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Surge of the Innovative Quest in the First Lockdown Period Due to the Pandemic Effect

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ABSTRACT

When the entire world is reeling under the COVID 19 pandemic effect and the tensed human race is struggling to return back to the normalcy of life, the one thing which has become very active is the grey cells of our brain. The pandemic effect has cut down our physical limits due to the movement constraints. But it is thankfully unable to restrict the ticking of the grey cells of the human brain. As is said, "Necessity is the mother of the invention". Sure enough!! We can be extremely pleased to know that the innovative surge in science and technology continues unabated in this lockdown period. The prime requirement of the pandemic effect is social distancing, less physical contact and keeping ourselves away from infection by corona virus. Keeping this necessity in mind, the doctors, the engineers, the researchers as well as the students' community are keeping themselves busy in pumping out the solutions to the currently faced problems. The outputs include automatic masks machines, low cost PPE's, automatic wash basins, suitable ventilators, sanitizer tunnels etc. This review paper looks into the innovative surge already made and what more can be churned out for the effective social safety in this tensed pandemic effect. The most awaited news as of now is the successful implementation of an effective vaccine and cost effective drugs which can help the human beings breathe easy. The pandemic effect has also showed us the way for a cleaner and greener nature. It is now a challenge to the intellectual world to come up with inexpensive, innovative and smart solutions which will make our beautiful planet safer, greener, cleaner and worthier to live in.

Keywords: Innovative surge, Pandemic effect, Smart Solutions.

INTRODUCTION

Since the historic and prehistoric era, the human civilization is creatively innovating its ways of life to live life; a little better and a little easier. Always a new problem has come up with a new solution. This is how life goes on from the time immemorial. This is how it will always be and the survival of the fittest will continue to dominate. The recent times has seen a very unfortunate havoc for the mankind in the wake of the incessant spread of the deadly corona virus which has shown alarming rate of transmission in the human community. Now the control of the outbreak in this alarming rate is the cause of concern and matter of research in the intellectual minds. As prevention is always better than cure, the major concern is to prevent the virus from spreading around and the next level of concern is to provide relief to the affected persons. The governments all around the world have implemented lockdowns and have being trying to constrain the surge as much as possible.

The various big tech companies have plunged into the market to capture the profit share by pouring in new apps and technological ideas proclaiming better benefits. The human race has seen the curbing of civil and democratic rights in this present scenario may be for their own benefit. It has also brought out the employment imbalance and the migration of workers from work place to their home land. The interconnected world has seen an upsurge of various e-platforms which claim to bridge the communication gap. They are however also enlarging an unwanted digital divide which has also been the point of frustration, depression and mental ill health for the have-nots. All in all the pandemic effect does not paint a very rosy picture and there is a continual tussle in the innovative minds as well as the deprived minds. The journey does not end here. It's the beginning of a long journey which is physical, mental, financial, social and ethical.

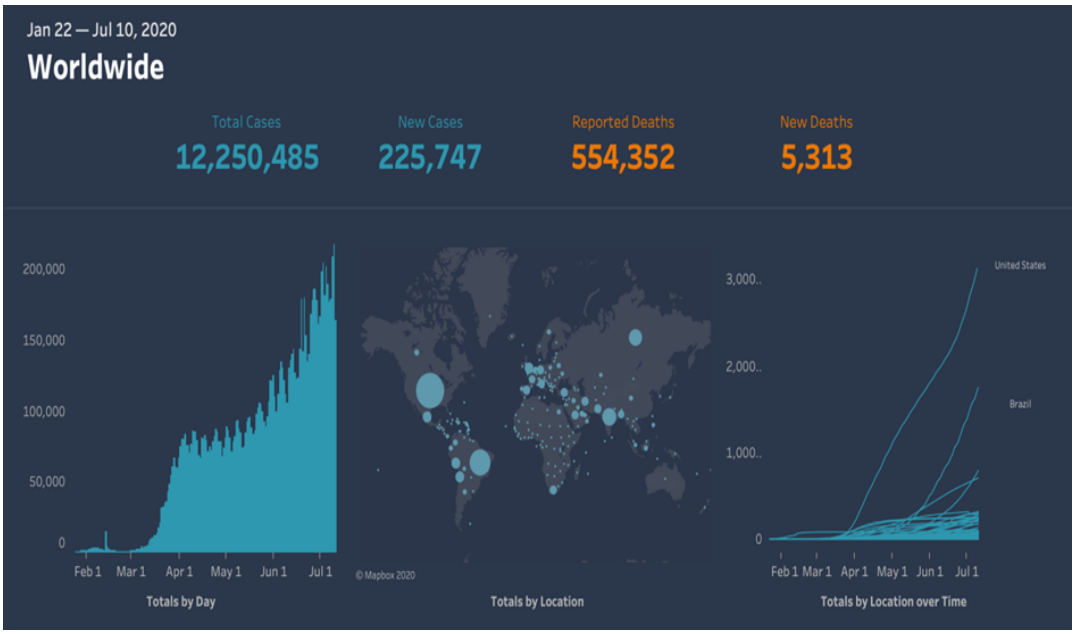


Fig 1: The global spread of the pandemic effect

THE INNOVATIVE EFFORTS TO KNOCK DOWN THE PANDEMIC EFFECT

"Ruhdaar" The frugal innovation

'Ruhdaar' is the prototype of an economical ventilator which is operating satisfactorily with the creation cost of around Rs.15000. This has been created by Engineers at Design Innovation Centre (DIC) of Islamic University of Science and Technology, along with a team of engineering students from IIT Bombay. Medical experts will evaluate its validity. Before the configuration of "Ruhdaar" three more prototypes have also been designed by the teams guided by Coordinator-DIC Dr Shahkar Nehvi, Dr Majid Hamid Koul, ex-faculty of IUST, Peerzada Shoaib, Asif Shah, Zulquarnain, Jawad Ahmad from IUST, Dr Saad Parvaiz from NIT Srinagar, Dr Shabir Hassan from Harvard University as overseas mentor and Abdul Rahim from Rahim Green.

Automatic mask machines

An initiative has been taken for preparing machines which will manufacture surgical and N-95 masks by June. The cost of these is supposed to be 45% cheaper than the other masks. Due to the growing requirements of N-95 masks in India, engineers from NIT & IIM Calicut in collaboration with a start-up firm in Bengaluru have come forward to meet the need

indigenously. A Rajkot based industry has also come up with a fully automatic machine that produces N-95 masks in bulk.

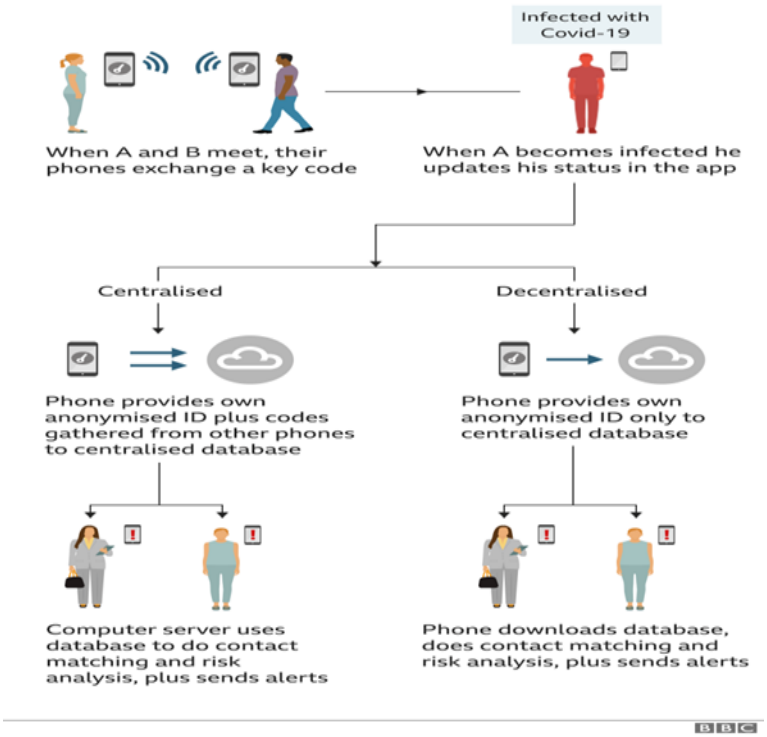


Fig 2: Corona Virus Contact tracing

Low-cost PPEs

It is a proud moment for Indian Navy as it has acquired a patent in association with the National Research Development Corporation (NRDC), an enterprise under the Ministry of Science and Technology for creating low cost PPEs. A doctor of Indian Navy has put forth his efforts in this initiative. The designed PPEs made out of a special fabric have the added advantage of suitability in the prevalent weather conditions of India due to its high 'breathability'. The technology validated by ICMR is utilized by a team of innovators from the Navy working in close coordination with IPFC, set up under the Mission Raksha Gyan Shakt in 2018 for the mass production of PPEs.

Advanced wash basins

As we know washing our hands and keeping them clean is the need of the hour. But fact also remains that we should avoid touching surfaces with our hands. Keeping this in mind, a feet operated handwash machine has been brought to light by the Jammu and Kashmir Police team with the thought to install it in the police stations across the territory. Similar wash basins have now popped up in the municipal corporations or Indian Railways with a no touch technology such as pushing the lever with the foot. Some smart washbasins allows the water tap and soap dispenser to operate mechanically without the human touch.

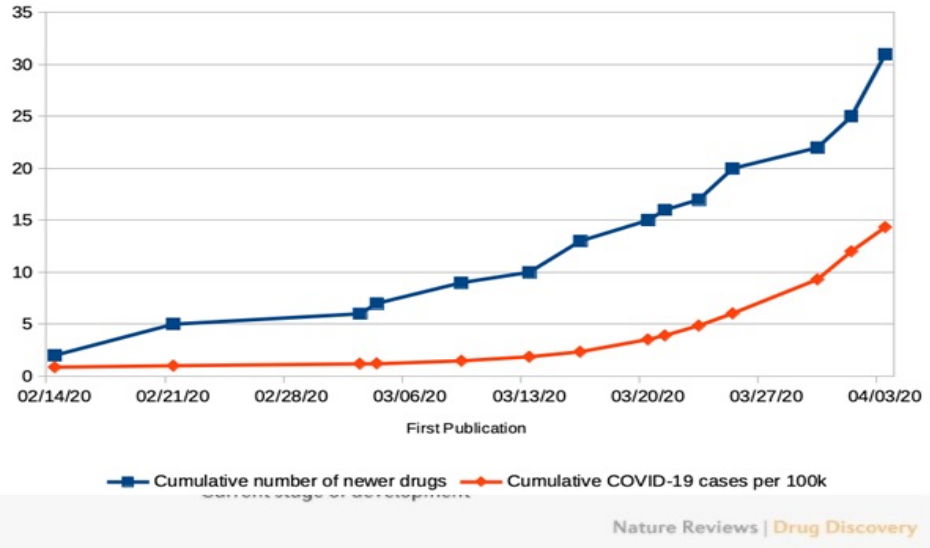


Fig-3 COVID-19: Reported Cases vs Newer Drugs for Therapy

Jeeva Setu ventilators

An oven sized low cost portable ventilator hoping to deliver 500-600 ml of air per breath and 15-18 breaths per minute has seen the light of the day due to the innovative minds of the students of REVA university of Bengaluru. The specifications satisfy the requirements of COVID patients. They have also made masks and contributed to the society. In response to the shortage of ventilators for critical care, start-ups such as Nocca Robotics (incubated at Indian Institute of Technology(IIT)-Kanpur), Aerobiosys Innovations (incubated at IIT Hyderabad) and AgVa Healthcare are developing low-cost, easy-to-use, and portable ventilators that can be deployed even in rural areas of India. These ventilators would need medical regulatory approval before they could be deployed.

COVISAFE, Transporting patients

This idea ensures the secure transport of the COVID patients as they are in the shape of air tight stretchers and equipped with the emergency facilities like oxygen and ventilators. Another out of the box idea is that even the exhaled out air from the patient is filtered in the box prior to coming out in the atmosphere. This innovation by the doctors of Nagpur will assist in keeping the medical staff safe from infection.

Sanitiser Tunnels

This idea is an indigenous effort with local materials made by a nodal officer from Chikballapur district. He set up the first organic sanitiser tunnel on the main road of Gowribidanur town using organic fumigant which has a height of 20 feet and is constructed with the help of polythene sheets.

User friendly Robots

As social distancing is the need of the hour, this innovative thinking is certainly very user friendly minimizing the risk of public contacts. Especially in crowded places like bus stands, railway stations, airports or hospitals, these robots can come in handy to help in the social needs without the fear of infections and transmissions. Asimov Robotics, a start-up based in Kerala, has positioned robots at entries to office buildings and other public places to deliver

hand sanitisers as well as public alerts about the virus. They have also been stationed in the isolation wards to cater to the need of food and medicines of the patients. Such arrangements would definitely aide the hospital staff for the efficient caring and sharing needs of the patients.

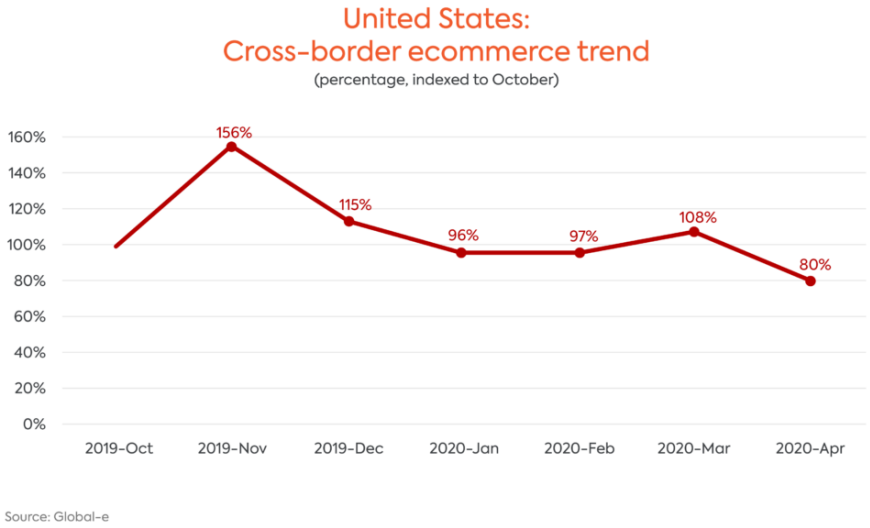


Fig 4: Cross border e-commerce trend of USA in the pandemic period

Aarogya setu apps

Yet another essential requirement of the hour is to stay updated and to be informed about the sources out there to assist us. In line with this requirement, the Indian government has launched a COVID-19 tracking app called Aarogya Setu which uses GPS and Bluetooth to inform people when they are at risk of exposure to COVID-19 in early April. To ease the pressure off the affected, start-ups including KlinicApp and Practo, are providing COVID-19 tests at home and online consultation with doctors through their platforms. Government has taken several steps to keep the public informed about the threats and the safety measures. The Kerala state government launched an app called GoK-Kerala Direct using a platform developed by QKopy. It refers to COVID-19 updates and travel information via phone notifications, and also via SMS to the half of India's population without smartphones. These messages are delivered both in English and in Malayalam, the local language.

Data representation platforms

All the meticulous details of the data regarding COVID-19 are very essential for the various governments, health sector as well as the public in general. Various data representation platforms have come up globally to meet this urgency. A few such examples are sited for reference. An interactive data dashboard from the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University tracks global COVID-19 cases, deaths and recoveries in real time. All the data is stored on GitHub. Similarly few such other platforms for data representation are Bing's COVID-19 tracker, Tableau's free resource page, Amanda Makulec's data visualization or Our World in data portals.

Safe swab; Phone booth testing

In an effort to protect healthcare staff from getting infected, the BMC has created a phone booth where patients can be tested for coronavirus. The method which was earlier incorporated in

South Korea keeps the air from leaking and also saves a lot of time. Currently, the BMC is planning to test at least 1500 patients through this by setting up the facility at Kasturba Hospital. Emergency ventilators, germ trap masks, protective plastic capsules, smart helmets, phone booths, sanitising UVD robots, airport cleaning robots, hands-free door openers are just a few of the many innovations that countries have come up with. Start-ups such as Marut Dronetech have partnered with state governments to test the use of drones to monitor adherence to social distancing rules. Drones are also being used to deliver medical supplies and even check people's temperature using thermal imaging.

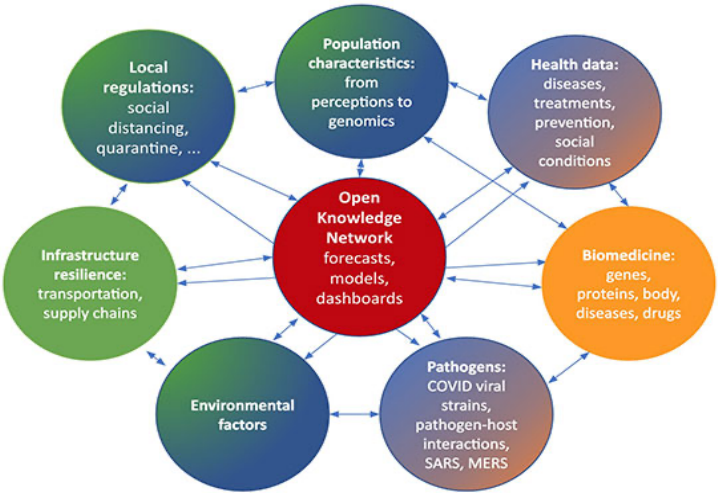


Fig 5- Fighting COVID- 19 with knowledge graphs.

Monitoring Public hygiene

The hygiene of public spaces is a big area of challenge and innovation. Start-ups such as Aqoza technologies and PerSapien claim they have developed chemical formulations that disinfect public spaces. Aqoza's approach, is a water-based sanitiser disinfectant, while Airlens minus Corona from PerSapien is a machine which the company claims to dispense ionised water droplets to oxidise the viral protein. A special anti-microbial coating called Corono Shield developed by a start-up Droom, impedes the growth of microorganisms such as bacteria, algae, yeast, moulds, and mildew on the surfaces of vehicles. It is being tested by police in Gurugram in Haryana state.

Crowd sourcing ideas

Intellectual and innovative minds exist widespread in our country which need to be brought to one common platform for proper encouragement and appreciation. Crowdsourced platforms have come out to be a significant effort to channelize and harmonize the ideas and the wisdom from universities, industry and government. The national government launched the COVID-19 solution challenge on March 16 that invites innovators to offer ideas and solutions for tackling the pandemic. Industry associations such as the Federation of Indian Chambers of Commerce and Industry co-ordinated in an online hackathon to develop non-medical solutions for COVID-19. Other platforms from start-up incubators such as "BreakCorona" received 1,300 ideas and 180 product solutions within two days of launch. In another effort, volunteers have set up an online crowdsourced portal called Coronasafe-Network, a real-time open-source public platform containing details on COVID-19 precautions, tools and responses which serves as a useful starter-kit for innovators.

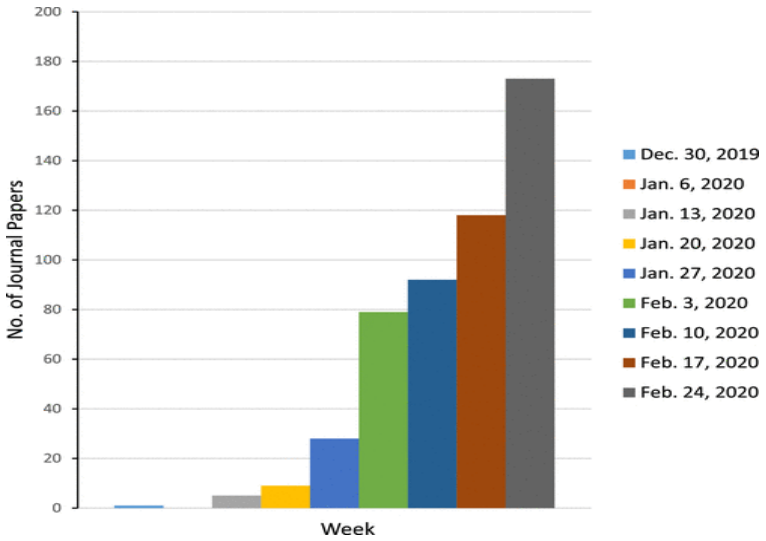


Fig 6 - The research trend globally

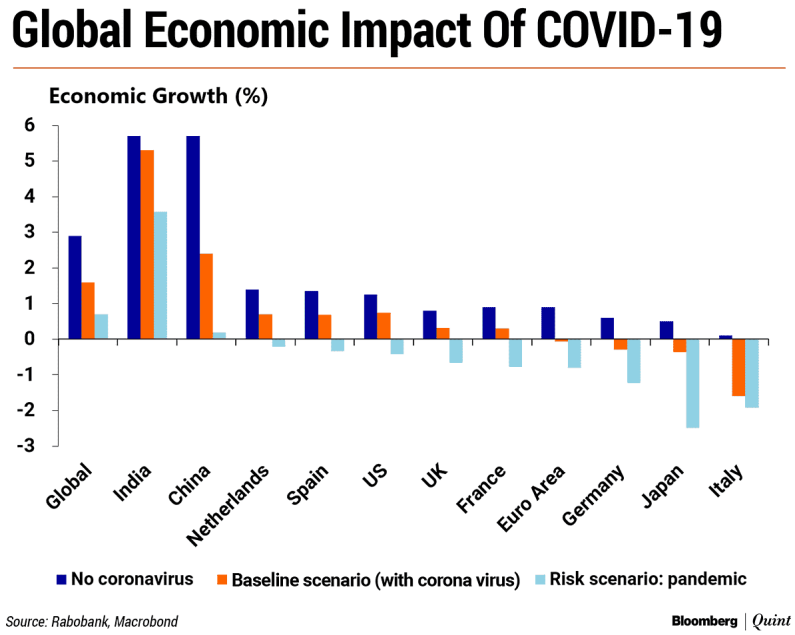


Fig 7- Global Economic Impact of COVID 19

Digital enrichments

The various steps followed in the treatment of corona virus example tracking, screening for infection, contact tracing, quarantine and self-isolation and clinical management require digital technologies like digital thermometers, wearable technology, mobile phone applications, GPS , real time monitoring, artificial intelligence, machine learning, web based toolkits, digital recorders, quick response codes etc.

FUTURE TRENDS AND FOCUS AREAS

As we have seen that the innovations in science and technology are right on track and the wise minds are taking up the correct focus areas to contribute efficiently and become effective corona warriors. All of us can rightly predict and project that the corona virus though very

miniature in size has posed before us challenges really huge in dimensions. One such context is the online connectivity in most of the academic and social activities. We are flooded with online apps each proclaiming added plus points. Things are now becoming more and more virtual; the touch therapy is missing and don't know how long it will be so missing the haptics. The labs which are essence of learning by doing have also become virtual labs. Yet we cannot keep on complaining all the way round. The future areas of focus to lighten the doom will be to come up with effective vaccines to keep our body immune from such notorious evils. Medical staff will have to keep themselves on the toes to bring out affordable medicines. The online mode of communication need to be more user friendly so that they can be enjoyed all the sections of the society. More such modes of learning can come up in radios and televisions which have the potential for affordable widespread distribution. Innovative ideas also need to pop up which will relax the mental and visual tensions which will continue for some months now.

In an interlinked world, technological strides in the digital-data domain, such as Artificial Intelligence (AI), have only contributed to escalating global disparity. The digital revolution has also bred a global class of elite who have deployed technology for consolidating corporate power. The pandemic effect has also shown us the weak links in the economic layers of the society in which collaboration and co-ooperation is not always the magic word. A glaring example is the patent based drug regime that allows corporations complete control over lifesaving treatment. Gilead, which holds the primary patents over Remdesivir, a potentially key treatment for COVID-19 in over 70 countries, did bow to public pressure by quashing its monopoly marketing rights under the Orphan Drugs Act in US jurisdiction. But, the pharma company continues to hold proprietary control over the drug. With the use of drones, facial recognition techniques, mobility monitors, AI based video analytics, the personal privacy may be under threat in the absence of strict protection laws.

In many cases it may seem that the different facets of science and technology in the COVID-19 outbreak have a meagre regards for social ethics and human well being. Today, contagious and transferrable epidemics have become the new normal. It is an indicator of disturbance in the natural climate cycles and ecosystems. The collaboration of genetic and AI technologies, and the datafication of soil, forests and oceans by powerful Big Tech today augurs great risks for the future of human civilization. The gene editing carried out in the name of research may have potential harms. Thus it is the prime duty and responsibility of the innovators to focus on all the aspects of human life, tradition and culture and ensure a peaceful co-existence of mankind with our mother nature and enjoy a healthy and happy life as far as possible.

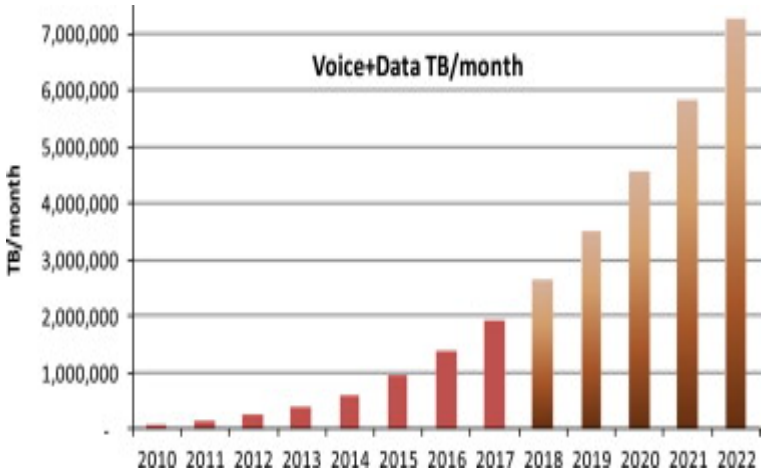


Fig 8- Forecasted growth in mobile demand

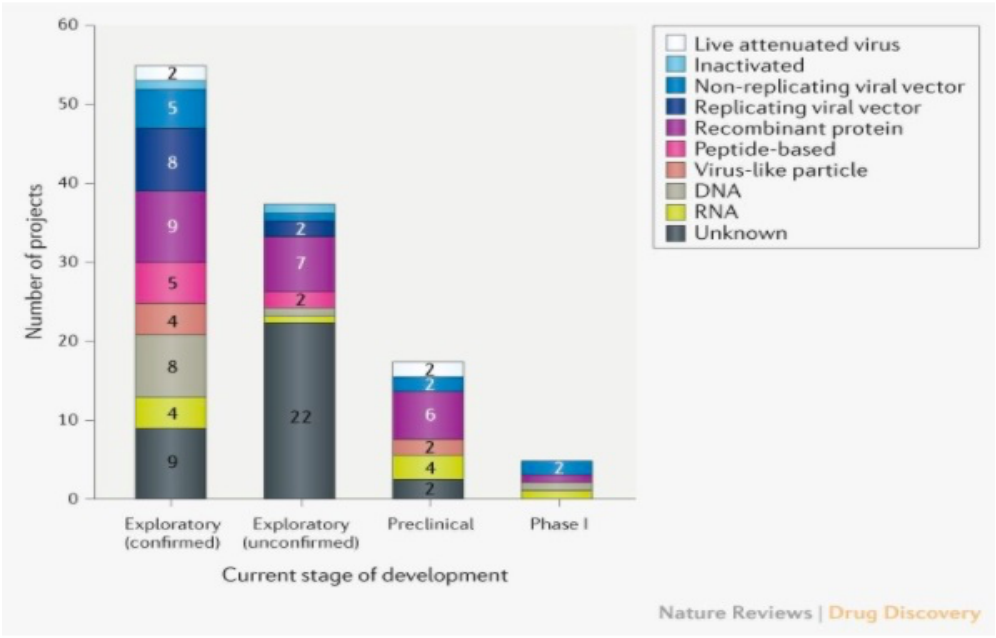


Fig 9 -Pipeline of COVID 19 vaccine candidates by technology platform

CONCLUSION

The summary of all these facts, figures and discussions is really thought provoking. We are bound to think that all is not well. Though the intellectual, social and thoughtful minds are trying to combat this pandemic disturbance in the best possible way, yet things are far from being normal and it may take too long to ever come back to the conditions in the pre COVID times. Yet life has to go on.. and optimistically in the best possible way. Hopefully effective and affordable vaccines are round the corner which will ease the extended tension in the human beings which is threatening us for months now all over the globe. User friendly inexpensive drugs are also expected sooner or later which will treat COVID just as a common viral fever.

We are now becoming impatient to greet our friends and relatives by hugging each other. We had enough of social distancing. The online classes, the webinars, the online conferences and video conferencing have become the saviours as of now. But it must be kept in mind that there

are still lot of economically backward sections of society who cannot really afford these platforms. We are afraid that there may be a digital divide which will not be conducive to the earnest learners of the rural areas. We need to understand that survival of the fittest is persistent through ages. The innovations in science and technology have continued unabated right from the historic period. Starting from creating fire to creating wheels, the sole objective has been to ease life a little more. The trend continues and innovations keep lining up even during the pandemic effect. We can be optimistic that the lifelines for dealing with COVID-19 will keep rolling and the social, medical, financial, digital and emotional divides will be taken care of very effectively.

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