Artificial Intelligence and Robotics - Transforming the Industrial Economies

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Abstract

The fourth industrial revolution, which is a combination of cyber-physical systems, the internet of things, and the internet of systems are quite dissimilar to the earlier three Industrial Revolutions as the cognitive thinking and skills of human beings are going to be challenged through it. Using disruptive technology, companies like Google, Uber, Airbnb, and Facebook have already overtaken the conventional market leaders. In future too, robotic intrusion will amplify so that sharing of information may become prompt to garner profits by promoting efficiency. This study discussed an illustration which threw light on the prospective disruptive developments likely to take place in the service sector of an economy. Also, few recommendations are being given, which can be a torch bearer for the service sector companies that want to milk the first mover advantage.

Keywords : **disruptive technology, robotics, fourth industrial revolution**

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A significant transformation has taken place in the manufacturing field, the credit for which goes to the digitization of operations. Changes taking place through this transition are termed as Industry 4.0 representing the fourth industrial revolution. A look at the previous three industrial revolutions demonstrate that the first Industrial Revolution that took place around 1775 was based on James Watt's invented steam engine, which led to the advancement of industries from England to Europe and to the United States later. The second Industrial Revolution, roughly beginning from 1870s, led to mass production and consumption attributed to the development of electricity, internal combustion engines, steel, and railways. The third Industrial Revolution that arrived in 1990s was based on the Internet that fundamentally transformed the meaning of business across the globe. The fourth Industrial Revolution, out stepping the third, moved a step ahead and introduced robotics, big data, nanotechnology, and 3D printing. A combination of cyber-physical systems, the internet of things, and the internet of systems make Industry 4.0 possible and the smart factory a reality (Marr, 2018).

It is anticipated that in the near future, computers connected with each other will be in a position to communicate with one another and make decisions without/with least human intervention. To explain it better, electronic gadgets affixed in homes and smart refrigerators placed in kitchens will automatically send orders (through computer based chips) to the designated stores for the replenishment of products for which we have to hitherto depend upon hawkers, peddlers, and nearby retailers. Similarly, artificial intelligence will enable the

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online companies to ship products to their customers anticipating the need for replacement based on their past purchase record. Thus, the present 'shopping to shipping' model of shopping goods online and then shipping of the product by the concerned company will be replaced by the 'shipping to shopping' model (Agrawal, Gans, & Goldfarb, 2017). It will naturally lead to a surge in the efficiency and productivity of companies due to automated dynamics which eventually will usher in more profits.

Already we have seen how business models based on data and analytics has facilitated companies like Google, Uber, Airbnb, and Facebook to enter the S&P 500 index in less than 10 years in comparison to the business houses like General Motors, which took a considerably longer time to capture the market. Market disruptions are not allowing any company to garner profits or increase sales without innovation aimed at lowering prices or offering enormous customer service. In this study, we have endeavored to forecast the future of technology that will be used in firms and industries.

Objectives of the Study

(1) To envisage the nature of disruptive technologies to be used in the future.

(2) To recommend strategies for the existing companies to survive the change.

Database and Methodology

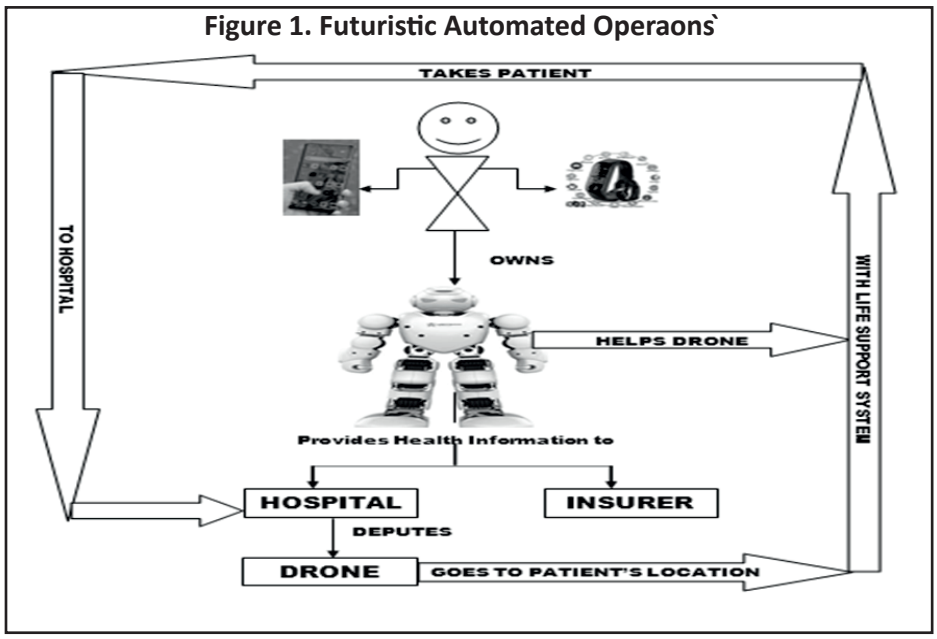
In order to realize the aforementioned objectives, we have surveyed the recent and past reports developed by international consultants like Ernst and Young, McKinsey, Accenture, Price water house Coopers, and Boston Consulting Group, etc. All these reports have been developed by taking into consideration the responses from business leaders. Incidentally, all these reports point towards the changing dynamics of the markets due to the use of disruptive technologies. Business leaders opine that consumer markets, education, healthcare, services, and automotive/transportation are the leading sectors that will undergo major transformation by the year 2035. Further, the demand for personal and industrial robots as well as drones is expected to increase as an alternative to hired employees. It is expected that by the year 2021, global spending on robots and drones will reach $218.4 billion. Taking cognizance of the same and using our own informed judgment, we have attempted to develop a model for the insurance and healthcare sectors. Details of this model are explained in the following section.

Future of the Insurance Industry

The insurance industry cannot be seen in isolation from this disruptive technology. Studies by Neghaiwi and O'Donnell (2017) and Balasubramanian, Libarikian, and McElhaney (2018) showed that artificial intelligence will have a seismic impact on all the operations of the insurance industry, that is, from distribution to underwriting and pricing to claims. Already, Fukoku Mutual Life Insurance from Japan experimented the same in the year 2017 which escalated the company's productivity by 30%. Accordingly, the company saved about 140m yen (£1m) in the first year and 200m yen (£1.4m) a year later. This is going to be a routine feature of all the companies in the next few years. Sooner the companies realize it and adopt robotic process automation, the easier will it be for them to thrive in the market.

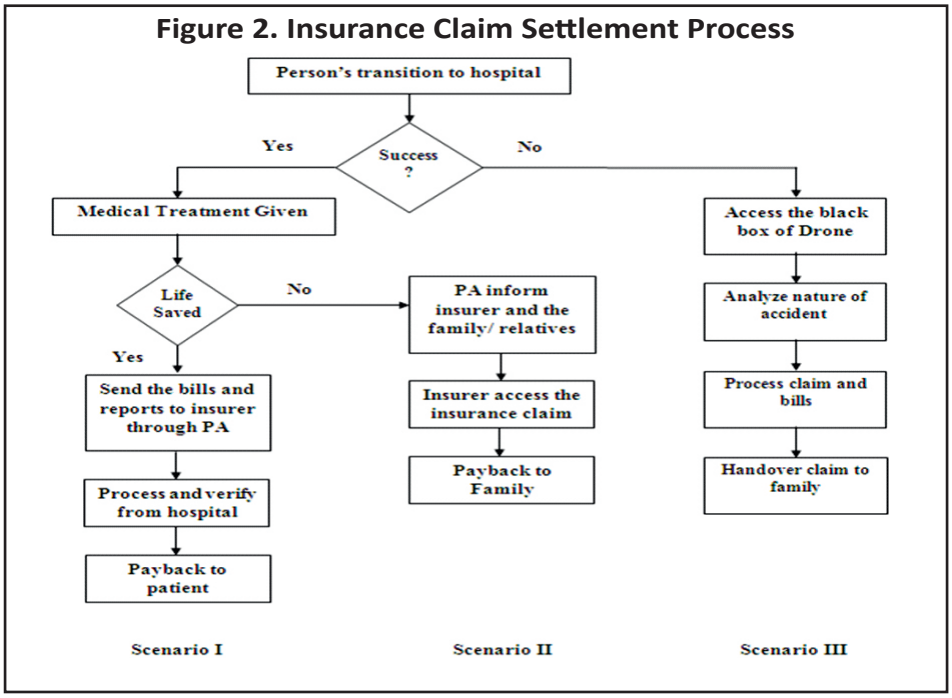
A look at the following case, as depicted in Figure 1, will enable us to understand the future shaping up of this industry. Imagine the world in 2040. An old person living on the outskirts of a city gets sick. Analyzing the condition, his/her personal assistant (robot) assembles information about his/her health data (like blood pressure, pulse, heart rate) stored in the digital watch he/she wears and the medical data (medical images, lab results, dental records, clinical reports, steps walked, past x-ray reports) from his/her mobile phone where information is stored.

Figure 1. Futuristic Automated Operaons`



This information is disseminated to the concerned hospital as well as to the insurance company from where the old person purchased insurance. Further, this digital information is received, stored, and disseminated to the respective departments at both these places. After diagnosing serious health issues and anticipating brain hemorrhage, the hospital deputes a drone to bring the patient immediately to the hospital. The robot attendants present in the drone using life saving equipments available and with the help of the aged person's assistant, transport the patient to the concerned hospital in no time, the information of which is also sent to the insurer. Here, three different scenarios emerge (refer to Figure 2).

Figure 2. Insurance Claim Settlement Process



↳ **Scenario 1 :** The concerned doctors perform surgery in no time and the life of the patient is saved. In this case, when the doctors carry out surgery, all the medical reports and expenses related bills are sent to the insurance company by the patient's assistant. The insurer processes this information and verifies it from the concerned hospital. By the time the patient recovers, all his/her medical expenses are cleared by the insurance company and he/she reaches back to his/her place happily.

↳ **Scenario 2 :** The concerned doctors perform surgery, but the life of the patient could not be saved. Here too, the information is sent to the insurer by the old person's assistant and the news about his/her death is remitted to his/her family members and relatives, who then manage to come to receive the body for cremation. Before the body is handed over to them, the insurance claim is settled by the insurer and the insurance return is handed over to the family members.

↳ **Scenario 3 :** The drone meets an accident due to technical problem and the patient dies. In this case, the insurance company acquires the black box of the drone from the accident site and analyzes the information like speed of the drone, direction, height, load, quarterly service data, maintenance, etc. to assess the nature of accident, that is, due to negligence or technical. On the basis of this information, the insurance company processes the accidental claim and settles it with the company owning the drone. Simultaneously, the insurance company will also process the bills pertaining to the life of the insured from its records. After verifying the facts from its records, the company hands over the claim to the family members of the deceased.

It can be seen from all these scenarios how the coupling of artificial intelligence will enable communication with least human intervention and promote efficiency.

Conclusion and Recommendations

The previously ensued industrial revolutions (first, second, and third) made mass production possible and brought digital competence. But the fourth industrial revolution is integrating the physical, natural, and digital worlds. It is going to impact everyone from individual to economies. Already, disruptive technology has facilitated companies like Google, Uber, Airbnb, and Facebook to be the market leaders, overtaking ages old dominant companies. But without undergoing transformation, it won't be easy for the companies to survive this gigantic change. In the case we have discussed above, it is shown how with the sharing of information between robots, human intervention is brought to an end and efficiency is promoted. It is an illustration which throws light on the upcoming developments in the service sector of any economy. All the economic sectors need to be geared up for this challenge. Of course, the change is not going to be radical and come in steps which offer time for different sectors to brace themselves for this transformation. We have presented few recommendations below which can be a torch bearer for the services sectors anticipating change.

↳ **Digitize the Processes :** At the outset, companies must embed digitization in all their processes. In the context of the insurance sector, internal processes related to underwriting, servicing, billing, claims, etc. should be digitized as customers in future will be actively looking forward to lesser process steps and more personalization. Effective digitization along with predictive analytics and cognitive computing will augment the prospects of futuristic progression through data capture, analytics, diagnostics, and risk management. Also, an endeavor should be made to rope in such technology which can collect, store, and analyze data through personal devices. Already BCG and Insure Tech have devised such modules which can help analyze digital data.

↳ **Create Networking Partnerships :** Companies must increasingly develop a network with related companies in the value chain keeping in mind the data led iterative approach. Where on the one hand, it will help to cut down the

costs of the insurer, on the other, additional information related to the insured becomes available. For example, in case of life insurance and health sectors, developing tie ups with Dr Chrono, My Fitness Pal, Life sum will help the insurer to assess the habits and lifestyles of the insured.

↳ **Identify New Sources of Revenue :** In order to create value in the ecosystem, the companies need to adapt to the latest disruptive business models. In the insurance sector, such models are peer to peer insurance, pay-as-you-use, and use of chatbots, etc. Peer to peer entails the electronic networking (certified by an insurance company) of people who agree to cover risks by pooling the amount without any intermediaries. At the end of the agreed period, the persons who had pooled money are refunded back their amount (except payment made to the insurance company), thereby enabling them to minimize their costs and attain maximum protection. Similarly, pay-as-you-use and usage and chartering of chatbots models can also be milched.

Conventional insurers must initiate transformation processes and take advantage of new technologies to reach the pinnacle of operational excellence and explore new business models that will no longer be luxury, but the only alternative in the future.

Limitations of the Study and Scope for Future Research

This study is restricted to the use of robotics in insurance and health sectors only. Further, we have anticipated that the model could be applied in full by the year 2040, but there is no clarity as to by which year the complete model could be in operation. Also, there is a probability that the model may be used by the industries in developed economies only and may not percolate down to the developing or under developed economies.

We have built up the case taking into cognizance only few sectors, that is, insurance, health, and transport. More such models can be developed by the researchers for the industrial and services sectors particularly taking into consideration the conditions prevailing in the Indian economy.

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