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Destructive Innovation to the Unsustainability of the Environment

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Abstract: *This article explores the causes of environmental degradation and aims to explain the interconnection of state, capital, and masses as enhancing environmental degeneration. Innovation and production processes have progressed under the guise of economic gains, and entrepreneurs' efforts to produce new things, coupled with capitalistic mottos, added to the hazardous environmental pollution. My argument is backed up by the theory of treadmill production as a political-economic explanation of the causes of environmental degradation. This stance refers to the extensive capitalistic search of the state and masses as getting stuck on a "treadmill" where they have not improved economically, yet their pursuits for economic development lead them to damage the environment. Using the narrative of New York 2140, this study warns about the possible menace thwarted back by the environment. This study highlights how the innovation process under capitalistic goals leads to unnecessary over-consumption, which ultimately results in environmental unsustainability.*

Key Words: Environment, Unsustainability, Innovation, Destructive

Introduction

Context of the Problem

In this modern dynamic world, innovation coupled with entrepreneurship plays an important part in the field of economic development. In the view of Joseph Alois Schumpeter, "carrying out innovations is the only function which is fundamental in history" (Sledzic p. 89). The historical development of industrialisation was the outcome of growing capital due to the greater prosperity of the western nations. Technological change and innovations were perceived as the guarantee for 'social welfare in general (Gries et al. 2017 in Sazarukki). The capital was used to replace labour with technology for increased production. This increase in industrialisation led to a substantial increase in demand for natural resources. New technologies were being used in introducing these nova industrial processes, which required more energy. With the passage of time, innovations started to swarm upon modern societies, and there began a capitalistic marathon to grab consumers to achieve materialistic gains by providing them with innovative industrial processes and productions. The consequences of these kinds of developments were hazardous in their effect. These activities not only brought about a sudden

decrease in natural resources but also polluted the environment on the whole.

The modern industrial revolutions generated a new political-economic system labelled as the "treadmill of production" (Schnaiberg 1980b; Schnaiberg & Gould 1994). This political-economic system runs over the rail of expanding industrial production and increasing consumption, as well as the politicised public confluence of private capital, labour, and governments, which is involved in promoting this goal. A remarkable increase in production generated opportunities for further employment, and the service sector seemed to grow more rapidly. Finally, states and their government apparatus increasingly shared a stake and created possibilities to expand the private sector in economic terms. Following these interests and beliefs, private capital, labour, and state interests represented a powerful political force, accelerating the treadmill of industrial production.

This industrial process demanded raw material inputs extracted from the ecosystem and added wastes as the by-products of outputs to the ecosystems (pp. 5-6). Thus greater mechanisation resulted in creating more pollution problems. Moreover, intensive capital requires greater material input and demands more energy to run machinery, so a higher level of withdrawal from ecosystems is required. Industrial factories use more chemicals in the production process, adding pollution to the ecosystem.

This article manipulates the innovation theory of Joseph. A. Schumpeter, describes the production process under the guise of economic well-being and environmental sociologist Allan Schnaiberg's theory of treadmill of production forms the argument that production process and over-consumption contribute to environmental pollution and instabilities. The treadmill or production process consists of Stakeholders (workers and citizens) and shareholders (investors and managers). They keep themselves indulged in this process of the treadmill and continue contributing to environmental pollution.

New York 2140 (2017), a science fiction novel by Kim Stanley Robinson, has been narrated from the viewpoints possessed by multiple characters of this dystopia. Global warming, with its consequential aftereffects, work at the backdrop to examine issues of greed, capitalistic exploitation, the imminent want for revolution, and the importance of teamwork when organising against a normative system. *New York 2140* is a cautionary tale regarding global warming and an illustration of the author's interest in resilient, tough New Yorkers. This sci-fi composition highlights how the capitalistic processes of overproduction have driven New York into environmental degradation.

Literature Review

The phenomenon of understanding the present might lead to future developments, and misusing the present for some definite goals might spoil the futuristic circumstances. Human actions operate within a framework of relationships, regulated processes, and systems that are ecological as well as cultural. These networks of processes have a greater impact on the lives of humans and their relationships with the outer non-human world, that of ecological territory, and the interplay of the human and the non-human (Black 1994). This interaction between the human and non-human world has been affected greatly by the innovation processes of production and over-consumption. This literature review provides a glimpse of the literary articles concerning the innovation theory of productions, how they are backed up by capitalistic gains, and how this capitalistic materialism is presented in the form of the treadmill theory of production, which challenges the fast-moving yet static production process and its hazardous effects

over the environmental stability.

Cheng-Hua Tzeng, in "A review of contemporary innovation literature: A Schumpeterian perspective", categorises the research primarily related to innovation into three main schools i) capability, an economic perspective characterising technological change (p. 374); ii) corporate entrepreneurship 'a social perspective' or improvisation in action and iii) the cultural perspective. Tzeng addresses the perennial problems regarding innovation as institutionalisation vs de-institutionalisation of the innovation, technological push vs market pull, and incrementalism vs radicalism. Innovation works on the dynamic capability of a firm, defined as the ability of a firm to build, integrate, and reconfigure not only external but also internal competences (Teece, Pisano & Shuen 1997: 516 in Tzeng 2009, p. 375). Institutionalisation of the innovation regulates it into a repeatable economic process just like a routine.

Klaudia Bracio and Marek Szarucki, in the article Commercialisation of Innovations through Internalisation: A Sys bt3tematic Literature Review, published in 2019, provide information on the concept of commercialisation of innovations carried out through internationalisation, on varied research perspectives and areas of analysis using bibliometric data. They show how prominent researchers argue in favour of innovation and a firm's internalisation as important 'factors shaping business success' (Buckler and Zien 2003, Szopik-Depczyńska et al. 2018, Wind and Mahajan 2006).

Ina Drejer (2003) describes Schumpeter's original innovation theory as encompassing the broad vision of manufacturing services as a major economic activity. The argument is built on the views that strong emphasis on organisational innovation, multiple agents involved in the innovation process, and specific codification of knowledge contribute to innovative manufacturing (p. 560).

Schumpeter's view on innovation and entrepreneurship by Karol Śledzik (2013) supports the innovation theory Schumpeter and gives a deep analysis of the "first" and "second" entrepreneurship theories proposed by him. Sledzick considers Schumpeter's theory different from the other theorists during that period, such as Frank William Taussig, John Bates Clark, Friedrich von Wieser, and Alfred Marshall. Schumpeter's "entrepreneur" definition is related to functions and activities concerning innovation (Sledzick, p. 92). In his early work, Schumpeter presents the entrepreneur as an individual pioneer who works with confidence beyond the level of familiar areas. But the second innovation theory is less individualistic, and he says that even a state or country can act as an entrepreneur (p. 93).

Professor Schumpeter, primarily known as a "business-cycle theorist", operates on the anatomy of economic change in a capitalist society, and Paul M. Sweezy (1943) attempts to elaborate on Schumpeter's views related to the cycle of economic change in the capitalistic economy highlighting that innovation, performing things apart from the norm in the mechanism of economic life" is the causative factor in bringing about that change (p. 93). A particular set of individuals or entrepreneurs perform the activity of innovation. Sweezy concludes that there is no way to contradict his conception of innovation as a central feature of economic development (p. 96).

The influence of Schumpeter on economic and social sciences is of greater degree and many researchers have analysed his contributions as related to the act of entrepreneurs as the personified agents of innovation and the big companies as the drivers of innovation in capitalistic developments. Hagedooren, in the research work 'Innovation and Entrepreneurship: Schumpeter revisited', assesses his influence on social sciences and especially on economics by emphasising that any

dichotomy does not lie between the 'old' and the 'young'. Hagedroon gives a combination of Schumpeter's biography as well as a scholarly examination of Schumpeter's contribution to contemporary economic theory and modern economics which is founded on non-linear dynamics. The two periods of Schumpeter's theory of modern economic development: entrepreneurial capitalism and justified capitalism, show the change in the roles of entrepreneurs and the rise of modern capitalism, where large companies become innovators. This difference is described as "the watershed between two epochs in the social history of capitalism" (Schumpeter 1934, p.67) as the competitive versus 'crucified capitalism'. Hagedooren explores that capitalistic divide.

Jan Verloop's "Insights in Innovation", a chapter in the book "*Success in Innovation",* 2013 categorises innovation as the third step in a structure of a whole process like

I. Discovery – Science domain
II. Invention – Technology domain
III. Innovation – Business domain
IV. Diffusion – Society domain

The more innovation diffuses into society, the more it will affect the way of life and the more it has been adopted by society. Verloop asserts that the impact of innovation is calculated by its use in society but not by the efforts in the science and technology domains. Innovation processes also have negative impacts, and thus they are prone to the resistance of society. Some theorists have also resisted the theory of innovation as they regard this capitalistic process as nothing but a static process in a fake movement, just adding to the environmental pollution.

Allan Schnaiberg, Kenneth A. Gould, and Adams Weinberg, in their work *Local Environmental Struggles: Citizen Activism in the Treadmill of production*, focus on local ecological problems. By examining the modern environmental motto of 'think globally' but 'act locally', the authors analyse the possibilities and constraints regarding local environmental activities ushered by economic and political structures at all levels. They explore the difficulties faced by local activism and propose that any successful efforts for 'mobilisation must have a local component'. Discussing structures beyond national boundaries and the limited local resistances and environmental conflicts, they proceed to transnational strategies from local struggles toward a model of sustainable mobilisation.

Dean Curran (2017) supports the treadmill of production, highlighting the position of advanced economies stuck on a "treadmill" in search of higher economic goals, not being improved in economic procedures yet causing massive environmental damages to the global sphere in the article, "The Treadmill of Production and the Positional Economy of Consumption". The state, citizens, and workers keep providing support to treadmill production. Analysing the positional economy of consumption states that the forceful structures keep individuals increasing their income and the 'levels of defensive consumption' to regulate their social practices and well-being, thus increasing the effect of the treadmill of production.

Many historians and theorists have discussed the dynamics of industrial change. Economic historians sketched the tremendous surge, Historians of technology focused on the role played by innovations, and Social historians brought to the limelight the changes wrought by industrial development, the consequential transformations of family/religious beliefs, social mobility, ethnic customs, working-class traditions, and the very nature of work itself.

Theodore L. Steinberg, in their work, "An Ecological Perspective on the Origins of Industrialization," regards environmental change as perhaps the most visible

manifestation of industrial change. Creating a debate about the evolution of agriculture, energy processes, and agricultural technological advance, the viewpoint of two groups is provided by E. L. Jones and S. J. Woolf emphasise the productive contributions of agriculture to industrial change, while others, notably Patrick O'Brien, remarked that "agriculture provided labour and capital, but its role in industrial development did not go much further". Agricultural improvement was a "protracted process" it spurred industrialisation, but it did not grow at the pace of industry (p. 271). Steinberg quotes i) E. A Wrigley who hinted that some technological innovations brought about the scarcity of organic resources, ii) Richard Wilkinson's more explicit statement in *"Poverty and Progress"* that Western culture was steered in such a way that it exploited nature innovatively and economic system resolved the subsistence problems (p. 272), iii) Dolores Greenberg notes that technological developments were included in a process where nature acted as a set of commodities-of land, wood and water. The technological revolution introduced the environment as an immense "natural resource" to what anthropologist John Bennett calls the "ecological transition" or "the development of an anthropocentric orientation toward the natural world" (p. 273).

John Bellemy Foster (1997) declares the three theoretical stances: i) ecological crisis and how it is connected with human productions; (ii) sustainability, a necessity for production imposed by nature; (iii) the transcendence of ecological crisis that requires sustainability necessary for any future society as the core elements of the Karl Marx's work. Marx's analysis of the crisis of the earth (or soil) compelled him to present a concept of sustainability. Marx examined the connection between the development of industry and exploitation of the soil in *The Crisis of the Earth*, being fully aware of the developing ecological degradation. This crisis of the earth was related to the crisis as propounded by soil chemist Justus Liebig and referred to the political economy through political economist Henry Carey's work belonging to the US (p. 284). It is obvious that many researchers have talked about different aspects of innovation and capitalistic production, but how innovations and capitalistic productions are becoming a dangerous source of global warming, climatic hazards, and environmental unsustainability has never been discussed and interpreted. This research has a unique viewpoint in its concerns.

Theoretical Framework

Innovations have been a vehicle for governing social and economic development from the advent of human civilisation through the swarming increase in the chase for innovative enterprise, and technological modifications can be observed since the onset of the 21st century (Godin 2008, Cassiman et al. 2010, Szopik-Depczyńska 2015 in Bracio and Szarucki 2019, p. 417). This technological process often is considered a token of providing economic opportunities to the masses as well as a surety of social welfare (Gries et al., 2017). Technological change related to the production of commodities already being manipulated, stepping forward in new markets or advanced means of supply, 'Taylor-isation of work', building up new organisational businesses – any "performing things in a different way" in economic terms, can be referred to as what Joseph. A. Schumpeter defines 'Innovation' (Schumpeter 1939, p. 80). It includes the arrival of new commodities, which may even act as a standardised model. Innovation is something conditioned; nothing else but a way to cope with any economic crisis or urge.

Innovation operates as a 'distinct internal factor' for changing society because it turns the existing factors of production to new uses under a devised economic process,

observing business behaviour in capitalist societies. Altered tastes, innovation, and growth, these three factors of change 'interact and mutually condition each other'. Schumpeter uses the term 'Economic Evolution' for the developments in the economic process, effects, and counter-responses created by innovation. Innovation works like an 'institutionalised capability' characterising technological change. Firms' members work in relationships that are 'instruction-based', and institutions affiliated with firms labour like a serving engine of innovation. Change in technology progresses in 'a path-dependent way' (Tzeng 2009, pp. 374-375). Consumer plays the role of 'co-operating agent in the production process and also in the process of innovation (Drejer 2004, p. 552). In recent times, Innovation has been adopted as a strategic agenda propelled by corporations. Masses have been involved in the production and consumption of tangible goods. But these productions and consumptions are proving to have hazardous effects on the environment.

In Theory of Economic Development (1934), Schumpeter describes the development of the economy as a procedure of qualitative transformation fostered through innovation i-e new methods of production, new products, modern sources of supply, exploitative trends in new markets, and new methods to organise businesses. Innovation, "new combinations" of pre-present resources, happens to be a purely "the entrepreneurial function" emphasised by the large firms. For successful innovation, entrepreneurs fight against "resistance to modern ways" to achieve their aims. The innovation procedure diffuses by forming 'clusters" in industries and time spans, thus forming business cycles and long chains in the economy. The technological and innovative changes are institutionalised under capitalism and finally transformed into "socialism", as described by Schumpeter in his book Capitalism, Socialism and Democracy (1943). Phrases of 'creative response' and 'creative destruction' can be retracted from Schumpeter's Theory of Economic Development (1934) and Capitalism, Socialism, and Democracy (1942). These terms were highly positive and progress propelling for society, but over time and with over-consumption, they can be considered as opposing environmental purification. "Creative response" turns out to be a "polluting response", and "creative destruction" turns into "environmental destruction". So it can be said that the masses, upper classes, businesses, and state all are involved in this process. In their economic pursuits, state, capital and masses have been interconnected to enhance environmental degradation.

In the 1980s, three environmental sociologists, Allan Schnaiberg, Kenneth Gould, and David N. Pellow, suggested the ways over-production contributes to polluting the environment. Allan Schnaiberg, an influential environmental sociologist from Northwestern University, was interested in how economic processes impact the environment. He observed that modern societies under capitalistic influence are giving privileges to economic activities at the cost of the environment. Very less attention is paid to protecting environmental stability, and capitalist industry ignores the consequences of vastly consuming natural resources. Schnaiberg considers economic well-being as the primal goal of modern developing society and that ecological destruction is, consequently, a by-product of this. He proposes the treadmill theory of production, which refers to the extensive search for economic well-being, which renders them stuck on a "treadmill" where they have not improved economically, yet their pursuits for economic development lead them to generate environmental hazards. This theory explores the production bosses who administer the production process, innovation entrepreneurs, and

corporations who are providing the supporting grid for the treadmill's continued re-re-productions. Consumers continue to provide the edge to this treadmill of production. The prescribed label does not refer to a single economic process under political influences. Rather, it is meant to refer to a form of political economy that encloses a set of practices, structures, and assumptions that are geared forward to technological innovation, economic growth and, therefore, continuous ecological destruction (p. 18).

The present continuation of the productions increases the environmental risk and damage (Schnaiberg et al. l., 1996). Environmental movements paid attention more to "feeling good" than to "doing good" because they stuck to economic growth at the cost of the continuing loss of ecosystems and depletion of natural resources rather than environmental protection (Gould et al. 1993).

Discussion and Analysis

This eco-critical interpretation of the science-fiction novel *New York 2140* by Kim Stanley Robinson (2017) is based on the fact that industrial productions pushed forward by the entrepreneurial innovation processes have been playing a pivotal role in contributing to the unsustainability of ecosystems. The continued production of exorbitant climate risk, faced by economically established societies, emerges as the most indispensable problem around the world. Climate change, with its manifested challenges, may lead to a genuine catastrophic situation if societies go on a "business as usual trajectory" (Maslin 2009 in Curran 2017). The disproportionate climate risk stems from the dominant response of "do nothing of a concrete nature" regarding this ever-growing dilemma (Giddens 2009, p. 2).

The novel is set in the fictional future of New York City which has gone underwater due to two major sea levels on account of hazardous climate change. The skyscrapers are floating in the water. Most of Manhattan below 46th Street has been nicknamed "SuperVenice" as it is completely flooded. Several of the book's characters live in the MetLife Tower on 23rd Street, outfitted with flood-prevention mechanisms and boat storage. People travel by boat from one place to other. This cautionary tale about global warming is also critical of the capitalist process, unregulated financial systems, and market economies. Mutt and Jeff, living in a "hotello", the innovative room "can be packed into a suitcase" at the top of the tower converted into farmland, talk about the capitalistic economic laws. "So look, the problem is capitalism. We've got a good tech, we've got a nice planet, we're fucking it up by way of stupid laws. That's what capitalism is, a set of stupid laws" (p. 12). This threatening novel reminds the reader about the present situation of faster depletion of natural resources under industrial production and modern innovations. Nowadays, America can be considered the symbol of technical progress, but "a citizen" who is one of the spokesmen of this futuristic narrative describes Manhatton as "technically an island; rocky, hilly, forested, meadowed, ponded: that's Manhattan. Forest? – a forest of skyscrapers."

New York 2140 gets its arrangement in eight parts, each "part" following a crowd of characters speaking their perspective viewpoints by tracing the events: two rogue hackers, Ralph Muttchopf and Jeff Rosen (Mutt and Jeff), financier and quant Franklin Garr, police inspector Gen Octaviasdottir, superintendent of MetLife building, Vlade Marovich, the most frequent leader as well as a lawyer of MetLife building, Charlotte Armstrong, wildlife activist and social media star Amelia Black, mayor of NYC, Galina Estaban, and two adventurers, Stefan and Roberto. "A citizen", most likely the mouthpiece of the author, offers valuable commentary and information. Mutt and Jeff

throw a cyber-attack, the global economy is hacked, and after that, they go into kidnapped hiding. Amelia Black, the wildlife saver, tries to relocate polar bears, airing her rescue adventures through her "cloud" shows. Someone struggles to buy the Met co-op, aqueous leaks start attacking the building, and Vlade is seen fighting off water to save the building from being moist and destructed. From the present to the novel's time in 2140, two "Pulses" when sea level rose in long spans of two decades, and it was followed by the collapsing of the huge ice sheets in Antarctica, triggered two massive economic depressions yet for capitalists, there is just one term "creative destruction" to explain both crisis and opportunity. The narrative has investment criteria to forecast oceanographic data on a per-minute basis that can be bought, sold, or short-predicted in terms of sea-level fluctuations, storm surges, and many other eco-catastrophic changes. Thus the "eco" in *New York 2140* denotes not only ecology but also the economy at the same level; climatic disaster turns out to be just another black-swan market event.

This sci-fi novel involves the hazards that Schnaiberg explains can be the outcome of the treadmill of production. Mutt describes the situation by describing that the prices of the accessories are always kept too low, and so the world becomes fucked. He says, "We're in a mass extinction event, sea-level rise, climate change, food panics", everything that is not presented in the newspapers. "All because of the market" Exactly! It's not just a matter that people experience market failures, but "the market is a failure" (p. 12). The innovations which were considered helpful in the development of society in the modern age turn out to be dangerous for the environment and a great threat to the living of human beings because most people have to pay for them. The futuristic character of the novel Mutt tells that the masses living in the modern capitalistic societies are "chewed up"; they're "squoze dry". They've been contributing "a fraction of what things really cost to make. Meanwhile, the planet, along with the workers who created the stuff, takes the unpaid costs right in the teeth" (p. 9). The capitalistic exploitation disgust Mutt and Jeff. The world runs over the efforts of the working-class and poor people who work for new productions and services for the enjoyment of the rich. Jeff demands justice in favour of the working class, which does not get benefited from their hard labour work. On the contrary, their employers, bankers, and traders relish it. Jeff demands justice for the global environment when he sees skyscrapers submerged in dark black water while standing at the railing of the farm at the top of Met Life Tower. Jeff and Met see lights squiggling off the blackish water everywhere below their building, and a few illuminated skyscrapers lit darker towers – a geological sheen – weird, beautiful, spooky"(p. 14). He witnesses the more perilous situation ahead when he remarks, "That's just part of it! A little part of a big thing".

New York 2140 creates a whole futuristic world, a future-realism, in such a compelling way as Robinson has really resided in the future span of time, through a time machine, and reverts backwards to report the documentary file. The speaking of the building in the voice of a woman to Vlade, "Report" "Water in the sub-basement" proves the technological advancements, and when Vlade asks about the intensity, she replies, "I have reported the first sensing of moisture. Speed of inflow not established. Room B201" (p. 92). Mayday is a signal that is uttered by the building when there is leakage, moisture, or inflow of water, and lights are turned on automatically ahead of Vlade while moving towards the basement. The villain is capitalism itself which has squeezed [them] till they are bleeding from the eyes". In 2140, technological progress targets more on improving lives rather than accommodating the changing world. Airships are steered by

rule-bound AIs, communication is done by wristpads, and celebrities broadcast real-world adventures through the cloud. It has not much changed from today but comparatively slowed down to a crawl. Franklin is also critical of the production processes and talks about whole global knowledge as "the tragedies and comedies of creative destruction and destructive creation, also the much more common but less remarked-upon creative creation and destructive destruction" (p. 18).

The first line of the narrative connects both computer software and real life: "Whoever writes the code creates the value". The plan of Mutt and Jeff fails in the end, which is the symbol of the failure of innovation and technology, diverting the world toward an environmental apocalypse. When Amitav Ghosh asks: “Where is all the fiction about climate change?” *New York 2140* shouts: “Here! here!". He was lamenting over the failure of fiction in performing its duty of addressing climate change. Robinson threads this SF novel through culture, and it would be critical myopia to miss the fact that *New York 2140* talks about the grievances of climate change and global warming.

Conclusion

New York 2140 appears to be a towering composition discussing a genuinely pressing threat to civilisation. Robinson knits this novel using the floods: the metaphorical events regarding environmental change, immigration, technological innovations, and capitalistic shackles against society. The situations in the novel are not only metaphorically eloquent, but the deluge appears to be dangerously near to becoming grave reality. Robinson's fiction alludes to the nation's complacency towards climate change and global warming and incites them to be attentive to pay heed to how complex and grave the situation of the world is now. This climate fiction diverts our attention towards the large-scale experimentations the humans are conducting with the global climate creating a sense of inspiration to remodel our relationship with our environment. Robinson depicts a planetary change with an intense magnitude that the readers are compelled to think that scientific personals should reshape the global energy, agricultural and technological systems. The world's scientific minds should focus not on innovative entrepreneurship or financial innovations but climatic challenges at hand. The description of the devastating scenario that earthly people might bring upon themselves, this novel criticises the technological change and innovative productions combined under the umbrella of capitalism. Digital technology is downplayed when finance breaks down the importance of agriculture, and climatic concerns are highlighted. *New York 2140* leaves us with an acute sense of urgency, a desire to act, about what Schnaiberg reminds us *'To think Globally, Act locally'* to attain environmental sustainability for the future.

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