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COVID 19 RAPID HUMAN INGENUITY

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A rapid response paper compiled as a pandemic was unfolding:

Corona Virus Disease (COVID 19): Rapid human ingenuity through innovation and technology as a proactive and admirable response in the storm of a global pandemic – dedicated to frontline workers

Bruce, T.A. (2020)

Abstract

The human response on the ground in the face of global *COVID 19* pandemic is an impressive example of how people apply innovative thinking to the design and development of ways to assist themselves and their fellow human. This paper seeks to capture ways that people respond in light of a sudden and global pandemic, where media newsreels will continue to change and reports in an era of mass information consumption will be replaced by the next news-story and potentially forgotten. This paper retrieves, almost entirely, media information via reported online text and imagery (paragraph or page numbers are not regarded) from around the globe and considers, as well as the innovative and technological efforts being made, the important and crucial role played by those media professionals whose jobs are to bring cutting information to the masses from often the most obscure and inaccessible of places.

Keywords: *Corona Virus Disease ; Innovation; Technology; Human Ingenuity; Masks; Ventilators; Robot Nurses; Media journalism appreciation; Future-generation salute*

Introduction

The concept of innovation is of Greek origin from the 5th century BC, derived from *kainos*,

meaning new. The word originally meant 'cutting fresh into' (Godin, 2015: p.19). Innovation is a derivative of the Late Latin *innovationem* with a mid-15th century usage as meaning restoration or renewal (Harper, 2018). The term's earlier recorded use is described by Godin as a word which carried a pejorative connotation. He writes:

As introducing change to the established order, innovation was seen as deviant behaviour, forbidden and punished. It was through religion that the concept of innovation first entered discourse in the Western World. In seventeenth and eighteenth century England, documents by the hundreds made use of innovation to discuss religion, using the word explicitly (2012: p.8).

In light of a sudden global *COVID 19* pandemic which reared its widely-rooted and unforgiving head at the beginning of 2020 but wasn't acted upon globally en-masse until the awakening of Spring, individual people tasked themselves or were tasked, in the innovative creating of responses to this very real and biting global social issue. At the hour of the compiling of this very basic paper the *COVID 19* coronavirus has infected 605,311 and removed the lives of 27,610 (Saturday, March 28, 2020: 10:06am), across 199 countries (Worldometer, 2020).

Masks

The coronavirus pandemic has led to a global shortage of face masks, and people around the world are making their own in response. Hadden reports:

Face masks are used to protect people from the novel coronavirus. N95 respirators are face masks that block physical particles that spread COVID-19, like saliva and mucus, as well as 95% of airborne particles that spread the illness. Surgical masks, the other common type, can block physical particles, but not necessarily airborne ones. As global demand increases, companies are simply running out of face masks. People are making face masks out of everything from old t-shirts to 3D printing technology (Hadden, 2020).

Brewster adds to the complexity of a DIY response and suggests that home-made cloth masks stop only three percent of particles, whereas a medical mask might stop up to 56 percent, whilst also reporting that Department of Health and Human Services estimates the United States alone will go through more than 3.5 billion face masks in a single year, with a national stockpile amounting only a single percent of this (Brewster, 2020). In China, as reported upon by Ibbetson, social media posts have shown people fashioning masks from grapefruit and melon skins, sanitary towels and water-cooler bottles, as in Figure 1 (Ibbetson, 2020).



Figure 1: Watercooler Head Mask

This paper's intention is to capture the innovative efforts of people throughout a global COVID 19 pandemic, whereby, if a similar strain of virus was to become apparent in the future as a second wave, these types of innovative efforts (as well as lessons learned) could be replicated and motivate others to rise to a task of innovating for themselves. The author considers at this point that innovation is required, but these must perhaps be informed and not just effort being made for effort's sake. In spite of this, the ingenuity of regular people who are not necessarily defined as innovators does shine through, whereby in the face of extreme hardship via threat of imminent infection or death, people make use of the most random of items in a bid to protect themselves and others. A philosophical consideration here asks whether certain cultures are more likely to not care whether they lose public face or not, where the author considers a visit to a supermarket wearing a bandana as protection where the author was sniggered at by passers-by. Perhaps public attitude toward innovatively taking control into one's own hands could be at question for future debate.

This paper will now consider other forms of innovation emerging from a COVID 19 crisis, in an attempt to capture some examples of a

global citizen response in a truly challenging hour.

Ventilators

The United Kingdom's National Health Service has around 5,000 ventilators, with a goal amidst the COVID 19 outbreak to manufacture a further 20,000 machines. As Henden writes:

A ventilator, also called a respirator, is designed to provide mechanical ventilation by oxygen into and out of the lungs, to deliver breaths to a patient who is physically unable to breathe, or breathing insufficiently. The machines can be used to help a person breathe if they have conditions making it difficult to breathe, such as lung diseases. Ventilators can also be used during and post-surgery to keep oxygen flowing through your lungs (Henden, 2020).

Ventilators are regarded as a current and critical necessity against the backdrop of a global pandemic. Readfearn provides insight into healthcare authorities across the world attempting to equip their hospitals with more ventilators to cope with increasing numbers of patients, also describing how the ventilator-process works, whereby before a person is placed on a ventilator, often a procedure called intubation will be performed by an anaesthetist. The patient is then provided with a muscle relaxant and sedated before a tube is placed through the mouth and into the windpipe. The tube is then attached to the ventilator where medical staff have freedom to adjust the oxygen mix as well as the rate the air is mechanically pushed into the lungs (Readfearn, 2020).

With major engineering, car manufacturing and technology companies including Dyson in the

United Kingdom and Ford, General Motors, Toyota and Tesla in the United States tasked to produce ventilators, Wattles and Valdes-Dapena report on the challenges faced by pointing out:

Ventilators are complex machines that use sophisticated software and specialized parts, and companies that seek to manufacture them face several hurdles – including intellectual property rights, the need for specially trained workers, regulatory approvals and safety considerations (Wattles and Valdes-Dapena, 2020).

From a United Kingdom perspective Gartenberg adds:

Dyson — the British technology company best known for its high-powered vacuum cleaners, hair dryers, and fans — has designed a new ventilator, the “CoVent,” in the past several days, which it will be producing in order to help treat coronavirus patients. The company reportedly developed the ventilator in 10 days based on Dyson’s existing digital motor technology. Dyson is still seeking regulatory approval in the UK for the rapidly designed device, but it’s already received an order from the UK Government for 10,000 ventilators, of which the National Health Service (NHS) is in dire need (Gartenberg, 2020).

The ability to large companies to respond to switching manufacturing from one product to another (Figure 2) is an impressive insight into how a multi-sector response to a global COVID

19 pandemic can result in innovation on a grand scale.



Figure 2: Dyson's "CoVent" ventilator product

This paper considers further *on-the-ground* and more makeshift attempts to create home-devices and how these, similar to face-masks, may not be the overall solution, but could result in protecting people and maintaining life as an interim, meaningful and effective response, which could result in seeing some fresh manufacturing companies emerge from a crisis. As Whooley reports:

The University of Minnesota is touting makeshift ventilators made from \$150 in parts as potential solutions amid the shortage of equipment at healthcare facilities during the COVID-19 outbreak. The researchers developed the mechanical ventilator as a compact device the size of a cereal box that does not require pressurized oxygen or air supply, unlike commercially available mechanical ventilators (Whooley, 2020).

Whilst the United Kingdom's Department of Health and Social Care has published a specification of a minimally clinically acceptable ventilator to be used in hospitals, setting out what is minimally acceptable (Department of Health & Social Care, 2020), other, perhaps

less socially-agreeable models are in design discussion and production regardless. Bergan describes that a shortage of suitable equipment amidst a pandemic situation has driven DIY designers to attempt to fill a supply gap (Bergan, 2020).

A visual example of an open source design that could be made at home (Figure 3) is offered by Thomsen, who adds:

Ventilators are complicated devices that require skilful technicians to use properly, and they're also subject to FDA approvals which mean most home projects are likely to unusable for most hospitals (Thomsen, 2020).



Figure 3: Homemade ventilator design shared via Google Docs and Github. Image copyright by jc15m1 / GitHub

With innovative considerations around face-masks and ventilation systems which could result part-way in stemming a pandemic in their own individual ways, whilst being mindful of the realities of an achieving of getting products to market, this paper now turns its attention toward China's technological attempt at placing less humans at the frontline, where machines could become a future response of every nation, in protecting its workforce.

Robot nurses

The author shopped at a Morrison's supermarket in Seaburn in the United Kingdom on the evening of Friday, March 27, purchasing some broccoli and other vegetables, together with Turmeric tea, bread and bottled juices. Approaching the checkout it became apparent that the checkout worker was wearing gloves but no protection at all for their face. This, to the author, was an example of a lack of empathetic response to a frontline worker, within a store which sees thousands of general public passing through its aisles every day and no doubt many germs being passed between people. When asked the reason for being issued with plastic gloves but no face mask, the checkout operator responded:

We've been told we cannot have these. They are installing screens next week, so we've been told. I'm actually terrified (Supermarket Checkout Worker, 2020).

This paper considers the life of a supermarket checkout operator as being as valuable as a frontline health worker, or any other occupation in public-facing roles, whilst positioned at the centre of a storm inside of a global *COVID 19* pandemic. China's response, through technology, is perhaps an example of how a future healthcare system might embrace innovation in a meaningful way, deflecting the potential of infection away completely from a human being. However, the author is reminded that the annual budget spending of a nation can often be less applied to the defence of people against hardship and the onslaught of infection or disease and more towards the defence of a nation against an attack upon its borders via other nations – the quite sad socially-

constructed reality the human species has found itself in, yet could perhaps shift its rigid paradigms towards altering. As Mulgan points out:

Meanwhile, vastly more innovation funding still goes to the military than to society, and the world's brainpower is still directed far more to the needs of the wealthy and warfare than it is to social priorities. More worrying is the shift in climate. Relatively centrist, pragmatic governments of both left and right were sympathetic to some of the arguments for social innovation. By contrast, authoritarian leaders of the kind who are thriving now tend to be hostile, suspicious of civil society and activism of any kind, and much more favourable to innovation that's linked either to the military or big business (Mulgan, 2017).

Hornyak writes of a novel field hospital staffed by robots opening in Hongshan Sports Center in Wuhan in China, where the global *COVID-19* pandemic began. It is reported to have originated from a seafood market where wild animals are illegally traded and where coronaviruses are evidenced as having ability to leap from animal to human. The Smart Field Hospital is a facility which can serve 20,000 patients. The trial was aimed at relieving healthcare workers, as the *COVID 19* outbreak, for the virus' original host nation at least, began to show signs of slowing:

All medical services in the facility were carried out by robots and other IoT devices. Patients entering were

screened by connected 5G thermometers to alert staff for anyone feverish. Patients wore smart bracelets and rings that synced with CloudMinds' AI platform so their vital signs, including temperature, heart rate and blood oxygen levels, could be monitored. Doctors and nurses also wore the devices to catch any early signs of infection. Meanwhile, other robots provided food, drinks and medicine to patients, as well as information and entertainment through dancing, and still other autonomous droids sprayed disinfectant and cleaned the floors (Hornyak, 2020).

Where additional global reports talk of robots performing ultrasounds, fluid-collection and swabs from a person's mouth, it is questionable just when this level of innovation will become widely available across a mass market. Countries such as Denmark are already established in the hosting of a range of test sites and robot applications in healthcare, describing themselves as an easy point of entry to the European market (Ministry of Foreign Affairs of Denmark, 2020). Denmark is also widely publicised as trading disinfection robots with China. Figure 4 shows a food delivery robot which is fully autonomous and alleviates the human to human contact, freeing up frontline staff for additional duties.



Figure 4: Hospital ward food delivery robot

Discussion

This paper was compiled in response to a COVID-19 pandemic situation, with an aim of capturing immediate reporting which relates to innovation and technology being considered and developed in an hour of critical need – as the world seems currently locked at the very eye of an unrelenting storm. The author leaves future discussion to those who will respond in their own way, who will consider perhaps the dire need of humanity to see through multi-layered agendas of the world's socially-constructed political and financial systems and to recognise that all we really are, as a race, is a species attempting to survive and *be* in the world. Where this ability to *be* has become overtaken by a callous and mass-supported endeavour to purchase all, own all and to control all, this has removed from every human being on earth their basic, individual right, to exist autonomously and to *be*, in their own light. There is much mixed cell and blood type from a range of varied species (plants and trees included) upon the hands of the nations of this tiny planet right now, as in the blinkered past. How exactly the future will unfold will be determined by whether true leaders stand up and speak, or remain seated and silent. But

perhaps, for now at least, silence is okay, whilst Nature is afforded just a brief spell, to mend its own broken system.

This paper here ends via a conceptual imagining of the entire global and universal system as one whole body, interlinked, where, from an anatomical viewpoint, Jasanoff, director of the MIT Center for Neurobiological Engineering considers '*how the brain is physiologically coupled to its surroundings*' (2018: 220). Here human physiological and all adjoining systems might be assumed as juxtaposed against a reality-backdrop, interconnected in all their array of splendid uniqueness and functioning in the kind of completeness which could see a future landscape awaken from an unwanted dystopian nightmare into more of a utopian, lucid dream – preferably one where the adults of tomorrow are permitted a more authentic and less tokenistic display of voice and control.

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Author note: As a rapid response paper all online sources were visited on March 28, 2020. The author apologises for any academic inconsistencies in the narrative. This paper was completed at 14:27pm where Worldometer (online) estimates 28,653 deaths with 620,938 confirmed cases across 199 countries and territories. This paper is dedicated to the 1,043 who in the blink of an eye whilst compiling this paper, were robbed of their right to survive – may those you left behind inherit an improved socially-constructed system of societies worldwide. This paper is also dedicated to current frontline workers such as nurses and the aforementioned supermarket staff.

Bruce, T.A. (2020) Corona Virus Disease (COVID 19): Rapid human ingenuity through innovation and technology as an proactive and admirable response in the storm of a global pandemic