Interview with a Guru

Our Science and Technology correspondent softbot recently caught up with Jose Alvares-Chang, best selling author and futurologist. Dr Alvares-Chang book "The Next Fifty Years" first published in 2002, remains one of the most incisive and accurate 'crystal-balling' books ever written.

Softbot:

Looking back, what would you say was the major catalyst for the rapid changes that took place over the last half century?

A-C:

Without doubt the availability of limitless and almost free computer power did more than anything else to ensure that human progress in the last fifty years was an order of magnitude more than that of the last fifty thousand! More powerful computers certainly helped (remember Moore's law), but it was the development of a micro-payments system coupled with free bandwidth that allowed us to tap into the combined power of the billions of computers on the Supernet. Almost every citizen in the developed world now allows spare processing cycles on his computers to be used for research and engineering by the knowledge brokers. The power available in ten billion massively parallel computers defies imagination. It means that anything already discovered or can be calculated is available almost immediately to whoever needs it. The construction of the radio micro-cellular networks allowed this infinite bandwidth to also be available to mobile devices. In theory, every parked car, every idle fridge or washing machine is as available to the network as the many discrete computers we all seem have in every room or office.

Softbot:

That may be so, but some people argue it was the final development of superconductors or the biotech revolution that deserve most credit.

A-C:

I disagree. With infinite computer power we could model the behaviour of materials at the molecular level with high accuracy. Superconductors at room temperature were simply designed just like we can design any material to meet any specifications however stringent. Same applies to biotech. We can model and therefore design viruses and bacteria to perform any biological function.

Softbot:

Let's discuss superconductors and the global changes that resulted.

A-C:

With superconductors the transmission of electric energy is lossless. This has finally destroyed the tyranny of distance as far as power generation and consumption is concerned. The network of superconductor cables now rivals that of the fibre-optic one. It reaches all corners of the globe. It allowed the mammoth gas-fired power stations of the Middle East and the nuclear power plants in the Australian desert to power the world. Now you just construct as large a station as you can where the fuel is or where the local environmental

or political regulations allow it. Also, there is extra efficiency resulting from the ability to do load balancing on a global scale. In real terms, electric energy now costs a quarter of what it did at the beginning of the century. The trend to micro-generation of power apparent in the early noughties was reversed. The small players are no longer significant in the generation game.

Softbot:

What of the impact of this global network on green power?

A-C:

Cheaper power has reduced the drive to greener power generation technologies. The success stories are the huge hydroelectric projects in China and geothermal stations in Iceland. Solar power remains a niche market. Fuel cells have been a disappointment as expected. There was never any real rationale for fuel cells as you know.

Softbot:

But the effect on power generation is only one aspect of the impact of superconductors.

A-C:

True. Another area of equal importance is its effect on transportation. Magnetic levitation became practical about 2015. Now, when we married intelligent controllers, the demands of trading on the Supernet, cheap energy and fast levitation, we ended with a few million unmanned mini-containers travelling at hundreds of kilometres per hours and linking all the major cities in the world. The network of small tunnels in Europe or the monorails across Siberia and into the Americas still amaze me as a marvel of engineering of the first degree. A car assembler in Argentina can now operate a just-in-time manufacturing regime even when his parts suppliers are in China and his engines come from Stuttgart.

Softbot:

This was predicted in your book. Are there aspects of the transport industry that really surprised you?

A-C:

Yes, the widespread use of nuclear batteries to power the small delivery carts that seem to clog our streets nowadays. I predicted the development of these safe batteries, but I assumed that their use would be restricted to stop their enriched plutonium falling into the wrong hands. I underestimated the market ingenuity in coming with solutions once an economic rationale was there. I therefore did not see the, now obvious, solution of including a micro-transmitter in each battery constantly transmitting its position and automatically raising an alarm when the battery is tampered with or there is an attempt to move it beyond the prescribed city or neighbourhood limits. By constantly communicating with the micro-cellular network, the position of each individual battery is known to a few meters as well as the identity of the persons last close to it.

Softbot:

Now that you mention it, you became quite notorious when you first advocated this constant surveillance of people by the use of implanted micro-transmitters.

A-C:

I did not advocate it *per se*. I advocated the use of digital ID's with built-in transmitters and worn like a bracelet as a way of getting rid of the many forms of identification that were required in the early noughties. It struck me as an elegant solution that allowed a person to do the shopping, withdraw money from a bank, drive a car or enter a secure office or home with the minimum of hassle. Now, once private security and insurance companies used similar devices to tag the more expensive cars, art works and the like and used the cellular network to report on their position, it was a small step for the bureaucrats to demand that government employees, ex-convicts and important politicians wear them all the time. Ever-smaller units were then designed as an implant under the skin. The use of such implants became common when they became a prerequisite for obtaining a foreign visa or working in any of the so-called sensitive industries. The rest is history. I still think it was a regrettable invasion of privacy when it was mandated that all school children get such an implant on their first day at school.

Softbot:

Let's go back to transport and these electric carts.

A-C:

The development of Internet, and later Supernet, trading created a need for efficient and flexible transport mechanism. There is no point finding an efficient supplier on the other side of the globe, if you then have to pay over the odds for delivery. The solution of course came in the shape of the intelligent levitation mini-containers linking the major hubs and the electric carts forming the spokes. Powerful computers and artificial intelligence software provide the control and administrative layer. Those among your readers, who are my age, may remember the packet-switching information networks of the late twentieth century, as the model for what is effectively a pallet switching transport system.

Softbot:

That is an interesting analogy. Now what about cars? Were you surprised by their continuing popularity?

A-C:

Of course not. Cars and the mobility and freedom they confer are simply too important for the human spirit. The restrictions on electric carts with their nuclear batteries and the refinement of small turbine engines still make cars the ideal choice for personal mobility. What really surprised me though is how fast the car making industry have imploded. Let me sidetrack for a moment and talk about modular production technology. Cheap and available electric energy and smart and very cheap machine tools allowed the millions of small factories, we now take for granted, to sprout everywhere. It was obvious to the farsighted manufacturers early in the century that they can make more profit with smaller capital requirements if they simply shipped the parts that needed their competitive know-how to these small manufacturers who then assembled the final product to suit local market conditions. Why ship, say, a detergent, which is mostly water across the globe when you can ship the cleaning chemicals to a local vendor who then adds water and the locally preferred scents. Car manufacturers used this model. They first bought their parts from small manufacturers in places like China or Brazil. Then they encouraged local entrepreneurs to assemble their cars for them and take care of local preferences. They were meticulous with the creation of standard

interfaces to allow all these components to work together. Well, it was a small step for some of these entrepreneurs to decide they could assemble their own cars using these components and parts. They became like the no-name computer clone makers of the early century. Car companies effectively became design bureaus selling their intellectual property. Very few high-end makers survived by providing extra services with their cars. Thus you have the total package high-end cars with the lifetime warranties and free service, with the integrated virtual reality entertainment systems including free program upgrades and even those with lifetime insurance and registration with security companies.

Softbot:

Even with the survival of fossil fuel cars one would have thought that gas-fired and nuclear power plants would have spelled the end for most of our oil companies. This did not happen.

A-C:

No, it did not. Quite the contrary, they continue to thrive. One reason of course is that they diversified early on and became integrated energy suppliers. Why sell fuel to a power station when you can sell power directly to the consumer yourself by linking to the superconductor network. Also, our ability to design bacteria tailor-made to convert crude oil into food created a new and huge market for oil. Most oil now is used as a chemical feedstock and, literary, as feedstock to these bacteria farms. An important side benefit of these farms is they reduced demand for normally grown foodstuffs allowing still scarce water resources to be diverted away from traditional agriculture. For practical purposes the world is no longer short of fresh water.

Softbot:

Designer bugs as they are popularly known are not limited in their applications to oil-for-food production.

A-C:

Not at all. Designer bacteria are used to control pests, convert toxic waste to less harmful forms and as chemical factories working on transforming raw materials to more industrially useful compounds. Designer viruses are used to carry replacement genetic material to deep inside the body. While we have not conquered all genetic defects we have come a long way to reducing their adverse effects. The quality of life for untold millions has dramatically improved as a result. Of course, the major advances in nano technology and the easy availability of nanobot surgeons working on things like removing arterial blockages or repairing nerve endings help.

Softbot:

A lot of Africans do not share your enthusiasm for designer bugs.

A-C:

I guess not. It should have been obvious to the politicians in the early noughties that the then artificial borders in Africa were not going to last. They should have fixed these borders even at the price of a few limited wars. By not doing so, many tribal-based organizations availed themselves of the cheap genetic engineering technologies and unleashed new deadly plagues on their enemies in their attempts at redrawing those borders. Of course, once unleashed, biological weapons are not easily leashed. By the time the rest of the world had designed the drugs necessary to contain these plagues,

Africa had lost over 50% of its people. Population losses in the Middle East and Europe were not insignificant either. About the only bright side of this sorry episode is the new global watch for exotic diseases. Whenever a new bug is discovered, its genetic material is immediately sequenced and an effective drug is designed and released within a day.

Softbot:

Now that we have touched on some of the political changes, albeit in Africa, what about closer to home?

A-C:

The changes in the way the developed world, now comprising three fifths of humanity, is governed have been dramatic. The universal use of digital machine-readable ID's and the ubiquitous Supernet, have allowed regular and frequent referenda. Most major issues of the day are decided in the weekly referendum. This is sort of a hi-tech version of the old Swiss tradition. I was almost alone in advocating this system at the beginning. Most commentators at the time were worried that extremist groups will hijack the decision making process as the silent majority will remain, well, silent and not bother to vote. The solution was beautiful in its simplicity. Voting changed from being a right of the citizen to being a duty. Heavy fines were imposed on those not bothering to vote. The silent majority has finally spoken.

Softbot:

What about the processes of government and the faceless bureaucrats?

A-C:

An amazing thing happened. Most of the administration of the government is now done electronically by softbots like you who can read the citizens' digital ID, refer to his complete history online and make the necessary decisions. Human officers are only needed in cases of dispute or appeal. The days of forms in triplicate are long gone and governments are now a model of efficiency.

Softbot:

Thanks for the compliment. Efficient or not governments still need taxes.

A-C:

Alas, this is true. In a Supernet economy with suppliers half way around the globe and most people working for themselves producing 'soft' products like entertainment content or acting as knowledge or goods brokers, traditional methods of taxation no longer worked. Governments were forced to tax the essential services they could see. Thus most of the tax receipts are from taxes on fuel and power consumption and levies on transport carts and mini-container tunnels and tracks. Real estate taxes make up the difference. Some form of user-pays is now used for almost all of government services.

Softbot:

You just mentioned entertainment content. This may be a good point to comment on the changes in the nature of entertainment.

A-C:

Well, the changes were mainly due to the perfection of virtual reality experiences. Holosuits, named after the Holodeck in the old science fiction series of Star Trek, provide their wearers with a sensory environment

complete with scents and tactile responses. Some even use nanobots inserted in the body to fire groups of nerve endings and provide more of the so-called holistic experience. The ability to experience the full range of social interaction without leaving home is causing a worrying trend where some rich people take a perverse pride in not having to meet another person in the flesh. We seem to be getting a new class of happy anti-social hermits. Of course, the 3-day working week and unprecedented prosperity means people have more idle time available and thus more demand for entertainment products.

Softbot:

What about the effect of virtual reality experiences on the family. Some are predicting the end of the male-female pairing as we know it.

A-C:

Obviously you are referring to sexual virtual experiences. So far the human need for companionship has proved sufficient to maintain marriages, legal and de facto, as the predominant form of long-term relationships. Some marriage councillors are even suggesting sharing the occasional virtual experience with your partner can be beneficial to your relationship. There is also a large body of legal precedent that determined having virtual relationships with other people is not adultery in the legal sense.

Softbot:

I appreciate we are running out of time as you plan to have a Supernet conference with the science advisors of the European Union and the Asian Co-prosperity Confederation. In a few short sentences, how would you describe the last fifty years?

A-C:

They were the age of contrasts. We have mammoth power stations and millions of very small manufacturers. Unprecedented wealth in the developed world and unprecedented misery in post-war Africa. Unbelievable potential for enhancing inter-personal interaction with potential for the creation of a new class of hermits. The list goes on. However, I am very optimistic about the future. I am ninety years old, in excellent health and plan to fully enjoy the next twenty-five or so years!

Softbot:

Dr Alvares-Chang, thank you for your time.