

## **Transformational Changes**

While the national politics lurches from one parliament session to the next one, while managers focus on managing expectations of their analysts and investors from one quarter to the next one, and while the media breaks one news after another hour after hour, there are many extraordinary changes taking place around us that will dramatically transform the world as we know it today, with much of this transformation taking place within the next 10 years itself.

While each of these changes is seemingly unconnected with other, they are likely to converge and impact the world in myriad ways and in every sphere of our lives including economically, socially, politically, and even philosophically.

To start with, one of the most potentially impactful of all the changes is the rapid progress a relatively new (about 25 years old, perhaps) technology “3-D printing” is making. Till a few years ago, 3D printing based manufacturing was still in the realm of a technology which could have applications mostly for the defence and then for limited industrial prototyping applications. They have already moved into the realm of mass consumer applications. While this subject requires much more space to be described in some detail, the possibilities are fascinating and range from printing of human organs including complex ones such as kidney using the recipient’s own body cells to complete elimination of several types of manufacturing with the end consumers directly “printing” at their home the objects which could include crockery and cutlery, small home appliances and then many others once they have electronically paid for the “application” to the designer and creator of such products. Indeed, with dramatic reduction or near elimination of labour from many manufacturing processes and industries, the implications are truly mindboggling.

The second transformational change is the onset of a “digital” age and the potential impact on our civilization is probably akin to what it would have been when the world moved from the Stone Age to the Copper Age and then to the other ages that followed. In this Digital Age, billions of individual inhabitants of this planet already have and in the coming decade, almost all will have access to one or more personal digital devices (smart phones and tablets), and a near universal connectivity to each other through internet. This would completely transform how the inhabitants of our planet receive information, communicate with each other and with the society, share ideas, buy and sell goods and services, and meet their social needs and desires. For the first time in human history, almost every single individual would have his or her own distinct identity, with a power to express himself or herself almost without any censoring (notwithstanding the increasing but losing effort of many governments to curb this free flow of information), and with a power to directly connect with each other (including producers and distributors / sellers of just about every product and service). The digital age will fundamentally impact just about every industry as we know it today, including education, healthcare, retailing, publishing, advertising, and entertainment to just list a few of the more prominent ones in terms of an imminent impact and transformation.

Other mega change areas include a take-off point for nano-technology to become mainstream, after the promise but otherwise frustratingly slow pace of moving of the technology from laboratory to the realm of practical and affordable applications. Again, the implications range across several sectors including healthcare, construction, and manufacturing. Materials technologies are also seeing transformational developments, with a whole new generation of engineered materials likely to make their way into mass applications straddling many industries that include automobile, defence, aviation, agriculture, and construction just to list a few.

And finally, several fundamental breakthroughs are just on the horizon in the realm of life sciences and bio-medical engineering that will not only impact the biological quality of our lives but potentially, give the humans the ability to control it even more from the very conception itself and in the process, giving rise to many philosophical and moral dilemmas.

Yet, unfortunately, our national attention spans are continuously becoming shorter and our time horizons to reflect upon and act upon have now shrink to a single year, a quarter, or even just a day. Long term, for many, is now anything just beyond the next year. Hence, the impact of these transformational changes will be much more severe for many nations, businesses, and individuals. As far as India is concerned, with the current political and business climate mostly focussed on managing on a day-to-day basis, it is very likely that the impact will take us by even more surprise. While the nation, the politicians, the mega business groups, and entrepreneurs should be spending more time on understanding these changes and creating appropriate new policies and new businesses / new ways of doing business, the effort is more to maintain or manage within status quo. It would help to remember one Charles Darwin.

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