

The Influence of Disruptive Innovations in A Cardinaly Changing World Economy

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Abstract

A disruptive innovation is an innovation that helps create a new market and value network, and eventually goes on to disrupt an existing market and value network, displaying an earlier technology. 3D printing and autonomous driving are examples of such disruptive innovations. 3D printing is the process of printing 3 dimensional objects from a digital technology. It can be used to print household items and even sophisticated productions like pharmaceutical drugs and guns. Autonomous driving is the use of a 'driverless' car in transportation. Autonomous driving has numerous advantages like easing traffic congestions, reducing accident and increasing speed of business transactions. The technology can also increase production output in Agricultural sector. These new technologies as they come in to full force in the next decades are able to upset the economic balance of the world. Business Corporation will be forced to develop new business model, and small firms will be able to compete with big companies. There will be changes in the demand for labour and upset in the balance of international trade is also expected.

Key words: Disruptive Innovations, 3D Printing, Autonomous driving, Technology, Company, Business.

Introduction

A disruptive innovation is an innovation that helps create a new market and value network, and eventually goes on to disrupt an existing market and value network (over a few years or decade), displaying an earlier technology'. In the primitive world, commerce was domesticated as men depend on what can be sourced from the immediate environment for sustenance. Goods and services were exchanged by barter system from house to house or at best animal assisted transportation from a community to another. Civilization especially the industrial revolution in the 20th century made it possible for primary goods to be processed in different ways to satisfy different classes of people and open up new challenges in the field of production, local marketing and international trade. Competitions among giants in the manufacturing sectors and also among firms have led to various innovations and accompanying changes in market model to get the attention of consumers, this led to the high growth of world GDP output from the 1950s compared to a near constant output between 1900 and 1920.

The result of these innovations has led to various shifts in the focus of world economy. Before the industrial revolution, there was the economy theory known as Malthusian Trap. This theory ascribes increase in income to small population. Fewer workers were expected to benefit from a stable agricultural production. The Industrial revolution changed this concept with the world highly populated countries in the world controlling world economy. 21% of world GDP is accounted by US 5% of world population. 30% of world GDP is accounted by 60% Asia world population excluding Japan. Technological innovations give rooms to a lot of people to be employed in production and the different phases of goods and services processing. This makes the difference between the Malthusian Trap and the Industrial Revolution. The upcoming disruptive innovation may once again set another paradigm shift in the world economy.

3D Printing

3D printing and Autonomous driving are examples of such disruptive innovations which are gaining attention and wide acceptance in the field of manufacturing, science, technology and transportation. 3D printing also known as additive manufacturing is the process of making a 3 dimensional object of virtually any shape from a digital model using digital technology. The process is initiated with computer Aided design (CAD) or animation software. Chemical raw materials are involved and the design from an 'stl' file to lay down successive layers of liquid, powder, paper, plastic or metal sheets to build the model. A lawyer (Deven, 2013) described 3D printing as "a general purpose technology that will do far physical objects what MP3 files did for music. It will unleash the creativity of producers and reduce costs for consumers".

3D printing opens up doors of opportunity for people to customize virtually anything and make things to their tastes. A consultancy Wohlers Associates put the market for 3D printers and services as worth \$ 2.2 billion worldwide in 2012 and increase of 29% from 2011 valuation (Sherma, 2012). Its application covers all sphere of life: Industrial design, construction, automobile, medical, fashion, jewelry e.t.c.



3D printed Dice (080813_dice_600 AP Photo/Mary Altaffer)

3D printing can be used to print household items like toys, tools, purpose made metals and even sophisticated productions like pharmaceutical drugs, guns and automobile prototypes. In medicine, (Michelle, 2013) gave an insight into how 3D can be used to create damage bone that could enable natural recreation of joints using the patients tissue. Mention is also made of the success of a British company that developed a 3D printed material resembling marble and already produces enough annual output to construct a 12 storey building. A researcher in a University in Toronto (with 3D) developed a tissue that resemble human skin, on this premise Dr Marc Jeschke opined that this technology can be used to treat patients suffering from severe burn. Despite the numerous advantages, 3D technology also comes with some challenges. Every powerful technology has its draw backs and not everything enabled by 3D printing will be desirable (Douglas, et al 2009). Edward Tenner opined that “Radically new technology inspires lyric Utopianism and melancholy catastrophic” (Edward, 2001): It will be difficult to control what can be produced at home. For instance, prescription drugs can only be purchased with a Doctor’s prescription but with 3D technology, it will be possible to produce it locally at home. Teenagers’ inquisitiveness about sex may endanger their lives by printing 3D sex toys. The possibility of 3D to print guns is also a portend danger (Tim, 2013). 3D printing will also make it easier for firms to rethink their business practices and courts to reexamined not only patent doctrine but also long established doctrine in areas ranging from copyright , merger to trade mark post and sale confusion (Denver, 2013).

Autonomous Driving

Autonomous driving is simply the use of autonomous car in transportation. An autonomous car is also referred to as a driverless car, it’s a car (robot car) that is able to drive itself in such a way that it fulfills capabilities of a traditional car. The computerization and other electronic gadgets which include: Laser scanner, radar sensors, cameras, ultrasonic sensors and differential Global Positioning System (GPS) allows the car to sense its environment and navigate in relation with other automobiles on the road without human input. Major automobiles like GM, Toyota, Nissan, Volvo, and Audi are already investing and testing prototypes; by 2020 these companies are all expected to sell autonomous cars. It’s estimated that in the next decade autonomous driving will be opened to the world.

The way an autonomous car operate is captured by (Will, 2013) in this story: “A silver BMW 5 series is weaving through traffic at roughly 120km per hour on a freeway that cuts northeast through Bavaria between Munich and Ingolstadt. I’m in the driver’s seat, watching cars and trucks pass by, but I haven’t touched the steering wheel, the break, or the gas pedal for at least 10 minutes. The BMW approaches a truck that is moving slowly. To maintain our speed, the car activates its turn signal and begins steering to the left, towards the passing lane. Just as it does, another car swerves into the passing lane from several cars behind. The BMW quickly switches off its signal and pulls back to the centre of the lane, waiting for the speeding car to pass before trying again.”

The commercialization of Autonomous driving just like the 3D printing technology will also make life a lot easier for people. Traffic congestion will be reduced which has a corresponding effect of reducing pollution and also improve fuel efficiency of automobile. Studies conducted at the University of California, Riverside in 1997 on experiments involving modified vehicles suggest that vehicles with high-speed automated “platoon” could lower fuel consumption by 20% (Will, 2013). A driverless car will take a lot of stress from people,

employees can sit comfortably in their cars and even review notes to and fro from work- this will impact positively on productivity.

The US National Highway Traffic Safety Administration estimates that more than 90% of road crashes involve human error. With an autonomous car, anybody: blind, underage, over age can use a car; restriction will be to the nearest minimum as human error is almost eliminated. Another advantage an autonomous car has is security. You may not trust a driver to go to a particular place and return but with an autonomous driving, the car which can be remotely monitored can be trusted to do exactly the assignment given. In this regards, the car can be sent to bring home children from school.

By the time autonomous Agricultural vehicles (tractors) and equipment are manufactured, Agricultural productivity will double worldwide. Imagine a farmer program a tractor to till the land and go back home. The tractor will move from one end of the field to another and make a U turn and continue work and go by itself to park in the garage at the end of the programmed time. A combine harvester can also work in this way, and I just imagine that another tractor can be programmed to take harvested crops and deliver by autonomous driving to a store house in the town. With autonomous driving, the possibilities are endless.

Cost will definitely be a draw back in the public acceptance of autonomous driving, it may also take some time for people to get used to it, maintenance and compromise of the computer system inform of virus attack and other forms will also be a great challenge to contend with.

The influence of 3D printing and Autonomous driving as a disruptive technology

These new disruptive technologies are able to upset the economic balance of the world. Jason Pontin Editor in Chief MIT Technology Review said: "Technology solves big problems, grow wealth, and expands human possibility". 3D technology makes it possible for people to design what they want at home, the technology will certainly lead to the development of small firms and entrepreneurs. Big corporation will also take advantage of its efficiency to reduce human labour and improve production.

This development will force corporation to develop a new business model. Before this new trend of technologies, competition has been among companies that are well known, some of them quoted on stock exchange. The advantage that these big companies have is high tech good finishes and cheap prices of product due to their advantage of economies of scale. With 3D printing, this leverage will gradually erase away. Large Corporation will have to brace up to compete with small firms, entrepreneurs and even consumers who are now able to produce their own goods. The use of 3D printing technology will improve the speed of production as testing of produce can now be done in a single unit with recourse to full scale production.

3D printing coupled with autonomous driving will improve the speed of delivery of goods to the market. The speed of 3D production can be complemented by speed, accuracy and reliability of autonomous driving in transportation of raw materials from different locations to factories and the delivery of finished goods to ware houses and other designated places. Marketing will also take a new form, as consumers could be reached by internet and given the opportunity to have an input on the design of the product they desire. At Any time manufactures of the goods can make delivery with autonomous driving.

There will be a change in labour demand in industries in terms of numbers and skills. 3D printing will take the job of many people in the production line so also autonomous driving will take the jobs of many drivers. With these disruptive innovations many workers will be required to have specialized training in 3D design and printing. The abilities of some drivers will also go beyond ability to press the accelerator of a car, apply brake and control steering to specialized knowledge in computing and trouble shooting.

These new disruptive innovations are bound to upset the balance in international trade. In the last decade big cooperation in America and Europe set up subsidiaries, factories or outsource production in Asian countries to take advantage of labour. Dell for example is an Asian American company based in Texas, it assembles most of its machines in its own plant in USA but outsource the supply of many components such as motherboards and DVD drivers to other companies in South Korea, China and Japan (Leslie et al ,2012). This new innovations will make it possible for some of these companies to start and finish production of their produce at home and then export. The ambition of China economy to overtake US economy thus may not come to fruition.

The big question on my mind is: What happens to manufactured goods and automobile that will be displaced by 3D printing and autonomous driving. Africa and some Asian countries will be at the receiving end. This will result in 'dumping' a practice in which a foreign company or government charges a price in the domestic market which is too low (Leslie et al, 2012). These countries at the receiving ends will jump at these offers as it will improve standard of living, but in the long run, their currency exchange rate will fall, technology development will be impaired and they will continue to look forward to international communities for assistance. The regulation of World Trade Organization and regulation governing trade in all countries of the world will help to reduce this problem. The exploit of an African Kodjo Afate Gniku who made a 3D printer he named W.AFATE out of parts of discarded traditional paper printers and electronics, and stepper motors is also hope that African and Asian countries can take advantage of disruptive innovations.

Conclusion

World economy is set for another transformation. Technological innovation is about to take men to another level of comfort and ease in getting what they want and in moving around. 3D printing and autonomous driving are two powerful disruptive innovations that will pilot this new level of world economy in the next decade. Corporations, entrepreneurs, professionals and the labour force will need to prepare ahead as the first set of operators of these new technologies stand the better chance to benefit from it.

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