From Creative Destruction to Creative Disruption: Lessons for Selected and Strategic Industries

Jean-Pierre SEGERS
Riga Technical University; Université de Liège and PXL,
Hasselt, B-3500, Belgium

Elina GAILE-SARKANE
Riga Technical University
Riga, LV1048, Latvia

ABSTRACT

In March 2020, the world was hit by a perfect storm: the COVID-19 pandemic. Already in 1994, Laurie Garrett made a case for "newly emerging diseases in a world out of balance", expressing concern about the appearance of new infectious diseases. More recently, many other thoughts and warnings were expressed on this topic, for example by Bill Gates in his 2015 TED Talk. And now it is happening, shaking the very foundations of our society and economy. The outbreak of the Wuhan Coronavirus (COVID-19) disease has transformed the world as we know it into a new normal – a kind of a brave new world 2.0 – disrupting the business models of civil society, (higher) education, world economy, business, governments, policies. It is clear – we are on the eve of a paradigm shift, and it is up to us whether we will influence it or simply allow it to happen, not only in science-knowledge but also in human interactions and behavior, basically all aspects of our up-to-now comfortable life.
Disruption came in a different shape and form. This article discusses the impact of the COVID-19 pandemic on a number of selected and strategic industries

Keywords: Corona/COVID19, Creative disruption, Strategic industries.

1. INTRODUCTION

"I think there are good reasons for suggesting that the modern age has ended. Today, many things indicate that we are going through a transitional period, when it seems that something is on the way out and something else is painfully being born. It is as if something were crumbling, decaying, and exhausting itself, while something else, still indistinct, were arising from the rubble."
Vaclav Havel (1994)

In March 2020, the world was hit by a perfect storm: the COVID-19 pandemic. Already in 1994, Laurie Garrett made a case for "newly emerging diseases in a world out of balance", expressing concern about the appearance of new infectious diseases. More recently, many other thoughts and warnings were expressed on this topic, for example by Bill Gates in his 2015 TED Talk. And now it is happening, shaking the very foundations of our society and economy. The outbreak of the Wuhan Coronavirus (COVID-19) disease has transformed the world as we know it into a new normal – a kind of a brave new world 2.0 – disrupting the business models of civil society, (higher) education, world economy, business, governments, policies. It is clear – we are on the eve of a paradigm shift, and it is up to us whether we will influence it or simply allow it to happen, not only in science-knowledge but also in human interactions and behavior, basically all aspects of our up-to-now comfortable life.
The COVID-19 pandemic can be cataloged as a so-called "Black Swan": a random event that underlies almost everything about our world and our personal lives. A black swan is a highly improbable event, unpredictable and carrying with it a massive impact (Taleb, 2007) [20].

Recovering from Covid-19 put our economic systems to the test. According to Chesbrough (2020), innovation will have an important role to play. Innovation is often analyzed in terms of costs. In the case of an unpredictable pandemic, time is so valuable and essential that the question of costs is far less important than the ability to get to a solution sooner. The global impact was far stretched and quickly visible with:

- slowed economies and societies;
- affected financial markets;
- decreased revenues for businesses and industries;
- disturbed global supply chains.

The multilevel theory of ***national competitive advantage*** of industries and nations (Porter, 1990) [13] focuses on why certain industries within a nation are competitive internationally. Porter argues that the competitive advantage of certain industries in different nations depends on a dynamic interaction of four aspects as illustrated below in his "diamond model", connecting firms, industries and nations.

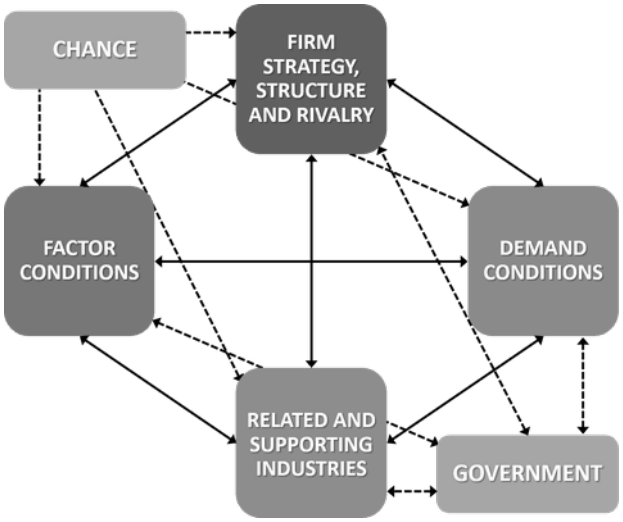

Fig. 1: The Competitive Advantage of Nations – Diamond Model (Porter, 1990) [13]

2. CREATIVE DESTRUCTION

Creative Destruction (Schumpeter, 1942) [17] is an evolutionary process within capitalism that "revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating the new one" (Pfarrer & Smith, 2005) [12]. Innovation and entrepreneurship occupy a decisive role for economic development, even more in times of crisis. The entrepreneur is the central player in the market process. The successful firm must constantly be innovating to sustain profitability and to avoid the "perennial gale" of Creative Destruction. According to Schumpeter (1942) [17], large, established enterprises play the role of innovative leaders.

Creative destruction refers to the phenomenon of economic change through the creation of new ways of doing things that endogenously destroy and replace the old ways. The term "creative destruction" is usually used to emphasize the dynamic nature of the modern economic system. According to Schumpeter, entrepreneurs initiate gales of creative destruction and therefore destroy existing equilibriums. Creative destruction results from challenges by disruptive technology (Kessler, 2013) [9].

Disruptive innovation means that speed is important to create and sustain competitive advantage of firms amidst rapidly changing business environments. The phenomenon of disruption was coined in the mid-1990s (Christensen, 1997; Christensen et al., 2018; Schmidt and Herting, 2020) [6],[7],[16], showing how new entrants challenge established organizations – incumbents – by introducing new offerings, which develop along an alternative performance trajectory.

Disruptive technologies are commercialized in niches of markets but they can penetrate mainstream markets and compete with incumbent technologies. Christensen (1997) [5] observes that established firms face an "*innovator's dilemma"* that is associated with internal resource-allocation processes leading them to systematically underinvest in disruptive technologies. The lack of business model innovation is the main reason for incumbents being disrupted. Many current cases across industries show how business models affect disruptive change in established industries (Christensen et al., 2018) [6].

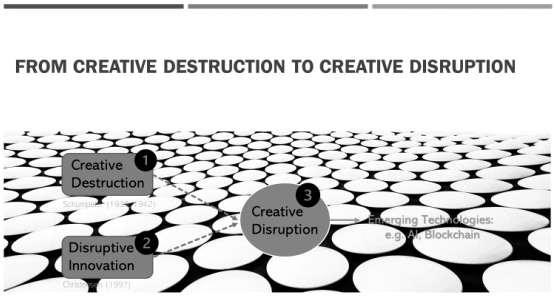

Fig. 2: From Creative Destruction to Creative Disruption (Segers, 2020)

Creative disruption is synonymous with creativity, challenge and change. The aims of creative disruption include creating new business innovations that lead to new markets – i.e. impact of emerging technologies – and new marketing techniques.

In the next section, a number of selected and strategic industries are explored, drawing on the concepts of multiple case study research design (Yin, 2009; 2012) [23], [24] and the use of secondary qualitative data. The multiple case study research method is widely used for examining technology and innovation adoption issues.

The proposed industries are:

1. the civilian aerospace and defense industry, in particular the case of Airbus Group (Airbus Industries) [1], [2];
2. the biopharmaceutical industry;
3. Big tech.

3. DISCUSSION OF SELECTED AND STRATEGIC INDUSTRIES

Civilian aerospace and defense industry: the Airbus case.

Airbus began operation in 1970 (Blagnac, France) and quickly became a powerful symbol of what can be achieved by European political and economic cooperation (McGuire, 1997) [10]. The company, formally known as the European Aeronautic Defence and Space Company (EADS) is a civilian aerospace and defence consortium that connected Aérospatiale-Matra (France), DASA (Germany), Construcciones Aeronáuticas (Spain) and British Aerospace (the United Kingdom). From the European perspective, Airbus was an entirely appropriate response to the United States dominance in the global market for commercial aircraft, its main competitor being Boeing. Airbus has risen to a position where it now has a 50-50 split of the global market with Boeing. Airbus is thus a good illustration of how European nations can work together to compete strategically on the international stage (see Porter's diamond model discussed earlier).

Over the last decades, Airbus has become the orchestrator in the leading European aerospace ecosystem with many European subcontractors, e.g., in Belgium (Segers, 2017a) [18]. Without related and supporting industries such as engines, avionics and materials, a key industry such as aerospace cannot become globally competitive. It is this that made it possible for Airbus to succeed.

An interesting evolution is the way Airbus has moved toward open innovation (Segers, 2017a; Airbus, 2020) [18], [1], [2]. with greater use of outsourcing in their business models (Saias and Kapadia, 2016) [14]. The aerospace industry is characterized by so-called value chain deconstruction: a focus on core business-critical competencies, together with the outsourcing of non-core activities. The outsourcing arrangements allow them to gain access to technology specialists that help them make the most of new innovations and models.

Airbus is enhancing its innovation process through the operation of a global network of accelerator facilities – called Airbus BizLabs (2020) [1], [2] – to speed up the transformation of ground-breaking ideas into valuable business propositions, all within an extended innovation ecosystem. This set-up has two primary methods for meeting its goal:

- accelerating the pace at which Airbus commercializes its own innovations;
- drawing upon and developing more ideas from outside Airbus, including customers and companies from other business sectors.

Another important feature is the use of subsidies by Airbus – the so-called government shelter – through extensive subsidization in public private partnerships (see Fig. 3).

Together with competitive product matching towards Boeing, this represents an interesting example of a company preparing itself strategically for moving beyond government shelter (Sarathy, 1994) [15].

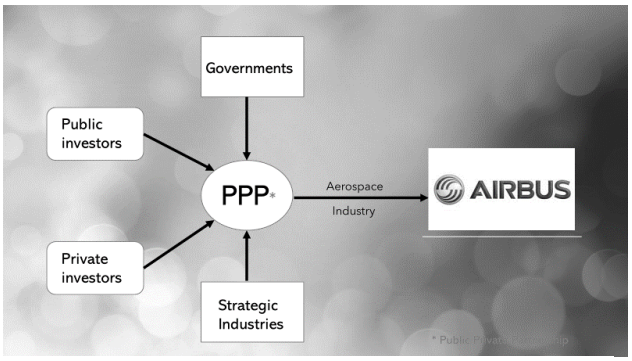

Fig. 3: The Airbus PPP (Segers, 2020)

And like so many industries, Airbus is now facing multiple emerging global issues such as climate change and sustainability, technological disruption, the current COVID-19 pandemic and an evolving competitive landscape with new business models, new mobility concepts and new transversal technologies.

Biopharmaceutical industry

The COVID-19 pandemic undermines the world economy and our health systems. The principles of disruptive innovation are applicable to the healthcare sector as it can improve both affordability and accessibility in healthcare so that more people get the care they need. The biopharmaceutical industry within biotech clusters around the world are more than ever considered as strategic industries in many countries. They are the driving forces of the economy and for global healthcare, as measured by R&D-intensity, the level of patent applications, the number of drugs in the pipeline, venture capital invested and the number of new biotechnology firms (Segers, 2017b) [19].

The first and most important task today is to defeat the invisible enemy – the coronavirus. The COVID-19 pandemic is reshaping the way companies collaborate and innovate. It triggered an unprecedented and intense level of global R&D activity and collaboration by research teams in companies and universities across the world in the search for vaccines. As of July 2020, 160 vaccines – this number is constantly rising (World Health Organization (2020); Callaway (2020)[3] – are being developed against SARS-CoV-2, the coronavirus that causes COVID-19:

- 21 candidate vaccines in clinical evaluation;
- 139 candidate vaccines in preclinical evaluation.

Some clinical trials involve next-generation vaccine technology platforms which have never been used in a licensed vaccine before.

Leading pharmaceutical and biotechnology companies like Johnson & Johnson (Janssen), Pfizer-BioNTech, Merck & Co, the Sanofi-GSK alliance, Gilead, Moderna Therapeutics, Inovio Pharmaceuticals, together with research universities and hospitals (e.g., the alliance of Oxford University Hospitals, Oxford Biomedica and AstraZeneca), governments and broader international scientific community are working together in public private partnerships (PPP) like never before to produce a coronavirus vaccine (see Fig. 4).

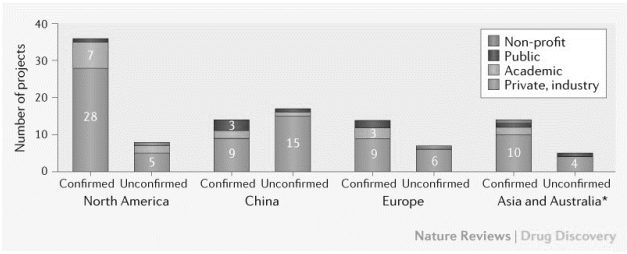

Fig. 4: Profile of COVID-19 vaccine developers (PPP) - Thanh Le, et al. (2020) [21].

Pharmaceutical and biotechnology companies and clinical research organizations are taking the race to the limit to develop a coronavirus vaccine, simultaneously waking the general public up to an important warning sign: the time of going from concept to marketable product, the time needed to produce vaccine. The pharmaceutical industry is stressing that the finish line is at least 12 to 18 months away. It hopes to compress the time to market distribution to within 2021 at the earliest, being significantly sooner than the 10 to 15 years the process of getting a new vaccine to market typically takes.

The joint battle against the coronavirus creates new business models of cooperation and coopetition. It provides a momentum for new public private partnerships to shift the world we used to live in. COVID-19 poses an unprecedented challenge for big pharmaceutical and biotechnology companies which creates new possibilities and models for coopetition and demonstrates real open innovation and value co-creation opportunities and approaches. Coopetition and open innovation here mean that companies cooperate on life saving projects while maintaining the drive of competition in the long run, making the race to find both medicines and vaccines for the COVID-19 pandemic more efficient and effective. According to Thanh Le, et al. (2020) [21], it will be important to ensure coordination of vaccine manufacturing and supply capability and capacity to meet demand.

Strategies of research alliances and acquisitions in the drug discovery industry may help incumbents to overcome inertia both in the initial stage of research and in the later stage of development of disruptive technologies (Coccia, 2020) [8]. Although the R&D competition remains as fierce as ever before, given this "normal" business model, a number of public private partnerships for the financing of clinical studies and the enhancement of production capacity worldwide have been speeded up. Some good practices are:

- finance independent research projects to develop vaccines against emerging infectious diseases;
- GAVI, the Vaccine Alliance. Its public-private business model draws on the skills and strengths of its core partners like the World Health Organization, UNICEF, the World Bank and the Bill & Melinda Gates Foundation. Gavi and its Alliance partners are providing immediate funding to health systems and enabling countries to purchase diagnostic tests;
- EFPIA, the research-based pharmaceutical industry in Europe, launching clinical development of potential vaccines against the coronavirus;
- IMI, the Innovative Medicines Initiative: the development of therapeutics and diagnostics to tackle current and future coronavirus outbreaks (drug development and repurposing);
- government-led consortia of pharma, biotech, IT and academia, e.g., in Belgium;

- open government approaches to tackling COVID-19 (Mention, 2020) [11], building trust between government and citizens, digital platforms or apps;
- Operation Warp Speed in the United States, a national program with the Biomedical Advanced Research and Development Authority (BARDA) to accelerate the development, manufacturing, and distribution of COVID-19 vaccines, therapeutics, and diagnostics;
- The Accelerating COVID-19 Therapeutic Interventions and Vaccines (ACTIV) partnership, i.e. a public-private partnership to speed COVID-19 vaccine and treatment options by the National Institutes of Health in the United States. It brings together more than a dozen leading biopharmaceutical companies, the Food and Drug Administration and the European Medicines Agency to develop an international strategy for a coordinated research response to the COVID-19 pandemic.

Big Tech

It's crucial that our economies embrace innovation and thus create societal and business value. We live in a time frame that is commonly referred to as the 4th industrial revolution. Many powerful new technologies and platforms have emerged (Fig. 5). Industry 4.0 relies on the cloud, internet of things (IoT), big data, 3D printing (additive manufacturing), artificial intelligence, augmented reality, virtual reality, blockchain and drone technology. Accordingly, industry 4.0 is about product development, manufacturing, supply chain and new business models for future growth (Treves and O'Shea, 2020) [22].

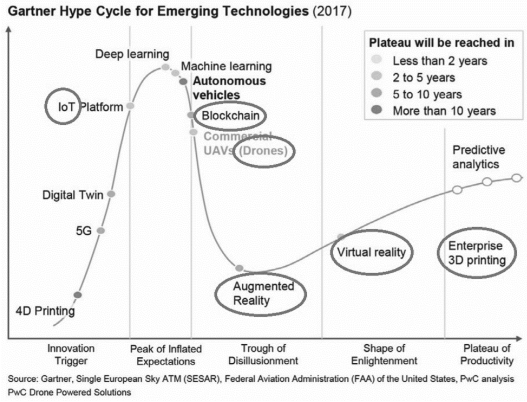

Fig. 5: Emerging Technologies (Gartner) [26]

The COVID-19 pandemic created a new and crucial momentum for these technologies and platforms. The world is in need of a rapid development and manufacture of critical personal protective equipment, testing material and diagnostics, access to vaccines, ventilators for the intensive care units, mouth masks, etc. In line with the sense of urgency, digital healthcare (e-health) and medtech, the use of big data and artificial intelligence are booming. COVID-19 thus strengthens big tech companies like Facebook, Amazon, Apple, Microsoft and Google.

At the same time, big manufacturing companies like General Motors, Ford and Tesla are forming partnerships with aerospace firms, ventilator manufacturers and others to transform some of their manufacturing capacity to assemble much needed critical equipment like ventilators and respiratory appliances and to boost output as fast as possible (Chesbrough, 2020) [4]. The world witnesses a time where well known startups and scaleups are now outperformed by big tech in a kind of reversed disruption.

Artificial intelligence (AI) is disrupting value chains. According to the World Economic Forum (2018) [23], there are several distinct value propositions for AI in the creative economy. One disruption will undoubtedly come in the form of automation and augmentation of human creative processes. The same is happening with Blockchain technology which has grown in recent years. It is primarily seen as a platform for cryptocurrencies, but further applications are rapidly emerging when the technology is applied to other data structures, such as ownership and contract details. AI will allow to obtain or sustain a competitive advantage or to move into new businesses.

COVID-19 has also stimulated the use of the 3D printing technology. Here also, universities and research centers are working closely together with new technology-based firms – high tech startups and scaleups. In Belgium, for example, the 3D-printing ecosystem is introducing new innovative business models and working on disruptive possibilities of 3D printing technology for business and society. Additive manufacturing software solutions and sophisticated 3D printing services can be applied in a wide variety of industries, including healthcare (3D bioprinting of live stem cells; artificial implants, medical image processing, surgical simulations), automotive, aerospace, design and consumer products (Segers, 2017a) [18].

We live in a century of robots, with a fast-growing subfamily called drones. The development of commercial drone applications in close partnership with other emerging technologies such as artificial intelligence is again a good example of COVID-19 enhanced innovation, e.g., with respect to crowd tracking and e-retail.

4. CONCLUSIONS

In terms sectors affected by COVID-19 one can mention tourism and transport - especially aviation. Due to the virus, we can observe both the closure of factories, prolongation of the delivery time of production to markets, shaking of financial markets etc. All areas are affected.

COVID-19 is a catalyst for change in all industries and gives unexpected stimulus for innovation development

This is obvious – world is going through a transitional period – society is breaking old habits and agreements with an aim to speed up movement to the future. Not all changes are equal or easy to make. It tackles all elements – financial, technical, human… some elements are easy to change, some not. It is time to break old corporate habits, adapt and improve, and create new business models – to better succeed in a global competition.

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