



"We should recognise that there will be mistakes, and there will be hazards. On the other hand, there's a possibility that the value of nanotechnology will be overwhelming. For me, it is the science of the 21st century" - Professor Harry Kroto.

The successful marriage of both biotechnology and nanotechnology will be the most rewarding and medically promising field of science in our time. And destined to become the principal technology used for future diagnosis, treatment and disease prevention.

The convergence and use of these scientific disciplines will focus on treatment versus prevention and put an end to a rudimentary health care system, shifting profit from treatment and into the hands of enlightened insurance providers, pharmaceutical companies and international data collection agencies.

Subsequently, resource efficiency, company profits and consumer expectations regarding quality of life will drive this emerging science and ensure its future success. It will, however, come with ethical, moral and hazardous risks and governments must contemplate and legislate for the risks and benefits this emerging technology will offer.

Nonetheless, "Nano-medicine" will expand into a multi trillion-dollar industry, and though the potential applications of "Nano-medicine" is interminable, the inevitable effect on the current medical industry model and its profits will be catastrophic.

Dinosaur pharmaceutical companies:

Cumbrous and belligerent pharmaceutical companies that defend their high profit, high volume traditional blockbuster drugs with considerable financial leverage and coercion of governments, will be first on the chopping block. They will make themselves known when their wealthy propaganda machines go to work on defending their immoral, financial and technical monopolies.

This defensive approach against disruptive change will end with the destruction of shareholder value, and the slow demise of profitable companies.

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On the other hand, pharmaceutical companies that undertake Microsoft's successful growth model will excel and survive. Admittedly, no short-term commercial incentive for belligerent pharmaceutical companies to transition from their current business models of providing billion-dollar blockbusting drugs exist.

However, innovative companies with a positive growth mindset and a disposition to increase shareholder value will be looking to acquire small to medium-sized biotechnology enterprises to exploit and market their R&D.

As a consequence, companies such as Google, Apple and Microsoft are positioning themselves to become market leaders in "Nano-medicine" to take full advantage of the financial rewards, (revenue growth and greater profit margins) open to the innovative adopters of disruptive technology.

This clever strategy of combining information technology companies and the "internet of things" (IoT) with "Nano-medicine" will ensure that personalised medicine will be at the forefront of modern treatment, thus increasing the cost-effectiveness and prompt delivery of treatment to the consumer. This innovative business model will be the Achilles-heel of cumbersome pharmaceutical companies and will guarantee their swift demise.

Redundant gatekeepers:

Statistical based data mining and machine learning linked to dependent variables will be the next set of tools used to undermine the importance and financial status of an outdated and cloistered medical profession.

Insurance companies, common law and template strategies have gained corporate control, ensuring that the delivery of treatment by healthcare corporations have been in the best interests of their shareholders and rarely the patients under their care.

Consequently, this business model has diminished their power and influence while unsympathetic governments and multinational companies position themselves to overwhelm the traditional business model (treatment of disease) with public impunity.

The reputational damage and the continuous infractions (medical errors, conflicting diagnoses and misaligned incentives) will leave the medical industry with little or no defence against rationalisation.

Additionally, data mining and machine learning will identify diseases, operational and systemic deficiencies with the sole aim of designing appropriate interventions and cost effective patient care. Nurses and Paramedics enabled with advanced tools (millions of data points will go into diagnosing chronic diseases and importantly, the continual monitoring of interventions) will replace many functions doctors and specialist perform today.

Ultimately, the guardians of outdated and cloistered medical traditions have become obsolete and powerless, as governments and multinational companies circumvent their stranglehold on traditions designed to empower and enrich their status.

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Game changer:

The fundamental keystone for change, will be wireless enabled integrated biosensors that offer the possibility of continuous monitoring of biologically relevant variables in real time.

These biosensors will appear in three waves as the various technologies advance, starting with hand-held, wearable and implantable.

- **Hand-Held:**

Apps created for mobile communication devices have entered the field with the deflationary effect of turning \$200 dollar devices into accurate \$50,000 lab spectrophotometers. Accordingly, these devices are capable of detecting viruses, bacteria, proteins and toxins in the field.

Speedy field assessments will allow mobile teams to test and track the spread of environmental contaminants and pathogens, thus undercutting the business model of equipment and service suppliers which gouge profits and crush unfortunate patients.

- **Wearable:**

Wearable biosensors in current production, although limited to monitoring heart rates and steps walked in a day, for now, are a harbinger for new and sophisticated devices being designed to sample proteins and biomarkers in sweat for indications of stress and disease.

Graphene and metallic ink in the form temporary or permanent tattoos will be able to monitor glucose, lactic acid, bacteria in the mouth, blood alcohol and heart functions.

Bio sensing contact lens will be another non-invasive alternative for the detection and management of cancer and other serious medical conditions, these wearables will enable full time monitoring and treatment of chronic disease and the demise of costly medical labs and associated staff.

- **Implantable:**

Implantable biosensors that resist rejection will be the last phase and the most important in the long game of increasing the health and “well-being” of people, thus increasing productivity, lowering the cost of treatment and destroying the stranglehold of medical colleges and traditions long held to the detriment of most.

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Implantable biosensors will allow personalised treatment of chronic disease and the design of individual medicines. Consequently, the long-term viability of belligerent pharmaceutical companies and the dispensers of their products are in doubt.

Imagine the future:

The encroaching shift of medicine from a treatment to a preventive based model will force governments, and the general population to reassess their notion of personal privacy. Indeed, to ensure that we reap the benefits of an abundant world it will be necessary to adjust many of our deep-seated beliefs.

In an abundant deflationary world, everyone will be able to afford a preventive medicine programme. Biosensors attached or embedded in our bodies will monitor and transmit dependent variables to our communication devices, and in turn to our chosen medical provider.

Furthermore, our chosen medical provider might not operate from the same country we reside in, as an example, our provider may operate from Fiji, where the low cost of living and government taxes will enhance the spiralling effects of deflation on the criminally dysfunctional western medical cartels.

In addition, the personalised health care information and medicine that we will require from time to time may originate from entirely different countries. That being the case, we can rest assured that invasive medical treatments will subsequently take place outside the control of the criminal medical cartels that plague western medicine as a strategy for reducing costs.

Imagine that you are an overweight forty-five-year-old man with a preventive medicine programme walking your dog at 6 pm.

At 6.10 pm your implanted biosensors and your permanent medical tattoo designed to monitor your heart rate contacts your mobile communication device and this device in turn advises your medical provider of an impending severe heart attack.

Before, any detrimental effects of the impending heart attack make themselves known, you will receive information from your medical provider advising you to remain calm and stationary as you are in danger of suffering a severe heart attack.

Furthermore, paramedics will know of your location and condition, an animal recovery team will arrive to care for your dog (the close location of your dog has been identified by its RFID implant).

Importantly, your partner will know of your condition and arranged transport will deliver them to the emergency centre, where a bed and a medical team awaits your arrival.

Eventually, your condition will stabilise and the damage suffered by your heart appraised, by your medical provider, a stem cell treatment could be recommended to aid your

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recovery. This treatment may occur in the hospital you are recovering in at present or at another location depending on time and costs.

As you can see from this example, the relinquishing of personal privacy in an abundant world will benefit the individual and their loved-ones.

The inevitable:

Although many self-interested groups and individuals will do their utmost to prevent this onslaught to their wealth generators and social positions, we live in a finite world driven by company responsibilities to shareholders (hedge funds, pension funds and sovereign wealth funds to name a few) and it is this legal responsibility that will drive this new world of abundance.

Admittedly, this scenario is fifteen or twenty years in the future, however it will be "driven and realised" by the combined forces of resource efficiency, company profits and consumer expectations.

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