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„Technological Solutionism  
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for ‚Problems‘ like ‚Climate Change‘“

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## Introduction

‘Climate Change is the defining crisis of our time’ - a sentence, you can read on the website of the United Nations High Commissioner for Refugees (UNHCR)<sup>1</sup>, in several newspaper articles and you can hear it from several intellectuals as the biologist David Attenborough. It is also the result of international polls within the EU, that most of the European citizens consider climate change the biggest problem of humanity.<sup>2</sup>

In 2022, there are probably a few people on this earth who can claim never to have heard of the problem of ‘climate change’ or ‘climate crisis’. Not only in high political circles the topic is thoroughly discussed: Meanwhile in Germany, as well as in Austria the Green party sits in the governments; Since 1995, the United Nations Climate Change Conference (UNCC) has met once a year to discuss how to tackle climate change and in 2015 has agreed on the 1.5 °C target, meaning to cut greenhouse gas emissions with a view to holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels; In 2018, the Swedish 16 year old girl Greta Thunberg with her ‘Skolstrejk för klimatet’ has founded the global Fridays For Future movement (FFF); Journalism is increasingly focusing on the topic, churning out more and more departments or formats on climate change. At this point one could mention many other developments referring the fight against climate change, since the knowledge about the topic has gained widespread public and political attention.

Though, what has actually happened to limit the causes of climate change? – Not enough, would be the response of most people concerned with the issue. The latest news from the Intergovernmental Panel on Climate Change is depressing: if we continue as we have been, we are heading for three degrees warming. This would lead to sometimes unpredictable climatic changes that threaten the existence of mankind. Hence, the problem with the current situation is that time is running out in order to find solutions – according to the young Fridays For Future Protestors it is ‘12 o’clock’. But how to act on such a big problem as Climate Change?

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<sup>1</sup> UNHCR, ‘Climate change is the defining crisis of our time and it particularly impacts the displaced’, <https://www.unhcr.org/news/latest/2020/11/5fbf73384/climate-change-defining-crisis-time-particularly-impacts-displaced.html> [10.6.2022].

<sup>2</sup> Europäische Kommission, ‘Eurobarometer-Umfrage: Europäerinnen und Europäer sehen den Klimawandel als das größte Problem für die Welt an’, 5.7.2021, [https://ec.europa.eu/commission/presscorner/detail/de/IP\\_21\\_3156](https://ec.europa.eu/commission/presscorner/detail/de/IP_21_3156) [10.6.2022].

Sy Taffel, co-director of the Political Ecology Research Centre at Massey University in New Zealand, summarizes the contradiction of the different approaches very succinctly: “On the one hand, we encounter a metanarrative of technological progress that has been fueled by decades of advances in computational, networked, mobile and pervasive technologies. On the other, we find the apocalyptic discourse of the Anthropocene, whereby human activity is understood to be responsible for precipitating the sixth mass extinction of life in Earth’s geological record.”<sup>3</sup> In other words: We live in a world in which Elon Musk promotes future for mankind on another planet, while at the same time Greta Thunberg strives for in depth consideration on climate change here on earth.

Apparently, proponents of the first idea, promoting technological innovation to exit the issue, seem to be louder. The EU has just published its ‘European Green Deal’, presenting an Emissions trading system (ETS) as key tool for cutting greenhouse gas emissions. Additionally, member countries have taken on binding national targets for raising the share of renewable energy.<sup>4</sup> In countries like Germany, the transition to e-mobility is well underway.<sup>5</sup> In Saudi Arabia, the government is promoting the practice of cloud seeding to allow more rain to fall and thus counteract the drought.<sup>6</sup> China has set itself the goal to shape green development models with an emphasis on innovation and the application of green and low-carbon technologies.<sup>7</sup> And, the OECD’s new future plan is based on green growth. This list goes on for a long time.<sup>8</sup>

For some, these steps don't go far enough. Criticism of this mainly comes from anti-capitalist, post-capitalist or degrowth camps opposed to the notion of 'green economic growth'. Their basic argument: A world with limited resources can only work if these limits are taken into account.

However, criticism also comes from the fields of social sciences and humanities. They claim that a specific problem-solution-framing - in this case, 'climate change' - opens the way for short cut solutions. In terms of climate change, they present the term ‘climate solutionism’. This

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<sup>3</sup> Sy Taffel, Hopeful Extinctions? Tesla, Technological Solutionism and the Anthropocene, In: Culture Unbound. Journal of current cultural research, Volume 10, 2 (2018) p., 163.

<sup>4</sup> European Commission, ‘2020 climate & energy package’ [https://ec.europa.eu/clima/eu-action/climate-strategies-targets/2020-climate-energy-package\\_en](https://ec.europa.eu/clima/eu-action/climate-strategies-targets/2020-climate-energy-package_en) [15.6.2022].

<sup>5</sup> Die Bundesregierung, ‘Wir fördern klimaschonenden Verkehr’ <https://www.bundesregierung.de/breg-de/themen/klimaschutz/klimaschonender-verkehr-1790050> [1.6.2022].

<sup>6</sup> Lea Frehse, ‘Die Wolkenjäger von Abu Dhabi’ In: Die ZEIT, 16.3.2022, <https://www.zeit.de/2022/12/abu-dhabi-wasserknappheit-wolkenimpfung-vae/komplettansicht> [5.6.2022].

<sup>7</sup> State Council Information Office China, ‘Responding to Climate Change: China's Policies and Actions’, 27.10.2021, <https://bit.ly/3xZiw2L> [1.6.2022].

<sup>8</sup> OECD, ‘Green growth and sustainable development’ <https://www.oecd.org/greengrowth/> [1.6.2022].

term summarizes so-called ‘end-of-pipe solutions’, or ‘false solutions’, meaning: “manag[ing] the climate crisis without compromising profits, the power structure or the economic system.”<sup>9</sup> The term ‘solutionism’ does not only play a decisive role in the climate issue. It can be traced back to the so-called ‘technological fix’ or ‘technological solutionism’. This thesis will get to the void of this in more detail. Where does solutionism come from? What is the nature of ‘technological solutionism’? What are solutionism’s implications? In how far can technology help to deal with the problems of the real world, like climate change? Since the term cannot be completely separated from the critique of economic systems and capitalism, the work also asks about the connection between the two: What is the relation between solutionism and capitalism? Using the example of climate change, it should be made clear what alternative solutions look like. What are ‘solutions’ beyond solutionism? Here, it is important to emphasize that neither alternative economic systems are to be presented nor will be analyzed which of the technological solutions appear to make scientific sense. The focus is on eliciting what suggestions come from the social sciences and humanities in relation to the framing of the problem.

## Climate Change and how to define it

### What is Climate Change?

For the purpose of this paper, a brief introduction of what ‘climate change’ means, is necessary. The term finds its origin in the natural sciences and has subsequently been adopted in the social debate, where it is the most commonly used term alongside other descriptions, such as ‘climate crisis’, ‘climate catastrophe’, or ‘climate warming’. Looking at literature on the subject from other disciplines, there seems to be mostly agreement on the term - at least not much debate. Hans Joachim Schellnhuber, founder of the German Potsdam Institute for Climate Impact Research, is one of the worldwide leading climate scientists. In his book ‘Klimawandel’ which he co-edited with his colleague Stefan Rahmstorf, he defines our climate as the result of an ‘energy balance’: “Die von der Erde ins All abgestrahlte Wärmestrahlung muss die absorbierte Sonnenstrahlung im Mittel ausgleichen [...]”<sup>10</sup>. Deviations from this balance result in what we call ‘climate changes’. Those climate changes can be triggered by the following three scenarios: “Erstens kann die ankommende Sonnenstrahlung durch Änderungen in der Umlaufbahn der

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<sup>9</sup> Matthias Dietz, *Die internationale Klimabewegung: Ein Handbuch*, p. 398.

<sup>10</sup> *Der Klimawandel. Diagnose, Prognose, Therapie*, ed. by H.J. Schellnhuber and S. Rahmstorf, C.H. Beck Wissen, 8th edn (München, 2018), p. 13.

Sonne oder in der Sonne selbst variieren. Zweitens kann der ins All zurückgespiegelte Anteil sich ändern [...] Und drittens wird die abgehende Wärme durch den Gehalt der Atmosphäre an absorbierenden Gasen (oft Treibhausgase genannt) und Aerosolen (also Partikeln in der Luft) beeinflusst.“<sup>11</sup>

Hence, these changes initiate climatic chain reactions, such as the melting of the polar ice caps, temperature rises, environmental disasters and so on. Schellnhuber and Rahmstorf continue by stating that even though all of these factors play important roles in climate history it still must be analyzed what factor or scenario is most dominant: “Zu unterschiedlichen Zeiten dominieren dabei jeweils unterschiedliche Faktoren – welcher Einfluss für einen bestimmten Klimawandel verantwortlich ist, muss also von Fall zu Fall untersucht werden. Eine allgemeine Antwort – etwa, dass generell entweder die Sonne oder das CO<sub>2</sub> Klimaveränderungen bestimmt – ist nicht möglich.“<sup>12</sup> What we know, from analyses of the Paleocene/Eocene temperature maximum about 55.8 million years ago, however, is that if huge amounts of carbon enter the atmosphere, climate changes can occur rapidly and significantly. Similar to what is expected from the release of carbon from the Earth's crust by humans, which is currently underway.<sup>13</sup>

In 1957/8, named the 'international geological year', it was first demonstrated that the increasing CO<sub>2</sub> concentration in the atmosphere had been caused by the use of fossil fuels. Since then we speak of 'anthropogenic global warming'. It took almost thirty more years until in 1990 the IPCC published its first report. By now, almost all climatologists agree upon anthropogenic global warming to be proven. The so-called 'greenhouse gas effect' is listed as the reason for this: “Die Oberfläche strahlt, wie jeder physikalische Körper, Wärme ab – je höher die Temperatur, desto mehr. Diese Wärmestrahlung entweicht aber nicht einfach ins Weltall, sondern wird unterwegs in der Atmosphäre absorbiert, und zwar von den Treibhausgasen. Die wichtigsten dieser Gase sind Wasserdampf, Kohlendioxid und Methan. Diese Gase strahlen die absorbierte Wärme wiederum in alle Richtungen gleichmäßig ab – einen Teil also auch zurück zur Erdoberfläche. Dadurch kommt an der Oberfläche mehr Strahlung an als ohne Treibhausgase: nämlich nicht nur die Sonnenstrahlung, sondern zusätzlich die von den Treibhausgasen abgestrahlte Wärmestrahlung. Ein Gleichgewicht kann sich erst wieder einstellen, wenn die Oberfläche zum Ausgleich auch mehr abstrahlt – also wenn sie wärmer ist. Dies ist der Treibhauseffekt.“<sup>14</sup>

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<sup>11</sup> Schellnhuber and Rahmstorf, p. 13.

<sup>12</sup> Schellnhuber and Rahmstorf, p. 13.

<sup>13</sup> Cf. Schellnhuber and Rahmstorf, p. 20.

<sup>14</sup> Schellnhuber and Rahmstorf, p. 31.



Schellnhuber and Rahmstorf hold five key statements on climate change from a natural science perspective<sup>15</sup>:

1. The concentration of CO<sub>2</sub> in the atmosphere has increased enormously since about 1850 - measured against the value typical for warm periods since 800,000 years ago (280ppm to 410ppm).
2. Humans are responsible for this increase, primarily through the burning of fossil fuels and deforestation.
3. Increased concentration of CO<sub>2</sub> in the atmosphere leads to an increase in temperature.
4. The climate has warmed significantly since the end of the 19th century. The past ten years have been the warmest since measurements began and for at least several millennia.
5. Most of this warming is due to an increased concentration of greenhouse gases, only a small part is due to natural variations.

In their book the two natural scientists also raise the question for resolution and respond with two approaches. One revolves around the conceptual pair 'cause-effect' and springs from the mindset of the natural sciences, the other results from an economic-utilitarian worldview and focuses on the principle of 'cost-benefit'. According to them, the approach propagating the cost-benefit calculation does not provide a real solution, if only because the actual costs of climate change cannot be calculated so easily. They therefore consider the former approach to be the only effective one: “Das anthropogene Klimaproblem wird als solches von der Menschheit erkannt und gelöst – so gut es eben geht.”<sup>16</sup> For this they present the following equation:

“G1: Climate damage = Climate vulnerability x Climate change”

Despite this rather rational set-up, they have to admit that the perfect solution does not exist, of course. However, they claim that the conscious factors can very well be minimized through social effort. Limiting climate change as much as possible is called 'mitigation', reducing it as much as possible is called 'adaptation', and the third, ignorant version – not so much of a solution though - is called a 'laissez-faire strategy', which allows things to go their way.<sup>17</sup> They conclude: „[...] wir können schon jetzt konstatieren, dass ‚Vermeidung‘ vor allem mit technologischem Fortschritt bei der ‚Dekarbonisierung‘ unserer Wirtschaftsmaschinerie zu tun

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<sup>15</sup> Cf. Schellnhuber and Rahmstorf, p. 50f.

<sup>16</sup> Schellnhuber and Rahmstorf, p. 95.

<sup>17</sup> Schellnhuber and Rahmstorf, p. 89.

hat, ‚Anpassung‘ vor allem mit intelligenter und flexibler gesellschaftlicher Organisation und ‚Laissez-Faire‘ mit Moral (bzw. ihrer Abwesenheit).“<sup>18</sup>

So far the natural scientists. The matter of this thesis however will be the complexity of the social scientific perspective on societal problems such as climate change.

### The scientific journey from Antropocene towards Technocene

Schellnhuber and Rahmstorf speak in their book of 'anthropogenic global warming'. Humans' impact took the lead in climate development and, most probably, overrode the natural ice age cycles. For this reason, the meteorologist Paul Crutzen in the year 2000 postulated the transition to a new geological epoch: the transition from the 'Holocene' to the 'Antropocene'. The term which has become quite popular since then, has been criticized by a number of scientists, such as the Swedish anthropologist and Professor of Human Ecology Alf Hornborg, the German philosopher and futurologist Hannes Fernow and the German cultural scientist Peter Sloterdijk. They all alternatively favour the term 'Technocene', which is rather connected with the question of how technology interacts with the socially constructed economy.

Here it is Hornborg's derivation supposed to clarify the terms meaning. According to him, the term 'Anthropocene' is 'species-centrist' implying climate change to be the inescapable result of Homo sapiens' evolution and that the phenomenon is equally distributed among the human species. Hornborg criticizes both assumptions. He disagrees with the argument that all human activities are inherent behaviors of the species and emphasizes that it was social and political overall conditions that directed human's development – factors, natural scientists are not necessarily aware of: “Rather than examine their societal and political drivers as factors that can be transformed, the narrative [anthropocene] tends to represent them as natural and inevitable features of our biology. But phenomena such as worldviews, property relations, and power structures are social phenomena. They are beyond the horizons of natural science, because require analytical tools that natural scientists are not provided with.”<sup>19</sup> Especially, due to the fact that growing acknowledgement of the impact of societal forces on the biosphere

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<sup>18</sup> Schellnhuber and Rahmstorf, p. 89.

<sup>19</sup> Alf Hornborg, 'The Political Ecology of the Technocene', in *The Anthropocene and the Global Environmental Crisis*, ed. by Clive Hamilton, Christophe Bonneuil, and François Gemenne, 1st edn (Routledge, 2015), pp. 57–69 (p. 62) <<https://doi.org/10.4324/9781315743424-5>>.

should not be couched in terms of a narrative so dominated by natural sciences such as climatology and geology.

For instance, regarding the Industrial Revolution which marks the beginning of the Anthropocene, Hornborg states that it was not the product of ‘progressive’ British engineering. Rather, it was the product of unequal global power relations and forms of human organization relying on technological innovation, meaning capitalist dynamics: “The rationale for investing in steam technology at this time was geared to the opportunities provided by the constellation of a largely depopulated New World, Afro-American slavery, the exploitation of British labour in factories and mines, and the global demand for inexpensive cotton cloth. It would thus be highly misleading to conceive of the anthropos starring in the Anthropocene narrative as the human species.”<sup>20</sup>

Hornborg also criticizes the implication that ‘Anthropocene’ would apply to entire mankind – In terms of climate change, it has been scientifically proven that less than 20% of the world's population is responsible for more than 70% of global emissions.<sup>21</sup> Hornborg also attributes this point to the structures within the Industrial Revolution. Beginning with the Industrial Revolution, he identifies a change concerning what technological innovation means. According to him, the idea of technology as founded on ingenuity has become inadequate since: “Ingenuity is a necessary but not sufficient condition for modern technological ‘progress’. Global price relations are systematically excluded from our definition of technology, even though, by organising asymmetric resource flows, they are crucial for its very existence. Much as inexpensive labour and land in colonial cotton plantations were fundamental to the Industrial Revolution.”<sup>22</sup> The fruits of the Industrial revolution and its modern technology could always only be very exclusive and unevenly distributed, because their very existence and expansion relies on unequal exchange.<sup>23</sup> Hornborg does not deny human species natural capability to develop an unequal system such as capitalism but at the same time this does not make all developmental stages necessarily natural. To him, human’s skill for abstract representation is the reason for that: “The world systemic events of the eighteenth century were products of a global history of increasing interconnectedness (and inequality) ultimately founded on the human capacity for abstract representation. The big question is whether this capacity will be of any use in redesigning our global economy for survival.”<sup>24</sup>

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<sup>20</sup> Hornborg, p. 59.

<sup>21</sup> Cf. Hornborg, p. 61.

<sup>22</sup> Hornborg, p. 60.

<sup>23</sup> Cf. Hornborg, p. 60.

<sup>24</sup> Hornborg, p. 62.

The problem's origin, Hornborg sees in a wrong understanding of what is natural and what is 'made up' by society. Stating that we are constrained by Cartesian categories that draw strict lines between nature and society - prompting us, due to the materiality of technology to classify it as belonging to nature rather than to society. This leads to its 'natural' connotation as well to a focus on the wrong aspects when it comes to climate change. Therefore, he pleads for a so called 'post-Cartesian' approach and a reframing towards political ecology: "Rather than dream of advanced technological solutions to problems of ecological sustainability, we would recognise most modern technologies as social strategies for displacing problems (labour as well as environmental loads) to areas where labour and environmental degradation are less expensive. Instead of technological utopianism, this radical re-conceptualisation of technology should prompt us to critically consider the role of general-purpose money in orchestrating asymmetric transfers of labour power and natural resources in the world-system."<sup>25</sup> From this he draws his conclusion to replace the term 'Anthropocene' by the term "Technocene."<sup>26</sup>

For the purpose of this paper, the 'problem' of climate change has been defined and its framing discussed, the paper from this point on focuses on finding 'solutions.'

## How to 'Solve' Climate Change?

*"It's like mopping up the spill  
when the spigot is still on,"*

Katie Matthews, chief scientist at the nonprofit advocacy group Oceana

According to Peter Brewer, an ocean chemist from the Monterey Bay Aquarium Research Institute, we are currently in a kind of solution evaluation phase as far as climate change is concerned: "In the classic psychological sequence with which humans often face extraordinary and perhaps inevitable danger (denial, anger, bargaining, and acceptance), we appear now to be at the bargaining stage, where all kinds of solutions are sought and proposed with new vigor and intensity."<sup>27</sup> To him, this is fully understandable, in respect to the world's urgent situation:

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<sup>25</sup> Hornborg, p. 65.

<sup>26</sup> Hornborg, p. 63.

<sup>27</sup> Peter G. Brewer, 'Evaluating a Technological Fix for Climate', *Proceedings of the National Academy of Sciences*, 104.24 (2007), 9915–16 (p. 9915) <<https://doi.org/10.1073/pnas.0703892104>>.

At the 'Conference of the Parties 21' (COP 21) in Paris on 12 December 2015 the so called 'Paris Agreement' was adopted by 196 Parties. It is a legally binding international treaty on climate change and has the goal to limit global warming to well below 2, preferably to 1.5 degrees Celsius, compared to pre-industrial levels. Nevertheless, most countries are running in vain after the goals of the Paris climate agreement, only one - Gambia - according to the current status, achieves them. Hence, the annual UN climate conference 'Conference of the Parties' (COP) rarely ends with hopeful prospects. And the global consequences of climate change are becoming more and more visible and noticeable. Although there are many proposed solutions from all possible directions, one particular one dominates: the one that puts technological solutions, innovation and regulation of the market first. Brewer states: "Engineering our way out of the climate change bind is widely discussed in the media: the faith in technology is high, and the desire to have the benefits of abundant fossil fuel energy without the unfortunate consequences is strong."<sup>28</sup> Not only Brewer seems to criticize this solution, but in social sciences as well it is critically debated in how far such an approach really leads to any solution. Isn't the problem bigger?

One controversial technique is called 'geo-engineering' defining a comprehensive set of methods and technologies aimed at deliberately altering the climate system in order to mitigate the effects of climate change. A distinction is primarily made between two groups of geo-engineering: the group that aims to influence solar radiation (solar radiation management) and the group that aims to remove carbon dioxide ("carbon dioxide removal") from the air. Already, Schellnhuber and Rahmstorf have made clear in their book that geo-engineering is not as logical as it sounds. They call it the genie becoming more and more impassioned in its bottle: „Gemeint ist damit der Einsatz von Technologie in planetarischer Größenordnung, um die unerwünschten Umweltfolgen unserer industriellen Zivilisation zu unterdrücken oder gar zu beseitigen.“<sup>29</sup> They also speak of 'end-of-pipe' solutions/technologies. This is understood to mean processes for the removal of already formed contaminants from air, water, waste, product or similar streams. Trading in CO<sub>2</sub>, Carbon Capture and Storage (CCS), E-mobility or renewable technologies also fall into this category. Since they don't tackle the problem at the source, but act as a kind of band-aid, they are also referred to by critics as 'false solutions'.<sup>30</sup> The opposite would be measures that preventively counteract contamination. Criticism of such 'end-of-pipe solutions' relates in particular to three main aspects: they are associated with unforeseeable

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<sup>28</sup> Brewer, p. 9915.

<sup>29</sup> Schellnhuber and Rahmstorf, p. 132.

<sup>30</sup> Klimascheinlösungen.de, Für Klimagerechte Lösungen!, <https://www.klimascheinloesungen.de> [03.07.2022].

consequences (geo-engineering), they are highly likely to exacerbate global injustice, they distract from actual sustainable solutions and they can only be understood as partial solutions, not as universal savior. They are also primarily based on the assumption that green growth is possible.<sup>31</sup>

Since it is only important for the present work to roughly show which solutions are meant, the following will focus more on how they come about. The central question will be: How are these assumed solutions related to the problem's definition?

### 'Climate Solutionism'

The Professor of Social and Political Sciences James Goodman, in his text criticizes the presentation of climate change as a scientific issue, leading to a near-consensus within authorities that technological change, and in particular renewable energy, offers the required solution. One of the global key players in terms climate related topics and decision-making is the 'Intergovernmental Panel on Climate Change' (IPCC). This intergovernmental institution was established in 1998, by the 'UN Environment Programme' (UNEP) and the 'World Meteorological Organization' (WMO) to summarize for policymakers the state of scientific research on climate change with the goal of providing bases for science-based decisions without recommending action. It has 195 member states and in addition, more than 120 organizations are registered as observers to the IPCC. For its regularly reports the IPCC convenes thousands of scientists from all over the world to compile the scientific basis and the worldwide state of research on the effects of global warming and its risks, as well as mitigation and adaptation strategies, and to evaluate them from a scientific perspective.

According to Goodman, by setting up the 'Intergovernmental Panel on Climate Change' (IPCC) the authority about the topic of climate change was handed over to experts to find a consensus on the reality of human-generated climate change. That authority carried over into debates about how to address climate change, by creating a near-consensus that technological change, in particular renewable energy, would offer the required solution. For Goodman that means: "[...] both the problem, climate change, and the solution, renewable technology, are abstracted from the social contexts in which they arise."<sup>32</sup> Here, Goodman sees the danger of political stagnation: "Not surprisingly, dominant policy debates on climate change resolutely avoid the

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<sup>31</sup> Klimascheinlösungen, Für Klimagerechte Lösungen!, <https://www.klimascheinloesungen.de> [03.07.2022].

<sup>32</sup> James Goodman, 'Responding to Climate Crisis: Modernisation, Limits, Socialism', p. 144.

question of social and ecological sufficiency, as against technical efficiency. Economic growth is the unquestioned fact of political life, as is our cherished faith in the capacity of technology.”<sup>33</sup>

Also, Mike Hulme is concerned about this development and therefore introduces the term 'Climate Solutionism'. According to him, the scientific framing of the problem leads to an insufficient 'problem-solution framing' which does not meet the problem's complexity: “Uniting behind science, putting ‘objective facts on the table,’ and thinking that solutions will flow naturally from them - what I mean by ‘climate solutionism’ - will not do. Science on its own offers no moral vision, no ethical stance, and no political architecture for delivering the sort of world people desire.”<sup>34</sup> In this way, he wants to draw attention to the need to focus less on the 'destination' - stopping climate change - but more on the political framework conditions along the way: “Rather than simply being a technical problem to be solved—like how to prevent mercury pollution of rivers or how to replace asbestos in buildings—at heart climate change is entangled with eternal questions about human meaning, purpose, responsibility and ethics.”<sup>35</sup>

By quantifying the problem (scientifically), the social and moral complexity of the problem would be overlaid: “Climate solutionism, driven by metrics, masks the contested politics and value diversity that lie behind different personal and collective choices—who wins, who loses, and whose values count. It is a form of moral attenuation. Metrics are alluring because they simplify complex realities into ‘objective’ numbers and because they appear to short circuit the need for difficult moral judgement.”<sup>36</sup> This quasi-short cut of the problem, would create a knowledge-action gap which makes finding a solution more difficult rather than easier. Pure numbers, engineering, and technology displace a broader exploration of human meaning and ethical goals: “[But] facts are never enough. With regard to climate change, merely seeking to ‘hit the numbers’ - whichever one you choose: 2 C, 1.5 C, 350 ppm, net zero - is not enough. It fuels what I have elsewhere called climate reductionism and climate deadline-ism [...]

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<sup>33</sup> James Goodman, 'Responding to Climate Crisis: Modernisation, Limits, Socialism', *Journal of Australian Political Economy*, 66 (2010), 23 (p. 144).

<sup>34</sup> Mike Hulme, 'One Earth, Many Futures, No Destination', *One Earth*, 2.4 (2020), 309–11 (p. 310) <<https://doi.org/10.1016/j.oneear.2020.03.005>>.

<sup>35</sup> Mike Hulme, 'Why and How to Debate Climate Change', in *Contemporary Climate Change Debates A Student Primer* (London: Routledge, 2019), pp. 1–5 (p. 1) <<https://doi-org.uaccess.univie.ac.at/10.4324/9780429446252>>.

<sup>36</sup> Hulme, 'One Earth, Many Futures, No Destination', p. 311.

‘Closed’ timetables and emergency imperatives fail to respect the diverse moral horizons that characterize - and complicate - the difficult politics of climate change.’<sup>37</sup>

### The path of ‘ecological modernization’

Goodman’s target is to enrich the debate about climate change’s solutions with a social theory on the topic. Subsequently for Goodman, in analyzing diverging solution approaches the view on the relationship between nature and society is crucial. Therefore, he alludes to the US geographer David Harvey, who categorized three perspectives onto the relation between nature and humans: those that see society dominating nature; „those that see natural limits as dominating society; and those that seek to free nature-society relations both from natural limits and from social domination.’<sup>38</sup>

Three 'types' of how to address climate change rise from these three attitudes, Goodman calls them: Ecological modernization, ecological limits and ecological socialism/socialist feminism. Though, he states, these perspectives do not stand for particular movements or intellectual currents, but overlap and are constructed to clarify the debate.

**Table 1: Addressing Climate Change: Three Models**

| Model                                      | Problem                                        | Solution                                       | Vehicles                               | Policy                                     |
|--------------------------------------------|------------------------------------------------|------------------------------------------------|----------------------------------------|--------------------------------------------|
| Ecological modernisation                   | Inefficiencies, north and south                | Northern-led decoupling                        | Technology markets growth              | Renewables eco-pricing Green state         |
| Ecological limits                          | Modernity vs eco-limits, mainly north          | Scale down in north, contain capitalism        | Southern models for de-growth          | Closing loops, non-extractive steady state |
| Ecological socialism/socialist ecofeminism | Capitalist exchange value, instrumental labour | Ecological use-value, freely associated labour | Regenerative growth to enhance ecology | Commons governance for eco-social needs    |

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Now let’s get a bit more explicit here. The first approach focusses on ‘ecological modernization’. Representatives of this view think that growth can be de-coupled from

<sup>37</sup> Hulme, ‘One Earth, Many Futures, No Destination’, p. 309.

<sup>38</sup> Goodman, ‘Responding to Climate Crisis: Modernisation, Limits, Socialism’, p. 148.

<sup>39</sup> Goodman, ‘Responding to Climate Crisis: Modernisation, Limits, Socialism’, p. 149.



ecological degradation thus can serve ecology: „In some versions, the goal is a form of ‘natural capitalism’, a new ‘industrial revolution’, where ecological values are internalised into the inner workings of capital accumulation, such that one becomes indistinguishable from the other.”<sup>40</sup> This stage has to be reached by technology and other forms of innovation: “[...] with the help of re-gear technology, re-grounded markets and eco-sensitive political institutions creating a cross-societal shift to renewables, eco-pricing, and to ‘green’ states, movements and cultures.” Practices of eco-modernizers would be geo-engineering, Carbon Capture and Storage (CCS), nuclear power, carbon sinks, renewable technologies that address the origins of emissions. Goodman identifies neoliberal climate policy approximating to this position that follows the so called, “[...] climate-trade nexus, where trade policy geared to stimulating economic growth is justified in terms of its capacity to stimulate trade in ‘environmental goods and services’. As the powerhouse of economic growth, trade becomes the guarantor of ecological modernisation, especially where it promotes growth in relatively efficient Northern contexts.”<sup>41</sup> Hence, for ecological modernizers the states, industries and science of the Global North are the ones who are able to solve the problem. The approach of ecological modernization dominates the international debates about climate change.

Yet this approach holds a variety of visions and ideas about how this modernization should actually proceed; at least they all share their faith in technology and economic growth. The German sociologist Ulrich Beck would classify this approach as 'reflexive modernization'. He sees the industrial states, in their second modernity, fighting the mainly ecological side effects of their first modernity: “[...] human society continues to dominate nature in risk society through reflexivity, just as much as it does under industrial society. Despite clear differences, reflexive modernisation retains ecological modernisation’s belief in modernity’s adaptive capacity.”<sup>42</sup>

The ‘ecological limits’ approach can be considered the complete opposite of the modernization approach. It recognizes that nature has its own eco-systemic laws as well as ecological limits that have been effected by human economy: “The production of goods requires a specific quotient of material and energy, directly sourced from the biosphere. Once nature’s regenerative capacity is factored-in, production proceeds at direct cost to ecologies: one wins while the other loses, and the society-nature relationship is irreducibly zero sum.”<sup>43</sup> Hence, the

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<sup>40</sup> Goodman, ‘Responding to Climate Crisis: Modernisation, Limits, Socialism’, p. 150.

<sup>41</sup> Goodman, ‘Responding to Climate Crisis: Modernisation, Limits, Socialism’, p. 168.

<sup>42</sup> Goodman, ‘Responding to Climate Crisis: Modernisation, Limits, Socialism’, p. 151.

<sup>43</sup> Goodman, ‘Responding to Climate Crisis: Modernisation, Limits, Socialism’, p. 152.

ecological-limits-approach is evaluating ways to transform societies towards nature's rules, respecting the fact that obeying natural limits results in reduction of economic growth. Subsequently, representatives of this approach see the solution in post-capitalist-, post-consumerist-, post-colonial- and/or post-growth-society. Though, the approach is not necessarily against technological solutions, yet pleas for a "technocracy within limits."<sup>44</sup>

The third approach, 'eco-socialism', moves one step further than that by stating: "[...] capitalism is founded on two contradictions, between capital and labour and between capital and nature."<sup>45</sup> So climate change is considered to be key element of our societal organization of exploiting nature and labour, rather than a negative side effect.

"This ecological socialism recognizes the logic of capitalism's ecological limits, as well as its social limits. Social limits are, of course, socially determined, with wage rates for instance, set by the socially-necessary minimum standard required to reproduce labour power. In contrast, ecological limits are defined by the demands of capitalism in confrontation with nature, and escalate with the intensifying efforts at technological innovation."<sup>46</sup> An eco-socialist system would focus on production for need rather than for profit. It would be 'ecocentric' which means that the societal system would only employ such production and required technologies that "foster economic integrity".<sup>47</sup>

Mike Hulme, professor of climate and culture at King's College London, makes the same distinction in his remarks as Goodman. However, he adds another perspective, that was given new focus in 2015 through the publication of Pope Francis' 'Laudato Si: On Care for Our Common Home': "Here, the facts of climate change 'reveal' an emaciation of the human spirit, which is having adverse repercussions for the material world [...] It escapes the confines of a narrowly drawn science and economics and shows the power, vitality, and inspiration of a Christian worldview."<sup>48</sup> The pope's message was: The ecological crisis is also a call to a profound inner conversion.<sup>49</sup> Hence, it rather proposes a deeper discussion than a 'solution'.

Accordingly, it can be stated that the current course of action to combat climate change in the Global North is most similar to the first approach: 'ecological modernisation' and its preferred

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<sup>44</sup> Goodman, 'Responding to Climate Crisis: Modernisation, Limits, Socialism', p. 154.

<sup>45</sup> Goodman, 'Responding to Climate Crisis: Modernisation, Limits, Socialism', p. 156.

<sup>46</sup> Goodman, 'Responding to Climate Crisis: Modernisation, Limits, Socialism', p. 156.

<sup>47</sup> Goodman, 'Responding to Climate Crisis: Modernisation, Limits, Socialism', p. 158.

<sup>48</sup> Hulme, 'One Earth, Many Futures, No Destination', p. 310.

<sup>49</sup> Cf. Hulme, 'One Earth, Many Futures, No Destination', p. 310.

vehicles ‘technology, markets and growth’. The present work tries to find out which basic thinking is behind that solution approach. By this, the paper strives to display that technological solutions some time come across rather theoretical and constructed in regard to the dimension of the problems addressed. This does not only apply to Climate Change but to almost every other issue as long as it can generate a market. This kind of dynamic however is not new and to make it more comprehensible the deep dive into the evolution of technological solutionism appears to be necessary. On this journey, you find the term ‘technological fix’ equally used for the same matter. But how are they actually linked?

## Hail, technology!

### From fix to solutionism

Googling ‘technological fix’ produces more than a billion search results, dealing with technology as the solution for complex problems. They are ranging from the sphere of health industry via climate change through to political organization. The overall question running through almost all of those publications is: In how far can the technological fix really help us solving our problems? In other words, this question quite precisely describes what the so called ‘technological fix’ was originally about: A fix or solution to a problem which has been produced by technology.

The term of ‘techno fix’, became popular in the 1960s, positively promoted by the US nuclear scientist Alvin Weinberg, in his 1967 book ‘Reflections on Big Science’.<sup>50</sup> Weinberg might also have been the first admitted “technological fixer” as well as eager facilitator. Over time, the historian Lisa Rosner states, the term’s positive connotation has changed: “Instead, it has become a dismissive phrase, most often used to describe a quick, cheap fix using inappropriate technology that creates more problems than it solves.”<sup>51</sup> Stating, that due to growing concerns about technology’s impact on social, political, and economic problems during the 1970s, the term has emerged into a rather critical description of using technology as problem solver.

The research of the British Professor of Science, Technology and Society Sean F. Johnston, who also concludes with Weinberg to be the inventor of the term ‘technological fix’,

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<sup>50</sup> Cf. Lisa Rosner, *The Technological Fix : How People Use Technology to Create and Solve Problems*, Hagley Perspectives on Business and Culture (New York, NY [u.a.]: Routledge, 2004), p. 1  
<<https://ubdata.univie.ac.at/AC04306438>>.

<sup>51</sup> Rosner, p. 1.

comprehends it as an “explicit concept, as a diffuse cultural belief, and as a contentious practice”<sup>52</sup> related to earlier discourse about technology-inspired solutions to human problems: “[...] trust in technological fixes is a cultural perception having profound implications for human actions and power relations.”<sup>53</sup> Yet, Michael Gibbons in 1970 detects a paradox imbedded in using the term, continuing into our present (time of the) ‘digital era’: “[...] the paradox of disillusion with science and technology in a civilization dedicated to the advancement of knowledge.”<sup>54</sup>

It will be that rather ‘critical’ use of the term to base the following paper upon. So why is it “technological solutionism” to be heading this master thesis rather than “technological fix”?

Actually this goes along with the so far development of the term’s interpretation. The Belarus writer, researcher and intellectual Evgeny Morozov – who in turn is considered to be the inventor of the term ‘solutionism’ – reveals the thinking behind ‘solutionism’ as ideology: “I borrow this unabashedly pejorative term from the world of architecture and urban planning, where it has come to refer to an unhealthy preoccupation with sexy, monumental, and narrow-minded solutions [...] to problems that are extremely complex, fluid, and contentious. These are the kinds of problems that, on careful examination, do not have to be defined in the singular and all-encompassing ways that ‘solutionists’ have defined them; what’s contentious, then, is not their proposed solution but their very definition of the problem itself.”<sup>55</sup> Morozov draws the attention onto the way of defining the problem, rather than to its solution. Thus, what once had started to be a positive description of finding technological solutions to problems, has emerged into the description of the ideological attempt on how to define problems leading to simplified technological solutions: “How problems are composed matters every bit as much as how problems are resolved.”<sup>56</sup>

As Morozov mentions, he borrowed the term from the design theorist Michael Dobbins, who in his book ‘Urban design and people’ issues a warning against solutionism (‘Beware of Solutionism’): “Problem-driven design assures that the larger context, both spatially and temporally, and socially and culturally, and the interaction between part and whole is kept in the forefront of any visioning or conceptualization process. Solution-driven design, on the other

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<sup>52</sup> Sean F. Johnston, *Techno-Fixers : Origins and Implications of Technological Faith* (Montreal: McGill-Queen’s University Press, 2020), p. 9, eBook Collection (EBSCOhost)

<<https://search.ebscohost.com/login.aspx?direct=true&db=nlebk&AN=2378081&site=ehost-live>>.

<sup>53</sup> Johnston, *Techno-Fixers : Origins and Implications of Technological Faith*, p. 7.

<sup>54</sup> Rosner, p. 3.

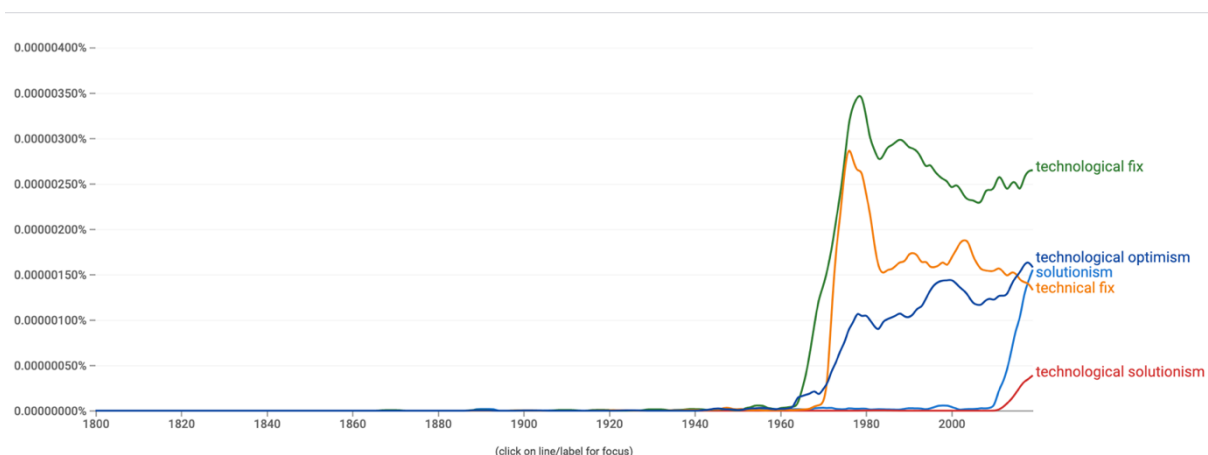
<sup>55</sup> Evgeny Morozov, *To Save Everything, Click Here: The Folly of Technological Solutionism* (New York: Public Affairs, 2013), p. 298, Kindle version.

<sup>56</sup> Morozov, p. 298.

hand, risks applying the ‘magic-bullet’ model to solve problems, reaching for the answer before the questions have been fully asked.”<sup>57</sup> The disconnect between the problem and its solution would be very much likely to be an issue. In the culture and practice of modernism in city design and planning, this became even more explicit, since here problems were ‘dumped down’ to finally make them meeting the solutions provided.

By ‘blaming’ modernism to be the origin of this way of thinking, the new term solutionism might have the better fit since the suffix ‘-ism’ has become the signature of the post-modern critique. So it appears, that the term ‘technological fix’ has continuously changed towards its more critical and modern, and ‘-ism’ – version, ‘technological solutionism’. However, the analysis of solutionism’s ‘history’, needs to begin with technological fix.

Johnston begins his investigation of the ‘technological fix’ by tracing the spread of the concept over time. For that effort he makes use of Google N-gram viewer which analyzes huge ranges of published texts to determine the frequency of usage of several languages and dialects over time. He so found out that in American English, for instance, the phrase ‘technological fix’ emerged during the 1960s and proved to be more enduring and popular than the term ‘technical fix’.<sup>58</sup> In the following graph, also the development of the terms ‘technological optimism’, ‘solutionism’ and ‘technological solutionism are shown.



But not enough with English, Johnston tracked this across languages: “In German, the term technological fix has had limited usage as an untranslated English import, and is much less common than the generic phrase ‘technische Lösung’ (“technical solution”), which gained

<sup>57</sup> Michael Dobbins, *Urban Design and People* (New York City: John Wiley & Sons, 2011), p. 182.

<sup>58</sup> Sean F. Johnston, ‘The Technological Fix as Social Cure-All: Origins and Implications’, *IEEE Technology and Society Magazine*, 37.1 (2018), 47–54 (p. 48) <<https://doi.org/10.1109/MTS.2018.2795118>>.

ground from the 1840s.”<sup>59</sup> In French, the term broadly parallels the German and the English usage. Expanded with the notion of (technological) solutionism, it becomes apparent that the use of ‘solutionism’ – as well as of ‘technological fix’ - begin to increase around the beginning of the 21<sup>st</sup> century, whereas the term ‘technical fix’ decreases.

In addition to the aspect of the difference and frequency of the usage of the respective terms, the data also reveal some information about the period of time when the term arose, which was clearly the 1960s. But was this really its beginning?

### Since when does technology solve our problems?

According to Johnston, technological fix’s history can be traced back to very early times: “The conviction that human problems can be side-stepped by clever engineering had been applied repeatedly, if less consciously, in earlier societal contexts.”<sup>60</sup> As the most popular recognized he calls technical solutions to support governance and political power, such as walls – like the Chinese wall, the Hadrian’s Wall or the Berlin Wall – for controlling the flow of population. Those barriers were conceived to supplement other methods such as diplomatic negotiation, laws or policing. Military hardware would be another example for a famous technological fix that actively defends territories and has been exploited by military tacticians to their advantage in waging war. Johnston comments that many of the successful war heroes have identified material rather than human power as the essential element in military success. Eventually, he concludes: “This simplification has tended to overlook human tactics, organization, and skills or, alternatively, has reconfigured the human elements as components of a military machine. This translation of human factors into technological elements is at the heart of technological fixes.”<sup>61</sup>

Still, Johnston states, history of ‘positive’ technological solutions is just as long as the one of ‘negative’ inventions – depending on the perspective it is seen. Emphasizing the close affinity between technologies and human prospering since at least the Neolithic period, when technologies of stone, copper and bronze were successfully exchanged for iron-based expertise. Admitting that modern archaeology is dominated by tool-making cultures because these artefacts are much easier to detect than cultural or social life. Similarly, the invention of

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<sup>59</sup> Johnston, ‘The Technological Fix as Social Cure-All’, p. 48.

<sup>60</sup> Johnston, *Techno-Fixers : Origins and Implications of Technological Faith*, p. 6.

<sup>61</sup> Johnston, *Techno-Fixers : Origins and Implications of Technological Faith*, p. 7.

agriculture has lead to rising populations and have brought benefits in terms of efficacy and labor savings.

Especially when it becomes difficult to implement social solutions, the way would be cleared for technological solutions, Johnston states. Tech fixes are particularly common for social issues surrounding human well-being and health: “Prosthetics for cosmetic enhancement, for example, have been widely employed through human history to compensate for perceived bodily disfigurement. Artificial toes of wood and leather were used in ancient Egypt; artificial eyes and non-functional hands in the ancient and medieval world normalized the appearance of afflicted individuals and provided a psychological sense of wholeness, aiding their reintegration into society.”<sup>62</sup> Modern examples would range from hairpieces to wheelchairs or the technological responses to obesity – like diet aids, liposuction, or supplements. Johnston emphasizes that those obesity-related responses suggest another theme through technological fixes’ character: “[...] the frame for identifying problems and the scale of problem-solving. Individual ‘fixes’ for obesity pin responsibility on individuals and may be the preferred solution for those who acknowledge their inability to diet or exercise adequately.”<sup>63</sup>

As two other ‘problem areas’ that are tackled in this manner, Johnston presents environmental problems and terrorism. In these fields, the technological fix even appears not only as an emergency stopgap but as a general societal approach: “As environmental concerns rose in the late 1960s, with growing attention to air and river pollution, oil-tanker spills, and fears about nuclear waste, technological quick fixes were proposed as timely and reassuring solutions. Current options include oil-digesting microbes to deal with spills and industrial waste, biodegradable packaging, biotechnologies for fuel production, and schemes for addressing anthropogenic climate change via geo-engineering.”<sup>64</sup> Similarly, when it comes to counterterrorism technological solutions such as body-scanning or technologies to monitor global internet communication that seems to be most attractive for governments and industry: “In the tradition of technological fixes, these single-minded hardware solutions are rapid responses to events that have relatively complex social, political, and/or economic roots.”<sup>65</sup>

According to Johnston in each of these examples the principle of technological fixes becomes obvious: „By narrowing the problem to a single specific cause having a technical work-around,

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<sup>62</sup> Johnston, *Techno-Fixers : Origins and Implications of Technological Faith*, p. 7.

<sup>63</sup> Johnston, *Techno-Fixers : Origins and Implications of Technological Faith*, p. 8.

<sup>64</sup> Johnston, ‘The Technological Fix as Social Cure-All’, p. 52.

<sup>65</sup> Johnston, *Techno-Fixers : Origins and Implications of Technological Faith*, p. 9.

they offer a measurable positive outcome [...] when social techniques are judged inadequate for solving problems, technological fixes are devised to detour around them.”<sup>66</sup>

Besides that, according to Johnston the thinking behind the technological fix was very much influenced by scientific shifts and movements. The chart below displays intellectual currents in scientific culture:<sup>67</sup>

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<sup>66</sup> Johnston, *Techno-Fixers : Origins and Implications of Technological Faith*, p. 9.

<sup>67</sup> Johnston, *Techno-Fixers : Origins and Implications of Technological Faith*, p. 30.



- 1700s Enlightenment rationalism: human values and societies can be understood and improved by rational analysis.
  - 1830s Positivism: scientific knowledge about the natural and social world progresses by acquiring quantifiable evidence. Human nature can be described by empirical measurement.
  - 1840s Social physics: statistics can reveal mathematical laws of human behaviour.
  - 1860s Biological evolution: viable forms of life are determined by their physical environments. The varieties of life forms and collective human traits are the consequence of this natural law of selection.
  - 1880s Eugenics: a society's "genetic health" and evolution can be directed by scientifically selecting desirable traits embodied in chosen breeding partners and preventing offspring from unsuitable partners.
  - 1890s Taylorism: factory workers can be modelled as components of technological systems. Scientific management optimizes tools and working conditions to shape human actions and maximize output of such sociotechnical systems.
  - 1910s Technological progressivism: innovations generally produce beneficial social outcomes.
  - 1910s Social mechanics, social thermodynamics, social energetics, physical economics, ergosophy: an economic system founded on the flow of physical energy is rational and just.
  - 1910s Technological determinism: innovations irresistibly drive and determine social consequences. Technologies, not human actors, are agents of social change.
  - 1920s Technocracy: purposeful technological invention can manage society.
  - 1920s Behaviourism: human behaviours can be understood as being shaped by living environments and life experiences.
  - 1930s Technological futurism: as depicted by science fiction forecasts, societies of the future will centre on and be empowered by technology.
  - 1940s Technologies as empowerment: new technologies can transform living conditions to deliver wide social benefits.
  - 1950s Radical behaviourism: animals and humans can be understood as sophisticated machines, and their behaviours can be shaped (conditioned) by events and environments designed intentionally as learning experiences.
  - 1960s Technological fixes: deliberate technological solutions are equivalent to, or better than, social approaches, and can substitute for them.
  - 1980s Technological innovation: in societies designed to accommodate it, technological change can drive the economy and human well-being.
  - 1990s Technological economics: innovation is the key driver of modern societies.
  - 2000s Transhumanism: human capabilities can be extended via technologies as a new and directed phase of evolution. The definition of humanity itself can be re-shaped by our incorporation of these personal technologies.
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Eventually, the fix's history appears to be rather long and undefined depending on where to draw definitional boundaries/lines. Johnston concludes that the confidence in technical solutions to address human problems "[...] is arguably a human trait, but it became a more ubiquitous aspect associated with modernity over the past century."<sup>68</sup> Hence, let us turn to the 20<sup>th</sup> century and real 'techno-fixers', how Johnston describes them in his book.

## 20<sup>th</sup> Century Technocracy

Johnston defines the 20<sup>th</sup> century to be the peak for technological fixes. He states that at the turn of the 20<sup>th</sup> century, growing audiences, especially in North America, became captivated by new inventions and their implications. During the past century, the rapid innovation has reinforced this confidence in technologies: "The wonder of the technological fix is that it became orthodox and so widely shared during the past century [...]. In distinct flavors, trust in technological fixes was echoed by utopian writers, popular media, and consumer culture. Our attraction to technological solutions for the problems of daily life is a key feature of contemporary lifestyles and dreams of the future."<sup>69</sup>

Within this period, the 'Machine Age' as dubbed by journalists, Johnston would recognize an essential amplifier of technology: the First World War. The time after the war, was "[...] a period that vaunted the mechanization of cities and agriculture, industrial efficiency, 'scientific management,' and most of all, engineering solutions to modern problems. Social progress became associated with applied science."<sup>70</sup> This momentum, Johnston defines as the birth of 'technological social design': "Many came to view technological change as inevitably life-transforming and unstoppable. A smaller fraction saw new technologies as tantamount to societal progress. A still smaller subset nuanced the optimism further: with wise technical designers at the helm, they argued, society's problems could be eliminated one by one."<sup>71</sup> This social design movement Johnston sees embodied in the Technocrats/Technocracy and more specifically by a group initially called the 'Technical Alliance', and later 'Technocracy Inc.': "The group is noteworthy in the way it boiled down popular ideas circulating among engineers for wider publics."<sup>72</sup> – and despite their brief popularity went mainstream. Consisting of its spokesperson profession Howard Scott, the General Electric engineer Charles Steinmetz, the

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<sup>68</sup> Sean F. Johnston, 'Alvin Weinberg and the Promotion of the Technological Fix', *Technology and Culture*, 59.3 (2018), 620–51 (p. 620) <<https://doi.org/10.1353/tech.2018.0061>>.

<sup>69</sup> Johnston, *Techno-Fixers : Origins and Implications of Technological Faith*, p. 6.

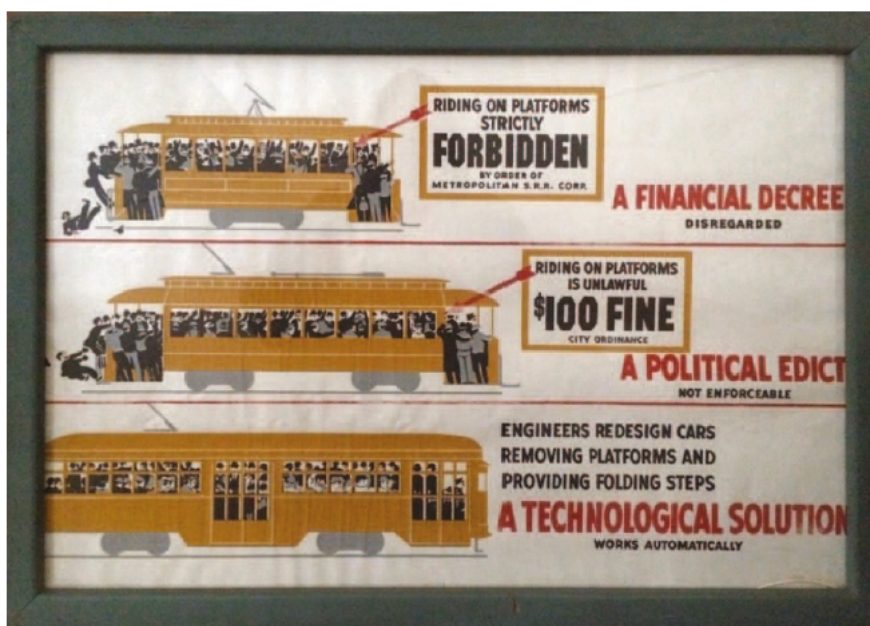
<sup>70</sup> Johnston, 'The Technological Fix as Social Cure-All', p. 48f.

<sup>71</sup> Johnston, *Techno-Fixers : Origins and Implications of Technological Faith*, p. 4.

<sup>72</sup> Johnston, 'The Technological Fix as Social Cure-All', p. 49.

social philosopher Thorstein Veblen, and economist Stuart Chase, the group's message was that technical experts, rather than politicians and financial interests, were the only viable providers of effective solutions for the problems of modern society.<sup>73</sup> "The group railed against the problems of waste, inefficiency, and incompetence of industrialists and government leaders, and called for the application of "the achievements of science to societal and industrial affairs."<sup>74</sup>

An illustrative example of their reasoning is the one of street car design. The problem: Passengers suffering injuries by falling from crowded running boards. Technocracy Inc's argument: neither financial decrees nor political edicts have improved the safety of its passengers - technology did: "The engineers solved it easily. They built cars that didn't have platforms."<sup>75</sup>



**FIGURE 3.** Graphic displayed at Technocracy Inc meeting halls and public exhibits from the 1930s [source: Technocracy Inc, courtesy of George Wright].

Scott argued that issues of coercion and control would melt away, when replaced by benign physical environments that ensure safety: "In effect the machine, rather than the operator, has agency. It embodies moral authority rather like a parent constraining the behavior of a willfully disobedient child."<sup>76</sup>

<sup>73</sup> Cf. Johnston, *Techno-Fixers : Origins and Implications of Technological Faith*, p. 32.

<sup>74</sup> Johnston, 'The Technological Fix as Social Cure-All', p. 49.

<sup>75</sup> Johnston, 'The Technological Fix as Social Cure-All', p. 49.

<sup>76</sup> Johnston, *Techno-Fixers : Origins and Implications of Technological Faith*, p. 35f.

But the group did not stop at more mundane and technology-related topics such as the nature of vehicles, but even claimed they could also “[...] offer a quick route out of the economic crisis. Attracting a strong coterie of engineers alongside wider audiences, it excluded only active politicians and repeatedly disavowed political affiliations from either the left or the right.”<sup>77</sup>

Additionally, according to Johnston, the technological fix of the Technocracy Inc. group was based on an interconnection between rational science, social order and technology. He states that the group was primarily active in the US, Canada and partly in South America, yet its theme was informed by contemporary discussions among European scientists not least because some members of the group were immigrants and kept in touch with their European peers. So did the English chemist Frederick Soddy (1877-1956) in his works offer his own model ‘ergosophy’, meaning a social philosophy emerging out of the laws of the physical world. Also, when speaking of Enlightenment as an important precursor of Technocracy as well as the fix, the English philosopher John Stuart Mill (1806-1873) and his vision of ‘utilitarianism’ as the arithmetic of morality should be mentioned. Or, the French mathematician Auguste Comte who developed a ranking system of human knowledge – starting with mathematics and physics and ending with religion – and who is famous for the philosophy of ‘positivism’, that “[...] valued the discovery of invariant laws of natural and social world by relying on observation and experiment.”<sup>78</sup> Not least because of that, the new scientific discipline ‘sociology’ tried to implement this strategy: “Combined with physical economics, the new social sciences aimed to characterize and ultimately manage human affairs.”<sup>79</sup>

Just as he had recognized World War I as an amplifier of solutionism, Johnston says World War II moved it up to an international scale: “First, new technologies could solve urgent problems and, second, technologists were essential to this. Military ascendancy had been traded back and forth by the opponents over six years of the war, providing a surfeit of strategic problems for which technological innovation provided quick, if temporary, solutions [...] Wars traditionally had depended on the organization of human combatants, and wartime leaders now acknowledged their heavy reliance on technological innovation and scientific guidance to refine strategies.”<sup>80</sup>

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<sup>77</sup> Johnston, *Techno-Fixers : Origins and Implications of Technological Faith*, p. 34.

<sup>78</sup> Johnston, *Techno-Fixers : Origins and Implications of Technological Faith*, p. 29.

<sup>79</sup> Johnston, *Techno-Fixers : Origins and Implications of Technological Faith*, p. 31.

<sup>80</sup> Johnston, *Techno-Fixers : Origins and Implications of Technological Faith*, p. 48.

This closeness to technological solution grew again more intensive in the course of reconstruction of many areas after the war: “The destruction of European and Asian cities during the war was followed by a quarter-century of rebuilding and, in some places, wholesale redesign. This rational reconstruction prioritized urban housing and infrastructure as the most effective means of improving the well-being of citizens.”<sup>81</sup> Johnston defines this “merging of science and human affairs”<sup>82</sup> that can be traced throughout the postwar period a “prerequisite for later acceptance of technological fixes”.<sup>83</sup>

“For instance, the link between wise governance and science first explored by various European scientists at the turn of the century reemerged at this time from the new field of ‘cybernetics’, which was developed during the postwar years to explore general principles of systems of control and communication. Like the notion of technological fixes, the underlying ideas combined ancient approaches and empirical techniques with modern rational perspectives.”<sup>84</sup>

Additionally, the complex problems of postwar reconstruction, uniting legislators, economists, and planners to redesign devastated cities, influenced larger-scale technological corrections. One of the key representatives of this thinking was the chemist and founder of the Federation of Atomic Scientists in 1945, Richard Meier. Within his research he turned to analyzing technological solutions to the problems of social development, pleading for an interdisciplinary approach focusing on sociotechnical connections that should not be limited by existing lines between the disciplines. His message was clear: to use scientific knowledge as well as engineering experience to tackle universal social problems. He was of the opinion that every social problem could be re-phrased so that it is also a scientific or an engineering problem that can not only be researched but resolved. Meier’s organization “[...] aimed to assert the authority of technologists in modern governance: to educate and influence policy-makers and to encourage the peaceful application of science and, specifically, nuclear energy for national and international benefit.”<sup>85</sup>

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<sup>81</sup> Johnston, ‘Alvin Weinberg and the Promotion of the Technological Fix’, p. 54.

<sup>82</sup> Johnston, *Techno-Fixers : Origins and Implications of Technological Faith*, p. 53.

<sup>83</sup> Johnston, *Techno-Fixers : Origins and Implications of Technological Faith*, p. 53.

<sup>84</sup> Johnston, *Techno-Fixers : Origins and Implications of Technological Faith*, p. 53.

<sup>85</sup> Johnston, *Techno-Fixers : Origins and Implications of Technological Faith*, p. 18.

Johnston considers this approach as an academic successor to the Technocrats' assumption, that technological innovation would be the most effective basis for solving societal problems.<sup>86</sup> As Meier himself admitted, the reason for his focus on comfort and convenience was a materialistic view of human behavior: "He [Meier] described turning social dilemmas into scientific and engineering problems, which would be more easily and quickly solved by technological means than by redesigning social systems and reshaping cultural norms."<sup>87</sup> Meier's ideas and proposals can as well be grouped with those of the behaviorists and Taylorists. And he did not allow himself to be tied down to one 'problem industry'; he applied his thoughts to a wide range of topics, from development aid and education to energy supply (through atomic power plants) and the optimal design of household furniture. He proceeded in this way to obtain data from climate scientists, agriculturalists, architects, chemists, and physicist and give it to technical experts who would rationally determine optimal engineering solutions.<sup>88</sup>

In rapid development, Meier saw society's chance to escape its own cultural and traditional limitation, even though there were new problems ahead: "'These, too, can be solved, but the keys to the solution are drawn from experience outside the culture, from the accumulated body of scientific and technical knowledge possessed by the world at large.'"<sup>89</sup> Such rational planning, Meier believed, would lead to a decline of nationalism and a gradual disappearance of economic and political inequalities.<sup>90</sup>

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<sup>86</sup> Cf. Johnston, *Techno-Fixers : Origins and Implications of Technological Faith*, p. 61.

<sup>87</sup> Johnston, *Techno-Fixers : Origins and Implications of Technological Faith*, p. 64.

<sup>88</sup> Cf. Johnston, *Techno-Fixers : Origins and Implications of Technological Faith*, p. 64.

<sup>89</sup> Johnston, *Techno-Fixers : Origins and Implications of Technological Faith*, p. 67.

<sup>90</sup> Cf. Johnston, *Techno-Fixers : Origins and Implications of Technological Faith*, p. 68.

## The Most Prominent Fixer: Alvin Weinberg

*„The Technological Fix accepts man’s intrinsic shortcomings and circumvents them or capitalizes on them for socially useful ends. The Fix is, therefore, eminently practical and, in the short term, relatively effective.”<sup>91</sup>*

– Alvin Weinberg

An important representative in the history of technological fix, is US physicist Alvin Weinberg. Besides his research in the field of mathematical sociology he was involved in designing the first nuclear reactors for the ‘Manhattan Project’ at Oak Ridge. It was a research and development project during World War II with the goal to produce the first nuclear weapons. It was led by the US, with support from the United Kingdom and Canada.

As already mentioned, Weinberg has been considered to be the person who popularized the term ‘technological fix’ – at least in its contentious **sense** claiming that: “[...] solutions founded on technological innovation may be innately superior for addressing issues traditionally defined as social, political, or cultural.”<sup>92</sup> Speaking in his words: “A technological fix is a means for resolving a societal problem by adroit use of technology and with little or no alteration of social behavior.”<sup>93</sup> Johnston investigates Weinberg’s understanding of the fix mainly by evaluating his correspondences with other scientists or politicians. He describes his and his contemporaries’ working environment as a situation that included interwar progressive science, wartime military technology, postwar National Labs, and subsequent science policy advising.<sup>94</sup> Weinberg was fascinated about the idea of using “cheap technological fixes”<sup>95</sup> to circumvent social problems. This thesis is introducing three of them to help better understanding of Weinberg’s argumentation. Firstly, Weinberg strongly supported the use of intrauterine devices (IUDs), because the topic of birth control had been a complex social issue before the invention of the Ring. From him the use of IUDs simplified the matter, “[...] [by] drastically reducing the

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<sup>91</sup> Alvin M. Weinberg, ‘Can Technology Replace Social Engineering?’, *Bulletin of the Atomic Scientists*, 22.10 (1966), 4–8 (p. 5) <<https://doi.org/10.1080/00963402.1966.11454993>>.

<sup>92</sup> Johnston, ‘Alvin Weinberg and the Promotion of the Technological Fix’, p. 621.

<sup>93</sup> Johnston, *Techno-Fixers : Origins and Implications of Technological Faith*, p. 85.

<sup>94</sup> Cf. Johnston, *Techno-Fixers : Origins and Implications of Technological Faith*, p. 70.

<sup>95</sup> Johnston, ‘Alvin Weinberg and the Promotion of the Technological Fix’, p. 630.

daily motivation needed for birth control.<sup>96</sup> Secondly, he favoured the so called H-bomb - a second-generation nuclear weapon design - which in his view was a cheap fix to human's basic problem of making war: the H-Bomb would offer a rather exceptional solution once diplomacy or other common methods had failed: by the atomic bomb a state of peace is technically created, which is based on one's own fear of survival or drive for self-preservation.

The third cheap fix might be 'smaller' than the others yet quite vividly since it suggests technological fixes as a regular political tool set. The matter became sparked by protests in response to police violence against an African American. Weinberg set out to find a technical solution that would buy time for a rather long-term social solution. So, after looking at the context, he found out that the protests had erupted while the hottest time of the year. His proposal turned out to be an investment of public money "to air-condition slum dwellings".<sup>97</sup> Referring to this, Johnston argues that Weinberg's hopes exceeded cooling down tensions: "they suggested long-term technological interventions that bypassed sociological approaches, public education, political negotiation, and indeed religious and moral teachings."<sup>98</sup>

Though, compared to radical technocratic opinions, Weinberg did not want to devalue or abolish social sciences but invented the term 'trans-scientific' in order to label problems that required social as well as scientific methods. Johnston states: "In this respect, Weinberg's views deviated from the earlier technocrats: where they had proposed replacing political leaders with governance by technologists, Weinberg envisaged engineers and scientists in government-funded national labs to devise solutions to problems identified by others. Both views, however, bypassed direct democratic involvement in favor of rational elites."<sup>99</sup> Rather, he agreed with Richard Meier's concept, combining social science with technology.

With the term 'big science', a third buzzword coined by Weinberg, he frames an analysis of the changes in science towards government-funded, nationally-oriented ones: "As he [Weinberg] reiterated, the new scale of research would demand prioritized government funding, but 'technological gigantism' would also require scientists to be more socially aware and responsible about the consequences of applications, and to consider the potential for accidents."<sup>100</sup> According to this, Weinberg was aware of technologies' positive as well as negative implications.

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<sup>96</sup> Johnston, 'Alvin Weinberg and the Promotion of the Technological Fix', p. 631.

<sup>97</sup> Johnston, 'Alvin Weinberg and the Promotion of the Technological Fix', p. 630.

<sup>98</sup> Johnston, 'Alvin Weinberg and the Promotion of the Technological Fix', p. 631.

<sup>99</sup> Johnston, 'Alvin Weinberg and the Promotion of the Technological Fix', p. 642.

<sup>100</sup> Johnston, 'Alvin Weinberg and the Promotion of the Technological Fix', p. 628.



Even though, there might be some differences in detail Johnston states, both Weinberg as well as the Technocrats shared the idea of the effectiveness of technological solutions to social problems and claimed it to be “a self-evident truism”<sup>101</sup>, after all. By comparing evaluated public speeches of both, - Weinberg and Scott (Technocrats) - Johnston can also identify four other commonalities:<sup>102</sup>:

1. Social problems of modern society are caused, and ultimately solved, by technological change.
2. Conventional solutions – notably economics, politics, social programs, revolutions – are ineffective.
3. Rational technological change of environments can produce new social behaviors rapidly, even without requiring a change in the individual’s social attitudes.
4. Only technically competent people, by redesigning physical environments, are equipped to solve modern social problems.

Nevertheless, it should be noted here that even Weinberg, as a proponent of the technological fix, may have recognized its limitations. Technology for him means a kind of expansion of the classic, social, societal solution options. However, what it always meant was progress: “Technology will never replace social engineering. But technology has provided and will continue to provide to the social engineer broader options, to make intractable social problems less intractable; perhaps, most of all, technology will buy time – that precious commodity that converts violent social revolution into acceptable social evolution.”<sup>103</sup>

The preceding section provided an overview of technological developments and their relationship to the 'fix' in the 20<sup>th</sup> century. Yet, with Johnston: “More recently, software technologies have been embraced by consumers as even more seductive ways to supplement personal skills, improve efficiency, and empower lifestyles - a marketing philosophy dubbed ‘solutionism’.”<sup>104</sup> This market-related aspect along with the millennial change towards massive digitalization opens a new in depth discourse on the matter.

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<sup>101</sup> Johnston, *Techno-Fixers : Origins and Implications of Technological Faith*, p. 89.

<sup>102</sup> Johnston, *Techno-Fixers : Origins and Implications of Technological Faith*, p. 85ff.

<sup>103</sup> Weinberg, p. 8.

<sup>104</sup> Johnston, ‘The Technological Fix as Social Cure-All’, p. 51.

## Can Technology Save The World?

The author, who is presented as the analyst of the 21st century's 'technological fix', is called Evgeny Morozov. Apart from the fact that digitization plays an essential role in his view of the 21st century, he also uses a new term for the 'ideology' he wants to uncover, 'technological solutionism'. This will be discussed in more detail below, but first we need to clarify: Who is Evgeny Morozov?

Morozov is a Belarusian publicist, researcher and intellectual who was, amongst others, a visiting fellow at Stanford University and at the Open Society Institute from George Soros. As of 2013, Morozov pursued a PhD in the history of science from Harvard, which he obtained in May 2018. He deals with political and social impact of technology and expresses scepticism about the solely positive consequences of the Internet and new technologies.

### Evgeny Morozov's solutionism

As mentioned in his book's header 'To Solve Everything, Click Here. The Folly of Technological Solutionism', Morozov deals with a conviction he labels 'technological solutionism' by examining the effects of technology on subjects ranging from politics and criminology up to health issues. It also leads to the assumption that Morozov seems not to be in favor of it. By solutionism he understands '[...] an approach which consists in treating social, cultural or political problems as purely technical issues which can be resolved by means of relatively simple engineering interventions.'<sup>105</sup>

His main concern: the series of social-political interventions undertaken by representatives of high-tech industry and IT sector, indicating their utopian and ideological nature, driven by a permanent 'will to improve'. This is what Morozov considers short sighted and only perfunctorily interested in the activity for which improvement is sought: "Recasting all complex social situations either as neatly definite, computable solutions or as transparent and self-evident processes that can be easily optimized [...] is likely to have unexpected consequences that could eventually cause more damage than the problems they seek to address."<sup>106</sup> It is, above all, the solutionist approach Morozov dislikes. According to him, it tends to transform complex

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<sup>105</sup> Lukasz Afeltowicz/ Krzysztof Pietrowicz, Solutionist interventions and their unforeseen consequences: a preliminary catalogue of often committed errors, 2018 II National Interdisciplinary Scientific Conference TechSpo'18: Power of Algorithms, Krakow, 2018, doi: 10.1109/TechSpo.2018.8584619.10.1109/TechSpo.2018.8584619. (25.08.2020) p. 1.

<sup>106</sup> Cf. Ibid., p. 5.

problems into a set of simpler issues and find a solution for each of them. He admits this of course, is not a bad thing per se, yet when applied to dramatic social problems it might produce the false answers.

### Humanity is imperfection

Solutionism, Morozov states, does not only strive to solve existing problems. He emphasizes that solutionism is trying to solve, by using their (technical) know how as starting point to think about, because what is essential when it comes to analyze solutionism is that: “How problems are composed matters every bit as much as how problems are resolved.”<sup>107</sup>

Hence, he is of the opinion that solutionism implies a specific misdiagnosing of problems, driven by the effort to fix them in a rather perfunctory manner which brings problems of its own: “This is where solutionism [together with internet-centrism] forces us to assume problems based on sheer awesomeness of our digital tools, not on the needs and requirements of democratic politics itself. [As political theorist Bernard Crick once wrote, ‘Boredom with established truths is the great enemy of the free man.’]”<sup>108</sup> He draws the example of Antipartyism in the USA and states that attempts to abolish political parties as the concept of ‘liquid democracy’ proposes, might make it worse, because they might not tackle the real problem behind it but only constitute a problem they can pretend to solve with their tools: “The kinds of deep structural issues that reduce American politics to just two parties have little to do with technology or lack of information; thus, it’s naïve to expect that digital platforms could help deal with them. Here, once again, ‘the Internet’ is a great solution to a problem that doesn’t exist.”<sup>109</sup>

Thus, Morozov concludes, either the problems solutionists are about to tackle are not in any sense new - “[...] generations of earlier thinkers have already addressed many related pitfalls and pathologies.”<sup>110</sup> -, or, they are no real problems in the first place: “[...] a deeper investigation into the very nature of these ‘problems’ would reveal that the efficiency, ambiguity, and opacity – whether in politics or everyday life – that the newly empowered geeks and solutionists are rallying against are not in any sense problematic.”<sup>111</sup> Morozov even goes so far as to state that those ‘problems’ solutionist would like to put an end to – such as inefficiency, ambiguity, and

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<sup>107</sup> Morozov, p. 282.

<sup>108</sup> Morozov, p. 114.ff.

<sup>109</sup> Morozov, p. 114.

<sup>110</sup> Morozov, p. 14.

<sup>111</sup> Morozov, p. 6.

opacity - whether in politics or everyday life – are not problematic at all. On the contrary, he calls them “virtues in disguise”<sup>112</sup>. One could say that Morozov here pleads for an acceptance of the imperfections of human life. The question he raises is: in an imperfect world, how can ‘perfect’ tools bring change? Morozov’s clear answer is : They can’t . Learn to love the imperfections, because they are good.<sup>113</sup> This, above all affects solutionist approaches to political problems: “Perfection shouldn’t be pursued for its own ends; democracy is a complex affair in which, in the absence of disappointments, there would never be any accomplishments.”<sup>114</sup> According to Morozov, believing in perfect politics damages democracy’s ground principles: “[...] pursued in an unreflexive manner, it recasts compromises like lower attendance rates at voting sessions or occasional resources to hypocrisy and ambivalence as sins, while any realistic model of politics should at least occasionally treat them as virtue.”<sup>115</sup>

What makes his book so relevant for current times however, might be his assumption of resurgence of a very special modern kind of solutionism, he calls the ‘Silicon mentality’ whose most passionate followers are not to be found in city halls and government ministries, but in Silicon Valley itself. Also ‘we’ would not find the courage to escape it. According to him, the mentality “[...] fuels much of the current quest for technological perfection, we risk finding ourselves with a politics devoid of everything that makes politics desirable, with humans who have lost their basic capacity for moral reasoning, with lackluster (if not moribund) cultural institutions that don’t take risks and only care about their financial bottom lines, and, most terrifyingly, with a perfectly controlled social environment that would make dissent not just impossible but possibly even unthinkable.”<sup>116</sup>

The term goes back to the place where Morozov locates the origin of this mentality, ‘Silicon Valley’. It originally refers to a region in Northern California that serves as a global center for high technology and innovation. Companies like Apple, Google, Microsoft and Amazon call the Valley home, as do thousands of tech start-ups. But, the Silicon Valley cannot longer be limited to its geographical borders. Julian Dörr and Olaf Kowalski in their article ‘Die politische Ideologie des Silicon Valley’ describe: „Dabei erstreckt sich diese Wirkungsstätte

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<sup>112</sup> Cf. Morozov, p. 6.

<sup>113</sup> Cf. Morozov, p. 116.

<sup>114</sup> Morozov, p. 116.

<sup>115</sup> Morozov, p. 116.

<sup>116</sup> Morozov, p. 177, Kindle version.

nicht nur geographisch auf den im nördlicheren US-Bundesstaat Washington gelegenen Großraum Seattle [...] sondern ist in einem umfassenden Sinne ohnehin besser zu verorten und zu verstehen als eine Semantik großer Visionen technologiebasierter Wertschöpfung.”<sup>117</sup> It is widely regarded as synonymous with digital progress, with the premise that nothing is impossible or excluded extending far beyond it.<sup>118</sup> It is in this capacity that 'Silicon Valley' is also used in this thesis and chapter 'The Valley' discusses it in more detail.

By describing that mentality it becomes clear that Morozov's critique does not come from a just 'anti-technic-attitude' but stems from his deeply rooted fear of losing human freedom: “Imperfection, ambiguity, opacity, disorder, and the opportunity to err, to sin, to do the wrong thing: all of these are constitutive of human freedom, and any concentrated attempt to root them out will root out that freedom as well.”<sup>119</sup>

If this 'Silicon mentality' that fuels much of the current quest for technological perfection was not stopped, Morozov says, “[...] we risk finding ourselves with a politics devoid of everything that makes politics desirable, with humans who have lost their basic capacity for moral reasoning, with lackluster (if not moribund) cultural institutions that don't take risks and only care about their financial bottom lines, and, most terrifyingly, with a perfectly controlled social environment that would make dissent not just impossible but possibly even unthinkable.”<sup>120</sup>

Both the Silicon Valley and “The Internet” hold key roles in Morozov's theory that will be elaborated more detailed later on. To illustrate his idea of solutionism, Morozov in his book refers to many examples from various areas. Some of them will be presented on the following pages to get a more thorough understanding of his theory.

#### Augmented technologically, diminished intellectually

Among many other examples, the one of cooking is a vivid and easy one Morozov gives and illustrates his approach well. To Morozov, cooking acts as a sample for a creative art that relies on deviations to create culinary innovations: “Strict adherence to recipes can produce predictable, albeit tasty dishes – and occasionally this is just what we want.”<sup>121</sup> Opposed to that, some solutionists have committed themselves to revolutionize the art of cooking: They have

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<sup>117</sup> Udo Di Fabio, *Made in California*, ed. by Olaf Kowalski, Zur politischen Ideologie des Silicon Valley (Tübingen: Mohr Siebeck, 2022), p. 10 <<https://doi.org/9783161611384>>.

<sup>118</sup> Cf. *Adrian Daub, Was Das Valley Denken Nennt. Über Die Ideologie Der Techbranche, Edition Suhrkamp, 2750 (Berlin: Suhrkamp, 2021), p. 19.*

<sup>119</sup> Morozov, p. 161, Kindle version.

<sup>120</sup> Morozov, p. 161, Kindle version.

<sup>121</sup> Morozov, p. 13.

installed a system in which a cook is monitored by several cameras in the kitchen that measure every step a cook takes to be replicated in the next moment; they use collected data about cooking to program virtual reality glasses which augment your cooking experience: “Thus, if you are about to cut a fish, the system will project a virtual knife and mark where exactly that it ought to cut into the fish’s body.”<sup>122</sup> According to Morozov, this leads to an “augmented diminished reality”<sup>123</sup> – meaning: augmented technologically, diminished intellectually. The cooking example shows another essential point in Morozov’s theory, that solutionist approaches should not be equated with technological innovation per se, as the example of molecular gastronomy shows: “Technology, used with some imagination and without the traditional solutionist fetishism of efficiency and perfection, can actually make the cooking process more challenging.”<sup>124</sup> Here we find a blind spot of his theory though, because in the end who is it to decide what solutionism as opposed to real technological innovation really is? Would someone who does not like molecular cuisine call it solutionism?

What he is actually talking about is the difference between innovation for its own sake versus improving something that needs to be reformed: “[...] to reject solutionism is not to reject technology. Nor is it to abandon all hope that the world around us can be ameliorated; technology could and should be part of this project. To reject solutionism is to transcend the narrow-minded rationalistic mind-set that recasts every instance of an efficiency deficit [...]”<sup>125</sup> For Morozov there are more humanistic, more responsible ways to think about technology’s role in enabling human flourishing: “[...] but solutionists are unlikely to grasp them unless they complicate their dangerously reductionist account of the human condition.”<sup>126</sup>

### The pro-innovation bias

According to Morozov, solutionism’s ‘improvement agenda’ is connected to the contemporary veneration of innovation. To solutionists, he claims, innovation is treated as inherently good in itself, regardless of its social or political consequences, leading to a ‘pro-innovation bias’, also in academia: “Such pro-innovation bias is responsible for the establishment of a clear boundary between the study of innovation and its various boosting factors – this field of inquiry is mostly pursued in business schools – and the study of the consequences of innovation, which is usually done in disciplines such as public policy and science and technology studies but very rarely

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<sup>122</sup> Morozov, p. 12.

<sup>123</sup> Morozov, p. 13.

<sup>124</sup> Morozov, p. 13.

<sup>125</sup> Morozov, p. 13.

<sup>126</sup> Morozov, p. 14.

under the umbrella of ‘innovation studies’ as such.”<sup>127</sup> As a consequence, innovations that fail or lead to disastrous results are not part of the innovation vocabulary and fall below the radar of investigation: “[...] since innovation is seen as having only positive effects, few are prepared to examine its unintended consequences [...] technologies are innovative only if they are successful and risk-free. Moreover the consequences of innovation that are considered tend to be rather linear and direct.”<sup>128</sup>

But Morozov emphasizes that this has not always been the case, but the term’s meaning has changed over time. The word innovation for a long time had negative connotations – interpreted with heresy and fraud - changing in the 1960s: “[...] Western governments, preoccupied with the modernization agenda and dominated by social scientists, economists, and consultants, stripped the word ‘innovation’ of its political content, turning it into a boring synonym for novelty, invention, creativity, originality, usefulness, or whatever buzzword was popular at Harvard Business School’s retreats that year.”<sup>129</sup> Hence, to Morozov the term innovation needs a critical review. Depending on what is created and to whom it becomes available, innovation can worsen existing injustices or create new injustices: “This requires going beyond preoccupation with novelty and efficiency and asking difficult, normative questions about power, legitimacy, and morality.”<sup>130</sup>

Another example which has to be picked up in the thesis is this one of education. This highlights an important aspect of solutionism, becoming apparent along with ‘macrosocial problems’ such as climate change. The approach to reform the educational system by integrating new technologies like online courses organized by start-ups, raises Morozov’s concerns, because online learning stands against the essential principles of what education means to him: “Digital technologies might be a perfect solution to some problems, but those problems don’t include education—not if by education we mean the development of the skills to think critically about any given issue. Online resources might help students learn plenty of new facts [...], but such fact cramming is a far cry from what universities aspire to teach their students.”<sup>131</sup> Further he states: “Of course, there are plenty of tools for increasing one’s digital literacy, but those tools go only so far; they might help you to detect erroneous information, but they won’t organize your thoughts into a coherent argument.”<sup>132</sup>

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<sup>127</sup> Morozov, p. 168.

<sup>128</sup> Morozov, p. 167f.

<sup>129</sup> Morozov, p. 168.

<sup>130</sup> Morozov, p. 169.

<sup>131</sup> Morozov, p. 8.

<sup>132</sup> Morozov, p. 9.

Of course the author does not deny that the education system must be reformed yet but not be interfered by digital solutions. According to him, technology is limited regarding its application on humans and their ecosystems, because it does not take into account that the world is following human chaos rather than rational guidelines. And this chaos longs for sustainable structural change and visionary ideas: “Here in lies one hidden danger of solutionism: the quick fixes it peddles do not exist in a political vacuum. In promising almost immediate and much cheaper results, they can easily undermine support for more ambitious, more intellectually stimulating, but also more demanding reform projects.”<sup>133</sup>

### Quantify the World

The main method these meta narratives of innovation and improvement rely on, is the one of quantification which can be carried out with various methods such as gamification, self tracking mainly by collecting data. To explain that phenomenon, Morozov speaks in the words of Gary Wolf and Kevin Kelly, the two proponents of the ‘Quantified Self movement’: “We tolerate the pathologies of quantification—a dry, abstract, mechanical type of knowledge—because the results are so powerful [...] Numbering things allows tests, comparisons, experiments. Numbers make problems less resonant emotionally but more tractable intellectually.”<sup>134</sup> Wolf continues with stating that quantification can help shield us from subjectivity and emotion, supposedly a benefit. What lies behind it, according to Morozov, is a deep faith in numbers, data and measurements as seemingly objective and consensus boosting. He hereby cites Friedrich Nietzsche, who has been one of the first rebels against the ‘quantification fetish’ criticising information reductionism: “[...] the faith in a world is supposed to have its equivalent and its measure in human thought and human valuations – a ‘world of truth’ that can be mastered completely and forever with the aid of our square little reason.”<sup>135</sup> According to Morozov, attempts at quantification pose the risk of simplification—and to him, simplification is anything but apolitical, especially when competing interpretations of a problem are discarded in favor of something measurable and manageable.<sup>136</sup>

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<sup>133</sup> Morozov, p. 9.

<sup>134</sup> Morozov, p. 231.

<sup>135</sup> Morozov, p. 243.

<sup>136</sup> Morozov, p. 246.



The other aspect Morozov bothers the most is that, in his opinion, supporters of the ‘quantification fetish’ have nothing to say about the ‘intangibles’: “[...] both the ethics and aesthetics—and this, if anything, is a good reason to worry about this new movement.”<sup>137</sup>

Hereby, Morozov refers to current strategies fighting climate change that rely on collecting numbers and data – mostly by self-tracking - such as carbon offsetting or individual attempts who are promoted such as tracking our garbage disposal or our water consumption: “[...] if quantification gives us an opportunity to save three gallons of water without questioning how this water gets into our bathrooms to begin with, then perhaps the savings are not as significant as we believe and maybe they even detract from our seeking more innovative ways of reforming the water system.”<sup>138</sup> Same goes for carbon offsetting. Morozov recognizes a certain "systems thinking" in such approaches that seeks to redescribe them in the language of relations, structures, and processes instead of reducing the roots of the problem.<sup>139</sup> Eventually, he states: “The logic of carbon offsetting—and the idea that sustainability can be bought through market relations - has now trickled down from nations and corporations to individuals.”<sup>140</sup> The consequences, Morozov sees in that, are citizens who are not able to think outside the box: “But even as we gain the ability to monitor our own carbon footprint, do we really know what those numbers actually mean? Or is taking such measurements yet another way to make us feel good about our own sacrifices without making any fundamental changes to the system? Do we know the relative importance of our tiny contribution? If everyone makes the same small efforts, will they be enough to reverse the troubling trends?”<sup>141</sup> What he wants to make clear is that monitoring such numbers about our consumption habits does not get us any closer to understanding how these complex systems function. Morozov calls that ‘numeric imagination’ and explains: “[Numeric imagination] enables us to think in numbers—that is, to ponder how much we can consume and, in the best of all cases, what we can unplug—but it never challenges us to think of how a different set of numbers might be generated.”<sup>142</sup> In doing so, he sticks to his line of reasoning, claiming that the ‘real’ solution to, for instance, climate change might require both more substantial sacrifices and perhaps even stepping out of the shower and fighting that fight somewhere else.<sup>143</sup>

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<sup>137</sup> Morozov, p. 245.

<sup>138</sup> Morozov, p. 5728.

<sup>139</sup> Cf. Morozov, p. 5728.

<sup>140</sup> Morozov, p. 5884.

<sup>141</sup> Morozov, p. 5884.

<sup>142</sup> Morozov, p. 4708, Kindle version.

<sup>143</sup> Cf. Morozov, p. 4708, Kindle version.

Solutionism's climax Morozov situates in the so called "Internet-centrism", which to him in the public debate as well as in science, is represented as an ideology: "The very idea of 'the Internet' has not merely become an obstacle to a more informed and thorough debate about digital technologies. It has also sanctioned many a social and political experiment that tries to put the lessons of 'the Internet' to good use. It has become the chief enabler of solutionism, supplying the tools, ideologies, and metaphors for its efficiency crusades."<sup>144</sup>

The way the public as well as so called Internet-experts see the Internet, Morozov considers to be inherently solutionist. Instead of having them define 'the Internet' with its inherent nature, to Morozov, one should try to understand the context behind their explanations of digital technologies and 'the Internet': "Why do rupture talk and revolutionary rhetoric tend to displace all other forms of analysis? Why do we label old activities as new, imagine incompetent youngsters as possessing complete mastery [digital natives] over technology and believe that nothing matches the Internet in terms of the complexity of the debate that it triggers? Isn't it time to inquire into what we are not talking about when the debate itself – that is, the issue it attends to and the questions it formulates – is constructed in revolutionary terms?"<sup>145</sup>

Morozov compares such perspective at the Internet with the revolutionary picture of the emergence of the printing press, amongst others, advocated by Elizabeth Eisenstein.<sup>146</sup> According to her, the invention of the printing press has triggered all subsequent social transformation such as Reformation or scientific revolution, following a rather linear logic: Printing was invented and influenced science. Science, in turn, then led to progress. Here in, Morozov detects a particular world view, also favoured by solutionists/Internet-centrists, who cherish the current 'Internet-culture' triggering all socio-political transformation: "[Thus,] Eisenstein's account holds only if one accepts a sharp separation between technology on the one hand and society and culture on the other – and then assumes that the former shapes the latter, never the other way around."<sup>147</sup> But one not only finds that logic in the reception of printing but also in television's emergence, which for some scientists symbolizes the era of the civil rights revolution, as well as the popularization of protests, plus a new era of minority

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<sup>144</sup> Morozov, p. 61.

<sup>145</sup> Morozov, p. 48.

<sup>146</sup> Eisenstein was an American historian of the French Revolution and early 19th-century France. She is well known for her works on early printing and its effects on the broader culture in the 'Western' culture. (*The Printing Press as an Agent of Change from*, 1979)

<sup>147</sup> Morozov, p. 54.

power. “The shorter Boorstin (US historian): move over, Martin Luther King Jr. – it was television, the natural successor of the printing press, that gave us the Civil Rights Act!”<sup>148</sup>

Hence, Morozov, if it is about the printing press, the television or the Internet, pleas for a more complex and accurate view at the history of technological developments that does not get caught in ‘epochalism’ which will be defined in the following chapter: “In other words, if we tried hard enough, we might find another way of talking about these technologies that would provide more nuance and not paper over important local differences.”<sup>149</sup>

Due to this inevitable construction of the Internet, it is easy to dismiss criticism of it with the accusation of conservatism or opposition to change, but Morozov strikes back, stating that these are the same arguments Internet-centrism sidesteps criticism of itself.”<sup>150</sup> This argument, he backs up with the example of several opponents or critiques of solutionism who are not from the same political persuasion but agreed upon the point that their “[...] least favorite brand of solutionist [...] have a very poor grasp not just of human nature but also of the complex practices that this nature begets and thrives on. It’s as if solutionists have never lived a life of their own but learned everything they know from books – and those books weren’t novels but manuals for refrigerators, vacuum cleaners, and washing machines.”<sup>151</sup> As well as he defends himself by making clear: “I do not advocate inaction or deny that many (though not all) of the problems tackled by solutionists – from climate change to obesity to declining levels of trust in the political system – are important and demand immediate action.”<sup>152</sup> Yet the author criticizes an un-reflected use of the tools that are used to solve these problems: “[But] the urgency of the problems in question does not automatically confer legitimacy upon a panoply of new, clean, and efficient technological solution so in vogue these days. My preferred solutions – or rather, responses – are of a very different kind.”<sup>153</sup>

#### The ahistorical view on ‘The Internet’

According to Morozov, he analyzes an ‘epochalist mode’ in which ‘the Internet’ is presented, entails an historical-revisionist world view establishing a coherent teleological and ideological account of how all other technologies paved the way for ‘the Internet’ and how their own governance failed to embrace ‘Internet-values’ and may have delayed the arrival of this

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<sup>148</sup> Morozov, p. 51.

<sup>149</sup> Morozov, p. 55.

<sup>150</sup> Cf. Morozov, p. 55.

<sup>151</sup> Morozov, p. 8.

<sup>152</sup> Morozov, p. 7.

<sup>153</sup> Morozov, p. 7.

‘network of all networks’: “This is the ideology of Internet-centrism at its purest: it suggests what kinds of questions we could and should be asking of the past. As an ideology, it has no need to dictate the answers, for we already know what we need to find in order to complete the grand narrative of ‘the Internet’ itself [...]”<sup>154</sup> The worst interpretation of the past, for Morozov, is that it is used to underpin every contemporary trend, presenting it as a natural result of the past: “At worst, an attempt to illuminate the present by studying the past can turn into a fishing expedition, where the past becomes just a giant toxic aquarium, storing enough factoids and exotic characters to buttress any interpretation of virtually any contemporary trend or phenomenon.”<sup>155</sup> Yet, it would be an equally great mistake to portray 'Internet centrism' as unique. According to Morozov, it feeds on many earlier discourses on technology and information, innovation and digitization: “Plenty of books on the inevitable arrival of the information age and the postindustrial era, on the virtues and perils of automation, and on the transformational potential of cybernetics and artificial intelligence have all prepared the grounds—and our minds—for the current discussion. To present the discourse on Internet exceptionalism as exceptional would itself be a great error, for it’s anything but.”<sup>156</sup> So it can be summed up that it takes an 'ideology' and its supporters for a technology like 'the Internet' to have such a resounding effect at all. Morozov makes it very clear that the respective technologies are less of a problem than their users. The next chapter will deal with that in more detail. What are the disadvantages of technology? And who or what is responsible for it?

## Technology’s Downsides

After this rather detailed introduction to Morozov's concept of technological solutionism, some readers may have wondered whether his explanations meet their own scientific standards. They are not alone in this!

Above all, Morozov is mainly criticized - also by those who are sympathetic to his broader thought - for failing to provide evidence for his claims beyond stating anecdotes. In public, he is considered the critic on solutionism, focusing ‘the dark side of the internet’, claiming an “antidote to the optimistic technological determinists.”<sup>157</sup> He has even been labelled an “anti-

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<sup>154</sup> Morozov, p. 58.

<sup>155</sup> Morozov, p. 58.

<sup>156</sup> Morozov, p. 777, Kindle version.

<sup>157</sup> S.E Frantzich, ‘Morozov, Evgeny. The Net Delusion: The Dark Side of Internet Freedom’, *CHOICE: Current Reviews for Academic Libraries*, 48 (2011).

tech grump”<sup>158</sup> or someone who provokes “the attack on the smart new world.”<sup>159</sup> Such labelling might as well come along with Morozov's own writing style: For despite his scientist' career at Stanford and Harvard, one reads the publicist out of his book(s) ('The Net Delusion'; “Smart new world’). Accordingly, Morozov's theory serves less as a scientific basis in this work rather a hypothesis: Is what Morozov analyzes relatively superficially in his popular science book actually a current that can be broken down to a scientific theory?

In addition, Morozov might be considered the inventor of the concept of ‘solutionism’, but by far not the first to deal with in a critical way. In fact his critique ranks among several others differing in their approaches and angles. Therefore, the following chapter will present some other concerned voices on technological solutionism.

### Oelschlaeger – The ‘Myth’ of Technological Fix

One of those having disclosed solutionist thinking before – and prior to the emergence of internet – was Max Oelschlaeger in his essay ‘The Myth of the Technological Fix’. Back in 1979, there he reveals the same phenomenon tagging it differently. Actually, it was a certain trend, Oelschlaeger perceived, not only amongst the general public, but also in society's upper echelons, such as corporate managers, governmental technocrats, natural and social scientists, even philosophers. That trend, he named Technological fix, characterized by the idea “[...] that it is easier to use technology to satisfy human nature than to go against it.”<sup>160</sup> He identifies the tendency, that eventually, science and technology will give the answer to any problem of humankind. To illustrate this, he cites a series of 'white papers' published by a Fortune 500 company: "We now have the problems of overpopulation, of pollution, of diminishing resources, of the risk of totally-destructive war-weapons. But what is the solution? . . . The solution is exactly the same as it's always been: the still further advance of technology. ... To put it bluntly as possible: Science and technology must answer our problems. If they don't nothing else will.”<sup>161</sup>

Ecological philosopher Oelschlaeger attempts to get behind that kind of thinking and suggests varied reasons why many people believe in it. He mentions that technology had already helped

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<sup>158</sup> Adam Thierer, ‘A Net Skeptic's Conservative Manifesto’, *Reason.Com - Free Minds and Free Markets*, 2013, 4.

<sup>159</sup> Dirk von Gehlen, ‘Attacke Auf Die Smarte Neue Welt’, *Süddeutsche Zeitung*, 25 October 2013.

<sup>160</sup> Max Oelschlaeger, The Myth of the Technological Fix, In: *The Southwestern Journal of Philosophy*, Vol. 10, 1 (1979) p. 43.

<sup>161</sup> Max Oelschlaeger and Southwestern Philosophical Society, ‘The Myth of the Technological Fix’, *Southwestern Journal of Philosophy*, 10.1 (1979), 43–53 (p. 43) <<https://doi.org/10.5840/swjphil19791014>>.

bend nature to human purposes, “[...] thus man expects that scientific knowledge can be almost automatically turned to beneficial applications through technology.”<sup>162</sup> Additionally, he points out the common faith, that it is a matter of time, that purely technological solutions will be devised for most social problems. Eventually, he states, the appeal of the technological fix rests on a particular view of human nature: “Advocates tend to believe that, since human behavior is governed largely by organismic impulse rather than reason, it is easier or more efficacious to solve social problems by using technology to satisfy human nature than reason to modify human behavior.”<sup>163</sup> Hence, he presents three assumptions on what - he calls - the ‘true believers’ (in technological fixes) base their worldview and idea of man:

Firstly, social problems are affected by irrational human nature, hence it is more difficult to change human nature than it is to engineer solutions to social problems. As an example, Oelschlaeger displays how the tensions and inequities between the Global South and North are tackled: „Through technology humankind might increase the total supply of the world's product, thus allowing the ‘have nots’ a larger share and freeing the ‘haves’ of any responsibility to modify their own behavior or institutions.”<sup>164</sup>

Secondly, man is inherently and primarily a pleasure maximizer – due to that, it is not about reconsidering a society’s ends or goals but about providing the greatest good for the greatest number: “Technology thereby serves at least a twofold function in the solution of social problems. First, it frees man from having to experience deprivation or frustration by denying himself pleasure. [...] Second, a technological fix frees society from re-evaluating the cost-benefit picture of consumption.”<sup>165</sup>

And thirdly, since immediate strengthening is supposed to be the most crucial determinant of human behaviour, “[...] short-term satisfaction is inherently preferable to any sort of action involving delay.”<sup>166</sup> By that, he means that even if achieving fundamental shifts in values, ideologies, or institutions as part of the solution might have the weight of moral or political argument behind, “[...] such a mode of problem solving goes counter to organismic impulses to gratification. [...] a technological fix for a social problem is preferable.”<sup>167</sup> Oelschlaeger illustrates this third assumption with the so-called energy crisis. Here, campaigners of the technological fix stand for solving the energy crisis by developing new production technologies rather than changing consumption habits. They argue: Since consumers do not strive for

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<sup>162</sup> Ibid., p. 43.

<sup>163</sup> Oelschlaeger and Southwestern Philosophical Society, p. 44.

<sup>164</sup> Oelschlaeger and Southwestern Philosophical Society, p. 44.

<sup>165</sup> Oelschlaeger and Southwestern Philosophical Society, p. 44.

<sup>166</sup> Oelschlaeger and Southwestern Philosophical Society, p. 45.

<sup>167</sup> Oelschlaeger and Southwestern Philosophical Society, p. 44.

resource conservation, this cannot be the solution. According to Oelschlaeger again, the appeal of the technological fix is at least twofold: “In the first place, there is no need to restrict immediate consumption of energy, since technology will provide future generations with abundant supplies. Belief in the technological fix thus eliminates worry about ethical questions of responsibility to future generations. [...] [Secondly] Since fusion technology or its like will presumably solve the energy crisis in the long term, there is therefore no short term need to practice conservation.”<sup>168</sup>

Eventually Oelschlaeger, step by step, assays to invalidate those assumptions, which in his opinion rest on what he calls the “greedy-little-pig”- theory of human nature: “The theory does reflect certain facets of modern man, such as a tendency to consume without limits. But insofar as twentieth-century conditions of existence are local and accidental (i.e., peculiar to democratic advanced industrial societies), they are not applicable in general to species *Homo sapiens*.”<sup>169</sup> According to Oelschläger the definition of “human nature” which campaigners of the technological fix favour, gains cogency only related to its cultural backdrop. Human traits as considered by them, may – to a certain extend – apply to individuals living in democratic industrial societies but not to the natural condition of man.

To prove his thesis he makes use of anthropological and natural historical research that reveal “[...] no inherent or organismic human nature which causes man to overpopulate, rapidly exhaust finite supplies of non-renewable resources, live in poverty, pollute the environment, or create any social problem.”<sup>170</sup> As opposed to that they show that it is human nature to live in a condition of relative balance between culturally defined wants and needs, technological ability to satisfy them, and environmental capacity to sustain the production-consumption cycle. Subsequently, he concludes that it is not about a specific human nature but about the categories which govern human behavior: “A society believing in laissez-faire individualism utilitarianism, and the GNP as an adequate measure of socioeconomic well-being will normally attempt to maximize the production-consumption cycle.”<sup>171</sup> Thus social problems such as the energy crisis, dwindling resources, or pollution may be almost inevitable in those kinds of society. However Oelschlaeger emphasizes, technological fix campaigners allocate those problems’ causes in human nature rather than examine their ideological and valuational

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<sup>168</sup> Oelschlaeger and Southwestern Philosophical Society, p. 46.

<sup>169</sup> Oelschlaeger and Southwestern Philosophical Society, p. 47.

<sup>170</sup> Oelschlaeger and Southwestern Philosophical Society, p. 47.

<sup>171</sup> Oelschlaeger and Southwestern Philosophical Society, p. 48.

components. He states: "If anything, technology seems more a part of many social problems than a solution."<sup>172</sup>

Moreover Oelschlaeger says, the idea that man is a pleasure maximizer has been contradicted in science. Again, it still might apply to men in an advanced industrial society and its consumer culture, but: "The human animal, however, does not have a natural tendency to consume without limit."<sup>173</sup> The argument of technological fixers ignores the sociocultural processes by which such consumer culture has been built and by which the consumer culture gets granted. The author here refers to the economic scarcity before the advent of the Industrial Revolution by which increased production had been emphasized as well as the democratic revolutions of the eighteenth century had been initiated, along with their social efforts to institutionalize a more equitable distribution of life's wherewithal. Subsequently: "The political economy of today's liberal democracies culminates (albeit unsuccessfully) the endeavor to eliminate scarcity and to provide equal entitlement to all men [...] Man does not inherently prefer more of a given commodity than less; neither is it natural for society to pursue the maximization of consumption as its ultimate goal."<sup>174</sup> On the contrary, critics of consumer culture even claim that unbridled striving for 'more' ("the quantity of life"), can have a negative or contradictory effect on the desire for 'better' ("the quality of life").<sup>175</sup>

Finally, Oelschlaeger holds the premise that man naturally prefers immediate gratification to postponement, not defensible. He states: "The notion that man is little more than a pig or rat in a maze seeking reinforcement oversimplifies the complexities of human behaviour and motivation."<sup>176</sup> Yes, relationship between reinforcement and behaviour clearly exists, but this does not necessarily mean that behavioural habits cannot be intelligently modified. The belief, technological fix naturally will be preferred opposed to action towards social modification and change henceforth is inaccurate. Such kinds of belief are blinding societies ability to see options. Oelschlaeger states, that immediate gratifications might fit in the short-term perspective but in the long run may not. This applies to the dilemma of nuclear power. Apparently this energy source, provides energy in a desirable mode without any request for behavioural change. Yet in the long-term perspective nuclear power leaves societies behind with open political questions and the severe problem of sustainable handling of nuclear waste

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<sup>172</sup> Oelschlaeger and Southwestern Philosophical Society, p. 48.

<sup>173</sup> Oelschlaeger and Southwestern Philosophical Society, p. 48.

<sup>174</sup> Oelschlaeger and Southwestern Philosophical Society, p. 48.

<sup>175</sup> Oelschlaeger and Southwestern Philosophical Society, p. Cf. 48.

<sup>176</sup> Oelschlaeger and Southwestern Philosophical Society, p. 49.



and accident. At the end of the day it turns out to be not that perfect solution at all, but at least it keeps society from thinking about the important questions.

Another misjudgement that Oelschlaeger defines as a characteristic of technological fixers resembles one of Morozov's arguments: The fragmentation of the technological aspect and the social problem. And again, he analyses one of the Fixers' basic cultural premises: reductionism and 'the belief in the method of analysis': "The recent successes of the analytic sciences have made reductionism a virtual cognitive absolute in this century."<sup>177</sup> He reports, what several system analysts had found out: "A society cannot be reduced to atoms of comprehensibility, since various combinations of atoms lead to 'emergent properties.' In other words, all characteristics of supra individual systems such as a society are not predictable from knowledge of the parts."<sup>178</sup>

Oelschlaeger does not deny the technological component on social problems but dismantles it to become only a part in a bigger picture. Also Oelschlaeger's argument, concerning technology's unpredictable consequences, sounds familiar: "Indeed, the science of technology assessment does not predict the effects of technology but only attempts to forecast possible outcomes."<sup>179</sup>

This reductionist approach, Oelschlaeger as well locates in dealing with the energy crisis: "[...] by abstracting the technological component of the energy crisis and working singlemindedly toward its solution, it appears that social problem can be solved."<sup>180</sup> He criticizes the depoliticization of the energy crisis by turning it over to the scientists and technologists: "Since a technological fix promises to free politically significant groups from threats of significant changes in their life-styles, political argument and opposition can be minimized. And since a technological fix is not controversial, relatively few decision makers in government and industry can decisively guide society toward ultimate solutions."<sup>181</sup>

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<sup>177</sup> Oelschlaeger and Southwestern Philosophical Society, p. 50.

<sup>178</sup> Oelschlaeger and Southwestern Philosophical Society, p. 50.

<sup>179</sup> Oelschlaeger and Southwestern Philosophical Society, p. 50.

<sup>180</sup> Oelschlaeger and Southwestern Philosophical Society, p. 46.

<sup>181</sup> Oelschlaeger and Southwestern Philosophical Society, p. 46f.

In his work the American pedagogue Chet A. Bowers, focused on cultural, linguistic, and technological root causes of the current ecological crisis as well as the educational reforms necessary to promote greater ecological awareness. So in his book on educational reforms addressing the ecological crisis, in chapter 16, he raises the question ‘Is the digital revolution driven by an ideology?’ which he then unambiguously approves.

To explain how he came to this conclusion, he begins by stating what basically makes ideologies: “They share the same fatal flaw of not recognizing the world’s diversity in cultural assumptions that frame how human with human and human with natural systems are to be understood and valued.”<sup>182</sup> In other words, he speaks of ideologies as ‘colonizers’ of the conceptual and moral patterns for how the world’s people should think and behave towards others and the environment. Yet, he states, the difficulty with classifying the digital revolution as a ‘cultural colonizing ideology’ lies within its global and connective capacities: “[...] how can the digital revolution, with its capacity of enabling people from diverse cultural backgrounds to solve local problems, to educate their children, and to become connected to the Internet and global markets, be understood as a cultural colonizing ideology that claims to embody universal truths?”<sup>183</sup> To challenge this current understanding – Bowers describes as an “ideologically driven surface level of thinking” by explaining the digital revolution as having at last reached the exponential rate of development (matching “Moore’s Law”<sup>184\*</sup>) – he proposes to take a deeper look into the field of ecological linguistics.

The aspect that might challenge the certainties of any ideology is that all cultures are based on “[...] metaphorically based linguistic processes called mythopoetic narratives, religions, root metaphors, and symbolic constructions.”<sup>185</sup> Those metaphorical linguistic processes are deeply interwoven with societies’ ways of assessing their past and at the same time make present generations taking for granted things coming from previous times.

As an example, Bowers refers to cultures that value innovations: “[...] that supposedly overturn the traditions of the older generation, the new ideas and innovations actually build upon and

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<sup>182</sup> C. A Bowers, ‘Is the Digital Revolution Driven by an Ideology?’, 1st edn, 2018, p. 228 (p. 211)  
<<https://doi.org/10.4324/9781315193403-16>>.

<sup>183</sup> Bowers, p. 211.

<sup>184</sup> Bowers, p. 211.

\*Moore's law is a term used to refer to the observation made by Gordon Moore in 1965 that the number of transistors in a dense integrated circuit (IC) doubles about every two years.

<sup>185</sup> Bowers, p. 211.

carry forward many of the deep cultural assumptions that underlie earlier patterns of thinking.”<sup>186</sup>

To make clear why he considers the study of those metaphorical linguistic processes important, he describes some characteristics of root metaphors - and thus also their effectiveness: words have a history – “When their meaning is framed by the analogs settled upon in the past, they carry forward earlier forms of cultural intelligence as well as the era’s misconceptions.”<sup>187</sup> - and they play a powerful role by introducing changes to the linguistic ecologies of other cultures; they provide the current unnoticed and unchallenged interpretative frameworks for thinking about relationships (example: nature – human); they frame how to understand and solve problems - some of which might not exist if the culture relied upon other root metaphors; and their supporting vocabularies exclude other vocabularies that would lead to different understandings of reality.<sup>188</sup>

According to him, it is about to dismantle these patterns as a culture’s linguistic ecologies and to acknowledge their impact on our present actions. With this, Bowers strives for the more in depth investigation of the cultural background of climate change, which he allocates in Western cultures. To illustrate his thesis, Bowers identifies the root metaphors of ‘the West’ - defined by industrial cultures (as opposed to those of ‘ecology’): ‘patriarchy’, a ‘human-centered world’, or ‘anthropocentrism’, ‘individualism’, ‘mechanism’, ‘progress’, ‘economism’, and ‘evolution’.<sup>189</sup>

For instance, the root metaphor of ‘mechanism’ that had displaced the root metaphors of the feudal era, led to both, a reframing of how to think about governments - ‘checks and balances’ -, the functions of organs – the heart displayed as a pump – and to the understanding of human intelligence equivalent to computer intelligence. Another example is the root metaphor of ‘evolution’ which - currently - finds its expression through the proclamation of the ‘post-biological phase of evolution’: “[...] with super-intelligent computers taking over from humans as the world enters the singularity stage of natural selection.”<sup>190</sup>

By another example, he explains that the root metaphor of ‘progress’ is supported by the vocabularies of other root metaphors such as ‘individualism’ and ‘anthropocentrism’ and by that, is excluding vocabularies required to name the traditions which needed to be

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<sup>186</sup> Bowers, p. 212.

<sup>187</sup> Bowers, p. 214.

<sup>188</sup> Cf. Bowers, p. 212.

<sup>189</sup> Bowers, p. Cf. 212.

<sup>190</sup> Bowers, p. 212.

intergenerationally renewed “[...] as the twin crises of a rapidly degraded environment and the globalization of the digital revolution continue to contribute to the loss of ecologically sustainable forms of knowledge and skills.”<sup>191</sup>

What scares him as a pedagogue however is his observation that such research does not sustainably take place at universities: “Thus, the students’ current lives and future prospects are being rapidly reduced by cultural forces of which they have little understanding. Yet, their formal education leaves them with the mythic understandings formed during the last 500 or so years when the forces of industrialization began the shift to an individualistic, mechanistic, and consumer-dependent lifestyle.”<sup>192</sup>

He therefore raises the question, if the ideology behind the digital revolution is based on cultural myths that undermine the ecologically sustainable forms of knowledge and values of other cultures that have taken a different and, in many instances, a more ecologically informed, approach to development? He will answer this question with a yes, as well.

As one of the main drivers of the digital revolution Bowers identifies Social Darwinism and a misconception of evolution as well as the capitalist mentality. Understanding the replacement of the world’s diversity of cultures - including the patterns of moral reciprocity, empathy, intersubjective identities, and wisdom traditions - by the monolithic nature of computer intelligence, as an evolutionary process, Bowers, interprets as a massive misconception of what should be perceived as progress. He states: “When the explanatory power of evolution is not based on the Western assumption of a linear form of progress, it then provides a way of understanding that nature depends upon diversity in determining what represents the better-adapted genes and behavioral traits.”<sup>193</sup>

According to Bowers, computer scientists and futurist thinkers, who follow this pattern of thinking, display absolute certainty about the nature of the forces driving the digital revolution. But they do not recognize those forces as expressions of an ideology: “For them, science provides the best explanation of why these forces are irreversible as well as why they should be understood as dictating the fate of all cultures. When they are speaking in the language of science, they call this force evolution. And when writing about its impact on other cultures, they revert to the high status vocabulary of their Western culture by referring to these forces as

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<sup>191</sup> Bowers, p. Cf. 213.

<sup>192</sup> Bowers, p. 215.

<sup>193</sup> Bowers, p. 216.

the expression of progress. They exhibit little awareness that they are moving down the slippery slope of scientism.”<sup>194</sup>

Additionally, Bowers criticizes the way the computer crisis is tackled not only by computer scientist but also by climate scientists. According to him, both share the limitations regarding their way of understanding the ecological crisis, which is to promote the development of new less environmentally disrupting technologies. What is more important to seriously address the climate would be to take the cultural roots of the crisis into account as well as to acknowledge cultures that have taken more ecologically sustainable paths to development. Bowers anticipates: “These are the cultures that are to disappear when the era of super computers and global connectedness (singularity) takes over.”<sup>195</sup> The ideology behind the digital revolution, to Bowers, leads into the inability to recognize one of the realities that the ecological crisis will force everyone to do so: “These misconceptions and silences included the failure to recognize environmental limits, other cultural ways of knowing (including cultures that had developed different forms of ecological intelligence), and thus the necessity of making the cultural turn away from the current consumer-dependent lifestyle—and toward a more cultural commons-centered lifestyle.”<sup>196</sup> Hence, he pleas for a re-evaluation of the Western concepts of progress into the direction of the Buddhist interpretation of progress as attaining a mindful existence; or the Western Apaches’ understanding as achieving wisdom by avoiding the distractions of the personal ego and the demands of the external surroundings - including the expectations of other.<sup>197</sup>

Eventually, Bowers identifies the root cause of the modernizing ideology of the digital revolution in the misunderstandings of the Enlightenment about the nature of cultural traditions: “[...] particularly those traditions of the cultural commons that enabled people to live more community- rather than individually-centered lives. The importance of the cultural commons that continue today to be passed forward through face-to-face communication and through mentoring relationships [...] enable people to live less consumer-dependent and thus less ecologically destructive lives.”<sup>198</sup>

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<sup>194</sup> Bowers, p. 215.

<sup>195</sup> Bowers, p. 220.

<sup>196</sup> Bowers, p. 224.

<sup>197</sup> Cf. Bowers, p. 219f.

<sup>198</sup> Bowers, p. 223.

## Günther Anders: Almighty Machines, Insufficient People

*Hier sitz' ich, forme Menschen  
Nach meinem Bilde,  
Ein Geschlecht, das mir gleich sey,  
Zu leiden, zu weinen,  
Zu genießen und zu freuen sich,  
Und dein nicht zu achten,  
Wie ich!*

Johann Wolfgang Goethe ‚Prometheus‘

Another interesting examination about technology and its relationship with humanity is Günther Anders' critical theory of technology - which he more accurately characterizes as 'philosophical anthropology in the age of technocracy': „Es wird eine der Hauptaufgaben der Philosophie der Technik sein, den dialektischen Punkt ausfindig zu machen und zu bestimmen, wo sich unser Ja der Technik gegenüber in Skepsis oder in ein unverblümtes Nein zu verwandeln hat.“<sup>199</sup>

Although, Anders at no time makes use of the words 'solutionism' and 'fix', in his theory interesting parallels become obvious. As a German-Austrian Jew, Anders in the course of the Nazi Regime emigrated, and gathered next to his experiences from Germany, influencing learnings from working in a US factory and from the invention of the atomic bomb. In his work, he takes a closer look at man's relationship to the world of his products and raises his guiding question: Can man emotionally and cognitively keep up with the scientific, technological and industrial superstructure he has created?: “Nicht was Washington oder Moskau aus der Technik macht, wird gefragt; sondern was die Technik aus uns gemacht hat, macht und machen wird,

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<sup>199</sup> Günther Anders, *Die Antiquiertheit Des Menschen : 2 : Über Die Zerstörung Des Lebens Im Zeitalter Der Dritten Industriellen Revolution*, [Beck'sche Reihe], Neuausgabe, 4., durchgesehene Auflage, Paperback. (München: C.H.Beck, 2018), p. 127 <<https://ubdata.univie.ac.at/AC15509203>>.

noch ehe wir irgendetwas aus ihr machen können.”<sup>200</sup> According to Anders, technology is humanity’s destiny. Stating that, Anders does not necessarily talk about a cultural origin for technology-centered thinking, even though he claims that it is fueled by the capitalist economic system. Therefore, unlike his teacher Martin Heidegger, Anders situates his theory against the background of factories, department stores, and weapons of mass destruction. For him, the 20<sup>th</sup> century represented an age of catastrophic developments and inventions, brought to a climax in the Nazi concentration camps and by the atomic bomb. Hence, he attributes the source of apocalyptic blindness to a blind faith in progress. What might be helpful while reading Anders, is the knowledge of his preference of the methodology of ‘exaggeration’ which he uses to emphasize the hidden effects and mechanisms of technology. The following paper focuses on Anders’ “Die Antiquiertheit des Menschen”, part one and two, in which he examines technology’s effects on society.

In the beginning of his book “Die Antiquiertheit des Menschen. Über die Seele im Zeitalter der zweiten industriellen Revolution” he states that criticising technology in the 20<sup>th</sup> century leads to severe pushback and to being blamed a “Maschinenstürmer”, no matter where in the world you are: “Es gibt nichts Prekäreres heute, nichts, was einen Mann so prompt unmöglich machte, wie der Verdacht, er sei ein Maschinenkritiker. Und es gibt keinen Platz auf unserem Globus, auf dem die Gefahr, in diesen Verdacht zu geraten, geringer wäre als auf einem anderen. In dieser Hinsicht sind sich Detroit und Peking, Wuppertal und Stalingrad heute einfach gleich.”<sup>201</sup> This also applies to the specific peer group the respective critique is placed in: “Denn in welcher Klasse, in welchem Interessensverband, in welchem sozialen System, im Umkreis welcher politischen Philosophie auch immer man sich die Freiheit herausnimmt, ein Argument über ‚entwürdigende Effekte‘ dieses oder jenes Gerätes vorzubringen, automatisch zieht man sich mit ihm den Ruf eines lächerlichen Maschinenstürmers zu, und automatisch verurteilt man sich damit zum intellektuellen, gesellschaftlichen oder publizistischen Tode.”<sup>202</sup> Plus, he emphasizes, criticizing technology often is perceived as reactionary since it stopped ‘progress’, a dynamic mainly observed in Germany. It is that concept of progress that plays an elementary role in Anders’ work, in which he recognizes the resurrection and further development of the National Socialists’ thinking: “Es ist ja bekannt, daß die Identifizierung von ‚Kritik‘ und

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<sup>200</sup> Günther Anders, *Die Antiquiertheit Des Menschen*, Klassiker Des Modernen Denkens, Ausg. in einem Bd.. (Gütersloh Wien: Bertelsmann-Club Buchgemeinschaft Donauland Kremayr & Scheriau, 1989), p. 7  
<<https://ubdata.univie.ac.at/AC00030951>>.

<sup>201</sup> Anders, *Die Antiquiertheit Des Menschen*, p. 5.

<sup>202</sup> Anders, *Die Antiquiertheit Des Menschen*, p. 5.

‚Reaktion‘, die Anprangerung des Kritikers als reaktionären Saboteur, zur ideologischen Taktik des Nationalsozialismus gehört hatte; der beliebte Ausdruck ‚Nörgler‘ schillerte ja in der Tat nach beiden Seiten. Durch die Identifizierung ehrte die ‚Bewegung‘ sich selbst, nämlich als Fortschrittsbewegung: denn wenn sie Kritik als eo ipso reaktionär hinstellte, ergab sich ja notwendigerweise, daß deren Gegenstand, also das Regime selbst, fortschrittlich sein mußte.“<sup>203</sup>

As another main aspect of his theory Anders elaborates what he calls “prometheische Scham”. By that he means man’s desire to actually be as good as the machine he created by himself. His awareness of his inferiority to his creation makes him ashamed – ‘prometheisch’ as a counter-concept to the technological optimism of the ancient figure of Prometheus.<sup>204</sup> The starting point of Anders’ theory is his conception of man himself. For Günther Anders, man is a stranger to the world per se, and thus has to make the world his own appropriate to his needs. The use of technology, makes man capable to create his world. Yet mechanization does not only change man’s essence - psyche, behavior and way of life. It also affects man’s self-perception, makes him aware of his power, while at the same time the world of globalization and space exploration, he actually created, grows larger and larger and finally he gets lost in it.<sup>205</sup> Thus Anders diagnoses man with a defect, which falsely has been understood as freedom. Due to the constant compulsion of the descendant of that freedom human being and his product world are no longer in sync: “Durch unsere unbeschränkte prometheische Freiheit, immer Neues zu zeitigen, haben wir uns als zeitliche Wesen derart in Unordnung gebracht, dass wir nun als Nachzügler dessen, was wir selbst projiziert und produziert hatten, mit dem schlechten Gewissen der Antiquiertheit unseren Weg langsam fortsetzen oder gar wie verstörte Saurier zwischen unseren Geräten einfach herumlungern.“<sup>206</sup> Anders names this growing distance as the Promethean gap (‘Prometheische Gefälle’), from which, in turn, shame emerges. He describes this gap as the central feature of the technological age, in which man’s products exceed his moral, psychological and physical horizons and imaginations. The machines or products, on the other hand, serve at the same time as evidence of man’s own insufficiency. But this means, man tries to ‘improve’ himself rather than accepting this status. Therefore, Anders introduces the concept of ‚industrial religion‘: “So wenig je von einer Religion die Tatsache, daß der Mensch kein Gott ist, sondern eben nur eine Kreatur, als Freibrief moralischer Indolenz anerkannt worden wäre,

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<sup>203</sup> Anders, *Die Antiquiertheit Des Menschen*, p. 5.

<sup>204</sup> Anders, *Die Antiquiertheit Des Menschen*, p. Cf. 23.

<sup>205</sup> Anders, *Die Antiquiertheit Des Menschen*, p. 173, Kindle version.

<sup>206</sup> Anders, *Die Antiquiertheit Des Menschen*, p. 15f.



so wenig würde heute von der Industriereligion und von deren Anhängern die Tatsache, daß er kein Produkt ist, sondern eben – wiederum – nur eine Kreatur, als Ausrede für faules Beharren in seiner geschöpflichen Unzulänglichkeit akzeptiert werden.“<sup>207</sup> So man is now making an attempt to overcome his ‘human shortcoming’ and does so in becoming a device itself through certain self-metamorphoses, namely human engineering, i.e. engineering work on people. Within the framework of this practice, man moves further and further away from himself and transcends himself more and more, “[...] und wenn er sich auch in keine Region des Supranaturalen hinüberschwingt, so wechselt er doch, da er die angeborenen Grenzen seiner Natur hinter sich zurückläßt, ins nicht-mehr-Natürliche, ins Reich des Hybriden und Artifiziellen hinüber.“<sup>208</sup>

Those who practice human engineering – which means, rely on technological progress in order to overcome their human insufficiency - for Anders are ‚perverted prometheids‘: „‚Prometheiden‘ sind auch sie zwar noch; aber eigentümlich pervertierte: ‘Ich dich ehren – wofür?’ höhnen auch sie zwar – nur verweigern sie die Ehre sich selber. Maßlos anmaßende Ansprüche erheben auch sie zwar – nur eben so anmaßende, daß sie sich selbst als ungemessen verwerfen. Zerfleischung erleiden auch sie zwar – nur eben nicht deshalb, weil Zeus ihre hochfliegenden Ambitionen bestrafte, sondern weil sie sich selbst züchtigen für die Tatsache, ihrer ‚Zurückgebliebenheit‘, für die ‚Schande ihrer Geburt‘.“<sup>209</sup> To them, their actions appear to be usual within their “Myth of Progress”.<sup>210</sup> They automatically see progress in each step further, “even if it's a step into the negative pressure chamber or into the icing installation, they're reassured because it's moving forward and proud of the novelty.”<sup>211</sup>

Here might be the best transition to Anders’ second volume in which he, amongst other things, prominently deals with the connection between technological progress and economy; and by what extent the ‘Prometheids’ can be assigned to it, since they are solely driven by ‘progress’. In the beginning of this second book, Anders defines the Industrial Revolution - and chooses an emphatically philosophical approach to do so. When publishing the second volume about thirty years after the first one, he faces a much more advanced phase of industrial development: “Von einer wirklichen ‘industriellen Revolution’, also von der ersten, kann erst in demjenigen

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<sup>207</sup> Anders, *Die Antiquiertheit Des Menschen*, p. 62, Kindle version.

<sup>208</sup> Anders, *Die Antiquiertheit Des Menschen*, p. 62, Kindle version.

<sup>209</sup> Anders, *Die Antiquiertheit Des Menschen*, p. 49.

<sup>210</sup> Anders, *Die Antiquiertheit Des Menschen*, p. 49.

<sup>211</sup> Anders, *Die Antiquiertheit Des Menschen*, p. 49.

Augenblick gesprochen werden, in dem man damit begann, das Prinzip des Maschinellen zu iterieren, das heißt: Maschinen, oder mindestens Maschinenteile, maschinell herzustellen. Seit diesem Moment, dessen Datierung nicht von Belang ist, hat sich diese Iteration rapide potenziert. Denn nun ist die Herstellung von Maschinen durch Maschinen kein Ausnahmevorkommnis mehr, sondern die Regel.“<sup>212</sup>

In that, he recognizes a recurring mechanism in industrial production: Products, used as production facilities producing products which again are used as production facilities to produce more products to be used as production facilities until finally the product for actual consumption has been produced. Only at the beginning and at the end of this chain there are people left. But what Anders emphasizes here is that even those final products produce something again, „nämlich Situationen, in denen eine, wiederum maschinelle, Erzeugung weiterer Produkte erforderlich wird.“<sup>213</sup> Thereby, he says that consumption itself turns into a production facility for it is consumption to keep production going. That production facility he calls demand and declares it the main development of the second industrial revolution. Hence, what Anders is getting at in the second part of his work („Über die Zerstörung des Lebens im Zeitalter der dritten industriellen Revolution“) is that this cycle never ends and production technology has taken on a life of its own within it – which is essential for the third industrial revolution: “Aber was durch die Erzeugung von menschlichen Bedürfnissen gestillt werden soll, sind nicht nur die Bedürfnisse der Produkte (nach Käufern), sondern auch die der Produktionstechnik, da diese pausenlos verlangt, dass all das gemacht werde, was auf ihrem Stande jeweils gerade machbar ist. Ich sage ‚verlangt‘, weil heute – dies ist die fixe Idee der dritten industriellen Revolution – das Mögliche durchweg als das Verbindliche, das Gekonnte durchweg als das Gesollte akzeptiert ist.“<sup>214</sup> Briefly, in the industrial Revolution(s), Anders observes the origin of man’s antiquatedness, since in comparisons to previous tools and devices - such like nails and hammers - machines require humans to adapt to their very own rhythms.

This ‘machine managed rhythm’ leads Anders to another of his core theses, which says, that technology determines the human need, and the moral imperative emanates from there. Accordingly, what began as a Promethean gap between what we can produce and what we can cope with, has been transformed into the gap between the maximum of what we can produce

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<sup>212</sup> Anders, *Die Antiquiertheit Des Menschen : 2 : Über Die Zerstörung Des Lebens Im Zeitalter Der Dritten Industriellen Revolution*, p. 15.

<sup>213</sup> Anders, *Die Antiquiertheit Des Menschen : 2 : Über Die Zerstörung Des Lebens Im Zeitalter Der Dritten Industriellen Revolution*, p. 16.

<sup>214</sup> Anders, *Die Antiquiertheit Des Menschen : 2 : Über Die Zerstörung Des Lebens Im Zeitalter Der Dritten Industriellen Revolution*, p. 17.

and the maximum of what we can demand.<sup>215</sup> As an example he presents the production of the computer, which generates more data than man have been able to take, but meanwhile also ejects more data than men ever could make use of „[...] was zur Folge hat, daß nun tausend Dinge das Licht der Welt erblicken, tausend ‚Odradeks‘, [meaningless objects] die keinem menschlichen Bedürfnis entgegenkommen, nicht nur keinem ‚natürlichen‘, sondern auch keiner artifizellsten Nachfrage.“<sup>216</sup> According to Anders, this represents a unique dynamic in the history of production: “Für den ‚Geist der Industrie‘, der unter der Zwangsidee steht, daß jedes technische Produkt zur Steigerung, also zum Komparativ, verpflichtet sei, ist die Tatsache, daß dieser Komparativ zwar möglich ist, aber keinen Sinn hat, daß sich Kaliber und Wirkungsradius des Dinges zwar ‚verbessern‘ lassen, dessen Wirkung aber nicht, einfach unbegreiflich.“<sup>217</sup>

For Anders, the atomic bomb is the most spectacular outcome of this dynamic of the industrial revolutions, in the sense of a production facility that allows men to produce their own extermination: “Aus diesem Grunde scheint es letztlich auch sinnlos, daß man die Größe oder den Brisanzkoeffizienten oder die Zahl der Bomben immer weiter steigert. Die absolute Gefahr, die man in Händen hält; der Effekt, den man auslösen kann, ist nicht mehr steigbar. Jedenfalls ergäbe die Steigerung des Mittels nichts Neues; nichts Neuere als der Komparativ des Eigenschaftswortes ‚tot‘.“<sup>218</sup> From this he phrases the supreme criterion for the third industrial revolution: we may not have to make use of what we have produced in order to keep up our existence. Therefore, all technological developments after 1945 represent only internal revolutions inside atomic age – the last in the history of mankind.

So what conclusions does Anders draw: that man is not up to the perfection of his products; that he can produce more than he possibly could imagine and take responsibility for; and that he believes that he is allowed to do what he can do, even has to. Anders also makes clear that man itself is the driving force of technological development and he lacks the desired capabilities to hold it in check. Eventually, humanity – including its politics as well as its economics - will be subject to the dictates of technology: “In Wirklichkeit gehorchten die Umwälzungen technischen Erfordernissen, und es wäre keine Übertreibung zu behaupten, daß Politik bereits Ideologie sei, nein, daß vielleicht sogar wirtschaftliche Programme nur noch Überbauten über

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<sup>215</sup> Anders, *Die Antiquiertheit Des Menschen : 2 : Über Die Zerstörung Des Lebens Im Zeitalter Der Dritten Industriellen Revolution*, p. Cf. 19.

<sup>216</sup> Anders, *Die Antiquiertheit Des Menschen : 2 : Über Die Zerstörung Des Lebens Im Zeitalter Der Dritten Industriellen Revolution*, p. 17.

<sup>217</sup> Anders, *Die Antiquiertheit Des Menschen*, p. 315, Kindle version.

<sup>218</sup> Anders, *Die Antiquiertheit Des Menschen : 2 : Über Die Zerstörung Des Lebens Im Zeitalter Der Dritten Industriellen Revolution*, p. 20.

„technological requirements‘ sind; daß die Diktaturen, unter denen Millionen ihr Leben zu absolvieren oder zu fristen oder zu opfern haben, selbst versklavt sind: nämlich durch die Diktatur der Technik.“<sup>219</sup> This dictatorship is supported by an inherent target - “innewohnende Zielidee”<sup>220</sup> – supposed to reach a phasing of ‚appliance and world‘, or, as Anders also calls it, again referring to Nazi ideology: „Volksgemeinschaft der Apparate.“<sup>221</sup>

### The Machine and its environment

A final important point in Anders' remarks, which might go with this thesis, is the relationship between machines and the environment, the natural world. It can be gleaned from his elaborations on the economical dynamics, which he analyses as the ‘Axioms of Economic Ontology’.

From the last paragraph we can take that Anders recognizes a machinic dynamic that develops towards the 'great machine'. As the driving force for this, Anders determines the principle of maximum capacity that every machine has to deliver. If it does not, it fails to exist. Yet, to deliver its expected capacity, every machine depends on an appropriate environment. So consequently, in best case the environment performs as good as technical-rational dynamics: “Und da das perfekte Funktionieren des individuellen Apparates allein dann gewährleistet wäre, wenn dessen ‚Umwelt‘ ebenso tadellos funktionieren würde wie er selbst, ist diese ‚Umwelt‘ selbst als Apparat vorgestellt.“<sup>222</sup>

And it is precisely this performance principle of the machines that he recognizes in the current capitalist ‘Wirtschaftsontologie’. Therefore, he analyses the ‘Axioms of Economic Ontology’. Here, Anders states that there is a divergence between reality and what is real, triggered by the economics principle of amortization (RoI) and outlines two axioms. The first axiom to him is, that only the process of reproduction generates reality: „Gäbe es eine ausgebildete Wirtschafts-Ontologie, also eine Lehre vom Sein, wie dieses aus der Perspektive heutiger Produktion, und heutigen Absatzes erscheint, so würde deren erstes Axiom lauten: ‚Realität wird durch Reproduktion produziert; erst im Plural, erst als Serie, ist ‚Sein‘.“<sup>223</sup> From this he builds the

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<sup>219</sup> Anders, *Die Antiquiertheit Des Menschen : 2 : Über Die Zerstörung Des Lebens Im Zeitalter Der Dritten Industriellen Revolution*, p. 107.

<sup>220</sup> Anders, *Die Antiquiertheit Des Menschen : 2 : Über Die Zerstörung Des Lebens Im Zeitalter Der Dritten Industriellen Revolution*, p. 111.

<sup>221</sup> Anders, *Die Antiquiertheit Des Menschen : 2 : Über Die Zerstörung Des Lebens Im Zeitalter Der Dritten Industriellen Revolution*, p. 115.

<sup>222</sup> Anders, *Die Antiquiertheit Des Menschen : 2 : Über Die Zerstörung Des Lebens Im Zeitalter Der Dritten Industriellen Revolution*, p. 115.

<sup>223</sup> Anders, *Die Antiquiertheit Des Menschen*, p. 234, Kindle version.

second axiom: “Unverwertbares ist nicht; oder nicht wert zu sein.”<sup>224</sup> Since reproduction followed by usability of things is on focus, everything besides that loses significance and is considered as ‘dead weights’: “Verglichen mit der reellen Existenz der in Serien hergestellten Fertigprodukte, die für die Bedürfnisstillung vorgesehen sind (oder die selbst Bedürfnisse, die sie stillen, ‘vorsehen’), fällt also, in den Augen des Wirtschafts-Ontologen, die Natur als Ganze, trotz ihrer Immensität, außerhalb des Bereiches des Vorgesehenen; außerhalb des Bereichs, der für ihn den der ‘Vorsehung’ darstellt.”<sup>225</sup>

In the context of this, Anders describes economic ontology as an ethics that takes it upon itself to redeem the chaos of the world: “In gewissem Sinne ist die Wirtschafts-Ontologie also zugleich eine Ethik; eben eine, die sich die Erlösung des Weltchaos aus seinem Zustand der Rohstofflichkeit, der ‘Sündigkeit’, der ‘Uneigentlichkeit’, zur Aufgabe setzt, also darauf abzielt, das ‘Uneigentliche’ in ein ‘Eigentliches’ zu verwandeln, das Chaos in einen Kosmos der Produkte [...]”.<sup>226</sup> And this happens in factories, electric plants, nuclear reactors, radio and television stations, which Anders describes as the ‘houses of being’.

Accordingly, he analyzes a transformation of the human type: Former “homo faber”, who once decided to produce his own world, and for that instrumentalized pieces of the world, which however had not been provided for that purpose; had changed into “homo oeconomicus”, a human being perceiving the entire world as material “[...] sich selbst lieber neue Bedürfnisse aufzwingt, als Seiendes intakt und unverwendet zu lassen; und die Welt als Ganze verarbeiten, verwandeln, ‘fertig machen’ will. Sein Anspruch ist gewiß um nichts geringer, um nichts weniger universal als der religiöse oder der philosophisch-systematische. Er ist der Schmied des Seins; mindestens dessen Hirte.”<sup>227</sup> In this picture of man as a ‘shepherd’, as a ‘guardian’, as the ultimate ‘maker of the world’, Anders sees the basis of anthropocentrism.<sup>228</sup>

### From Myth to Ideology

The approach to work on the downsides of technology offered a huge variety of literature providing differing perspectives. Amongst them, I identified groups of scientists each group to follow one main hypothesis explaining the origin of concerning development of technology. Through my research I eventually stuck with that group of scientists who discuss the

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<sup>224</sup> Anders, *Die Antiquiertheit Des Menschen*, pp. 239, Kindle version.

<sup>225</sup> Anders, *Die Antiquiertheit Des Menschen*, pp. 239, Kindle version.

<sup>226</sup> Anders, *Die Antiquiertheit Des Menschen*, p. Cf. 241.

<sup>227</sup> Anders, *Die Antiquiertheit Des Menschen*, pp. 242, Kindle version.

<sup>228</sup> Anders, *Die Antiquiertheit Des Menschen*, p. 243, Kindle version.

‘ideological’ foundation of technological solutionism. And within that group I decided to deep dive into the theories of the four of them: Max Oelschläger, Günther Anders, Chet A. Bowers and Evgeny Morozov, to understand the similarities and contradiction in their thinking, walking quite the same way still never referring to each other. Now that these four detailed voices on the downsides of technologies have been presented, the question is what insights can we draw from this and how do they relate to Morozov's theory of solutionism?

Oelschlaeger starts with the thesis of wanting to analyze the 'myth of the technological fix', Bowers asks for an 'ideology' behind the 'digital revolution', Anders thinks to recognize a certain 'omnipotence' behind technological developments - man-made, but out of control – as well as a ‘religion’. Eventually, Morozov uncovers a profit-driven dynamic behind technological promises of solutions, which he titles the ideology of ‘solutionism’. For this reason, all of them begin from a similar starting point with the aim to uncover a certain ideology, myth, belief or dynamic that goes hand in hand with technological development and leads to various rather negative consequences.

At this point, Oelschlaeger and Bowers take up the ecological consequences in particular. Instead of looking for actual solutions that relieve the environment, the focus is also on technologies that, as Oelschlaeger says, should be seen 'rather as part of the problem than its solution'. Bowers also supports this argument, highlighting in particular the false assumptions of Western cultures that lead to this unsustainable model of life. For Anders, it is more about the technological supremacy that results and can be applied to all issues, up to the self-destruction of man and his freedom. Morozov more or less unites all these points in his remarks: He emphasizes the loss of freedom through corporate surveillance, laments the compulsive will to improve, he criticizes the way solutions are found on the basis of a false definition of solution, and finally warns of political loss of power.

Another main argument, what runs through all their perspectives is the assumption that the Western industrial economic dynamic - the industrial principle - and solutionism favor each other and run in parallel. All four authors identify Western industrial society, consumer culture, or capitalism as both a haven and a driving force for a disproportionate and destructive belief in technology. Morozov then finally summarizes this as 'solutionism' and locates it in the very economic society that is characterized by a capitalism that constantly satisfies needs as well as

invents them. This is why the next chapter will go into more detail on the connection between technological solutionism and capitalism.

## What's capitalism got to do with it?

*„Wenn eine Krise zuschlägt,  
ordnet sich der Kapitalismus gewöhnlich neu.  
Neue Technologien, neue Organisationsformen,  
neue Formen der Ausbeutung, neue Tätigkeiten und  
neue Märkte entstehen und eröffnen neue Wege  
für die Akkumulation von Kapital.“<sup>229</sup>*

After discussing solutionism and its history in the upper part, the following chapter relates solutionism to economic theories and asks ‘What's capitalism got to do with it?’ The following chapter begins where Morozov's elaborations leave off: with Silicon Valley's ‘capitalism-driven Internet’.<sup>230</sup>

Though, before we dive deeper into researching the link between solutionism and capitalism, it is first important to note: Solutionism did not begin with capitalism, the internet, the digital era, or Silicon Valley. This has been the outcome of the previous examination of technological fix. This chapter will therefore also provide a brief introduction to the sequence of industrial revolutions – from a non-mainstream perspective -, up to and including Silicon Valley, which in this thesis is not so much a geography as it is a think tank. Nevertheless, the work must be limited to the current manifestation of capitalism. The capitalism that is attributed in particular to the tech world and Silicon Valley.

Nick Srnicek in his book presents the concept of ‘platform capitalism’ to us. Roughly speaking, it is characterized by four main points: 1. It uses a completely new and comparatively new raw material: data. 2. The focus on production is removed and replaced by ‘producing users’. This

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<sup>229</sup> Nick Srnicek, *Plattform-Kapitalismus* (Hamburg: Hamburger Edition, 2018), p. 39.

<sup>230</sup> Morozov, p. 569.

means that the consumer produces himself. The 'capitalist' only provides the platform. 3. Work thus develops into an immaterial good. 4. It follows the narrative of 'change', triggered in particular by ever-evolving technology and automation.<sup>231</sup>

But that is by no means the only term attributed to this age. Although they all share similar key points – above all the narrative of 'change'–, they weight them differently: “McKinsey spricht von ‚Paradigmenwechsel‘, der Geschäftsführer des Weltwirtschaftsforums [Klaus Schwab] von der ‚vierten industriellen Revolution‘, und in eher lächerlicher Weise werden Vergleiche mit der Renaissance und der Aufklärung gezogen. Immer neue Bezeichnungen sind aufgetaucht: Gig-Ökonomie, Sharing Economy, On-Demand-Economy, die nächste industrielle Revolution, Überwachungsökonomie, App-Economy, Aufmerksamkeitsökonomie und so weiter.“<sup>232</sup>

The term under which one can summarize all these approaches is that of 'digital capitalism'. Jonathan Pace provides a concise and clear definition which is intended to serve as the basis for the present work: “Digital capitalism is the collection of processes, sites, and moments in which digital technology mediates the structural tendencies of capitalism. Digital capitalism is neither a structural totality nor a historical period. It is capitalism’s complex actualization in digital processes—a local phenomenon that should function as the starting point of inquiry rather than the conclusion. Digital capitalism is not the structural cause of certain developments but those nominal developments themselves insofar as they emerge from the intersection of digital process and capitalist structure.”<sup>233</sup>

This 'new' capitalism will be explored below. The focus is on theories and approaches that include the technological and/or solutionist component.

### Nachtwey & Seidl: The Sociology of Justification

Following Luc Boltanski's and Ève Chiapello's<sup>234</sup> thesis that every capitalist phase has a certain 'spirit', the German sociologists Oliver Nachtwey and Timo Seidl in their text outline a cultural sociology for the current 'digital capitalism'.

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<sup>231</sup> Cf. Srnicek, pp. 8–40.

\* The term 'spirit of capitalism' goes back to Werner Sombart in 'Modern Capitalism' and Max Weber in 'The Protestant Ethic and the Spirit of Capitalism'.

<sup>232</sup> Srnicek, p. 40.

<sup>233</sup> Jonathan Pace, 'The Concept of Digital Capitalism', *Communication Theory*, 28.3 (2018), 254–69 (p. 262f.) <<https://doi.org/10.1093/ct/ctx009>>.

<sup>234</sup> *Der Neue Geist Des Kapitalismus*, ed. by Luc Boltanski and Ève Chiapello, *Klassische Und Zeitgenössische Texte Der Französischen Humanwissenschaften* (Konstanz: UVK Verlagsgesellschaft mbH, 2013), xxxviii.



Yet before deep diving into this a brief introduction of ‚spirit of capitalism‘ might be helpful: “Sombart hatte mit dem Konzept des kapitalistischen Geistes eine Perspektive auf die Entstehung des modernen Kapitalismus eröffnet, die nach der Rolle außerökonomischer Faktoren für die ökonomische Entwicklung fragt.”<sup>235</sup> Thus the concept is primarily concerned about the impact of uneconomic factors and motivations on the development and existence of capitalism; it is about to understand the ethical or value-rational aspects of an economic mindset. For the authors, the term thus carries a 'mediating role' - between the utilitarian world of capitalist economy and the normative world of justifying reasons: “Es ist die Aufgabe des kapitalistischen Geistes, zwischen diesen außerökonomischem, in einer Gesellschaft vorherrschenden Rechtfertigungsmustern und dem Rechtfertigungsbedürfnis der in kapitalistischen Akkumulationsregimen beteiligten Akteure zu vermitteln.”<sup>236</sup> In short: between capitalism and its critique. This is what makes critique, along with the internal capitalist dynamics both, an vital motor of the capitalist spirit, and an assurance of stability of capitalism.

Above all, they state, the current knowledge- and communication-based capitalism depends on its actors' engagement and commitment, on their ethical beliefs and normative justifications - which, depending on the time, can be filled differently. This 'filling' is what Nachtwey and Seidl try to analyze for the newest version of capitalism's spirit, the digital capitalism. At its center they locate the so called 'polis of solutionism'. In order to investigate this, the two authors have analyzed the speeches of ten protagonists of digital capitalism, amongst them Peter Thiel and Jeff Bezos.

The so-called 'sociology of justification' ('Soziologie der Rechtfertigung') provides the tools necessary to reconstruct these moral 'orders' and sort them into 'orders of justification'. The eight known 'orders' – labelled as 'polis' -, on which Nachtwey and Seidl base themselves, are: The polis of the market, of Industry, of Inspiration, of House, of Opinion, the civic Polis, the project Polis and the ecological Polis.

Each of them follows own principles. In the industrial polis, for example, efficiency is the highest-valued principle, whereas the civic polis is measured in terms of the representation of an overall will: “Der Kapitalismus kann in diesem Sinne auf die in der Gesellschaft gültigen Rechtfertigungsordnungen zurückgreifen, um die kapitalistischen Akteure mit rechtfertigenden

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<sup>235</sup> Oliver Nachtwey and Timo Seidl, 'Die Ethik der Solution und der Geist des digitalen Kapitalismus', 38 (p. 5).

<sup>236</sup> Nachtwey and Seidl, p. 7.

Gründen für ihr Tun zu versorgen.”<sup>237</sup> This capitalist dynamism of justification has historically changed its combinations and compromises over time and by that, created differing capitalist spirits.

For current capitalism, Nachtwey and Seidel identify three spirits of different polis compositions: The first quarter of the 20th century was characterized by the so called ‘family capitalist spirit’, represented by company patriarchs such like Krupp and fueled by the polises of market, industry and house. In the middle of the 20th century the so called ‘industrial capitalist spirit’ became dominant, focusing on bureaucratic planning, rational work organization as well as innovation. In the end of the 20th century a new third capitalist spirit has evolved from that, ‘the spirit of digital capitalism’: “Im Mittelpunkt stehen der Begriff der Aktivität und die zahlreichen damit verbundenen Entgrenzungsdynamiken zwischen Arbeit und Leben, persönlichem und beruflichem Wissen, ernster und spielerischer Tätigkeit. Dies entspricht den Anforderungen eines flexiblen, kreativen, individualisierten, wissensbasierten und globalen Kapitalismus.”<sup>238</sup>

According to Nachtwey and Seidel, it is not only the capitalist dynamism that is changing capitalism, also its critique does. What they mean by that is that the capitalist spirit – in the way it has been performing from the 1970s on - developed the capability to make of exploiting its own criticism. In short: Capitalism manages to take advantage of the criticism directed at it. Examples for that might be relocation, outsourcing, change of the production model etc. These processes skill capitalist spirit to adapt to new criticisms, social expectations, political developments – in short: to the value compass of the zeitgeist.

As the two relevant types of criticism concerning capitalism, Nachtwey and Seidl constitute the ‘social’ and the ‘artist’ criticism. Following Boltanski and Chiapello, the first says that capitalism is socially unjust, the second that it suppresses the self-activity of autonomous subjects. To Nachtwey and Seidl, digital capitalism plays them off against each other. They identify: „Im Zuge der Krise des fordistischen und des Übergangs zu einem postfordistischen Akkumulationsregime\* ist es dem Kapitalismus gelungen, sich durch Inkorporierung von Motiven der Künstlerkritik von den Fesseln der Sozialkritik zu befreien und zugleich seine motivationalen und legitimatorischen Grundlagen zu erneuern.”<sup>239</sup> According to the authors, the spirit of digital capitalism does not negate the social criticism but presents himself as the solution to social problems. They notice that it stands for: “[...] einerseits für einen

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<sup>237</sup> Nachtwey and Seidl, p. 10.

<sup>238</sup> Nachtwey and Seidl, p. 14.

<sup>239</sup> Nachtwey and Seidl, p. 29.

Entfaltungsindividualismus mit teilweise esoterischem Einschlag; andererseits für eine nicht nur antietatistisch, sondern überhaupt antizentralistisch und antiinstitutionalistisch ausgerichtete Kritik an repressiven Großorganisationen sowie eine vor allem ökologisch und regionalistisch orientierte Kritik an nicht-nachhaltigen und nicht-authentischen Konsumweisen.“<sup>240</sup> As its origin as well as the place where it exists in its strongest form, the two identify Silicon Valley – from where it’s expanded globally.

Another way to approach the spirit of digital capitalism is to analyze its new mixture/compromise of different ‚polis‘. For instance, the authors claim, the ecological polis plays an important role but in a modified version: „Umweltprobleme werden nicht als kapitalistische Externalitäten betrachtet, die wie im industriellen Kapitalismus an Staat und Gesellschaft ausgelagert werden, sondern als Probleme, die der Kapitalismus lösen kann und soll. Erneuerbare Energien bis hin zur digitalen Absicherung der gesamten Biosphäre nehmen im digitalkapitalistischen Geist einen wichtigen Stellenwert ein.“<sup>241</sup> Or, they emphasize the spirit’s technology centredness coming along with its focus on efficiency that also underlies the industrial polis.

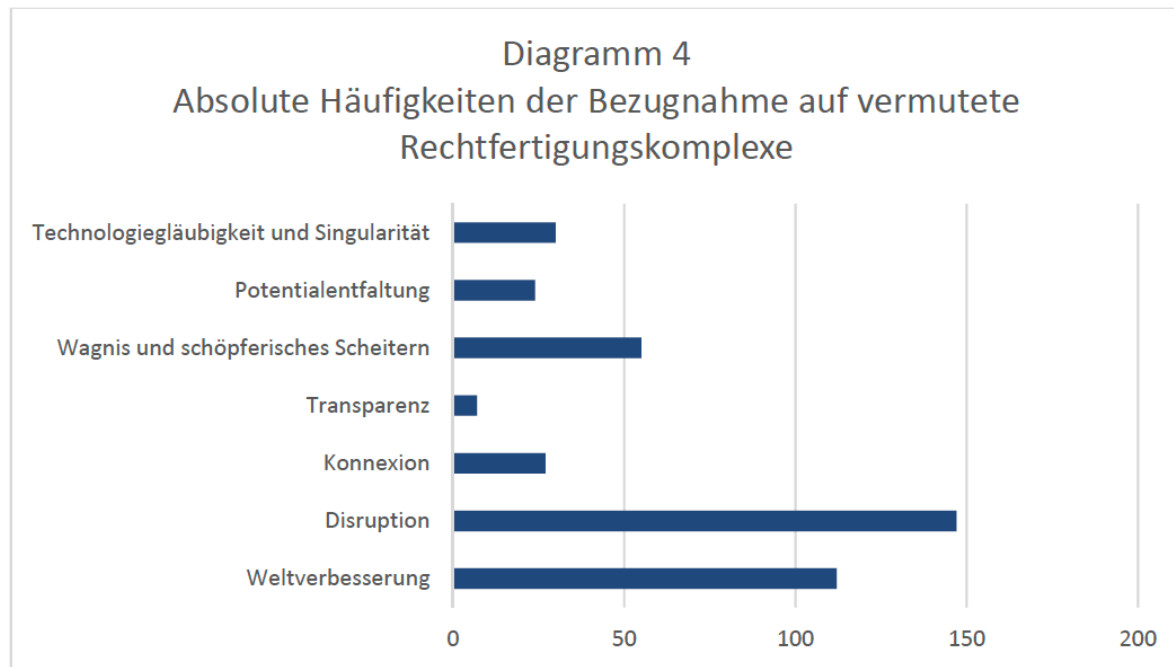
But besides those specific new polis combinations, Nachtwey and Seidl above all, detect the origin of an entirely new polis of justification, the 'polis of solution': „Die Bedeutung dieser Rechtfertigungsordnung, die wir im Anschluss an Evgeny Morozov als Polis der Solution bezeichnen, zeigt sich bereits in der quantitativen Häufigkeit, mit der auf die von uns vermuteten digitalkapitalistischen Rechtfertigungskomplexe Bezug genommen wird.“<sup>242</sup> Analyzing the speeches, they come to the conclusion that especially two justification complexes are used within this polis: Those of disruption and of world improvement.

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<sup>240</sup> Nachtwey and Seidl, p. 30.

<sup>241</sup> Nachtwey and Seidl, p. 18.

<sup>242</sup> Nachtwey and Seidl, p. 21.



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Within their analysis of the composition of this new polis, the two authors revive Morozov's theory but emphasize the aspect of a fusion between world improvement and entrepreneurship: "Die Solutionistin ist nicht einfach Unternehmerin, sie ist Philanthropo- beziehungsweise Weltverbessererunternehmerin. Im Solutionismus sind Philanthropie und Unternehmertum nicht länger biografisch unterscheidbare Lebensphasen. Man wird nicht zum Philanthropen, nachdem man Unternehmer war, sondern man ist Philanthrop, während und indem man Unternehmer ist. Das Motiv, Geld zu verdienen, und das Motiv, die Welt mit technologisch-unternehmerischen Mitteln zu einem besseren Ort zu machen, sind im Solutionismus eng verschränkt."<sup>244</sup> From this, they conclude disruption's significance: Following the logic of solutionist' thinking, only business ideas that have the capacity to totally change how humans live or how markets are organized, are valuable - in short, solutionist thinking leads to an equation of potential for change and potential for improvement: "Vor diesem Hintergrund erklären sich die Überhöhung des Disruptiven und die Idealisierung der ‚change-maker‘. In einer von Grund auf optimierungsbedürftigen Welt ist die Zerstörung des Bestehenden stets kreativ und Veränderung ein Wert an sich."<sup>245</sup>

<sup>243</sup> Nachtwey and Seidl, p. 20.

<sup>244</sup> Nachtwey and Seidl, p. 23.

<sup>245</sup> Nachtwey and Seidl, p. 26.

Tabelle 2

Polis der Solution

|                                    |                                                                                       |
|------------------------------------|---------------------------------------------------------------------------------------|
| <b>Wertigkeit</b>                  | Solution (Lösung von Menschheitsproblemen)                                            |
| <b>Idealer Typus</b>               | Weltverbessererunternehmer (auch: der Gescheiterte)                                   |
| <b>Wahnsinn</b>                    | Wall Street, Washington, Hollywood, Wirkungsloses Erfindertum                         |
| <b>Modellhafte Bewährungsprobe</b> | Disruption                                                                            |
| <b>Anthropologie</b>               | Menschen und Gesellschaften als fundamental fehlerhaft, aber zugleich potentialbegabt |
| <b>Geschichtsdeutung</b>           | Technologische Perfektionierung in Richtung Singularität                              |
| <b>Politische Philosophie</b>      | Schumpeter, Whole Earth Catalogue, Marshall McLuhan                                   |

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Another main aspect the two allude to is monopolization. From the evaluation of the speeches named, they draw the conclusion that the spirit of digital capitalism is also characterized by a deliberate monopolization. As opposed to the existing polis of the market, the polis of solution aims to achieve: “Der solutionistische Monopolist ist der natürliche Abschöpfer und Reinvestierer von Innovationsrenditen, welche es ihm erst erlauben, in größerem Umfang Weltverbesserer zu sein.”<sup>247</sup> As a famous example, they cite Google, which can only live up to its own corporate slogan - 'Don't be evil' – since it doesn't have to worry about competition: “Monopolrenditen erlauben es innovativen Unternehmen, langfristige und zugleich riskantere Investitionsstrategien zu fahren, was wiederum neue Innovationsdynamiken entfacht.”<sup>248</sup> They find the basis for all of this to be an unstoppable belief in the redemptive power of technology: “Die Solutionistin ist eine Sozialingenieurin im wahrsten Sinne des Wortes. Und der Aufstieg des Solutionismus bedeutet die Rückkehr der Sozialtechnologie mit anderen, nunmehr tatsächlich technologischen Mitteln.”<sup>249</sup>

Since Nachtwey and Seidl, in their work, have allocated solutionism in the very heart of digital capitalism, the thesis takes a closer look at its ideological center, Silicon Valley.

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<sup>246</sup> Nachtwey and Seidl, p. 20.

<sup>247</sup> Nachtwey and Seidl, p. 27.

<sup>248</sup> Nachtwey and Seidl, p. 27.

<sup>249</sup> Nachtwey and Seidl, p. 22.

## ‘The Valley’

### Barbrook & Cameron: The Rise of the Digital Class

The two British media scientists Barbrook and Cameron attested the end of the 20th century to be a turning point to the world. The convergence of media, computers and telecommunications towards hypermedia, briefly said, the beginning of the age of information, the post-industrial society – as predicted by many experts – eventually took place and brought along enormous social change. This historical moment they state, also marked the origin of the information age’s underlying belief: “At this crucial juncture, a loose alliance of writers, hackers, capitalists and artists from the West Coast of the USA have succeeded in defining a heterogeneous orthodoxy for the coming information age: the Californian Ideology.”<sup>250</sup>

According to that concept of ‘Californian Ideology’, Barbrook and Cameron state: “This new faith has emerged from a bizarre fusion of the cultural bohemianism of San Francisco with the hi-tech industries of Silicon Valley [...] the Californian Ideology promiscuously combines the free-wheeling spirit of the hippies and the entrepreneurial zeal of the yuppies.”<sup>251</sup> The authors say it was their common faith in new information technologies plus their universal belief in technological determinism what caused them merging: “Above all, will the advent of hypermedia will realise the utopias of either the New Left or the New Right? As a hybrid faith, the Californian Ideology happily answers this conundrum by believing in both visions at the same time - and by not criticising either of them.”<sup>252</sup>

This merger of the two directions is the essence of Californian ideology, according to Barbrook and Cameron. On one side, there were the hippies of the 60s. They stood up against militarism, racism, sexualized violence, as well as for sustainability, for freedom and self-fulfillment: “In place of the traditional left's rigid hierarchies, they created collective and democratic structures which supposedly prefigured the libertarian society of the future. Above all, the Californian New Left combined political struggle with cultural rebellion.”<sup>253</sup> Some considered this goal to be achieved through a 'return' to nature, while others relied on new technologies. These so called

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<sup>250</sup> Richard Barbrook and Andy Cameron, ‘The Californian Ideology’, *Science as Culture*, 6.1 (1996), 44–72 (p. 44) <<https://doi.org/10.1080/09505439609526455>>.

<sup>251</sup> Barbrook and Cameron, p. 2.

<sup>252</sup> Ibid., p. 5.

<sup>253</sup> Barbrook and Cameron, p. 3.

“West Coast radicals”<sup>254</sup> became involved in developing new information technologies for the alternative press and community media: “The creation of the electronic agora was the first step towards the implementation of direct democracy within all social institutions. The struggle might be hard, but 'ecotopia' was almost at hand.”<sup>255</sup>

On the other side, the so called New Right reacted to this movement with their very own idea of libertarian future, the authors call this vision “retro-utopia”<sup>256</sup>, due to its conservative basis: “Responding to the challenge of the New Left, the New Right has resurrected an older form of liberalism: economic liberalism. In place of the collective freedom sought by the hippie radicals, they have championed the liberty of individuals within the marketplace [...] The path of technological progress didn't always lead to 'ecotopia' - it could instead lead back to the America of the Founding Fathers.”<sup>257</sup> According to the authors, it is actually this fusion that IT and media industry have occupied. Those companies depended on key people like cognitive scientists, engineers, computer scientists, skilled workers who literally built the engine of their products. Barbrook and Cameron call these workers the ‘virtual class’: “On the one hand, these hi-tech artisans not only tend to be well-paid, but also have considerable autonomy over their pace of work and place of employment [...] Yet, on the other hand, these workers are tied by the terms of their contracts and have no guarantee of continued employment. Lacking the free time of the hippies, work itself has become the main route to self-fulfillment for much of the 'virtual class'.”<sup>258</sup> Eventually, the authors allocate these core workers somewhere between the privileged part of the labour force and the radical ideas of the community media activists. Therefore, the Californian Ideology, simultaneously reflects the disciplines of market economics and the freedom of hippie artisanship.

In the course of this, according to the authors “right-drift of the Californian ideologues”<sup>259</sup>, they also address the ambivalence of the American idea of freedom: “Yet there is a profound contradiction at the centre of this primordial American dream: individuals in this period only prospered through the suffering of others. Nowhere is this clearer than in the life of Thomas Jefferson - the chief icon of the Californian Ideology.”<sup>260</sup> By that, they allude to the former US president Jefferson who cherished democracy and liberty on the one hand, but on the other,

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<sup>254</sup> Barbrook and Cameron, p. 47.

<sup>255</sup> Barbrook and Cameron, p. 48.

<sup>256</sup> Barbrook and Cameron, p. 49.

<sup>257</sup> Barbrook and Cameron, p. 49.

<sup>258</sup> Ibid., p. 4.

<sup>259</sup> Barbrook and Cameron, p. 8.

<sup>260</sup> Barbrook and Cameron, p. 51.

believed in the natural right of man to own human beings as private property. The authors see this racial segregation still prevailing, especially on the American West Coast, identifying the tech and media industry as key element of the New Right: “[More importantly], many members of the 'virtual class' want to be seduced by the libertarian rhetoric and technological enthusiasm of the New Right. Working for hi-tech and media companies, they would like to believe that the electronic marketplace can somehow solve America's pressing social and economic problems without any sacrifices on their part.”<sup>261</sup> Accordingly, as Barbrook and Cameron state, the Californian Ideology had apart from its original optimistic emancipatory vision, but instead reflects the racially and socially polarized society in which it had its source: “Despite its radical rhetoric, the Californian Ideology is ultimately pessimistic about real social change. Unlike the hippies, its advocates are not struggling to build 'ecotopia' or even to help revive the New Deal. Instead, the social liberalism of New Left and the economic liberalism of New Right have converged into an ambiguous dream of a hi-tech 'Jeffersonian democracy'.”<sup>262</sup> An argument, repeatedly coming through in this paper. This kind of differentiation can be observed by looking at the extend of poorer populations' occurrence in information age; they basically perform as cheap work force producing chips in Silicon Valley factories and cannot afford much more than limited access to online services.<sup>263</sup>

Moreover, for Barbrook and Cameron, the next ambivalence that the Californian Ideology carries in sight can be seen in the conception of liberalism and its notion of a 'free market'. In their chapter „Free Market Myth“, the authors argue that Silicon Valley has opposed any governmental interventions, from which it actually benefited and still does: ““Yet, the sacred tenets of economic liberalism are contradicted by the actual history of hypermedia. For instance, the iconic technologies of the computer and the Net could only have been invented with the aid of massive state subsidies and the enthusiastic involvement of amateurs. Private enterprise has played an important role, but only as one part of a mixed economy.”<sup>264</sup> In terms of the hypermedia industry development they state the question “[...] isn't whether or not it will be organised as a mixed economy, but what sort of mixed economy it will be.”<sup>265</sup> They name several examples, such as the launch of 'Windows '95', which would have had to be postponed, without public support; or IBM's first programmable digital computer, that depended on a

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<sup>261</sup> Barbrook and Cameron, p. 52.

<sup>262</sup> Barbrook and Cameron, p. 7.

<sup>263</sup> Barbrook and Cameron, p. Cf. 52.

<sup>264</sup> Barbrook and Cameron, p. 45.

<sup>265</sup> Barbrook and Cameron, p. 50.



request by the US Defense Department during the Korean War: “Ever since, the development of successive generations of computers has been directly or indirectly subsidised by the American defence budget [...] The US government has poured billions of tax dollars into buying planes, missiles, electronics and nuclear bombs from Californian companies. For those not blinded by 'free market' dogmas, it was obvious that the Americans have always had state planning: only they call it the defense budget.”<sup>266</sup> According to the authors, what Silicon Valley’ people fear is that the admission of public funding of their companies might legitimate rise in taxes in order to finance better health care, environmental protection, housing, public transport and education.<sup>267</sup>

The Valley’s re-interpretation of the capitalist motivations promote their ability to change social and individual decision making. This Valley kind of thinking, Daub is describing opens another remarkable path that might lead towards undesirable power shifts, societal and political.

#### Daub: The modern kind of disruption

Adrian Daub, Professor of comparative literature at Stanford University, at some point found himself surrounded by students, attracted by the Silicon Valley ideas, seeing their benefit in working in start-ups rather than graduating from university. A phenomenon, which can be observed in Stanford more frequently than in other Universities since it’s located right next to Palo Alto, the epicentre of technological ‘innovation’ of the 21<sup>st</sup> century. The critical number of those ‘dropouts’ favoring the tech sector, drew Daub’s attention onto analyzing what he calls the ‘ideology of the tech sector’: „Studienabbrecher:innen laufen Gefahr, die Universität als Denker:innen zu verlassen, die in einem geistigen Niemandsland zwischen allgemeinen Binsenwahrheiten und einer sehr begrenzten und überpragmatischen Betrachtung von Problemen gefangen sind.“<sup>268</sup> For that, he holds the tech sector’s rhetoric accountable that sells the break as necessity for innovation. But what the Valley defines as new, Daub thinks might be not, in every sense.

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<sup>266</sup> Barbrook and Cameron, p. 51.

<sup>267</sup> Barbrook and Cameron, p. Cf. 52.

<sup>268</sup> Daub, p. 31.

His hypothesis: What Silicon Valley is selling as innovation is double-edged: “Manches an der Techindustrie ist vollkommen neu (darunter die Technologie), während anderes genauso ist wie immer (insbesondere die Industrie).“<sup>269</sup>

What is dangerous about this rhetoric, according to Daub, is that the ideas might lead to ‘bad thinking’ and give the rich and mighty the control about our world view: „Die in diesem Buch behandelten Ideen des Techsektors sind nicht falsch, aber sie erlauben es den Reichen und Mächtigen, Unterscheidungen ohne Unterschied vorzunehmen, und kaschieren Unterschiede, die politisch wichtig sind.“<sup>270</sup> Hence, by ‘bad thinking’ Daub means the idea that new products, technologies, ideas from the tech sector are in need of a new framework, not the other way around: “Nun sind diese Technologien freilich oft wirklich neuartig – aber die Unternehmen, die sie einführen, verweisen häufig auf diese Neuartigkeit, um zu behaupten, die traditionellen Verständniskategorien würden der neuen Technologie nicht gerecht, obwohl sie in Wahrheit durchaus geeignet sind, um sie zu beurteilen.“<sup>271</sup> According to Daub, subsequently people, used to work with those comprehension categories, such as activists, experts, academics, journalists, unionists and politicians, are supposed to have lost their capabilities to categorize them properly and so technology appears to be the better ‘problem solver’.

Daub raises the question if tech companies instrumentalize the meaning of innovation legitimizing their own methods: „Und hier verwandeln sich die Grenzen unseres Denkens rasch in die Grenzen unserer Politik. Was, wenn das, was Innovation genannt wird, in Wahrheit nichts anderes ist als eine opportunistische Ausnutzung von Gesetzeslücken? [...] Viele dieser Unternehmen haben sozusagen ihr Hauptquartier in dieser historischen Grauzone errichtet.“<sup>272</sup>

### *From Disruption to Innovation*

Daub assumes that the story of ‘re-inventing the world’ is an essential part of the Valley’s ideology: Doing something new implies to break with tradition; break is needed to make a change; innovation comes from disruption, not from continuity. Hence, in this interplay between disruption and continuity; or, how Peter Thiel writes in his book ‘From Zero To One: Wie Innovation unsere Gesellschaft rettet’: “Die Best Practices von heute führen morgen in die Sackgasse. Die besten Wege sind neu und unbekannt.“<sup>273</sup>

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<sup>269</sup> Daub, p. 116.

<sup>270</sup> Daub, p. 11.

<sup>271</sup> Daub, p. 9.

<sup>272</sup> Daub, p. 10.

<sup>273</sup> Thiel, Peter, Zero To One (New York: Random House Children's Books, 2015)., p. 8.

This story about disruption and continuity, Daub sees deeply attached to the dynamics of capitalism, which is not new at all: “Handelt es sich bei den Veränderungen, die der Techsektor herbeiführt oder herbeizuführen behauptet, um eine grundlegende Transformation der Funktionsweise des Kapitalismus, oder stellen sie lediglich eine unverhohlene Erweiterung seiner gewohnten Funktionsweise dar?”<sup>274</sup>

Regarding the rhetoric of the Valley this means to reclassify questions, problems and solutions: ”Aber wie die Öffentlichkeit, die Medien und die Politik auf die Technologie und ihre Industrie reagieren, hängt davon ab, was unsere gegenwärtige Kategorien erfassen und was sie nur erfassen können, wenn sie angepasst werden. Die Disruption ist eine Möglichkeit, die Anpassung der Kategorien narrativ zu untermauern.“<sup>275</sup>

The economic concept of ‘disruption’ was first mentioned in Karl Marx’s and Friedrich Engels’s ,Kommunistisches Manifest’: “[...] kennzeichnend für den modernen Kapitalismus sei die ‘fortwährende Umwälzung der Produktion, die ununterbrochene Erschütterung aller gesellschaftlichen Zustände’, so dass ,alles Ständische und Stehende verdampft.“<sup>276</sup> Marx’s conclusion is prominent: That procedure would end up in revolution and end capitalism.

As opposed to that in 1942, Joseph Schumpeter re-modelled this idea into a descriptive version called ‘creative destruction’.<sup>277</sup> He would go along with Marx in two relevant aspects: “Die unablässig zunehmende Effizienz der kapitalistischen Ausbeutung senkt zwangsläufig die Profitraten, und der Rückgang der Profitrate führt zur Entstehung von Monopolen.“<sup>278</sup> Yet, Schumpeter classifies the process of ‘creative destruction’ to be capitalism’s engine rather than the foundation of revolution: “Die schöpferische Zerstörung alles Verfestigten auf dem Markt, die Tendenz des Kapitalismus, seine Märkte durcheinanderzuschütteln und neu zu definieren bedeutet, dass der Monopolist von gestern plötzlich ein Konkurrent unter vielen ist und oft genug vollkommen aus dem Markt gedrängt wird. Und der Zyklus beginnt von vorn.“<sup>279</sup> In the long run, Schumpeter anticipated, regulation of capitalism will lead into an form of socialism through political intervention: “Schließlich werde die ständige Zerstörung, so viel Neues sie auch aus der Vogelperspektive hervorbringe, zu Versuchen führen, den Kapitalismus zu

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<sup>274</sup> Daub, p. 117.

<sup>275</sup> Daub, p. 117.

<sup>276</sup> Daub, p. 122.

<sup>277</sup> Joseph Schumpeter, *Theorie Der Wirtschaftlichen Entwicklung. Eine Untersuchung Über Unternehmengewinn, Kapital, Kredit, Zins Und Den Konjunkturzyklus*. (Berlin, 2013).

<sup>278</sup> Daub, p. 123.

<sup>279</sup> Daub, p. 123.

regulieren. Während die schöpferische Zerstörung wirtschaftlich funktioniere, sei diese Erfahrung politisch zu desillusionierend, um das langfristige Überleben des Kapitalismus zu erlauben.“<sup>280</sup>

Hence, according to Daub, the Marxist concept of ‘disruption’ criticizing capitalism, by Schumpeter has been developed into a descriptive version that merely explains capitalism’s taxonomy. So how about Silicon Valley?

Daub states that, in a third step, the original concept of ‘disruption’, practiced by the people in the Valley has been re-modelled again by reframing the process: ‘Destruction’ (or ‘disruption’) has turned into ‘innovation’. <sup>281</sup> Daub on the one hand, agrees that the procedure of disruption is part of technological change but on the other hand accuses the Valley of a certain ‘amnesia’: “Die Amnesie, die jene Konzepte umhüllt, mit denen die Technologieunternehmen öffentliche Politik betreiben (ohne zuzugeben, dass sie es tun), ist ein struktureller Bestandteil dieser Konzepte. Indem die Neuheit des Problems (oder zumindest seiner ‘Einordnung’) zum Fetisch gemacht wird, werden der Öffentlichkeit die analytischen Werkzeuge entzogen, die sie bisher für die Auseinandersetzung mit ähnlichen Problemen nutzte.“<sup>282</sup>

According to the author, compared to Marx and Schumpeter, the Valley uses the concept of disruption for its own account and by that creates a theodicy of hyper capitalism - without any alternative -, rather than towards its self-destruction: “Die Vorstellung vom modernen Kapitalismus bringe eine sich unablässig beschleunigende Veränderung hervor, es gebe keine Gegenentwicklung und das Beste sei, sich mit dieser Veränderungsrate abzufinden, wird als Akzelerationismus bezeichnet.“<sup>283</sup>

This reframing of disruption into innovation, combined with the famous argument of companies in the Tech-sector that ‘if we don’t do it someone else will’, as if it was a natural law, Daub concludes, is dripping from technological determinism and a revisionist approach to history manipulating our collective phantasy in favour of (capitalism and) the tech-sector: “Man sehe sich nur an, wie sehr das Silicon Valley von seinem technologischen Determinismus profitiert [...] Oder man sehe sich an wie Schlagworte wie ‘Disruption’ und ‘Innovation’ dem Techsektor helfen, unsere kollektive Fantasie zu vereinnahmen. Wie sie bestimmte Teile des Status quo umstülpen und andere Teile rätselhafterweise unangetastet lassen.“<sup>284</sup> This aspect is what brings

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<sup>280</sup> Daub, p. 124.

<sup>281</sup> Cf. Daub, p. 125.

<sup>282</sup> Daub, p. 9.

<sup>283</sup> Daub, p. 125.

<sup>284</sup> Daub, p. 9.

us back to solutionism's main characterization of an ahistorical framing, in terms of technology's development. Since the tech sector makes use of history to support its own success story, it appears to be unavoidable and necessary: „Schließlich verzerrt die Rhetorik der Disruption einfach die Betrachtung der Frage, wen Gesellschaft und Staat unterstützen sollten [...] Denn der eigentliche Vorteil des überhistorischen Impulses des um Disruption bemühten Akteurs ist die Überzeugung, dass er nicht seine Idee der Welt anpassen, sondern dass sich die Welt dem Genie seiner Idee unterwerfen sollte.“<sup>285</sup> Daub even goes so far as to say that the tech industry has changed the rules and hijacked current standards: „Letzten Endes ist mit der Disruption wahrscheinlich auch die Disruption unseres Urteilsvermögens und unserer Kategorien gemeint. Aber dieses Privileg genießt natürlich nur derjenige, der die Disruption herbeiführt.“<sup>286</sup> And he echoes the argument heard several times in this paper: the difficulty of resisting or criticizing technological development: „Wann immer ein von der Disruption Betroffener einwendet, er würde vorziehen, die Welt würde angepasst, um sein Überleben zu gewährleisten, wird ihm gesagt, das sei ein Zeichen seiner Schwäche und seines Widerstands gegen Veränderung.“<sup>287</sup>

### The dynamics of technological revolutions

Identifying Silicon Valley the hub for solutionist thinking, does not mean it started here. As mentioned in the introduction to this chapter, this narrative must begin with industrialization and the ‘industrial revolution’ that traces its roots to the late 18<sup>th</sup> century in Britain. Various theories have since counted between two and five subsequent industrial revolutions – in the global north - and many of them advocate the thesis of a rather linear development of progress, such as Klaus Schwab, founder of the World Economic Forum (WEF).<sup>288</sup>

If we have worked out in the paper so far that the story of this ‘industrialization’ has a great influence on its following development and its reputation, here is one view of the ‘industrial revolution(s)’ that does not follow the classic linear narrative styles and gives a special focus on technology's impact, rather than reproducing the master narrative of industrial development.

Carlota Perez, in her text ‘Capitalism, Technology and a Green Global Golden Age: The Role of History in Helping to Shape the Future’ contradicts the traditional assumption that there have

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<sup>285</sup> Daub, p. 132.

<sup>286</sup> Daub, p. 133.

<sup>287</sup> Daub, p. 133.

<sup>288</sup> Klaus Schwab, *Die Vierte Industrielle Revolution*, 3rd edn (München: Pantheon Verlag, 2016).

been three Industrial Revolutions, but five “great surges of development.”<sup>289</sup> She bases her considerations on the ‘Kondratiev waves’ by Nikolai Kondratiev and Joseph Schumpeter’s theory on ‘business cycles’ – both have identified cycle-like dynamics in the modern world economy, instead of continuous movements.

According to her, identifying these shifts as revolutions does not only refer to the new technologies themselves. Rather, to their ‘revolutionary’ power for increasing productivity all over the world, resulting in a ‘techno-economic paradigm shift’, which leads to a profound transformation in ways of working and consuming, lifestyles and aspirations across society: “Their propagation changes the relative cost structure of production in most sectors, by providing new powerful and cheap inputs. They unleash innovation potential that typically leads to synergistically connected chains of new products and to the renewal of mature industries. The new infrastructures—from canals to railways, to steamships, to highways and electricity, to the internet—allow wider and deeper market penetration at decreasing costs. And their application gradually transforms organisational models and the ‘common sense’ criteria for best practice in production and innovation across all industries.”<sup>290</sup>

According to her, it is not mainly about the specific industries or technologies each revolution has brought with it but about the recurrence of specific transformation stages. Hence, each surge of development, she states, has taken half a century or more to spread unevenly across the economy. Every revolution has occurred in two phases, the one of ‘installation’ and the one of ‘deployment’, separated or linked by a ‘turning point’ in the form of a ‘bubble collapse’ or a ‘recession’.<sup>291</sup>

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<sup>289</sup> Carlota Perez, ‘11. Capitalism, Technology and a Green Global Golden Age: The Role of History in Helping to Shape the Future’, *The Political Quarterly*, 86 (2015), 191–217 (p. 193) <<https://doi.org/10.1111/1467-923X.12240>>.

<sup>290</sup> Perez, p. 193.

<sup>291</sup> Perez.

| No., date, revolution,<br>core country                                                       | INSTALLATION PERIOD |                                                                                             | TURNING<br>POINT                    | DEPLOYMENT PERIOD                                   |                  |
|----------------------------------------------------------------------------------------------|---------------------|---------------------------------------------------------------------------------------------|-------------------------------------|-----------------------------------------------------|------------------|
|                                                                                              |                     | 'Gilded Age' Bubbles                                                                        | Recessions                          | 'Golden Ages'                                       | Maturity/decline |
| 1 <sup>st</sup><br>1771<br>The Industrial<br>Revolution<br>Britain                           |                     | Canal mania UK                                                                              | 1793–97                             | Great<br>British leap                               |                  |
| 2 <sup>nd</sup><br>1829<br>Age of Steam<br>and Railways<br>Britain                           |                     | Railway mania UK                                                                            | 1848–50                             | The Victorian Boom                                  |                  |
| 3 <sup>rd</sup><br>1875<br>Age of Steel and<br>heavy Engineering<br>Britain / USA<br>Germany |                     | London funded global market<br>infrastructure build-up<br>(Argentina, Australia, USA)       | 1890–95                             | Belle Époque (Europe)(*)<br>'Progressive Era' (USA) |                  |
| 4 <sup>th</sup><br>1908<br>Age of Oil, Autos<br>and Mass<br>Production<br>USA                |                     | The roaring twenties USA<br>Autos, housing, radio,<br>aviation, electricity                 | Europe<br>1929–33<br>USA<br>1929–43 | Post-war<br>Golden age                              |                  |
| 5 <sup>th</sup><br>1971<br>The ICT<br>Revolution<br>USA                                      |                     | Internet mania, Telecoms 1990s<br>emerging markets<br>Global financial casino&housing 2000s | 2000–03<br>2008–<br>20??            | Global sustainable<br>'golden age'?                 |                  |

We are here

(\*) Note an overlap of more than a decade  
between Deployment 3 and Installation 4

**Figure 1:** The historical record: bubble prosperities, recessions and golden ages

Source: Based on Perez 2002 and 2009

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The first phase thus describes upheaval, characterized by Schumpeterian creative destruction, overinvestment in new infrastructure, competition, and the manifestation of a new paradigm. This could only inevitably lead to a crisis: “However, installation also involves painful social disruption and adaptation. The diffusion of the new paradigm leads to a massive displacement of old skills and to polarisation between new and old industries, regions and incomes.”<sup>293</sup> The bubble bursts and/or economic growth requires a radical redirection in order to be able using the new potential. Hence, someone must intervene to regulate an orderly transition, someone like the state: “Immediately following the crash, private investors have become risk-averse and are not ready to fund the expansion. Thus, after the major collapses, the state has historically stepped in to play an active role in favour of investment and growth.”<sup>294</sup> According to Perez, because of these dynamics, the current 'surge', she calls it the ‘age of information and communication technologies’ (ICT), has the potential to usher in a 'green direction' - if responses to the revolution are steered towards a more sustainable world.<sup>295</sup>

<sup>292</sup> Perez, p. 195.

<sup>293</sup> Perez, p. 196.

<sup>294</sup> Perez, p. 197.

<sup>295</sup> Perez, p. 200.

Perez conclusion from her work could of course be classified, refuted and elaborated at this point, but that is not the subject of this paper. Therefore, in the next chapter we jump to the far more important question for this thesis: How else can problems be defined that they come to ways out outside of solutionist thinking?

## Beyond Solutionism

Eventually tech solutions keep succeeding because of the match of the way they were defined before. This produces short-cut solutions leading the economical direction – at its best: Silicon Valley. Accordingly the search for ‘alternative’ solutions must begin with the framing of the problem.

### The ‘Wicked Problem’ of Climate Change

A concept that involves the connection between problem solving and its definition is that of ‘wicked problems’: “The circular nature of a wicked problem is important. The problem cannot be defined accurately because the solution depends on how the problem is framed, and vice versa: the definition of the problem depends on the proposed solution. Wicked problems have uncertain boundaries because they are symptoms of other problems, and vice versa, in a circle of mutual implication.”<sup>296</sup> ‘Wicked’ here, is not used in the sense of “[...] being ethically deplorable, implying malicious intent, but in the sense of being malignant (instead of benign), or vicious (as in a vicious circle), or tricky (like leprechauns), or aggressive (like a lion).”<sup>297</sup> Science, in the opposite has developed to deal with ‘tame’ problems, which makes handling wicked problems even more difficult.

The South African theologist and philosopher Ernst Conradie, in his text “‘Why, Exactly, Is Climate Change a Wicked Problem?’” cites the two planners Horst Rittel and Melvin Webber<sup>298</sup> who have analyzed ten characteristics of wicked problems:

1. There is no definitive formulation of a wicked problem.
2. Wicked problems have no stopping rule (to know when a problem has been

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<sup>296</sup> Ernst M. Conradie, ‘Why, Exactly, Is Climate Change a Wicked Problem?’, *Philosophia Reformata*, 85.2 (2020), 226–42 (p. 229) <<https://doi.org/10.1163/23528230-8502A003>>.

<sup>297</sup> Conradie, p. 229.

<sup>298</sup> Horst W.J. Rittel and Melvin M. Webber, ‘Dilemmas in a General Theory of Planning’, *Policy Sciences*, 4 (1973), 169 <<https://doi.org/10.1007/BF01405730>>.



- resolved).
3. Solutions to wicked problems are not true or false, but good or bad.
  4. There is no immediate and no ultimate test of a solution to a wicked problem.
  5. Every solution to a wicked problem is a ‘one-shot operation’; because there is no opportunity to learn by trial and error, every attempt counts significantly—previous attempts to address wicked problems leave traces that cannot be undone.
  6. Wicked problems do not have an enumerable (or an exhaustively describable) set of potential solutions, nor is there a well-described set of permissible operations that may be incorporated into the plan.
  7. Every wicked problem is essentially unique.
  8. Every wicked problem can be considered to be a symptom of another problem.
  9. The existence of a discrepancy representing a wicked problem can be explained in numerous ways. The choice of explanation determines the nature of the problem’s resolution.
  10. The social planner has no right to be wrong—planners are liable for the consequences of the actions they generate.<sup>299</sup>

Hence, the concept by many social scientists and humanists applies to the topic of ‘climate change’. Sun and Yang for instance, in their work conclude that climate change fits in this concept since it has economic, social, and political ramifications, and relies on behavioral decisions made by countries and organizations generating high levels of socially constructed uncertainty. Thus, positivist approaches - following a linear-rational scientific model - to solve the climate-change problem to them seem to be inappropriate.<sup>300</sup> They even state: “Indeed, the linear model of science may even have contributed to the formation of wicked problems [...] as a cumulative effect of the technology that has sprung up from linear scientific methodology.”<sup>301</sup> They argue for the issue and its solutions to be viewed in a more dynamic and

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<sup>299</sup> Conradie, p. 227.

<sup>300</sup> Jiazhe Sun and Kaizhong Yang, ‘The Wicked Problem of Climate Change: A New Approach Based on Social Mess and Fragmentation’, *Sustainability*, 8.12 (2016), 1312 (p. 4) <<https://doi.org/10.3390/su8121312>>.

<sup>301</sup> Sun and Yang, p. 4.

complex way, involving ‘social messes’ and the fragmentation of industries and organizations. These approaches set their focus on the part played by social actors: “[...] every [social] problem interacts with other problems and is therefore part of a set of interrelated problems, a system of problems.”<sup>302</sup> Social messes also occurring when individuals in overlacking situations face choices, “in which the maximization of short-term, self-interest yields outcomes leaving all participants worse off than feasible alternatives.”<sup>303</sup> Therefore, they take the ‘Brundtland Report’\* as an example stating that the increase of social and ecological stability only can be achieved by abandoning old approaches and past patterns.<sup>304</sup> By the fragmentation of industries and organizations they allude to a lack of shared understanding and commitment to collaborate in terms of climate change: “Instead, the attempts at negotiating emissions targets have furthered the fragmentation already present within the climate change problem, especially as the grounds for setting targets are base-weighted on past emissions. With its implicit apportioning of blame, this approach seems only to have alienated certain countries and industries further. As a result, other problems have emerged.”<sup>305</sup>

The interdisciplinary group of scientists (Political Science, Environmental Studies, Environmental Management) Kelly Levin, Benjamin Cashore, Steven Bernstein, and Graeme Auld in their article about ‘Overcoming the tragedy of super wicked problems: constraining our future selves to ameliorate global climate change’ emphasize that tackling climate change is in need of an “applied forward reasoning approach.”<sup>306</sup> According to them, the challenge is not a lack of interest to find a solution but “[...] to counteract the tendency of our political institutions, as reinforced by our individual tendencies as consumers and voters, to make decisions that give greater weight to immediate interests and to delay required behavioral changes, even when doing so is clearly contrary to our long-term interests.”<sup>307</sup> Their approach would be better suited for such wicked problems, since it takes their characteristics into account, in order to work on the solution. These characteristics are described as following:

1. Time is running out
2. Those who cause the problem also seek to provide a solution

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<sup>302</sup> Sun and Yang, p. 5f.

<sup>303</sup> Sun and Yang, p. 5f.

<sup>304</sup> Sun and Yang, p. 5f.

\* Report of the World Commission on Environment and Development: Our Common Future, 1987

<sup>305</sup> Sun and Yang, p. 7.

<sup>306</sup> Kelly Levin and others, ‘Overcoming the Tragedy of Super Wicked Problems: Constraining Our Future Selves to Ameliorate Global Climate Change’, *Policy Sciences*, 45.2 (2012), 123–52 (p. 125)  
<<https://doi.org/10.1007/s11077-012-9151-0>>.

<sup>307</sup> Levin and others, p. 125.

3. The central authority needed to address the problem is weak or nonexistent
4. Partly as a result, policy responses irrationally discount the future (more or less in the same way that smokers postpone thinking about the health consequences of their habit).<sup>308</sup>

The ‘applied forward reasoning approach’ attempts to help with identifying new ways to develop and assess policy interventions on the basis of whether they contain plausible logics in order to trigger more path-dependent processes. Additionally, it supports policy analysts in detecting on what guidelines they aim to. And, it emphasizes the aspect of building up collaborations and determining norms and values, for unleashing path-dependent processes that lead to transformative change over time.<sup>309</sup> What they also state is that history and politics should not be framed as inefficient in terms of presenting solutions to wicked problems, but to draw attention on how such forces may in fact open up creative solutions to address super wicked problems.<sup>310</sup>

So is it even more the humanities rather than the social sciences to direct towards better/sustainable problem solving?

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<sup>308</sup> Conradie, p. 233.

<sup>309</sup> Cf. Levin and others, p. 125.

<sup>310</sup> Levin and others, p. 148.

## The 'Everything Change'

*"If climate means to us only the measurable and physical dimensions of our life on Earth then we will always be at war with climate. Our climates will forever be offering us something different from what we want."*<sup>311</sup>

According to Mike Hulme, the framing of climate change is essential. He states that by objectifying climate through standardized measurements, for the 'moderns' climate change means a physical transformation to be managed and predicted. Disagreements about it often end up revolving around disputed science, economics and diplomacy: "Having allowed science to strip climate of its cultural anchors and ideological meanings – part of what sociologist Bruno Latour calls the 'purification' of knowledge – we have been slow to recognise that understanding climate change and responding to it demands a re-engagement with the deeper and more intimate meanings of climate that have been lost. Science may be solving the mysteries of climate, but we have lost – or chosen to ignore – what climate means to us."<sup>312</sup> According to Hulme, climate scientists do not lose their special role in repairing the damage done, but rather it is on them to repair the idea of what climate change really is: "By dissolving the strained boundaries between Nature and Culture, by revealing that knowledge and scale are co-dependent, by disclosing the spatial contingencies of climate change knowledge, geographers can offer a different reading of climate change. It will be a reading that is more engaging and human than the one currently on offer."<sup>313</sup>

Hume states, that it is more important to focus on the motivations behind different opinions about climate change, in order to find its solution and for "[...] allowing for the identification of common ground between previously polarized individuals, thus creating a thread by which dialog may begin."<sup>314</sup> In his opinion, questions regarding the climate change are rather about "matters of concern than are about matters of fact".<sup>315</sup> He pleads for a deeper analysis on how people imagine themselves in the world than about what they factually know about it: "It is

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<sup>311</sup> 'Beyond Climate Change', in *Why We Disagree about Climate Change: Understanding Controversy, Inaction and Opportunity*, ed. by Mike Hulme (Cambridge: Cambridge University Press, 2009), pp. 322–66 (p. 361) <<https://doi.org/10.1017/CBO9780511841200.012>>.

<sup>312</sup> Mike Hulme, *Why We Disagree about Climate Change: Understanding Controversy, Inaction and Opportunity*, 2009, p. xxxix (p. 355) <<https://doi.org/10.1017/CBO9780511841200>>.

<sup>313</sup> Mike Hulme, 'Geographical Work at the Boundaries of Climate Change', *Transactions of the Institute of British Geographers*, 33 (2008), 8 (p. 9).

<sup>314</sup> Hulme, 'Why and How to Debate Climate Change', p. 2.

<sup>315</sup> Hulme, 'Why and How to Debate Climate Change', p. 1f.

people's identities and values, their attitudes to technology, their attachment to the idea of 'progress' and about how they understand their relationships with human and non-human others."<sup>316</sup> The disputes about climate change depend are often acting as proxies of other disagreements which might be about attitudes to nature, about the distribution of wealth, about rights and freedoms, about desirable forms of governance.<sup>317</sup> Hence, we should overcome the vision of a world that follows the authority of science because this will not stop political differences. Rather: "What should be aimed for are less ambitious, more incremental, and multi-scalar projects that emerge from a humbler disposition toward the future and that anticipate perverse outcomes."<sup>318</sup> These interventions, he sees coming from a bottom up narrative, with new "[...] participatory and agonistic forms of democracy - where value conflicts and political disagreements are acknowledged, voiced, and worked with - is as important (perhaps more important) than investing in new scientific or technical knowledge."<sup>319</sup> In climate change, he sees the chance to start over: "We can use the idea of climate change to move beyond the separated categories of the physical and the cultural, beyond the framing of climate change that uses the language of problem and solution. Climate change can help us bring the physical and the cultural, the material and spiritual, into a new realignment."<sup>320</sup> It is an idea around which it is possible to mobilize concerns for social and environmental justice.

Therefore, Hulme suggests to examine climate change as an idea of the imagination rather than as a problem that can and should be solved: "By approaching climate change as an idea to be mobilised to fulfil a variety of tasks, perhaps we can see what climate change can do for us rather than what we seek to do, despairingly, for (or to) climate."<sup>321</sup> In short: Hulme wants climate change to serve as a trigger that makes us to rethink our relationship with the world around us, because it affects so many areas of life and its 'solution' must lead to the big questions. For that, he presents four 'myths' in the sense of "[...] of stories that 'embody fundamental truths underlying our assumptions about everyday or scientific reality.'"<sup>322</sup> Those four myths - which do not necessarily have to be the only ones - are intended to serve as mirrors that are intended to provide information about the human condition<sup>323</sup>:

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<sup>316</sup> Hulme, 'Why and How to Debate Climate Change', p. 1f.

<sup>317</sup> Cf. Hulme, 'Why and How to Debate Climate Change', p. 1f.

<sup>318</sup> Hulme, 'One Earth, Many Futures, No Destination', p. 311.

<sup>319</sup> Hulme, 'One Earth, Many Futures, No Destination', p. 311.

<sup>320</sup> Hulme, *Why We Disagree about Climate Change: Understanding Controversy, Inaction and Opportunity*, p. 357.

<sup>321</sup> Hulme, 'Beyond Climate Change', p. 340f.

<sup>322</sup> Hulme, 'Beyond Climate Change', p. 341.

<sup>323</sup> Hulme, 'Beyond Climate Change', p. 358.

1. The myth of Eden, born of nostalgia – shows our desire to return to simpler era, to nature but also that we are uncomfortable with our godlike powers regarding our climate.
2. The myth of Apocalypse, born of fear – tells us our worry about the future and our own appetite for material consumption, desperate about newly locating the once lost gratitude.
3. The myth of Babel, born of pride – presents us or longing for mastery and climate change offers new possibilities for structuring that ‘globally’ even without reaching the ideal state.
4. The myth of Jubilee, born of justice – shows us humans’ call for responding to injustice as well as our limits.

To put it in the words of the Canadian novelist Margaret Atwood, who analyzes the roles creativity, adaptive thinking and storytelling can play in overcoming the challenges of climate and ecological crises: “I think calling it climate change is rather limiting. I would rather call it, the everything change.”

## Conclusion

This thesis has expressed concerns about the ‘mainstream’ solutions presented or even have been invented to solve ‘climate change’. Such kind of solutions often rely on technological innovation or on methods that are quite easy to be implemented in our current system of global capitalism.

Based on the social science studies of climate change, the term ‘climate solutionism’ arose, criticizing an engineering approach towards climate change. The criticism comes from the fact that the specific framing of the so-called ‘climate change’ is accompanied by a specific solution behavior. It looks at the problem separated from its political, social or cultural nexus. To question this, the thesis’ attempt was to spotlight where this solutionist approach came from and how it has evolved over time. This solutionism, formerly labeled ‘technological fix’ could be observed early in human history. The historian Sean F. Johnston, who in his work deals with the cultural aspects of science and technology states: “The conviction that human problems can be side-stepped by clever engineering had been applied repeatedly, if less consciously, in earlier

societal contexts.”<sup>324</sup> As the most popular recognized he calls technical solutions to support governance and political power, such as walls used to – like the Chinese wall, the Hadrian’s Wall or the Berlin Wall – for controlling the flow of population. However, with advancing industrialization and technologization in the 20th century, it has reached its peak. The two world wars, the reconstruction after and the atomic bomb have played an essential role. To understand the logic of the technological fix back then, you only have to read Alvin Weinberg, its first convinced representative: „The Technological Fix accepts man’s intrinsic shortcomings and circumvents them or capitalizes on them for socially useful ends. The Fix is, therefore, eminently practical and, in the short term, relatively effective.”<sup>325</sup> The technological pinnacle has been embodied by the enormous and pervasive digitalization, symbolically represented by 'the Internet.'

Morozov's definition of solutionism makes clear how profoundly this has become established in our society for what he shows various examples: from cooking behavior to 'solutionist' interventions in health to political reforms based on digital innovations. It was elaborated that this development does not only have down sides, since technology can certainly be supportive once it is used to resolve 'real' problems plus it is not taken as sole solution. However, what should be viewed critically is a solutionist approach to solving complex problems, which in turn gives rise to new problems: “Recasting all complex social situations either as neatly definite, computable solutions or as transparent and self-evident processes that can be easily optimized [...] is likely to have unexpected consequences that could eventually cause more damage than the problems they seek to address.”<sup>326</sup>

In addition, not all technological 'solutions' are to be understood as solutionist, the matter is more differentiated. Solutionism describes the derivation rather than the final solution. Thinking in technological structures also results in technological solutions. Solutions, or even the desire for a solution, no longer depends on the wishes or expectations of the socio-political framework, but is driven by an ideology that puts technology, digitization, progress and innovation above everything else. The problem that lies in this is that terms such as progress and innovation are often not analyzed in more detail at this point. New technology often means innovation followed by progress. This in turn plays into the hands of those who make their money with it and is also exploited by them in the context of marketing. In short: 'simple' solutions are suggested for problems where there are no problems. On the other hand, this also means that those solutions might lead to people being dumbed down and things like morality

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<sup>324</sup> Johnston, *Techno-Fixers : Origins and Implications of Technological Faith*, p. 6.

<sup>325</sup> Weinberg, p. 5.

<sup>326</sup> Cf. Ibid., p. 5.

or education suffer as a result. If an App or device tells me how to act, why should I worry too much about it? True social enlightenment suffers from this and ultimately it results in an incapable society governed by the owners of the devices. On the other hand, there is a danger that 'real' far-reaching solutions, in the sense of social change, will be supplanted by technological solutions and dismissed as 'irrational'. Morozov's main concern: the series of social-political interventions undertaken by representatives of high-tech industry and IT sector, indicating their utopian and ideological nature, driven by a permanent 'will to improve'. This thinking results from the belief in rational science and the Enlightenment. In short: modernity.

However, one quickly gets the impression that Morozov, since amongst other critiques most frequently quoted, was the inventor of this criticism. This is not so. Therefore, the present thesis provided insights into three different approaches to criticism that arose way before Morozov. While the ecological philosopher Max Oelschlaeger describes technological fix in 1979 as a myth that does not correspond with the anthropological behavior of people, pedagogue Chet A. Bowers speaks of an 'ideology' that frames digitalization, by examining the 'culture's linguistic ecologies', which as he believes, influence how we think about problems and their solutions. What unites both of them is that they closely connect solutionist dynamics with the development of western, industrial societies. Characterized by: mechanization, technology, capitalism, consumerism.

Günther Anders' criticism of technology can also be classified in the same category as these criticisms and focuses on the overpowering of technology over people. Here the concept of the 'Promethean shame' plays an essential role, meaning man's desire to actually be as good as the machine he created by himself. It can also be read from Anders' explanations that the capitalist system can be seen as a supporter of this dynamic. To put it in the words of Christian Fuchs: "In the age of the Internet and big data capitalism, Anders' warnings about the potential negative effects of capitalist technologies and capitalism remain of crucial relevance and have taken on new qualities. Anders' philosophy is an undiscovered critical theory of technology that allows us to critically understand power structures in the age of big data and social media."<sup>327</sup> Therefore, the question arose by what extent solutionism and digital capitalism are actually linked.

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<sup>327</sup> Christian Fuchs, 'Günther Anders' Undiscovered Critical Theory of Technology in the Age of Big Data Capitalism', *TripleC*, 15 (2017), 613 (p. 582) <<https://doi.org/10.31269/triplec.v15i2.898>>.



Oliver Nachtwey and Timo Seidl gave a suitable answer in their investigations of digital capitalism. They have allocated solutionism in the very heart of digital capitalism. It is characterized by the fusion of philanthropy and entrepreneurship. Therefore, solutionist thinking leads to an equation of potential for change and potential for improvement, based on an unstoppable belief in the redemptive power of technology. As the ideological center of this solutionist digital capitalism, they locate in Silicon Valley. The 'Californian ideology' underlying the Valley can also be confirmed with these statements. Barbrook and Cameron coined that term the origin of the information age's underlying belief: "[...] the Californian Ideology promiscuously combines the free-wheeling spirit of the hippies and the entrepreneurial zeal of the yuppies."<sup>328</sup> The authors say it was their common faith in new information technologies plus their universal belief in technological determinism what caused them merging. But what effects does this have on behavior and social and individual decision-making, as well as on the search for a solution? Adrian Daub, a Stanford Professor of comparative literature would answer: A lot. What Silicon Valley is selling as innovation is double-edged, because not everything that is sold as innovative and new actually is. In truth, Silicon Valley shows that the master narrative of innovation, inevitably linked to the disruption of everything traditional, rids the 'digital elite' of all rules.

After this intensive consideration of solutionism, its origins, its consequences and also its powers, the work returns to its starting point: How can climate change be tackled if not through pure technology? What has to happen to other solutions to become more popular? Since the thesis aims to find alternative approaches instead of analyzing alternative systems, answers can be found in the social sciences and humanities in particular.

As found out from the analysis of solutionism, solving a problem is more about defining the problem appropriately. Because the consideration of the potential solution also depends on this. In relation to such large and far-reaching problems as climate change, the concept of 'wicked problems' is therefore examined more closely. First of all, it advocates admitting that there is probably no one 'right' solution to such a problem, maybe a better or a worse, yet. Due to the ramification of the most diverse interests and aspects - political, economic, social, cultural - there can be no right or wrong in the end. A linear-rational solution based on scientific rules cannot work for complex, dynamic, non-linear problems such as climate change.

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<sup>328</sup> Barbrook and Cameron, p. 2.

Social scientists like Sun and Yang therefore see their task in dealing with climate change in such a way that they can derive policy advice from it. They argue for the issue and its solutions to be viewed in a more dynamic and complex way, involving 'social messes' and the fragmentation of industries and organizations. The interdisciplinary group of scientists (Political Science, Environmental Studies, Environmental Management) Kelly Levin, Benjamin Cashore, Steven Bernstein, and Graeme Auld follow a similar approach by making use of the applied forward reasoning approach. It attempts to help with identifying new ways to develop and assess policy interventions on the basis of whether they contain plausible logics in order to trigger more path-dependent processes. Because the problem of climate change is no longer any disagreement about the scientific facts, but a lack of long-term solutions.

Rather than settling on a fixed 'destination', historian Mike Hulme says it is better to try to point the way. The different ideas for the future count, it's time to debate values and to reconnect climate change with culture, instead of relocating it in the scientific sphere. Because climate change is not only a scientific problem. It is closely intertwined with cultural aspects and gives us the opportunity to rethink what role we humans have and what place we want to take in the future. Finding a solution based on scientific facts is therefore impossible to find: "[Instead], we need to see how we can use the idea of climate change – the matrix of ecological functions, power relationships, cultural discourses and material flows that climate change reveals – to rethink how we take forward our political, social, economic and personal projects over the decades to come."<sup>329</sup> The Canadian novelist Margaret Atwood puts it in a nutshell: "I think calling it climate change is rather limiting. I would rather call it, the everything change."

In summary, then, 'solutionism' has been analyzed as a way of thinking that, though always having held its place in human history, has become more and more present as a result of rapid technological development. With the 'Internet Centrism' it has reached its current peak. And who symbolizes the internet boom more than Silicon Valley? This is where visionary tech utopias meet capital. What emerges is a fusion of both, but with capital emerging as the winner. Products that are practical and at the same time want to improve the world sell much better. And therein lies the danger. Because there are no simple solutions to complex issues. Framing climate change as a 'wicked problem' would help to think out of the solutionist box. Such problems cannot simply be solved, they require far-reaching changes. They are not triggered

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<sup>329</sup> Hulme, *Why We Disagree about Climate Change: Understanding Controversy, Inaction and Opportunity*, p. 362.

by a single aspect and therefore cannot be solved with a single screw. It needs more negotiation, democracy, debate and societal 'innovation'. What is needed is the 'Everything Change'. History can help by not succumbing to ideologies within the framework of its narrative, but remaining neutral. Paradoxically, it is precisely the Critical Future Studies gets it to the point: what ideas we have for our future depends heavily on how the present and the past are told.

It is important to keep in mind that firstly, technological development is not natural, but man-made. 2. Technological progress does not always lead to social improvement, but 3. that blind belief in technology can quickly turn negative, trigger its own problems, or overwhelm everything 'human.' In relation to climate change, this can be easily illustrated. The problems we have today were triggered by technological developments and are now supposed to be solved with technological solutions.

## Outlook

Hence, the paper did not provide a natural scientific analysis of technological solutions for climate change, but an indepth research and historical contextualization of a specific approach. In addition, it can be stated that the present work was processed with an enormous predominance of male literature. That was by no means the intention of the author, but due to the literature situation and remains to be regretted.

Despite a global historical research approach, the literature has also focused on the US and European areas. This could be because of the particular focus on English-language literature, or because of the topic that showed us that there is a deep connection between solutionism and the Silicon Valley, nowadays. However, as new 'Silicons' have emerged globally in recent years, such as in India or Israel, it is worth taking a closer look at them. In subsequent work, this hypothesis can be checked, which is also compared with the results of the work: Is technological solutionism actually shaped by the West? Or what role does it play in other global regions? After all, we live in a particularly economically globally networked world. Additionally, other papers on the topic could focus on non-Western approaches regarding the topic of climate change which would automatically lead to more non-Western literature.

The work has also focused on the 'critical' perspective on technology. Optimistic perspectives on technology have therefore taken up less space. It should be emphasized again here that it was not about condemning technology. However, instead of using them in an unquestioned 'innovative' way, the work advocates a more differentiated approach.

Eventually, the alternative approaches for a solution, represented here by the concept of 'wicked problems' and touched upon by various social science and humanities approaches, only play a secondary role in the work. It would be desirable for future historical works to draw more attention on these approaches and to derive framings that would also contribute to a realistic 'social solution'.

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## Appendix

### Abstract

The aim of this paper is to examine the phenomenon of technological solutionism. The term 'solutionism' is used critically to describe approaches that are based on technological innovation and are comparatively easy to implement in existing political and economic systems. The criticism is that these approaches, when applied to social problems, hinder long-term solutions and political change. With new technological possibilities in the digital age, this approach has reached a peak and is subjected to economic and capitalist dynamics. Silicon Valley is the emblematic center of this in this thesis. However, the origins of 'solutionism' can be located well before the 21st century and will be illustrated and contextualized using various authors who have addressed its terminological predecessor 'technological fix' and general critique of technology.

The handling of climate change serves as a striking example that debunks 'solutionism' well. In reference to this, the term 'climate solutionism' is used. Criticism comes in particular from the humanities and social sciences, which argue for a differentiated debate and see in problems such as 'climate change' opportunities for political and social reform. As in the case of other 'problems' identified by representatives of solutionism, they draw attention to the specific definition and framing of a problem, which is crucial for finding a solution. For this, different concepts based on the theory of 'wicked problems' are presented. They plead for a renaming to the 'Everything Changes' to allow negotiation, democracy, debate and social innovation as legitimate solution approaches.

Die vorliegende Arbeit hat sich zum Ziel gesetzt, das Phänomen des ‚technological solutionism‘ zu untersuchen. Unter dem kritisch verwendeten Begriff des ‚solutionism‘ werden Lösungsansätze zusammengefasst, die auf technologischer Innovation aufbauen und vergleichsweise leicht in bestehende politische und wirtschaftliche Systeme zu implementieren sind. Die Kritik daran beläuft sich darauf, dass jene Ansätze, angewandt auf gesellschaftliche Probleme, langfristige Lösungen und politische Veränderungen behindern. Durch neue technologische Möglichkeiten im digitalen Zeitalter hat dieser Ansatz einen Höhepunkt erreicht und wird wirtschaftlichen und kapitalistischen Dynamiken unterworfen. Das Silicon Valley bildet in der vorliegenden Arbeit das sinnbildliche Zentrum dessen. Der Ursprung des ‚solutionism‘ lässt sich jedoch weit vor dem 21. Jahrhundert lokalisieren und wird anhand

verschiedener Autoren, die sich mit dessen terminologischen Vorgänger ‚technological fix‘ und genereller Technikkritik auseinandergesetzt haben, illustriert und kontextualisiert.

Der Umgang mit dem Klimawandel dient als markantes Beispiel, welches den ‚solutionism‘ gut enttarnt. In Bezug darauf wird der Begriff des ‚climate solutionism‘ verwendet. Kritik kommt insbesondere aus geistes- und sozialwissenschaftlicher Richtung, die sich für eine differenzierte Auseinandersetzung aussprechen und in Problemen wie dem ‚Klimawandel‘ Möglichkeiten einer politischen und gesellschaftlichen Reformierung sehen. Wie auch bei anderen, von Vertreter\*innen des solutionism identifizierten ‚Problemen‘, machen sie vor allem aufmerksam auf die spezifische Definition eines Problems, taktgebend für dessen Lösungsfindung. Hierfür werden verschiedene Konzepte, auf Basis der Theorie der ‚wicked problems‘ vorgestellt. Sie plädieren für eine Umbenennung in den ‚Everything Changes‘, um Verhandlung, Demokratie, Debatte und gesellschaftliche Innovation als legitime Lösungsansätze zu ermöglichen.