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Trapped in Complexity: Worlds and the methods they make

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After several years of working with industrial design as a tool for exploring the types of radical systemic change that climate change arguably needs, it now seems timely to discuss the systemic approach. Much at odds with current discourse, this article promotes disciplinarity per se and questions the systems oriented design (SOD) assumption, which seems to take for granted that there is an inescapable intimate relation between development and complexity. It is done by revisiting four seminal scholars within system thinking and cybernetics, which arguably were significant for giving rise to the current praxeology of SOD and its continued development. The article makes three brief explorations, covering (i) the ecologic worldview, having nature as a guiding metaphor versus the mechanical having a machine as a guiding metaphor, (ii) the expected turning point for radical climate action and why it has not turned up yet and (iii) the ecology of disciplines and its knowledge production, and how the modes of disciplinary cooperation tend to be, more or less, easy to control. These discussions intend to explore the tensions between the worldviews that direct our understanding and action. The article shows how the worldview makes the methods as much, if not more, than the other way around. Finally, the paper tries to establish a creative dialogue with the SOD community by both questioning its current main focus on the current system's complexity and, at the same time, suggesting how the SOD praxeology could be potentially much more beneficial if its view instead were directed towards ways to transcend the current system.

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1. Introduction

> The endless cycle of idea and action,
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> Endless invention, endless experiment,
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> Brings knowledge of motion, but not of stillness;
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> Knowledge of speech, but not of silence,
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> Knowledge of words, and ignorance of the Word.
>
> All our knowledge brings us nearer to our ignorance,
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> All our ignorance brings us nearer to death, ... (T.S. Eliot, 1934)

Given the escalating nature of the climate crisis, T.S. Eliot's poetic and seemingly prophetic words from nearly a century ago can be seen as a final call to rethink our current actions (Eliot, 1934/1963, p. 147). One can only hope that we then finally will understand the urgency and be able to act more wisely on all knowledge we have gathered about how charged our ecological systems currently are with disasters. Can we then question the systemic roots and relations of those disasters and start to rethink our current system and actions accordingly? This article argues that "we," as a minimum, urgently need to decide if we should do our best to sustain the current system by making it more efficient or work for its replacement instead. A choice that for some might seem overly binary, but for this discussion, I prefer to see it as an illustrative example of the kind of fluid dichotomies we designers enjoy using, as the design philosopher Johan Redström (2017, p. 2) suggests, being "resilient to reductive dichotomies."

The "barefoot-economist" Manfred A. Max-Neef (2009) reminds us of the Spanish philosopher José Ortega y Gasset's insight that every period has its theme. According to Max-Neef, "there is nothing wrong with it, as long as the dominant "language" [i.e., theme or worldview] of a given period is coherent with the challenges of the period"

(Ibid. p. 5). However, Max-Neef emphasises that the "important thing to keep in mind is that this [,kind of,] "language" influences our perceptions and, hence shapes our actions" (Ibid). After discussing some earlier historical periods and their respective themes, Max-Neef ends with the current period that, in stark contrast to the ones preceding it, nearly exclusively focuses on economics. It all starts at the time when T.S. Eliot wrote the lines above, i.e., around the same period as the Great Depression from which Keynesian economics emerged. It was followed by the post-war era dominated by "development," an era US president Truman kicked off in 1949 (Hickel, 2017; Sachs, 2010/1992). Finally, Max-Neef's historical journey ends with the last 50 years of what has been coined the neoliberal era. Despite the obvious disastrous consequences, this era seems to be a more entrenched worldview than ever before (Max-Neef, 2009, p. 6). It is, arguably, so ingrained that we can think of it as the; "calcified worldview" of our time.

An interesting footnote in the history of design and cybernetics is how the scholar and management consultant Stafford Beer, in his published lecture series *Designing Freedom,* describes how, already 50 years ago, it could be to be living through the genesis of the so-called neoliberal worldview. Beer (1973) describes this time as when "we"

> ... spend our days boxed in our houses, swarming in and out of office blocks like tribes of ants, crammed into trains, canned in aeroplanes, locked solid in traffic jams on the freeway. Our unbiblical concern for what we shall eat, what we shall drink, and what we shall put on is amplified and made obsessional by the pressure to consume—way, way beyond the natural need. All this is demanded by the way we have arranged our economy. And the institutions we have built to operate that economy, to safeguard ourselves, protect our homes, care for and educate our families, have all grown into large and powerful pieces of social machinery which suddenly seem not so much protective as actually threatening. (p. 2)

Thirty years later, in the paper "What is cybernetics?" Beer (2002) follows up by writing:

> The purpose of a system is what it does. This is a basic dictum. It stands for a bald fact, which makes a better starting point in seeking understanding than the familiar attributions of good intentions, prejudices about expectations, moral judgments, or sheer ignorance of circumstances. (p. 217)

If so, we can learn from the economic anthropologist Jason Hickel (2017), who very bluntly describes the purpose of our current system by what it actually "does." According to him, a Euro-centric worldview has been globalised since at least the 15th century. It's a strategy that is consistently based on a division where the many only seem to live lives to feed a system controlled by and channels the gains for the few, with results confirmed by many studies (e.g. Chancel & Piketty, 2015; Oxfam, 2018). However, according to Hickel, the means to achieve these system goals have changed. For instance, what was once slavery, has now been replaced with sweatshops and obedience that used to be enforced by violence (Federici, 2004, p.16) is, albeit allied (Graeber, 2011), now more often replaced with financial debts. What before were tangible are today hidden by an opaque marketing screen—where being oppressive becomes an "advanced economy," and colonial extraction is rebranded as a "free trade," and everyone eventually will gain from an infinite process towards a "better world."

My own standpoint is that of a concerned industrial designer who primarily focuses on radical change, development, futures, equity, and global warming, applying systems thinking as a sense-making tool. This view, combined with the broad context described above, is both the backdrop and the standpoint of this article. However, I will try to zoom in and focus on an exploration of what started as a mere hunch. That systems oriented design (SOD) might not only be very focused on complexity but might also be trapped in it. Indicating that SOD, seemingly unknowingly, is trapped in a broader system that subtly guides the kind of subsystems that SOD typically studies. My hunch can be reformulated into three related and designerly WHAT-IFs:

What if complexity is not a reliable characteristic of an advanced society but rather a telling characteristic of our current system, which is intrinsically interested in it for its own self-preservation? If so, we might suspect that the system's interest in complexity

originates from an attempt to sustain and control our current system, whose increased complexity seems suspiciously correlated with growing tensions with an ecological system that now starts to talk back.

What if all attempts to address particularly problematic and complex issues within this current system without questioning its frames will sustain this system further? If so, perhaps we need to be extra wary about what we apply SOD to so that our attempts do not benefit those with resources and power to implement efficient contra-actions that obscure, hide or neutralise any tensions that might have been revealed along the way.

What if system thinking's managerial legacy still permeates SOD's mindset, and that is the "world that makes the methods" (ref. RSD11Focus: Methods and the worlds they make[1]) SOD currently applies and builds its praxeology on? If so, perhaps we must question how we can best go beyond a legacy that seems to lead towards a calcified, or mummified, trap. Below I'll explore if we, as a kind of reversed contra-action, can do it by learning from seminal thinkers within managerial systems like Stafford Beer and Russell Ackoff and instead apply their insights in—and for—a system of our own choice?

2. Three explorations

> Cultural transformations of this magnitude and depth
> cannot be prevented. They should not be opposed but,
> on the contrary, should be welcomed as the only escape
> from agony, collapse, or mummification. What we need,
> to prepare ourselves for the great transition we are about
> to enter, is a deep reexamination of the main premises
> and values of our culture, a rejection of those conceptual
> models that have outlived their usefulness, and a new
> recognition of some of the values discarded in previous
> periods of our cultural history. (Fritjof Capra, 1982)

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[1] https://rsdsymposium.org/systemic-design-methods/

To zoom in, the article briefly explores three inter-layered aspects by building on mere snippets of insights, primarily, but not only, coming from four foundational scholars of systems thinking: Stafford Beer, Fritjof Capra, Erich Jantsch and Russell Ackoff. It's best understood as three illustrative and explored examples that hopefully will provoke a much-needed dialogue on the kind of measures required to address the urgent ecological challenges currently at hand. Challenges I, with others, have already published my views elsewhere (Edeholt & Joseph, 2022; Edeholt et al., 2021).

2.1 Exploring ecological, mechanical and calcified worldviews

Over a long and productive life, Fritjof Capra has persistently explored the world-views, paradigms and systems we live in. Despite all systems and subsystems available, he often moves his gaze to a meta-level that's high enough to enable him to focus and compare only the largest of them. Building on Thomas Kuhn, Fritjof Capra (1996) generalised the definition of a scientific paradigm to a social paradigm:

> a constellation of concepts, values, perceptions, and practices shared by a community, which forms a particular vision of reality that is the basis of the way the community organises itself (pp. 5-6).

Applying Capra's definition to the current situation gives a tentative affirmation that "we all," including SOD, currently might be trapped in a particular vision of reality that we, more or less consciously, use as a basis to organise our work.

For this article, I build on Capra and start with the largest of the systems we will consider in this article (i.e., the globe we co-habitat with so many others). Focusing on this system typically leads to what I will call "the ecological worldview." For a few centuries, another view has entered and nearly completely outgrown the available space given by the ecological frames of the globe. I will refer to it by its most common descriptor, "the mechanical worldview." These two competing worldviews are briefly described below.

The ecological worldview is characterised by being a holistic, living, and organic way of understanding our world in ways that have been around since the very beginning of human societies (i.e., during many millennia). The human worldview is here based on understanding oneself as a mere part of the ecological system. In their recent book, The Dawn of Everything: a new history of humanity, the anthropologist David Graeber and the archaeologist David Wengrow (2021) describe how this worldview often was characterised by dynamic experimentation that facilitated a diversity of quite advanced social systems to emerge and change with time, season, geography and climate, i.e., much like nature in general evolve.

The Mechanical worldview—is, in comparison, a late arrival that dates back to the 16th–17th century. It's often attributed to Francis Bacon, who, in his Meditationes Sacrae from 1597, wrote that "knowledge is power" and his whole life "passionately advocated for the empirical scientific method and the domination of nature" (Capra & Mattei, 2015 p. xvi). As a metaphor, seeing the complex world as a simple machine has facilitated a culture of extremely efficient knowledge production. But as a hegemonic worldview, it arguably, both literally and figuratively, has entered a very dangerous dead-end. It rests on the understanding that we humans somehow exist outside an intrinsically complex nature and actually can control it as if it were the machine the metaphor simplifies it to be.

Speaking of reductive metaphors, I would suggest another metaphor—that of a parasitic cuckoo that increasingly takes over the host's nest. But, as we already learned from Manfred Max-Neef (2009), we've also nurtured a new kind of cuckoo in the nest over the last century. During its first two generations, an era that nearly only focused on the Economy, per se, and by that, at least partly addressed some concerns of that time. However, during the second half of this economic era, a new third generation of cuckoos seems to have occupied the nest. In this neoliberal era, elusive globalised financial power even trumps national-level economic strengths and values. This "neoliberal cuckoo" is characterised by not being able to fly by itself, so instead, it holds on to its privileged position in the nest without letting go. As it needs constant and infinitely increased nutrition from others to survive, it taxes the whole ecology far beyond available resources and jeopardises the survival of itself and everyone else. So,

metaphorically, it still resembles a mechanical machine that requires fossil fuel to move. In addition, I'll argue that financial capital[2] is the metaphorical oil that ensures smooth propelling, ensuring it never gets stuck entirely. This sequence, starting with a holistic view and ending with its complete opposite, can be simplified, as illustrated in Figure 1.

To wrap up, it seems like 'we', as Carolyn Merchant (1980) suggests, have moved from a diverse, dynamic, holistic and organic worldview, ending up in a reductionist worldview that, de facto, appears to be a monocultural system that now is so calcified that we, despite or due to, its toxicity seem unable to fly over or climb the walls erected around it and move on towards a safer and more long-term sustainable system. The next section discusses the challenge to un-trap us and to escape the current "nest."
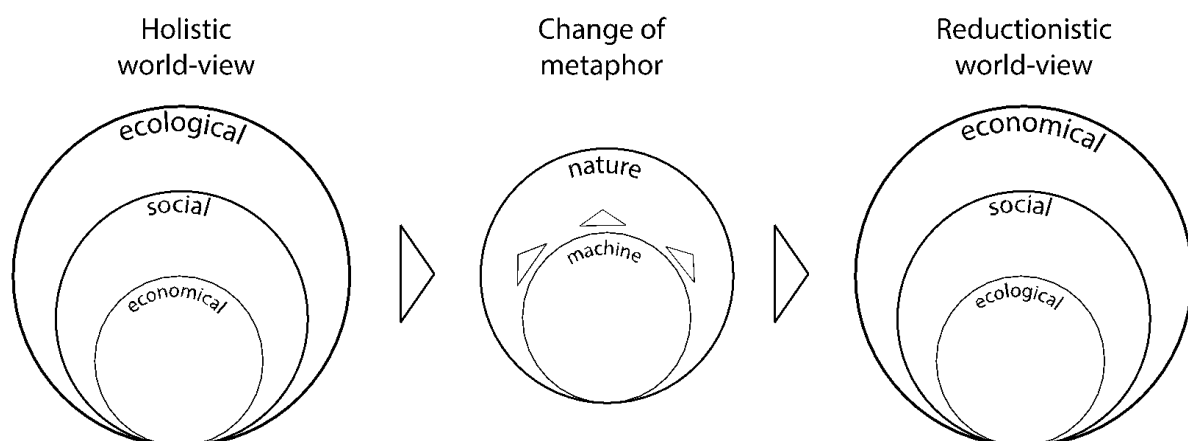

Figure 1. The growth of the mechanical machine metaphor has changed the worldview (figure by author).

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[2] Financial capital(ism) is arguably another side of neoliberalism. It has been growing in significance since Nixon 1971 abandoned the gold standard, giving much more leeway to print money out of, what has been coined, "thin air." Even though beyond the scope of this article, it's interesting to see how it, at that very time, the early 70s, was intended as a temporary measure to keep the dollar's dominance and control of the global market. But as it emerged as a very efficient tool actually to do that, it has been maintained, and with disastrous consequences, allowing the socio-economic machine to run, more or less, de-coupled from the production of real value and ecological concerns. For further discussions and references, see Edeholt & Joseph (2022).

2.2 Exploring the turning point

In the book *The Turning Point,* Capra (1982) describes how he, in the early 80s, saw the genesis of an emerging "rising culture" that again would be more in tune with nature and guided by a view that recognised that we are a mere subset of the planet's ecosystem we share with so many others. Based on his experience from physics' turning point at the beginning of the 20th century, which had made it so evident that the mechanical worldview was way too simplified, he foresaw how society should soon follow suit.

Now 40 years later, we might ask ourselves, what happened with that turning point? Why haven't we even been able to bend the emission curve (Stoddard et al., 2021), and what are the odds that we'll be able to do it in the much shorter timeframe science tells us now remains?

A growing pile of evidence suggests that the environmental concerns that emerged in the 1960s and '70s (Larsson Heidenblad, 2021) became a powerful warning. Making it, on the one hand, essential to show that the established, arguably mechanical system could also be made sufficiently efficient and sustainable and that it, in its neoliberal version, was already heading towards a "better world." At the same time, on the other hand, it questions the reasons and seriousness of climate change. Over time when climate change became too obvious, the focus moved from explicit denial to instead nurture different strategies of delay (Lamb et al., 2020). These contra strategies, one can suspect, were more or less designed to focus on the emergence[3] of self-correcting
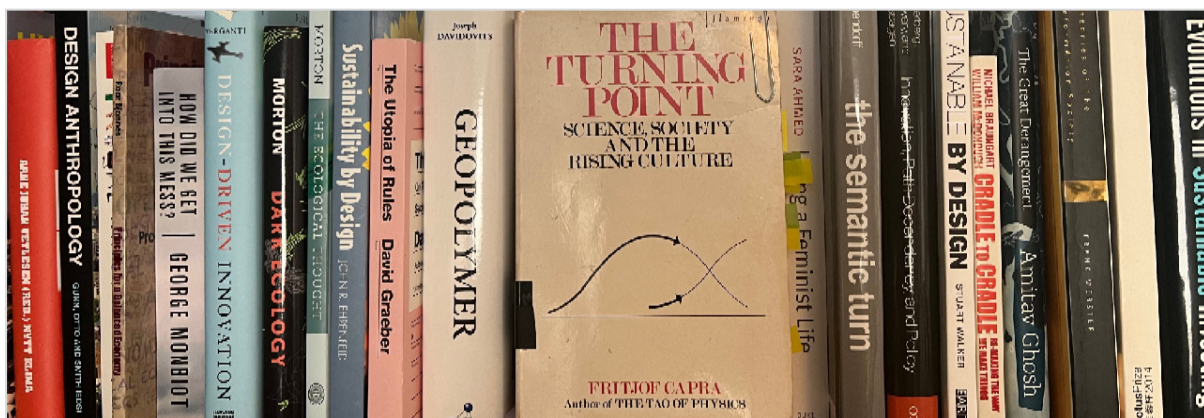
psychological behaviours the system itself could produce, or what Beer (2002) calls an "intrinsic control" mechanism. Below I will briefly investigate the marketing and delay strategies of this "calcified worldview."

The marketing strategies often have co-optation as one of their hallmarks, meaning to carefully take care of concerns that otherwise could grow into a severe tension that demands radical change. One example might be the softening of the international climate conferences organised over the last 30 years. This period has seen more fossil CO_2 emitted than humanity has ever done over its entire history (Stoddard et al., 2021). Another example is the Millennium Development Goals (MDGs) established for 2000-2015, followed by the Sustainability Development Goals (SDGs) for 2015-2030. However, Hickel (2017) eloquently reveals how these marketing narratives not only "efficiently" hides the extractive and colonial history up to now and how it covertly continues into our days. But also, as I have coined it, "calcifies" the present system as the only "viable option" we have by conveying a story that tells us that we are on track and doing the right thing. One of the more flagrant of many outrageous examples is how the statistics a few years before the end showed that the MDGs were so much off-track that it "suggested that the structural adjustment programmes[4] imposed by the World Bank and the IMF on Global South countries during the 1980s and 1990s in the name of 'development' were actually making things worse" (Ibid., pp. 50-51). That flaw in the narrative was hidden by simply moving the natural base year from 2000 to 1990, which incorporated the enormous decrease in poverty China experienced during the 90s to improve the statistics. This is especially significant as China was one of the very few countries that were strong enough not to follow the structural adjustment programs enforced by the World Bank and IMF. Now, halfway into the SDG period, there is no evidence of SDG's transformative impact (Biermann et al., 2022), and given the climate emergency (Edeholt & Joseph, 2022), we can't wait to (re)act until we know for sure.

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[4] Structural adjustment programs (SAPs) consist of loans (structural adjustment loans; SALs) provided by the International Monetary Fund (IMF) and the World Bank (WB) to countries that experience economic crises (cf. https://en.wikipedia.org/wiki/Structural_adjustment). Many scholars like Hickel have criticised it for being instrumental in the globalisation of the neo-liberal agenda by promoting and enforcing agreements that unilaterally, only gain the most powerful nations.

De facto, this further leads to the kind of delay strategies that have been mapped (Lamb et al., 2020) and reveals how ubiquitous these strategies play out as an intrinsic control mechanism that safeguards the current system (Figure 2).
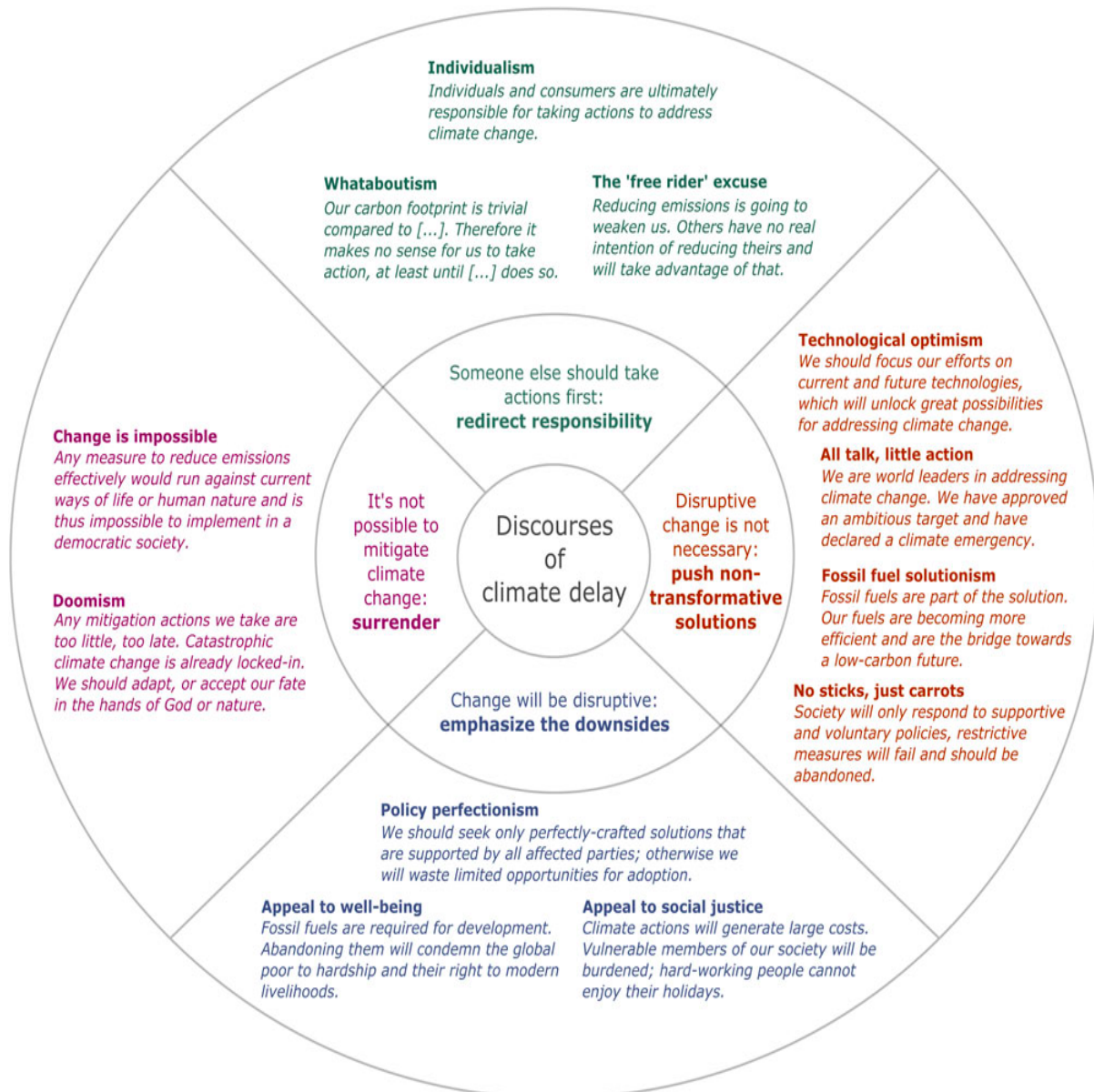

Figure 2. From (Lamb et al., 2020).

However, being in academia, what this also calls into question is a particular delay we can illustrate with the political scholar Chantal Mouffe's (2018) concern that we don't dare to touch or reformulate certain concepts (e.g., populism, as it's so closely related to right-wing racism and the binary distinction between we-they). However, in a situation where all dominant political worldviews are squeezed into the centre, we arguably need a radical alternative to the far right-wing populism that seems to become a new cuckoo in our nest. So instead of dismissing the binary distinction we-they, Mouffe believes one should use it, but to be an alternative, move the frontline from one underpinned by racism to one that sees a frontline between the very few (let's say) 1% to the very many 99%. The following section will explore if it's possible to de-calcify another academically calcified issue that further tends to delay action.

2.3 Exploring the ecology of disciplines and knowledge production

To paraphrase Chantal Mouffe (2018, p. 9): I would like to make clear that my aim is not to add another contribution to the already plethoric field of disciplinary studies, and I have no intention to enter the sterile academic debate about the true nature of disciplines and their different modes of cooperation.

Instead, I intend to simplify this contested area as much as possible by focusing on the attributes that make it most helpful in this particular context. We can see this contested area as a calcified dichotomy (or binary) that advocates a replacement of disciplinarity with a post-disciplinal situation that, in turn, seems underpinned by a very peculiar (mis)understanding of the concept of transdisciplinarity. The significance of this exploration is born out of Francis Bacon's insight that knowledge gives the power to dominate, and what here might be at stake is a realistic understanding of how the power and control of our knowledge production unfolds. The description builds on what's already discussed in a previous article (Edeholt & Joseph, 2022), which will be expanded in a direction I hope will make it even easier to comprehend. I'll try to do it humbly but still confidently, relying on Beer's words:

a model is neither true nor false:

it is more or less useful. (Beer, 1985, p. 2)[5]

However, in this case, most of the confidence comes from the seminal writing of Erich Jantsch (1972), who arguably is the most common source being (ab)used when tracing the roots of the hierarchy going from disciplinarity to transdisciplinarity and all modes in-between. Jantsch was an established scholar that published extensively on general system theories, innovation, and futures. Jantsch conveyed a simple taxonomy of prefixes that was applied to a hierarchy of realities, starting with (i) the empirical level and continuing with (ii) the pragmatic level, (iii) the normative level and finally (iv) the purposive level of values and meaning[6] (Figure 3).
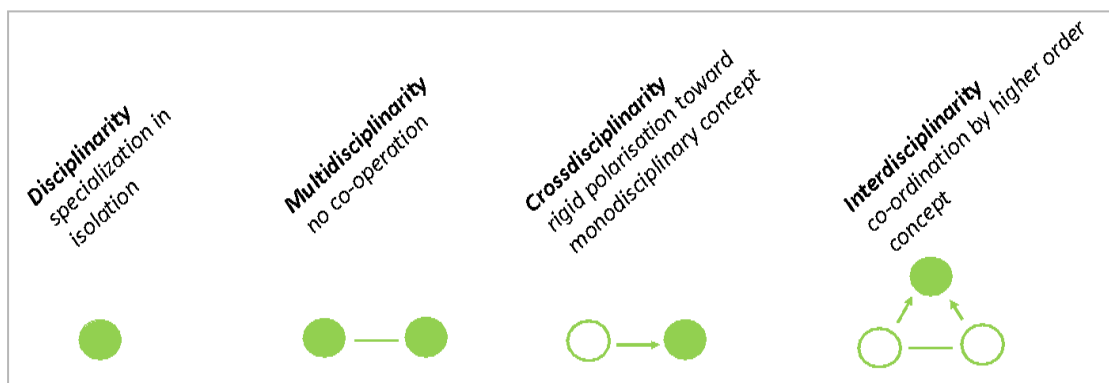

Figure 3. Illustrating Jantsch's (1972, p. 222) system of increased complexity in the continuum of concepts of disciplinary cooperation (figure by author).

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[5] A slightly catchier version of this phrase instead often reads: "all models are wrong, but some are useful." A recurrently used phrase that typically is attributed to either Georg Box or William Deming.

[6] See Edeholt, H., & Joseph, J. (2022). Design Disciplines in the age of Climate Change: Systemic views on current and potential roles. *DRS2022,* 25 June - 3 July, Bilbao, Spain.

As the figure only illustrates modes of disciplinary cooperation, it doesn't mention transdisciplinarity. The reason is that transdisciplinarity can be seen as a feature of transcending disciplinary knowledge rather than, as the other prefixes indicate, a more direct and specific mode of cooperation between disciplines. Jantsch describes transdisciplinarity as a "multi-level coordination of entire education /innovation system" (1972, p. 222). Talking about science Jantsch later added:

> Transdisciplinarity [...] may be viewed as the ultimate result of interdisciplinarity penetrating the entire system of science. It is an ideal that will always be beyond the complete reach of science, but which may guide in important ways the direction of its evolution (Jantsch, 1980, p. 305).

So, up to interdisciplinarity, we have a taxonomy describing different disciplinary modes of cooperation. Of those modes, only interdisciplinarity can, in principle, transcend their individual discipline's current knowledge, while multi- and cross-disciplinarity rather add up or mix their complementary knowledges. So, when the transcending approach is characterised by adding new unique knowledge (1+1>2), the latter, a mixing approach, rather compiles already available knowledge (1+1=2).

Unfortunately, transdisciplinarity often gets confused to mean what it sounds like, to transcend disciplinarity, while it instead implies transcending the disciplines' current knowledge. Now in hindsight, Jantsch's label transdisciplinarity should probably need to be labelled differently to avoid the possibility of obscuring his intention, which was to merely describe "interdisciplinarity penetrating the entire system" (Ibid). However, more importantly, it means that Jantsch's notion of transdisciplinarity is not a form of post-disciplinarity but a vision of a mega system of interdisciplinary subsystems. Furthermore, as the critical realism tradition in the book *Interdisciplinarity and Wellbeing: a critical realist general theory of interdisciplinarity* clarifies, "the search for interdisciplinarity does not mean giving up one's speciality. In the leap from multidisciplinarity to interdisciplinarity, the disciplines are not collapsed, but enhanced" (Bhaskar et al., 2018, p. 127), from which it finally follows that both trans- and interdisciplinarity require disciplinarity.

However, it is paramount to understand that these different modes also give different opportunities for predictability and external control. Following the rule, more control provides more predictability, while less control gives more unpredictable creativity. Multidisciplinarity—a pure mixing of knowledge without cooperation—is, therefore, more prone to be controlled by an external managerial level. While interdisciplinarity —cooperation that's driven by a higher-order concept consciously set beyond the disciplines' current knowledge—works best as a self-organised entity. This sequence of disciplines that cooperate in order to mix or even transcend current knowledge can be illustrated in Figure 4.
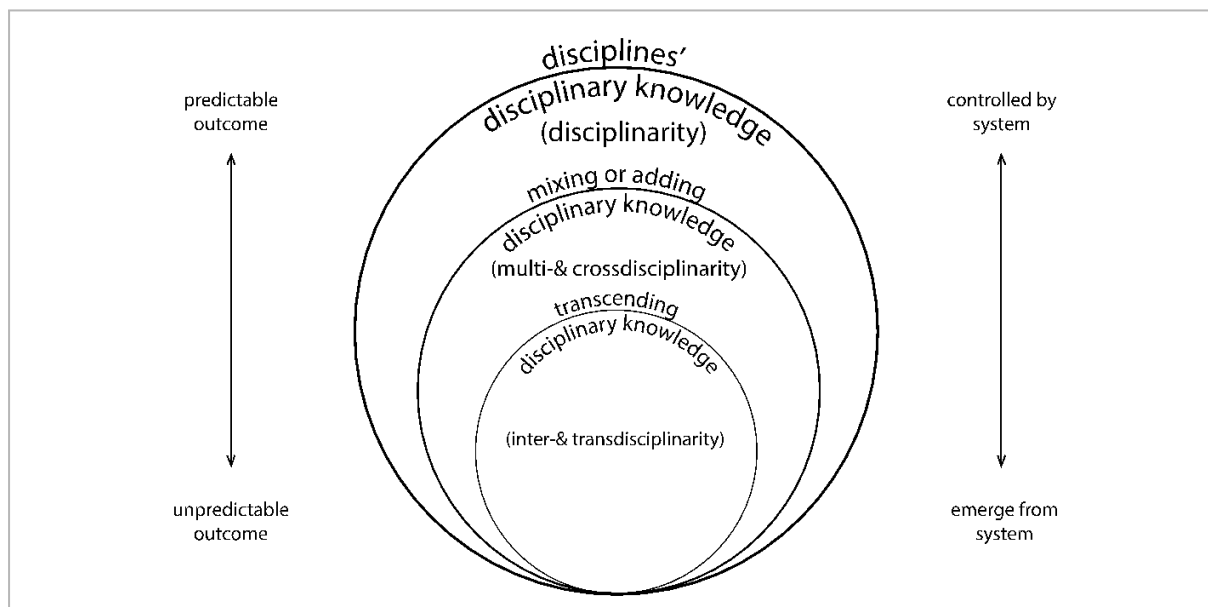

Figure 4. Mapping the nested systems of disciplinary knowledge and where in that map each mode of disciplinarity belongs, their kind of output and how easily they typically can be controlled (figure by author).

So, a final hunch in this exploration builds on what probably was evident already in the 60s and 70s, i.e., that the kind of knowledge production that yielded the most creative innovations proved harder to control. Making it crucial to also co-opt and, in practice, steer away from uncontrollable but inventive modes of cooperation by embedding them deeply in closed and controlled R&D departments and instead implement multidisciplinarity as the big-scale, more external, operational and espoused mode of their development.

3. Final Discussion

> Where is the life we have lost in living?
> Where is the wisdom we have lost in knowledge?
> Where is the knowledge we have lost in information? (T.S. Eliot, 1934)

In an interview, the system thinker Russell Ackoff (2001) expands on T. S. Eliot's insights by adding two new concepts, "data"[7] and "understanding." Ackoff describes it as a hierarchy of order that naturally should move in the opposite direction to the one described by T.S. Eliot. What Ackoff effectively describes is how a huge amount of data can give us (a bit less but more valuable) information that, in turn, can give us (a bit less but more valuable) knowledge and, if we are lucky, still a bit of understanding. But what we arguably lack today is the last step, the ability to transform all this into wisdom in action, which the ancient Greeks called *phronesis*. The scope of this article is not to suggest how to reach this final level exactly but rather to explore a few systemic aspects that seem to stand as roadblocks and obscure the path to altruistic long-term wisdom that today, arguably, needs to replace the current focus on individual short-term gains.

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[7] As an anecdote, when I at that time (2000-01) worked as an industrial designer in a research lab in Silicon Valley, I learnt from my colleagues in computer science how appropriately one could add two lines to Eliot's poem; 'Where is the information we have lost in data' and 'where is the data we have lost in the computer' (the latter would today probably instead be 'lost in the cloud' or 'lost to FB'?).

Consequently,

The first systemic aspect, in 2.1, briefly explored the current globalised economic system of neoliberalism. I've, together with others, characterised it as a reductive, mechanistic monoculture that procures gains for the very few but, as most monocultures, deprives not only the many but also jeopardises the survival of all. It is arguably a system that has gained such enormous hegemonic and calcified proportions of our worldview that we all, more or less, seem to be trapped in it. In contrast, I juxtapose it with a more resilient, organic and agile system that Capra (e.g.,1982) characterises as a holistic "ecological system" based on diversity. The paradox here is that the latter, more organic system arguably is the foundation of systems thinking. At the same time, I still need to question how much SOD is currently trapped in an attempt to understand and improve the current system and, by that, albeit unintentionally, might become an efficient roadblock for required radical change?

The second systemic aspect, in 2.2, therefore, brings the potential need for a radical leap to another more ecological system that's more in tune with what "[s]ystems theorists claim for themselves [is their] holistic outlook" (Merchant, 1980, p. 291) and therefore, as argued, being the fundaments of SOD. In other words, how to "untrap" ourselves from the current system and move on to what Capra scrutinises in his book, *The Turning Point: science, society and the rising culture* (1982). However, as already noticed, the turning point hasn't emerged as Capra, 40 years ago, saw the genesis of. The point here is not to claim that Capra was wrong, but why did it not "turn"? Albeit a bit out of the scope and space of this article, I've touched on a few analytical concepts relating to power, control, strategy and co-optations that could be useful. Regardless, at the end of the day, this aspect raises a crucial question about SOD's praxeology and how and on what it's primarily employed and honed.

The third systemic aspect, in 2.3, finally questions a common misunderstanding of a post-disciplinary mode of knowledge production. My concern is that I (albeit anecdotally) experience the discussion as confused within and outside the SOD community. The paradox here is twofold (i) that the taxonomy initially was suggested by a well-known systems thinker and (ii) that the system, at its core, in a simple and systemic manner merely depicts nodes and their relations (i.e., disciplines and how they

relate when cooperating). The point here is not to say that there is only one description of a system moving towards transdisciplinarity but rather to question why it is so hard to come to an adequate understanding (whatever that is) to enable discussions around the intrinsic and extrinsic power structures of knowledge production. The point is neither to claim that all knowledge production occurs within nor between disciplinary knowledge. But to suggest that we probably will be entirely at a loss if we can't rely on the best available disciplinary knowledge as stepping stones to address complex issues like global warming.

An expanded dialogue on what's briefly summarised above will hopefully pave the road for an informed and serious discussion on how to best use SOD to mitigate and redirect our current trajectory away from a future that currently becomes scarier by the day. The road will still not be without hurdles and bumps, making it crucial to instead utilise and go beyond than getting trapped in calcified dichotomies (or binaries) such as the ones hinted below.

We vs they—by giving it an alternative meaning—and by doing so, challenging the current strategy of completely dismissing binaries and giving away its rhetorical strengths, for instance, to the political far right. If so, it requires us to reclaim the politically neutral or flat understanding that we all are in the same boat and instead replace it with a new frontline between most of us against the very few remaining 1% (Oxfam, 2018).

Diversity vs dichotomies—by identifying and working with dichotomies as a very designerly way to zoom in on generative tensions in a system. However, from a systemic perspective, it should remain a subsystem nested in a broader dynamic system one both works on and within.

Freedom vs control—by asking whose and what kind of freedom we are talking about and what we need to control today to make that freedom as equitably distributed as possible.

Design vs emergence—by acknowledging that system dynamics both involve designed and emergent control mechanisms, one can, e.g., avoid the "conspiracy theory trap" that

Capra recently mentioned as one of the current problems that tend to lead our actions astray (Capra & Henderson, 2020).

To build on Beer (2002), the current system obviously isn't the "only viable option we have." It's, in fact, not even itself a viable system.[8] Instead, the final lingering hunch is that the current system's contra actions, described above, have been extremely and ubiquitously successful in strategically controlling, calcifying and feeding a system we urgently need to transcend. Consequently, we seem to need a new type of de-calcifying agent that we can use to soften and break up the calcified socio-economic system that we today seem so trapped in.

We can now finally wrap up by revisiting the calcified—binary—dichotomy between sustaining the current system versus replacing it entirely. Even though initially helpful, it might not appear so binary anymore. Because what is ultimately suggested here is that we urgently need to replace a toxic global monoculture with a system characterised by a diversity of local resilient subsystems. Which, by that arguably makes the binary descriptor obsolete and may suggest a role for design to become a de-calcifying agent. I, therefore, argue that design in general, and SOD in particular, needs to become much more critical, pragmatic and explicit in their strategic goals and long-term visions. If so, it seems to be an opportunity where SOD's tools can be applied by revisiting the field's seminal scholars. So, as a mere reminder, let's end with a famous snippet from Russell Ackoff's (2001) interview referred to above, where he builds on T.S. Eliot and others by so profoundly claiming:

> See, doing the right thing is wisdom, effectiveness. Doing things right
> is efficiency.
> The curious thing is that the righter you do the wrong thing, the
> wronger you become. If you're doing the wrong thing and correct it, you become
> wronger.
> So, it's better to do the right thing wrong, than the wrong thing right.

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[8] Beer defines a viable system as one "that is self-sustaining, or survival worthy, in just the way that a human being is viable when it can survive outside the womb. It is not totally independent—nothing in this world ever is—but it is autonomous within limits that are defined in terms of its own physiology." (2002, p. 215).

Acknowledgement

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