other service providers. Consequently, site providers need to verify that people are actually present so often use tricks such as monitoring key clicks and timing people out if there is no activity, so naturally, a black market has also emerged for tools to persuade computers that people are physically present when they are actually not. Companies that can provide trusted environments with proper verification and monitoring will presumably attract more sustainable revenue. Supporting user interaction within these spaces is also a market. This will include routine transaction services but also things like translation, recording and so on.

Image consulting, management and maintenance can be sold too. People might not have time or skill to look after their own image with all the enormous potential variants for all kinds of on-line spaces and purposes. Companies that can automate such services could find a large market. Persona management is not likely to be a major service but will certainly have a significant niche. Personal marketing is a growing business in the real world, as is image consultancy and other forms of lifestyle consultancy. The can apply just as much, or even more in the virtual world. A more interesting variant of this is that in the virtual world, it is much easier to substitute for someone than in the real world. A computer that can learn over time how someone behaves can learn to emulate them to a reasonable level of convincingness.

Virtual entities though are a new market and one which shows huge potential. We are long accustomed to the use of avatars on web sites and even TV now. However, future TV is likely to be more personalised and it is possible for a virtual host to appear very differently to different viewers, even delivering content using different languages to different viewers. For this reason, our BT timeline long ago suggested that the world's most valuable TV host will be virtual by 2010. I still believe we are on schedule for that. People are the same to everyone, and a particular presenter might put a particular viewer off watching a programme, where another might make it work well for that viewer. If the presenter were a virtual entity with a selectable appearance and manner, this might make shows palatable for many more viewers. TV channels will have to start using this kind of personalization to increase advertising revenue again. Virtual entities are transportable across a wide range of media, and also don't suffer from shortage of supply. There is only one of each human celebrity, whereas a virtual entity can be in many places at once. Interactive TV, fig 12, is therefore likely to be a big market once personalization is fully taken into account.

As with other areas, there will be some convergence between humans and virtual entities. People already choose avatars to represent themselves and may have several in virtual environments. Digital bubbles will project these into the augmented reality too. However, there is no serious technology barrier to enabling people to blur their projected personality and appearance with that of a virtual entity. This effectively extends the range of their real personality, and changes their personal branding. Personality augmentation might become popular. Collective personality is another possibility, where groups of people can blur the boundaries between their on-line personae and augmented reality personae. This might be popular particularly with groups of kids, whose tribal identity can be almost as important to them as their own individuality. Tribal support services that facilitate interactions between members of groups will become more significant too. Instant voice messaging is an obvious service that we could provide. Showing people where other members of their group are in the real world is another one, and could easily be done using a mobile phone display.

In the augmented reality world, there is huge scope for many kinds of virtual entities to enhance the environment. Digital fauna and flora, aliens, digital shadows, virtual people, all can enhance the atmosphere of an environment. We should expect that future shopping will involve interacting with a wide range of these.

Marketing and branding follow quickly behind, applying to corporate as well as personal. Even governmental image is important.

A wide range of support services can be provided on these platforms such as identification, transaction recording, clearing, currency exchange. Each of these layers offers revenue potential, leading to a five domain view of the future telecoms marketplace, fig 13. The list is almost endless and is equivalent to the business support services in the real world. Service provision to occupants can also include communications, including translation. Although people can see each other on the screen, high quality telecoms services can easily be linked to these environments.

Trust brokering is one of the most important services on-line. When people don't know each other in the real world, there is a lot of value-add in being able to demonstrate their trustworthiness by means of trusted 3rd party recommendation.

Tools for designing environments, artifacts and personal appearance are also likely to be a big revenue source. People are naturally creative, but most people don't have high levels of artistic or technical skill so tools that cultivate and augment their natural creativity are important. Allowing people to indulge their creativity is a primary entertainment application. People enjoy creating virtual worlds.

Electronic cash is another important service in virtual worlds, and already there are exchanges between virtual and real cash forms. Taking these and linking them to all the other forms of cash that exist in our modern world, we can see that there are lots of lucrative opportunities in making electronic cash forms that are versatile enough to transport across these many environments, fig 14.

Linking between cultural media offers blurring of boundaries, which often creates new kinds of markets. Virtual worlds have a large common ground with multiplayer gaming, and this makes them a good place to start converging other media, such as magazines, video, music, concerts, plays... just about any service that can be delivered electronically.

History and archiving are important in virtual worlds as in the real world. People like to keep photos and videos to remind them of pleasant experiences. There is a market for virtual photos and videos too, electronic journals, even 'black box' services. These would be useful particularly for business where it is often useful to have a full record of activity for legal, business or personal reasons.

Education could benefit hugely. Teachers could take kids round Stonehenge as it was 5000 years ago and let them join in a druid festival. The use of such tools will give kids a 'first hand' experience rather than dull textbooks and improve their learning dramatically, fig 15. Business training can often benefit from similar technology too.

Exploration is a proven market. People want to explore both real and virtual worlds, and blurring the boundaries between these might make it even more popular. Real world geography can be changed in the virtual, world representation to put attractive locations together and make themed tours, rather than having to go through all the dull stuff to get to what you want.

Real world video sales are an obvious spin-off from this. Large displays in people's homes might as well act as virtual windows when they are not being used for anything else, and there will be a market for both real-time and recorded video of real and virtual places.

Much of this paper has considered dual environments. The ability to use the real world as a platform for physically navigating through virtual environments is a highly attractive market. The virtual environments can include anything in the real world of course, so this also means that real world locations can be used to explore other real world locations too. We may see supermarkets being produced with the same physical layouts so that customers can shop through virtual layers at the same time as they shop for real goods. Or I could shop in Tesco's in Watford by walking through one in Martlesham. Art galleries can use real world streets as extra display space, or the walls of any building. They don't even need the permission of the owners under today's law. Given that galleries can only ever have a tiny fraction of their total collections on display, this is attractive possibility to them. It also opens up the possibility for many more artists to be exhibited. There are hundred of good amateur artists for every professional who makes it into a public art gallery. People may be prepared to pay to have their works hosted in dual environments.

Summary

The virtual economy will become very large, simply because it offers so much potential to improve so many aspects of our lives. As our wealth increases, there is a higher proportion available to pay for non-physical stuff, so the virtual economy has potential for enormous growth even without substituting for real world expenditure.

The virtual economy is an ideal target for telecoms companies that can provide professional class platforms. As well as the obvious networking requirements, security, transaction processing, software interfacing, media compression, displays, positioning, ambient intelligence, augmented reality, artificial intelligence, avatars, voice recognition, synthesis and mobility are all potential markets. As we migrate into the augmented reality world, these markets will become even more lucrative.

Biography

Ian Pearson graduated in Maths and Physics from [Queens University, Belfast](#). After four years in missile design, he joined BT Labs as a performance engineer, and has since worked in areas from chip design to mobile telephony. He currently works as BT's futurologist, studying the future of technology and its likely implications across the whole of industry, government and society. He spends a lot of time at conferences and talking to the media, but he still dabbles in research. He is a fellow of the British Computer Society, the World Academy of Art and Science, the Royal Society of Arts, the World Innovation Foundation, and the Institute of Nanotechnology.