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***“An Outlook on the Multi-Level Perspective: a Critique on its
Functional Aspirations and the Uses of History”***

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Abstract

Innovation Studies have become a central field in the policy-making and political decision fields. Since their conception in the 1930s and their establishment as a multidisciplinary academic field in the 1970s, they have gone through several reiterations and reformations. The most recent among them is the broad adoption and implementation of the Multi Level Perspective (from now on, MLP), a descriptive model that concerns itself with sociotechnical transitions through History, mainly from the Industrial Revolution and onwards. In this thesis, we will see how the MLP employs itself in the study of History by utilising three analytical levels, the landscape (macro), the regime (meso), and the niche (micro) and the interfacing of the historical actors among all three of them. Through the study of its conceptual and ontological genealogy and a critique of its applications on case studies, I hope to assess its explanatory, descriptive, and predictive aspirations, its political impact and its epistemological status within the broader fields of the History and Sociology of Technology.

Introduction

It would be quite safe to say that the Multi Level Perspective (MLP from now on) has taken the Innovation Studies world by storm, for the last 20 years. Since 1998 and the central paper of Rip and Kemp describing several modes of technological change, positioning them in the centre of Innovation Studies, and defining the ontological equipment of the MLP, there has been written a vast array of articles and reformations of the MLP. Each one has claimed to bring something ever newer to the table, thus constantly informing the MLP, bringing it up to speed with its most crucial critiques.

Most would agree that the MLP is the brainchild of Rip, Kemp, and Geels but since the early 00s, a diverse collection of scholars from several disciplines, academic fields, or political backgrounds, have taken it up and used it a heuristic model to study sociotechnical transitions in a broad spectrum of localities and temporalities. The users of the MLP always position themselves firmly in support of empirical sociological research. Whether this has to do with in situ research of the various frameworks, or the constant reformulation of MLP's premises through its checking against secondary bibliography, it is a core principle of the MLP that it is a posteriori used and reformed to better suit the research object's contexts, needs, and presuppositions. In this manner, as we shall see later in this thesis, it echoes the empirical tenets that defined Schumpeter's reasoning as the founding father of Innovation Studies, and Nelson and Winter's Evolutionary Economics.

This mingling of sociology, economics, and political science came at a very specific moment in time - our moment - when interdisciplinarity constitutes the "be all, end all" requirement for contemporary academic literature. Whether this mixture of knowledges is volatile or not, whether it can indeed reform and reform itself, remains to be seen. 20 years after the MLP's first iteration, this is the main goal of its thesis.

Through this monograph, the reader should expect to find a journey through the history and the development of MLP's central ontological, economical, philosophical, sociological, and political equipment. Thus, in my first chapter, tracking back to the raucous 1920s and Schumpeter's first formulations of innovation within a market economy context and up to last year's criticisms of the MLP's assumptions, I hope to offer a clear and deep overview of the MLP's roots and evolution. We will see several

modelisations of sociotechnical transitions as wholes, views on the nature of technology, and the aspirations of the community that shape the MLP.

In my second chapter, I will attempt to break the MLP down to its constitutive elements. These are the Evolutionary Economics of Nelson and Winter, the Institutional Theory elements that it incorporates, sociological notions such as Bourdieu's *habitus*, and the formative assumptions it adopts from the field of the Science and Technology Studies, especially the Actor-Network Theory as this has been posed in the writings of Bruno Latour and Michel Callon.

As one can expect, with such a broad array of elements there comes a broad array of critiques. It is here that this thesis positions firmly itself. Through contemporary anthropological critiques, especially via the postcolonial bibliography, the ontological turn, and Marxist-Leninist political economy, I hope to bring the MLP's elements under the microscope as they seem to constantly ignore core issues that arise through the limitations it poses to its readings of historical narratives and sociological studies.

My third chapter will come as a combination of the two that precede it. I will examine the claim of MLP authors that the model always reforms itself and reflects on its issues through an inductive process rooted in its approach towards its several case studies. Given the ever-recurring and foundational nature of its drawbacks as I will have shown in the second chapter, this cannot be the case. The assumptions that are set in stone in its very conception, render the MLP irredeemable concerning its takes on agency "equality", stakeholders interests and power, and views on the relationship of deep sociotechnical transitions with the properties of market governances. This is a direct result of the elements that constitute it.

Both the MLP authors' claims concerning its self-reformative power, and its assumed sense of various historical contexts fall under the general scope I wish to understand and critique the MLP. The ultimate goal of my thesis is to check the MLP regarding its answers concerning the contexts that shape innovation and technology in general, and the depictions of their interrelations within their histories. The first two chapters will provide us with the tools to examine the ways in which the MLP "distributes" agency to technologies, historical actors, and social practices. Recognising and interpreting the ways these technologies are narrated to shape and be shaped

within their contexts, will open new ways for us to judge whether the MLP can provide (or be provided by) History with new prisms of combating technological determinism and its political subsequents.

Technological determinism is a by-product of the misrepresentation of historical agents and the role that technology has played in shaping socio-technical transitions. Taking into account distinctions of the various technological determinisms, I aim to examine if and what streams of determinism does the MLP assume when talking about technology-in-practice, and technology-within-history. The comparison with Schumpeter's works on the capitalist contextualisation of innovations provides us with axes according to which we can compare the uses of History regarding what Schumpeter and the MLP authors want, and what Guldi and us deem as needed.

Under the lights of Big History's celebrities' claims around technology, the last 2 years' quasi-apocalyptic events, and the rise of public pseudo-understandings of science, policy, and their manners of production, historians stand before an unprecedented task. We cannot hope to reform our practices around survival, even more so sustainability, unless we scrutinise the wrongdoings of the past. Simply accepting any kind of technological determinism whether that is soft or hard, failing to recognise the incumbency of political stakeholders, and falling victims to all undoubtedly failed ontological equipment of agenda-serving frameworks, is a one-way ticket to a climate, political, and social hellscape.

If the MLP does hope to make normative claims to combat dreadful scenarios, it has to be pitted against society's emergent needs concerning sociotechnical innovations ie. sustainable energy uses, or environmentally viable modes of urbanisation. If, on the other hand, we want to keep it restrained and functioning solely through its descriptive and explanatory facets, it has to be reformed regarding the boundaries of its self-proclaimed reflexivity and empiricism. The MLP can become a model of policy making informed by historical events around sociotechnical transitions, albeit not under its current structure that undeniably favours the role of technology and downplays the role of hegemonic socio-economic incumbency. My thesis aims to highlight its shortcomings when it comes to its applications on the various temporalities and localities it has studied. Proposing a specific "new" MLP cannot fit under the scope of a

Masters' thesis and demands skills and knowledge that I as a historian do not possess. The feasibility of the current MLP has to be judged in the face of constant crises and transnational issues.

1.1 A Timeline of Innovation Studies

Considering Joseph Schumpeter as the father of this domain would be fair. Notions such as “innovation” or “entrepreneurship” have their foundations in Schumpeter’s seminal work *Theory of Economic Development*.¹ Of course, Schumpeter is not the first to study technology as an economic factor. In this aspect, he certainly came way later than Karl Marx. But we can safely claim that he is the first to study technological innovation and change for the sake of innovation and change themselves.

In this undertaking of his, he “sets the tone” concerning the research agenda of the field of Innovation Studies. We still aim to create a kind of case studies database that will ease our inquiries on historical contexts surrounding innovation processes. As Fagerberg, Martin, and Andersen pose it, despite Schumpeter’s effect in considering the innovation process as an economic factor, the analyses of it did not really gain any traction until after the second world war.² Within the classes of the RAND Corporation is where we would find central Innovation Studies masterminds, especially those of Richard Nelson and Sidney Winter whom we know from their 1982 monograph *An Evolutionary Theory of Economic Change*.

If one looks closely, they would find that research projects around innovation had quite specific goals in their core, such as the diffusion of innovations in specific sectors, and interested a limited array of social groups, mainly industrial firms, unions, and small governmental sectors. These efforts culminated in Burns and Stalker’s *The Management of Innovation*.³

It was right then and there where the first interdisciplinary disputes began. Right off the bat, various fields came together to dispute and constantly reformulate their interests, definitions, and aspirations around innovation; and as we shall see, even innovation itself did not escape this intermingling of disciplines.⁴

¹ Schumpeter 1934.

² Fagerberg et al. 2013, 2.

³ Ibid., 3.

⁴ Ibid., 4; Frodeman et al. 2010, ch.2.

A key event in this field of study was Nelson and Winter's publication. They provided the researchers with ways to study competition and technological embeddedness that while they stemmed from Schumpeter's works, they took the much-needed steps towards a more empirically oriented study of economic processes. Quickly afterwards, there came new ways to systematically understand innovation and its diffusion that paid more attention to the interweavings between firms' activities and took into account the various temporalities and localities where innovation took place.⁵ The subsequent interest of policy makers that arose around these new ways of study of innovation, was almost instantaneous.

Nelson and Winter's book also advanced the Schumpeterian aspirations concerning what today we call "Innovation Studies", in the manner that we now are in possession of a theoretical framework through which to study and reflect on the role of knowledges, everyday practices, and routines of firms. As opposed to Schumpeter's thoughts around the role of able and willing actors reacting to market opportunities, Nelson and Winter have made the leap from the study of what we would call microeconomic phenomena to the search and modelling of macroeconomic stakeholders and interests. The common axis between these two works is of course, as always in these matters, the theme of "growth".

This shift from the micro-level towards the macro has brought along the needs for several shifts in our focus as innovation researchers. For these last 35 years, Innovation scholars actively search for new frameworks and methodologies that will aid them in studying the environments in which stakeholders operate, the frames of reference of each historical and social actor and their interests, and most importantly, the contexts of the innovations' embeddedness.⁶ In these studies' forefront, some seemingly new notions appear that grasp our interest; namely those of knowledge, skills and resource distribution, and the refounded interest towards the interfacing of public, private, and community actors.

In 1998, the chapter *Technological Change* by Arie Rip and Rene Kemp came along to point out a key issue in Innovation Studies. For too long, scholars have been

⁵ Freeman 1984; Lundvall 1992; Nelson Winter 1982, 93.

⁶ Fagerberg et al. 2013, 6

studying the issues of innovation, invention, technological diffusion, the interweavings of technology and society and several other themes. There has been a swathe of attention to the research, creation, and development of innovation, yet the “black box” of industrial and social dynamics of user practices, social construction of innovations, and the emergence and change of needs, remained closed.⁷

Practically no one up to that point had studied matters of technological *change*. The modes of progress, advancement, modulation of technologies, the dialectical relationships between technical, economic, political, and social framings that moved them towards new sociotechnical states of being, had remained practically unknown. Since then, several models of technological change have been put forth, all rooted in the same Schumpeterian ground that presupposes innovation practices as parts of a cyclical economic activity.

While Schumpeter was not the only one to suggest this recurring nature of economic activity - we did have Kondratyev’s intuitions on the homonymous “waves” and the co-opted by Schumpeter, Marxian notion of “creative destruction” - Schumpeter is the first to position the issue firmly in terms of social actors and arising opportunities, which also frame his notion of innovation and entrepreneurship.⁸ For a firm core of MLP authors, innovation can be seen as an element of a cyclical development of economic trends. To bind it even further with Nelson and Winter’s ideas, it is described as the result of actors (ie. entrepreneurs) reacting to rising possibilities.⁹

Addressing the modes of these “rises” of possible transition pathways and the ways they root themselves within their contexts, is the field where the MLP comes especially at hand. While I will catalogue a few of them below, these approaches are most definitely not the only ones. We also have to consider the *induced innovation* and *new growth theory* that have existed since the 60s and 80s respectively.¹⁰ Nelson and Winter on the other hand focus explicitly on firm practices and their heuristic methods around innovation and I will explore their take on sociotechnical change in the next chapter.¹¹

⁷ Geels 2008, 525.

⁸ Schumpeter 1934.

⁹ Geels 2007, 1.

¹⁰ Rip Kemp 1998, 354-355.

¹¹ Nelson Winter 1977; 1982.

All three of these approaches seem to have been rendered obsolete as they stood, due to being bound to endogenise technical change. Abiding by the curse of Economics called “ceteris paribus” does not betray an effective and coherent descriptive or explanatory method of studying any social phenomenon. Fortunately for us, the MLP tries to open its scope up to all external factors that seem worthy of affecting the outcome of a change.

In Geels’s writings we find the following manners that sociotechnical change comes about, to be the most prominent:

- Coevolution: this view supports that sociotechnical changes take place specifically because technology evolves hand in hand with society. There can be traced 5 subcategories of this, in reference to technology evolving along with its users, the industrial and political institutions, science and the markets, science by itself, and culture.¹² When technologies and societies coevolve, we can retroactively interpret their interactions in a fit-stretch manner; that is, while initially, innovations fit the existing regime, the regime ends up adapting around them to better suit and incorporate them.¹³
- Substitution: in this view there does not seem to be any clear-cut distinction between technology and society. Transitions happen because an initially stable regime develops incrementally and remains relatively stable.¹⁴ Radical innovations rise and embed themselves with the help of their own momentum under the destabilising pressure of the landscape that creates a fertile soil and needs do not get satisfied as they used to. This quasi-Kuhnian approach suggests that when niches do break through they take the regime by surprise and send ripple effects throughout its

¹² Geels 2005b, 364.

¹³ Geels 2005c, 689; Geels 2016, 898.

¹⁴ The ways in which a regime remains stable mostly highlight the self-fulfilling properties of it. The reproduction, refinement, and reformation of the rules by incumbent actors implies that under normal conditions, a regime is dynamically stable and only the accumulation of niches results in major performance shake-up and potential for improvement (Geels Kemp 2007, 445). As we shall see below, the patterns that describe the accumulation of niches are directly related to the costs of interrelatedness that regime actors in a way, impose. As Rip and Kemp pose it: “the greater the interrelatedness [...], the less likely that an innovation will be compatible with [a regime]” (Rip Kemp 1998, 349; Levinthal 1998, 223).

totality. When the dust of the caused creative destruction, the adaptations, and the transformations that take place, settles, the newly established sociotechnical regime returns back to incremental development.¹⁵ This transitional pattern is the most prominent within MLP circles as it best incorporates the core element of the MLP, that of technical change being defined by the interactions between the three sociotechnical levels.¹⁶

- Wide Transformation: regimes that undergo wide transformational transitions have accumulated a swathe of persistent problems beforehand. Changes take place across a variety of social fields such as policy, user practices, cultural preferences and whatnot.¹⁷ This loosening or destabilisation of the regime offers opportunities for experimentations regarding new technical options. When this wave of innovation passes, these options get filtered and some of them gain traction, become dominant, and grab the markets. This results in the rest of the innovations to be pushed out for several reasons that vary from the policy level to the degrees of interlocking of niches.¹⁸
- Reconfiguration: a reconfigurational path of sociotechnical transition does not hold the view of old structures being replaced by the new ones. On the contrary, new technologies are being incorporated in the old, recombining and reconfiguring them. Their initial development still happens within niches, and their adoption either brings something radical to the regime that is being slowly “absorbed”, or it links with already existing,

¹⁵ Geels 2005c, 686.

¹⁶ This can also be partially found in Christensen’s *disruptive innovation framework*. Incumbent firms can find themselves vulnerable to “attacks from below” as innovations destabilise their efforts to sustain already existing technologies (Geels 2017, 1). While this approach could remind us of the MLP, let us not forget that while it represents an interaction between levels, it keeps itself firmly bound to the technical level, maybe touching that of supply and demand while at it. An MLP description of a technical change would also take into account cultural and social contexts and an array of user, firm, and technical practices.

¹⁷ A parallel can be drawn from this approach towards the change process described by Geels and Kemp simply as “transformation” (Geels Kemp 2007, 445). Landscape and regime interactions create pressure on the regime, ignoring any niches in the meantime. Negotiations, power struggles, and the shifting of actors’ interests create cumulative adjustments that give rise to the new sociotechnical regimes that outgrow the old ones. The downplaying of these changes by the incumbent classes are a key element that exerts its own power on suppressing change that is deemed as unfavourable to them.

¹⁸ Geels 2005c, 687-689.

complementary elements of the regime. Both these processes may and most often do trigger further reconfigurations.¹⁹ A reconfigurational modelisation of transition leaves the space open for the possibility of unforeseen, unexpected, and sometimes, unwanted major system changes as the complexity of the interplay of so many niche and regime elements without any one “core” technology or structure of any kind, brings randomness to the forefront of History’s transitional properties.²⁰

As it becomes highlighted, all these views on sociotechnical change assume certain natures of technology itself that might seem contradictory to a keen eye. Rip and Kemp offered several definitions of technology, namely those of the cannonball, as “configurations that work”, as black boxes, or material and organisational sequences, as a seamless web.²¹ As they justifiably point out, the understanding of technology as belonging in one of the above categories, runs the risk of overvaluing its historical agency and undermining the role of social actors.²²

Each one of these conceptualisations of technology, in a manner presupposes the way in which we describe the modes that its changes come across in history. Characterising technology as a historical force independently of its context, runs the great risk of assuming that what seems like an exogenous property of it regarding its existence outside, above, and beyond its several localities and temporalities, also determines its uses, historical trajectories, and modes of adoption in a quasi-a priori fashion..

To this, we can all agree that a certain amount of technological determinist point of view firmly plants itself. Of course, not all technological determinisms are equal and the writings of Winner help us recognise three of those.²³ As we shall see, technological determinist approaches directly affect the prisms and filters through which we study innovation practices, technical change, and the existence of technology within its

¹⁹ A similar approach concerning solely the level of niches has been put forth by Levinthal quoting Kodama and Yoffie regarding the *melding of technological lineages*. Here, we see a break with evolutionary biology as the biological analogy would be species interbreeding (Levinthal 1998, 224-5).

²⁰ Geels 2007, 1429.

²¹ Rip Kemp 1998, 330-333, 337. The term “seamless web” stems from Thomas Hughes 1986 publication (Hughes 1986).

²² Rip Kemp 1998, 338.

²³ Winner 1980.

context. As we have it, technological determinism can be found in three flavours, let me call them. Embodied, exogenous, and interactional. An overview has been put forth by Zimmer drawing from Friedman and Kahn describing each one below.

The embodied theory suggests that technologies are conceived and designed in clear symphony with their designers' biases, as an accurate reflection of their ontological, political, and ethical assumptions.²⁴ This renders technology into a deciding factor on the level of the shaping of society as it imposes its inventor's will on the society. A common example of this is the design of the Long Island Highway.²⁵ It must be clear that this is a form of the hardest of technological determinisms, one that sees technologies as single causes of history happening. Even if we tone this take down, from “single cause” to a simple influencer on historical movement, it still remains a quasi-deterministic historiographical suggestion, albeit a softer one. What this does offer us though, is a clearer view to the emergence of social and cultural frames and their co-constitution au-pair with technology.

One step beyond this “soft” determinist position, there can be formulated the *exogenous* theory of technology. This is a way of arguing for the effect that social forces are inscribed in technology by social phenomenae, resulting in specific and inevitable social consequences. The inventor or designer bears no direct responsibility as his biases arise beyond his control, as a result *of* technology.²⁶ As such, whereas the embodied theory projects technology's grip on society via the person, the exogeneous one showcases its grip on the person via society. This does not however remove us from determinism's sphere of influence.

We can find a much wished for middle ground – or so it would seem – in theories that rest the possibility of technology containing or enclosing biases upon the bedrock of the practices that put it into use. This interactional theory tells us how these biases result primarily from the interactions of the technology with the goals and biases of the users.²⁷ It can seem that this is a kind of an alliance between the embodied and exogeneous theories. Yet, as we can clearly see, nothing is said about the social power

²⁴ Friedman Kahn 2008, 1242-1243; Zimmer 2005, 2.

²⁵ Winner 1980.

²⁶ Zimmer 2005, 3. An example of this approach can be found in Bijker Pinch 1987.

²⁷ Ibid. 4.

that these biases of technology can exert upon society and the decorating of time with history. It is right here that for the first time in this thesis, we come across the neglect of the concept of hegemonic power and power structures that permeate innovation networks, user practices, invention and design culture, and of course, policy making and its study.

The interactional theory of technology does not separate us from technological determinism, it is only a description of the constant appropriations and redesignings artifacts go through via their uses and movements. It might be so that biases emerge as results of these processes, and it might be that via them, these biases can be resisted, retrofitted, or even reconnected. What remains undoubtable is that either way, this theory of technology-in-practice tells us nothing concerning its historical agency.²⁸

Even worse, like the two determinisms preceding it, it has nothing to say concerning technological, or sociotechnical shifts and changes. The interactional theory seems to be the furthest from hard technological determinism. In our context, that of sociotechnical change, it cannot be put to use as this would undermine the most central tenet of the MLP; that of studying technical and social changes not for the sake of study, but the sake of producing new suggestions around policy making. Still, as we shall see shortly, the MLP is plagued with technological determinist presuppositions that mostly fall under these three categories.

As it becomes obvious, the MLP might be skewed from its nascency. Let me proceed in a step-like manner, and now focus on the MLP ontologies. This will enable us to judge for ourselves whether a discourse of technological hegemony exists in the roots of the MLP.

To combat the aforementioned overvaluation of technology's historical agency, Rip and Kemp enrich their approach with the first core aspect of their views on technology; that of the sociotechnical landscape which constitutes the higher level of

²⁸ The above should not be interpreted as being an exhaustive list of these theories, or that these are incommensurable between them. I am sure that if we ignore their assumed ontologies and view these in a manner using common misinterpretations of Hegel (I speak of "thesis → antithesis → synthesis" one, that has been proposed by Singer (Singer 2001, 100-102)), we could extract an ad hoc synergy between them. Would this approach rid us of our attribution of a type of historical agency to technology that renders it above history itself (to make Hegel churn)? It must be obvious by now that this would not be the case.

organisation within the MLP frame of study.²⁹ We must never forget that all three levels of the MLP are not exact ontological descriptions of any sociotechnical reality; merely ways to analyse and study technological transitions.³⁰

Most importantly, as all the authors show and I do accept, the landscape, regime, and niche levels of inquiry are not so clear-cut and well-limited or external to one another. Instead, in stark contrast to such a belief, these levels are mostly interwoven, constantly interfacing and interacting with one another.³¹ Geels describes these interrelations as a “nested hierarchy”.³² We must always keep in mind that within the fields of MLP’s study, sociotechnical transitions come about specifically due to that inseparability of the three levels.

1.2 Landscape

As Rip and Kemp pose it, the landscape notion is put into use to caress our anthropological conceptions of technology. The sociotechnical landscape is a landscape in a quite literal sense of the word, it is traversable, sustaining and constitutive of us. We could consider it to be the whole of society, our “world”, but as we shall see, during the last 20 or so years that the MLP is being used, the term “society” is constantly being reimagined. We have to critically examine whether the first descriptions of the landscape by Geels in 2002 as a material context of society are any better, as this context is ever-changing. As he more correctly chooses to frame the term: “The landscape is an external structure or context for interactions or actors”.³³

The landscape, to put it briefly and exhaustively, is that all-including structure built from ideologies, practices, materialities, institutions tangible and/or intangible. It constitutes “the greatest degree of structuration in the sense of being beyond the control of individual actors”.³⁴

²⁹ Rip Kemp 1998, 334.

³⁰ Geels 2002, 1273.

³¹ Depictions of this claim can be found in all MLP schematisations such as the ones offered by Geels 2002 (fig. 5), Geels 2004 (fig. 9), or Geels 2007 (fig. 2).

³² Geels 2005a, 451.

³³ Geels 2002, 1260.

³⁴ Geels 2012, 473.

Up until Geels's 2020 study of electricity generation in the UK, which to the best of my knowledge is the most recent empirical study that employed the MLP, the definition and properties of the landscape level have largely remained unchanged.³⁵ That goes a long way as its development or its lack thereof for some, does aid us in tracing its conceptual roots. These are none other than Bourdieu's *habitus* and all presuppositions that have been accepted by the new institutional theory such as firm networks, the unwillingness of incumbent actors for change, and the ways that technical systems entrench themselves both technologically and culturally thus proving costly to reverse their routes.³⁶

1.3 Regime

Within the MLP framework, the regime level is by far the most uniquely studied, reframed, and expanded upon than the other 2 levels put together. This is partly because the niche level has and is being studied by several other approaches in the Innovation Studies field, and mainly because the regime level is the connecting link between the levels thus rendering the Perspective, Multi-Level. In any case, the definitions and most importantly, the components, and properties of regimes are what drive and define conditions and practices around innovation.

Simply put, the regime is a set of rules.³⁷ A regime is the frame from which innovations are conceived, developed, introduced, and in the end, thoroughly mediated within sociotechnical landscapes. Drawing parallels with a Saussurian semiotic approach, Rip and Kemp describe it as a grammar rule set that arches over material practices, production processes, the structuration of the creative industry, problem solving and the embeddedness of all of these within the institutional infrastructure.³⁸ The term, stemming from Nelson and Winter's as a conceptualisation of coordination and the outcome of routines, results in creating trajectories, paths for practices and communities to "fall in".

³⁵ Geels 2020.

³⁶ Rip Kemp 1998, 345.

³⁷ Geels 2002, 1260.

³⁸ Rip Kemp 1998 in Geels 2002, 1259.

Regimes possess an inherent historicity as they are the outcomes of previous sociotechnical changes and they incorporate change itself. Novelty, radical, incremental, or revolutionary - terms which shall be refined later - evolves within regimes and landscapes.³⁹ The spread of these novelties, these niche innovations, their discursive relationship with both the regime and landscape levels, and of course their generation to begin with, takes place within regimes.

Parallels between regimes and Kuhnian paradigms can be drawn to the extent that regimes constitute amalgamations of technical systems, scripts, fixes, channels and forces of diffusion, and include technologies within much broader “seamless webs” of social and economic lives, practices, and structures. Rip and Kemp draw the conclusion that regimes are “a broader, socially embedded version of technological paradigms”⁴⁰

As Geels in his study of the birth and breakthrough of rock and roll has shown us, there is no need for the singularity of any one regime. Multiple regimes can coexist, interface or wholly interact, compete or cooperate. As such, user and firm practices, and the rise of niches can take their cues from a multiplicity of sides and cause multi-dimensional changes in a kind of ripple effects throughout a whole network of social, cultural, political, and infrastructural regimes.⁴¹

Not all is utopian in regime land. Regimes can and most oftentimes are resistant to rising changes or radical breaks. Studies regarding low-carbon transitions have showcased how incumbent actors within specific regimes develop discursive strategies that dominate discourse not only to the “what” but most importantly to the “how”.⁴² The study of the intraconnectivity between incumbent actors such as firms, media, governments and policy makers suggests that regime resistance can occur under a tri-faceted guise of framing.⁴³

Incumbent actors are not the only ones resisting sociotechnical changes as studies in the transitions around transportation show us. Change can be confronted by public groups of pressure that find it to be clashing against its interests or entrenched

³⁹ Rip Kemp 1998, 338.

⁴⁰ Rip Kemp 1998, 388.

⁴¹ Geels 2007.

⁴² Geels 2014, 9.

⁴³ Benford Snow 1988. I will focus on the intraconnectivity between actors and regimes, in the discussion of Bourdieu's *habitus* notion, in the next chapter.

practices and beliefs. Landscape changes affect and curb these resistances more often than not. To study these widespread changes there needs to exist a demand for the study of further geographical and historical nuances, such as in the case of the regime of transportation, the disparities between societal demands, and pushes and pulls between the ICE or electric car industries and mass transportation modes, or between rural, suburban and urban contexts of living.⁴⁴ We must also take into account the changes that reshaped the users' daily practices, routines, and the reconceptualisations of seemingly ahistorical entities such as speed, security, or luxury.⁴⁵

The MLP boasts of this ability to reframe these notions and highlight that we take as atemporal and highlight the interplays between regimes and landscapes. One such well-known case study is the study of the implementation of piping and sewage networks in the Netherlands of the late 19th and early 20th centuries. As it is described, the increasing demand for personal hygiene from the upper classes, reframed the whole concept of luxury, cleanliness, and health in a quasi “trickle down” manner.⁴⁶ The rising bourgeois constructions of etiquette and behaviours, further corroborated the division between the social classes as it is shown.⁴⁷ The cultural landscape and its premises shifted to cater to the needs of the bourgeoisie, and the governmentality within the regimes in question, followed suit.

The ways that niche innovations find momentum and in the end become part of the regime have been thoroughly studied under the themes of *path dependency* and the subsequent *lock-in mechanisms*. These two subjects are the most prominent link between the regime and the niche levels. Before delving deep into these two notions, it would suffice to say that within the path dependency discourse, as it is rooted in the evolutionary economics elements of the MLP, researchers find answers concerning the manners that rising innovations gain traction and gradually rise to become part of the respective regimes.

⁴⁴ The MLP has been critiqued for this underdevelopment of spatial and territorial issues that arose in its case studies. The existing path dependencies can vary greatly depending on their localities and it seems that the MLP puts active effort into developing an “epistemology of the particular” to advance its geographically and temporally intercontextual comparative ability (Hodson et al. 2017).

⁴⁵ Geels 2005a, 459-468.

⁴⁶ Let us not take this description for granted. The descriptions that the MLP offers on the manners in which intangible shifts such as this affect the whole social spectrum, is one of the second chapter's central points of critique.

⁴⁷ Geels 2005b, 373-378.

Authors abide by a certain randomness that defines these processes, as do in the study of the subsequent lock-ins that take place and render a risen niche technology able to stave off competitors and plant its feet firmly into the grounds of the regime. These “mechanisms” may include new cognitive routines, changing landscape preferences, properties of scale economies, and the phenomenon of increasing returns that constitutes all these among others.⁴⁸

Studying these two approaches highlights a core element of the MLP. In the framework we are working in, it is generally accepted that an innovation does not only refer to the material level of the produced and used technology, but also to the emergence of new knowledge and practice caused by it. The formation of new communities, rules, activities and in the end, new societies is what makes the transitions we are studying *sociotechnical*.⁴⁹

1.4 Niche

The niche level of the MLP is by far the most widely and deeply studied from the Innovation Studies scholars. This fact can be attributed to Schumpeter’s early approaches towards the formation and rise of innovations within the framework of business cycles and the economic development within historical processes.

Rip and Kemp utilise the metaphor of yeast cells to communicate the concept of niches, not in its market sense but within the domain of evolutionary economics as it is being inspired by biological processes. For them, niches are limited, easy, and advantageous domains of application and development that predetermine their growth and production.⁵⁰ As their limitations also act as protection, niches morph into incubation rooms for radicality. New technologies can only shape within this protective “sphere” as they can only exist as such solely within different selection criteria than those of the regime.⁵¹

⁴⁸ Geels 2005a, 447.

⁴⁹ Geels 2008, 524. There have been proposed several alternatives concerning the study of transitions in the last 20 years. Geels outlines five of them; namely the neoclassical economic, the psychological, the deep ecological, the industrial and the political ones (Geels 2012, 471). As it becomes obvious, the MLP comes both as a synthesis and a critique of all such single-faceted approaches.

⁵⁰ Rip Kemp 1998, 357.

⁵¹ Geels 2002, 1261.

Such a metaphor would seem as quite limited at an initial reading. Do the cells reproduce and develop on their own? Of course not. Rip and Kemp need to explain how niches “feed”, what mechanisms act as links to a chain of causality that drives innovation to emerge, expand, and diffuse.

For that, they use the concept of “demand pull”. We should not misinterpret their intention towards this concept as they critique it as it stood at the time. As it is obvious in a context of interplays and interactions that all branches of evolutionary economics are - MLP included - demand is not a sole-existing factor. Demand coevolves and is being constantly reassessed along with its diametrically opposite of supply and its pushes.⁵²

Supply and demand get refined along the way of a sociotechnical change, articulation of needs and responses optimises the technologies, even if the rules of the regime and incumbency and even the changes themselves, infuse technologies with certain degrees of non-malleability.⁵³ These rules as they are shaped by interactive processes render certain elements of the transition irreversible, exactly because sociotechnical changes are collective processes and seem impenetrable by any single actor.⁵⁴ This argument of course ignores certain facets of the nature of incumbency and assumes that all actors “act” per se. It does not tell us anything about hegemonic structures of design and emergence enclosures of technologies and policies. This issue will be addressed later.

For the MLP scholars, what it takes for niches to fully form, is the undergoing through a competitive process between them at the first level, to become stable, improve their components and for their performances and competencies to become

⁵² One can see the pivots of demand, the listening practices, the changes in the radio regime and their effects in the reshaping of the music industry of the 50s through the MLP prism of study in the 2007 paper of Geels (Geels 2007, 1427).

⁵³ This non-malleability of technology has other aspects besides this single-facetedness of demand. Other explanations of this phenomenon can be traced in the cumulateness of technical knowledge, the increasing returns of technical adoption, and the lock-in mechanisms in paradigms and trajectories (Rip Kemp 1998, 353). See ft. 46.

⁵⁴ Rip Kemp 1998, 352. One example of these interactive processes of innovation that utilise the concepts of demand pull and supply push, can be found in the definition of *sectoral innovation systems* given by Breschi and Malerba (Geels 2004, 897-8). Another example exists in the formulation of *technological systems approach* but as Geels correctly points out, these descriptions exhaust themselves in the functioning of systems and interactions not on the reasons or cause behind sociotechnical change (Geels Kemp 2007, 442).

mappable from their researchers.⁵⁵ This irreversible process can be described better with the help of Clark's notion of *design hierarchy*.

This concept has been used to describe the processes through which the extension of the designing practices through time can be highlighted. What reaches to the regime level can be quite different from what was conceived in the early design stages within the corresponding niches. Design practices coevolve along with organisation and management systems and incorporate the central principle of evolutionary economics concerning contingencies and alternatives around technical elements; that of uncertainty.⁵⁶

While the description of niches is inspired from evolutionary theories, their functional elements are not. Rip and Kemp have posed the issue of power struggles shaping the elements that constitute and enable a niche, and by using the well-known Long Island bridge study by Winner, they highlight how their shaping can and is being influenced by landscape tendencies and cultural expectations.⁵⁷ As such, niches do not only interface and weave themselves with regime demands and mandates, but are also interacting with the higher structure of our model, that of the landscape.

This of course, refers us back to the critique that has been put forth concerning the contextualisation of regime influences regarding the variety of historical contexts. Not all niches are created equal, especially if we take into account the discontinuity between the needs and influences of the various regimes and landscapes that "under" them niches are shaped. On the contrary of what a universal evolutionary approach would suggest, for niches to incubate and break off to the regime so they may begin their competition with established technologies, gradual processes of accumulation, coevolution, production, and conscious intervention take place.

Geels lists several of these processes, patterns as he calls them thus giving them a more reductive, model-like character as is characteristic of his work. For Geels, several actors interlink, push and pull, and act according to their interests to shape a niche and its adoption process by the regime. Firms, actors, users, cultural processes

⁵⁵ Rip Kemp 1998, 360.

⁵⁶ Clark 1985. Worthy of pointing out is the fact that design as a problem-solving process relies on the cooperation or the competition of a variety of designing approaches so as the elements that get solidified through the designing process are mostly optimised and criticised beforehand (Clark 1985, 238-243).

⁵⁷ Winner 1980; Rip Kemp 1998, 359.

and presumptions, policies and governmentality, and of course, other technologies all reinforce or skew a niche's way towards its establishment. Even if this particular niche or its predecessors have interlocked between them, solved cooperatively their issues and shortcomings, opened up the regimes in question, catalysed the processes that shape their rise to the regime, and lended elements to one another, the core point of critique remains.⁵⁸ Technologies are not the only agents of their future - if at all.

1.5 Normativity - Descriptivity - Policy

The notion that technology is not a single-minded driving force of sociotechnical change is being heavily supported by the domain of Strategic Niche Management (SNM from now on). Firstly brought into light by Levinthal's 1998 *The Slow Pace of Rapid Technological Change* stemming from Evolutionary Economics and critiques on them, SNM articulates that sociotechnical change and its variability are certainly not bound to their full extent solely to their contexts, but decided upon by exoteric factors, at least to a certain degree.⁵⁹

As innovations are never immediately ready to compete in the markets of the regime, there needs to exist a framework of interlinking between technologies, processes of embedding within societal needs, changes, and expectations, and of course, answer core questions regarding the success around niche conception, creation, and emergence.⁶⁰

Levinthal's work articulates the SNM as incorporated within the process of niche development before them invading the mainstream.⁶¹ While he elaborates on the processes of speciation, drawing analogies from evolutionary biology concerning the niche's potential for adaptation and speed of diffusion, it remains to be seen whether Levinthal's approach is in line with claims of the SNM as a form of "reflexive governance".⁶²

The inquiries around niche emergence and incorporation within the regime have been also answered by approaches of Hoogma, Schot, Kemp, and Truffer. To specify

⁵⁸ Geels 2005c, 690-694.

⁵⁹ Schot 2008, 539.

⁶⁰ Schot 2008, 540.

⁶¹ Levinthal 1998, 222.

⁶² Schot Geels 2008, 538.

their suggestions, we need to look at their take on early market formation that posits as the framework that demands the presence of niches. For them, niches provide the structural constituency that sets in motion interactions between learning processes and adaptations of institutions around the emerging technologies. These are all-important elements for technologies' development and diffusion.⁶³

These have been retaken into account by the 2008 reformulation of SNM by Schot who nevertheless, recognises an internal controversy of SNM regarding actor incumbency and exclusion of weaker stakeholders from the promotion of several social aspects of technologies.⁶⁴ Schot's proposed solutions against this within the SNM framework follow the multidisciplinary and democratic character that the sum of MLP authors seem to propagate.

Specifically for the issue of incumbency that rightly seems a recurring hook of critiques against the MLP, Geels has recognised that incumbent actors set against sustainability can impede investments initiatives and the early formation of markets. On the other hand, several Innovation scholars have showcased that incumbent actors do not only pose threats towards innovative practices and processes but also foster new technologies, provide legitimacy, protection from political clouds, and most importantly, resources for new technological journeys.⁶⁵

One does not have to ponder long to decrypt Geels's position around actor incumbency given that for him, a core strategy around sociotechnical transitions should focus on the stimulation of emergence and diffusion of the niches, and the enhancement of selection practices of the regimes via economic instruments.⁶⁶ These of course have evident implications regarding the political interests of incumbent actors and their profiteering practices under current market structuration.

Geels is not blind to these and turns towards his critics to assess their takes on the politicality of sociotechnical transitions. While I will address the issue in the next chapter, we have to keep in mind that the three streams of policy around innovation, sustainability, and research that Geels presents us with, is not an exhaustive list.

⁶³ Hoogma et al., 2002, ch.6.

⁶⁴ Schot Geels 2008, 542.

⁶⁵ Geels et al. 2008, 533.

⁶⁶ Geels 2012, 479.

In his 2015 paper he recognises three main positions around the politicality of production and consumption which constitute central notions regarding innovation research and sustainability. These are the reformist and the revolutionary position, which precede him, and what he is suggesting as an alternative, the reconfigurative. He presents the main issues of the reformist position as it being limited in its fostering potential around sustainability, and on the other hand, the revolutionary approach for him is politically unpalatable and elitist in the current economic and sociopolitical context.

As he describes the two positions, “extremes” as he names them, he bases his distinction upon their responses towards the current status quo. Reformists deem the current system as worthy of note but failing to realise its potential on environmental sustainability, and seek to reform through incremental change on modes of production, institutional arrangements, and consumption practices. For reformists, win-win outcomes seem feasible as economic activity under the current context, and sustainability can complement each other through cleaner, innovative, and differently managed processes of production and consumption while assuming the continuing existence of markets and current economic relationships.

Diametrically opposed to this position, there exist the “revolutionary” scholars that seek to uproot and replace the current cultural and economic contexts that are less resource-intensive. Nuances in this position contain shifts in economic conceptualisations such as capitalism’s demand for growth, an emphasis towards services and third party initiatives, pivots in cultural values away from over-consumerism to target frugality, and sufficiency, and the promotion of grassroots innovation.

The reconfigurational position presents itself as a quasi-synthesis of the two that precede it and tries to highlight the need for sociotechnical change through the changes in practices. It is exactly here that the MLP is rooted as it is founded upon notions of combinations of materiality, routine, and social sanctioning and sense-making of practices. Reconfigurational scholarship studies the heterogeneity of configurations, the

distribution of agency, and the tension that is created by the perpetuation of current practices.⁶⁷

The current scope of the MLP does not limit itself to considerations of alternative political contexts. New developments around niche management also express the researchers' moral implications and pursuits. *Constructive Technology Assessment* is one such stream of scholarship as they try to study the impact and externalities that design, emergence, and stabilisation processes of new niche innovation induce to their contexts. CTA tries to create feedback loops in these design phases to better predict future outcomes around the contextual, social embeddedness of an innovation.⁶⁸

Under the presentation of these details of the MLP, we cannot but wonder. Does the MLP assume the burdens of describing what is wrong with current practices, explain the whys and hows of their failures, or does try to point out corrective policies or even make simple suggestions? Its authors seem to accept all three of these roles, yet the MLP as it stands apart from them seems to simply be a retrofitting model of describing historical processes of sociotechnical change.

On the other hand, given its combination of the theories that constitute it and equip it with their often intercontradictory ontologies and assumptions, it seems to rise itself to a level of an all-encompassing theory of innovation practices; something more than a model. At the very least, it could call itself a presentist, historiographical theory of studying them for the sake of today's reassessment. To add to that, it would seem like the interests of MLP's scholars have shifted from attempts to define and clear any misconceptions around the ontologies of the MLP, to a study of the interactions between its already set in stone levels of niches, regimes, and landscapes.

To answer these questions and formulate a description on the MLP's relationship with historical processes and their presentist use, first I have to showcase the central criticisms that have been fired upon it and the reasons behind them. In the next chapter, we will see how the MLP picks and chooses the objects of its study, the aspects of incumbency and agency that would fit its aspirations and political leanings, and how its failure to formulate responses and normative suggestions stems from its very

⁶⁷ Geels 2015, 1-6.

⁶⁸ Geels 2018, 31.

conception as a mixture of evolutionary economics, STS, institutionalism, and general sociological literature.

2

The MLP seeks to describe and provide general modellings and guidelines around sociotechnical transitions with the use of a three-leveled analytical ordering of the sociotechnical world in question at each particular case.⁶⁹ To accomplish such a monumental task, given the complexity and fluidity of the phaenomenae under inquiry, early Innovation scholars needed to recognise the need for interdisciplinarity, the combination of multiple academic fields. Of course, as we saw in the previous chapter, this did not happen. While Schumpeter provided us with a general frame of work that described business cycles, the economic roles of entrepreneurs, and put effort into describing markets' behaviour and adaptation to the societies around them, the 90s had to come around before Innovation Studies steered away from pure economism, and we witnessed a true mixing of disciplines.

Under the current questions of the world around transitions towards sustainability and liveable - not just survivable - futures, it should not surprise us that the MLP is one of the main prisms of study of the interfacing between society, technology, and science.⁷⁰ Since its conception in 1998, the MLP is putting active effort to combine Evolutionary Economics (EE) and the institutional theories derived from them, with Bruno Latour's sociology of relations known as Actor - Network Theory (ANT), and to rid itself from the remnants of Enlightenment that want to separate the unit from the whole, particularly the citizen-subject from its society, via Bourdieu's *habitus* theory of practice.⁷¹

As such, this chapter aims to present these 3 main, constitutive elements of the MLP while I will be trying to examine whether the MLP's shortcomings regarding agency representations and its conclusions on power disparities, can be genealogically traced to any contradiction or argumentation gap that fosters misinterpretation and can be attested to the interweavings of these frameworks. Before inquiring about the relationship and uses of History by the MLP in the next chapter, I have to examine the theories that inform the MLP and provide its scholars with the prisms that they

⁶⁹ Geels Turnheim 2022, 8-9.

⁷⁰ For more on the bibliometrics around the MLP see Wang et al. 2022.

⁷¹ Geels 2004; Geels 2020; Grin et al. 2010.

constantly try to reform and make more effective. The answer regarding the potential success of their efforts has to be rooted in the study of the dialogue between the assumed ontologies and methodologies of the MLP's roots.

2.1 Evolutionary Economics

The Evolutionary Economics component of the MLP can be seen as the most prominent, the face-first element of this approach. As Geels puts it, the MLP stems from EE in the manner that it recognises the processes that cause and shape transitions and their outcomes in a non-deterministic manner.⁷² It incorporates the elements of randomness, adaptability, and contingency of outcomes that EE brandish and directly describe MLP's views of transitions as processes.

As we will see these are the very elements that while they blend well together with the rest of MLP's elements, they were the main causes of the MLP's ignorance towards stakeholders' interests and exertion of power of incumbent actors. Of course, since then, the issue has indeed been recognised and efforts have been put into reappropriating EE to better fit the MLP's cause for sustainability and reconfiguration of sociotechnical systems. Issues on the shortcomings of the MLP around selection of actors have been addressed and according to Geels, resolved due to EE's flexibility in choosing the actors and via the formulation of new rules and routines that create the actors' processual contexts.⁷³

Ever since its very first formulation by Nelson and Winter, EE claims to come into the field of economics as an effort to critique the orthodox and neoclassical paradigm. What Nelson and Winter mean by "orthodox" is the tradition of economic thought stemming from Smith, Ricardo, and Mill that rooted itself in the study of microeconomics with methodologies and theories devoid of substance.⁷⁴ They draw the line between infertile, "formal" theorising and a more intuitively critical "appreciation" approach within the orthodox tradition.

⁷² Schot Geels 2007; Kohler et al. 2019.

⁷³ Geels 2006; Geels 2020.

⁷⁴ Nelson Winter 1982, 6.

This “appreciative” part of EE is what is mainly adopted by the MLPers by turning EE to reflect upon themselves in true SSK fashion.⁷⁵ Appreciating a theory means that it is not being uncritically implemented within the MLP framework but instead it is being “exploited” for its strengths to recognise the regularities, the social and economic behaviours and patterns that *work*. EE in its appreciative stance, brings the R&D part of any industry front and centre as it is right there that their presumptions about versatility and adaptability come into focus. Firms learn from theirs and others’ mistakes. This appreciation from their part adds more realism and agency, it balances EE out with the sheer randomness of the biological metaphors.⁷⁶

Since the MLP has clear normative goals in mind - namely those around sustainability - it would seem easy to recognise exactly which ones of these furtherly promote sustainable practices and regularities and appreciating practices, theories, and entities offers this by enabling scholars to critically reflect upon their objects of study. This adoption of appreciation comes with its drawbacks as it guides the MLPers to create unfounded entities that only function as descriptive reductions, such as their three main levels (landscape, regime, and niche).⁷⁷ The sum of the MLP scholarship could be seen as an effort to make these things fit the constructions of reality.⁷⁸

Given the 1982 context, Nelson and Winter deemed the orthodox school of thought as naive, anachronistic, uninformed by contemporary questions and happenstance. Restricted in the very same sense that Newtonian physics - whilst useful but ultimately wrong - was, these traditional economic approaches had to be overwritten for economics to become relevant again. Thus, EE claims to enter the field as a theory “unabashedly Lamarckian”, that uses biological analogies solely for the sake of explanation and never aiming to formulate any kind of theory around human nature or the Economic Man, one of the very concepts they put effort into bringing down.⁷⁹ What EE scholars of today have to ask themselves is whether their model of choice can

⁷⁵ In this, I refer to the 4 principles of the SSK as these are posed by David Bloor; causality, impartiality, symmetry, and reflexivity (Bloor 1991, 7). As we shall see, while the effort to fulfill these 4 principles in terms of self-criticism and re-elaboration of its foundations, especially given the ANT roots of the MLP, is there from the MLP, it falls short given the ontological, economical, and political presumptions that are set in stone within the MLP literature.

⁷⁶ Grin et al. 2010, 37.

⁷⁷ Elzen et al. 2004, 284.

⁷⁸ For examples of this appreciative theorising see Geels 2007, Geels 2015, and Geels 2020.

⁷⁹ Nelson Winter 1982, 11.

actually formulate any normative claims or even prescribe solutions, or if it always comes post-festum to describe capitalism's failures behind the presumption of randomness and unpredictability it has centred itself around.

For EE, orthodox models form two assumptions concerning firms - the main ontological element of EE - and rule enforcement.⁸⁰ Setting off to critique the maximisation model, they redefine what a firm *is*, what is equilibrium, and whether a firm even aspires to that at all; does a firm take into account such a fluid, intangible concept when shaping its economic behaviour? EE's authors seem to answer this question in the negative as for them firms shape their practices around several observable variables, most central among them, profitability. As profitability leads to growth and the firm exists within a specific-to-it social context, thus the first biological analogy is drawn. A firm's growth is a reflection of the prosperity and/or adversity it undergoes.⁸¹

Firms' behaviours are rooted in routines, processes that define their market practices, their R&D spending, and the ease of modifications they can ascribe to, in function to their lock-in mechanisms. These modifications constitute "searches" that draw the analogy with biological mutations leading to a better adapted firm.⁸² EE mostly concern itself with retroactively describing such dynamic multi-factor processes, patterns and market outcomes as they join one another through time.

This post-festum arrival of the economist may be attributed to the lock-in mechanisms I described in the previous chapter, or the alignment processes taking place in random manners, thus disabling the researcher from formulating predictive models and only being able to study a process after it has fully revealed itself. As EE authors put it, they too, like their orthodox colleagues, distinguish between the descriptive power and generality, and the limited results of their modelling efforts.⁸³ We cannot but ask; if a theory so dominant and widely accepted within the MLP scholarship admits its shortcomings from the get-go, under what factors is its power judged by?

⁸⁰ There remain questions as to how "the firm" is metaphysically any different from any "human nature" that predicated theories formulated within the orthodox, neoclassical model. The answer is beyond the scope of this thesis but it sheds a small light as to how capitalist economics makes unfounded ontological assumptions and names them "scientific".

⁸¹ Nelson Winter 1982. 17.

⁸² Ibid., 18.

⁸³ Ibid., 21.

Here we see the first signs of defeatism that are sown throughout contemporary sociology. The adoption of flat models that create ontological soups to describe social phenomena way after these have revealed themselves, the retreat in powerless rhetorics to blur the waters of petit-bourgeois terminological conundrums are telltale signs of scholars afraid to critique the powers-that-be. Powerless theories that undermine their own efforts towards better societies will exist as long as Marx's 11th position remains under attack and does not become a staple deontological presumption of our professions. Sustainability will not be attained by hands-off retrospective descriptions that not only presume but accept and legalise the existence of war hawks, colonial firms, and capitalist polluting practices, especially through justifications of them as prime movers that openly accept these actors' overwhelming power.⁸⁴

Nelson and Winter recognise the ad hoc character of orthodox descriptions around sources and outcomes of innovations, and the distorting properties of representations of reality that have been provided by their colleagues as inadequacies pertaining to individual and organisational capabilities and patterns. What makes EE vulnerable to attack, is that these same inadequacies plague all EE deployments by the MLP. Describing firms as merely reacting to unanticipated market changes severely underplays the shaping power that firms hold against that intangible called market. For EE, adaptive change rests on the initial direction of a firm's response that tends to be towards profit maximisation *and* the ultimate convergence of responses towards a new equilibrium; a concept that was one of the main targets of critique against the orthodox model, now becomes a descriptive staple in the EE framework.⁸⁵

Within the MLP scholarship, we can find these *a priori* acceptances of this convergence qua-equilibrium in the rise of niches and their fostering and adoption by the grammar of the regime. While arrays of niches emerge to answer the rising needs of the regime, the notion of equilibrium survives in the MLP as it gets nuanced and developed towards the concept of alignment that describes why the niches and regimes interlock and create the more generalised entities of sociotechnical regimes. In the

⁸⁴ Smith 2005, 1497.

⁸⁵ Ibid. 26.

exact opposite way, the unbalancing process of dealignment produces regime instabilities.⁸⁶ These alignments produce hybridities in regimes as they multifactorially shape the direction and shape of the developments within the regimes and as a result, the ways in which regimes foster niches.⁸⁷ A view of these alignments at work can be found in the ways transitions get diffused and adopted in different landscape contexts as Sovacool describes.⁸⁸

While rhetorical effort has been put into overcoming the obstacles equilibrium as a presumption causes, Nelson and Winter attribute the issue to the commitment of firms to maximisation and equilibrium analysis.⁸⁹ I have to assume that the proposed alternative under the EE framework would be adaptability and adjustment under the Schumpeterian aspects of experiential learning and cumulative interaction that foster diversity within the structuring of industries. I fail to see how that overcomes the notion of equilibrium given that EE are direct genealogical descendants of Schumpeterian change theories.⁹⁰

The accepted model of industries by the EE is one that rests upon the notion of equilibrium.⁹¹ Demand, operation pace, supply, and returns are all solidified as presumptions due to EE's unwillingness to make any explanatory claims and its retreat to the randomness of actors and circumstances. While Nelson and Winter in particular, can be absolved for not recognising firms' tanking practices, today's economists, in the post-2008 era cannot hope to justify their positions as to EE's ability to provide any

⁸⁶ Elzen et al. 2004, 34.

⁸⁷ Kanger Schot 2018, 4.

⁸⁸ Sovacool 2020, 7.

⁸⁹ Nelson Winter 1982, 27.

⁹⁰ Even if in the Schumpeterian analysis, economic change is studied as a process and not a static equilibrium situation, Metcalfe points out that equilibrium does arise in the form of the limiting state of the process of rivalry or competition (Metcalfe 1998, 12-17). Of course, we must never forget that an inert market, does not mean that it is at an equilibrium state of rest as for Schumpeter capitalism and equilibrium are contradictory. Capitalist change is a process. This is exactly what gets abandoned as a notion by Nelson and Winter, and subsequently by the MLPers. Furthermore, Schumpeter describes the process of industrial reaction in the face of changing circumstances as an *adaptive response* which forms into a *creative response* when the procedures followed fall outside the spectrum of what is expected or already existing. From the standpoint of the observer of these processes ie. the MLP researcher in our cases, these responses can only be understood ex post, "after the feast", a fact that Nelson and Winter also point out. In these transitions, the manners in which creative responses arise also cause social and economic situations to change radically (Schumpeter 1947, 150). These notions have been referenced in the previous chapter and their connection with the interlockings of the three levels of the MLP is direct.

⁹¹ Nelson Winter 1982, 281.

useful normative framework around sustainable transitions. Firms have quite specific agendas and sustainability of the liveability of the planet is definitely not among them.

One more effect of the survival of the concept of equilibrium in the form of alignments of the regimes, is that the depersonified view of regimes obscures the inherent power struggles that exist within the alignment processes. If alignments do happen randomly, quasi-unconsciously, actors that have the luxury of remaining passive and in the end, benefit from them, either because of other actors' attitudes or simply because of the favourability of the alignment in question, have their interest furtherly advanced; their power is all the more greater.⁹² If on the other hand, alignments are guided or even forced towards certain directions, this phaenomenae in themselves prove the unfounded presumptions of EE and MLP for randomness of the alignment processes and the power of incumbency. One cannot deny that there exist actors that unexpectedly benefit from alignments that did not initially concern them, but this does not seem relevant as power and its exertion can only be judged within definitions of power that recognise its contextuality and intentionality.

We arrive at one of EE's main points of attraction for MLP authors; EE's presumption of economic actors. These are "social structures with objectives that they pursue".⁹³ Objectives in this sense, vary wildly within the MLP context. From the goals regarding profits of incumbent actors such as Dunewater Pipeline Co. in the matter of water supplies in the Netherlands, to moralistic answers of the UN in its Rio reports that disregard the systemic reasons behind the unattainability of sustainability and eradication of poverty.⁹⁴ Due to this quite open and diverse spectrum, the MLP finds its intellectual home somewhere between EE and ANT regarding the representational frameworks for a vast array of objectives of actors and the relations between them and their objectives.

Here enters the "managerial" side of the MLP that seeks to succeed in correctly representing the motives behind actors' decisions.⁹⁵ For the MLP, it is the constitutive complexity of social issues around sociotechnical transitions that guide actors to follow

⁹² Lukes 2021, 83.

⁹³ Nelson Winter 1982, 30.

⁹⁴ Geels 2005b, 377; for a collection of the Rio UN reports, see: <https://sustainabledevelopment.un.org/rio20> (last accessed: 19/06/2023).

⁹⁵ Nelson Winter 1982, 34.

set patterns and rules, thus falling under the “grammar” of the regime.⁹⁶ These rules are by no means optimal or simple to follow, yet they are evaluated in a more pragmatic way. Their value and effectiveness is only judged according to the satisfaction that their following provides for the purposes of an actor given the problems the actor faces.⁹⁷

Transition outcomes rise as the “gestalt” sums of these variations of rules-following and behaviours that inform the regime. The landscapes produce regimes and the regimes incorporate and reform landscapes qua-habiti. These responsive variations that regime actors form, also shape the answers to the landscape issues that arise. The abridgement of these gaps between individual behaviour of the niches, the following of the rules as prescribed by EE, and the intangibility of the rules and the landscape conventions that arise in ways described by the ANT, is what interested MLP scholars to adopt Bourdieu’s *habitus* theory as we shall see below.

Organisation and management within the EE context gain a different colourisation as its authors claim. EE does not prescribe sets of choices for the firms to face “economic problems” ie. the constant changing of circumstances that demand adaptability from their part. Instead, EE claims that changes, choices, and consequences are unknown, as opposed to the orthodox model that purports betterment of production and distribution in given sets of alternatives.⁹⁸

EE’s authors admit to the powerlessness of their model that is caused by firms pursuing specific agendas and profitability in contrast to what they advertise as unknown agencies, circumstances, and responses. Firms have clear-cut interests and ways to pursue them. What I can accept as being quasi-randomly determined, is society’s response to these pursuits. But even this can be researched and steered as

⁹⁶ Geels 2004, 3.

⁹⁷ This is also prevalent within the confines of the Neo-Institutional Theory (NIT) if one is willing to see the power the organisations that exist under the rules of the regime, actually possess regarding their capabilities of bending and shaping the rules to their will. In the manner that the MLP appreciatively employs the NIT, technology as a cultural and a material force has its place within the factors that shape the processes that organisations are (Geels 2020, 10). Yet if we accept that uncritically, we will recognise that even though technology may arise in the niche levels in the forms of innovations, the actors that adopt and promote certain innovations above others, do so with their specific interests in mind. The MLP bonding with the NIT fails to criticise the role of capitalist interests and processes qua-institutions in their exertion of power against sustainability and transitions towards it.

⁹⁸ Nelson Winter 1982, 276.

firms most definitely take into account their power in shaping the cultural and political superstructure.

External to EE, one needs only to look around to witness the hold of incumbency and sunk costs that lead firms and powerful actors to drive markets in quite specific, predictable ways. From the standpoint of a model that accepts the existence of incumbent actors and capital as axiomatic, constitutive elements of economic activity, issues that arise from them cannot so much as be described, even moreso, resolved.

It seems like causes and consequences of capitalism's flailing failures are unknown solely to EE scholars. The rest of the world is catching up with practices and rhetorics of flat ontologies. In hierarchically structured market economies there can be left no place for descriptions founded on randomness. Capital knows that to be true and is actively pursuing to put markets into a stranglehold while advertising some kind of consumer power. Evolutionary proponents take their time in providing explanatory or descriptive accounts of this. Meanwhile, historians know that even if markets have existed long before capitalism, it is due to distanced approaches such as this that they remain the main justification for the murdering of people.

For EE the ultimate judge of innovation and development seems to be the market system. Subscribing to Schumpeter's notions about the internality of entrepreneurial innovation that arises as a initiative from within, they seem to accept that innovation - and transitions as such - occur as reconfigurations of already existing components, something that fits greatly with the MLP scholarship that promotes a reconfigurational approach towards sustainability transitions.⁹⁹

"Market evolves endogenously".¹⁰⁰ The question that remains is how does one expect anything to actually reconfigure itself as long as the agendas and mandates of profit remain - as EE authors themselves claim as prime causes of economic activity - solidified with the very actors that cause current sociotechnical systems to lock in in such powerful ways.¹⁰¹ As Collingridge has shown, studying the oil sector, the main field around low-carbon transitions that proves to be unable to budge, change is stifled on the grounds of the investment risks regarding cost and time to optimally adjust rising

⁹⁹ Nelson Winter 1982, 277; Geels Turnheim 2022, 5.

¹⁰⁰ Nelson Winter 1982, 283.

¹⁰¹ Ibid., 308.

technologies to the stakeholders' interests. In this, oil magnates have the backing of conservative think tanks and climate crisis deniers as they sow doubt in an otherwise undebatable topic.¹⁰² Market most definitely does not evolve, it is chokeheld, and this most definitely does not happen endogenously.

Fixes are favoured - as the reconfigurationist model proposes as well - as alleviations to current issues. Given the high value - low variety, and cartelised nature of the energy market, one cannot hold out much hope as to any imminent change if the power doesn't shift from those that would take into account monetary and temporal cost and prioritise them higher than their natural and human equivalent. Lock-in mechanisms lie completely with those having money on the line to lose when the shift towards sustainable energy sources happens.

While the recognition of the ailments that lock-in mechanisms and their consequences bring upon societies, is quite important, we cannot ignore the fact that no takes critique the interrelatedness of the notions of growth with the very existence of market economies.¹⁰³ Is there any possibility to have an economy that is not centrally designed and guided by non-incumbent people, yet still combats the accumulation of capital, power, and the means of its exertion and the imposition of firms' agendas of profitability via growth?

As EE's founding text poses, the answer is most definitely not a yes. Nelson and Winter realise the shortcomings of competitive market economies, as it is not human need that drives practices. Instead, competitive systems of economic organisation can result in accumulation of market control, in higher-than-average production costs - with whatever this entails for natural and human resources such as the exploitation of the land and labour - and greater R&D costs than would be needed. They rush to waive these worries aside, but questions on whether capitalist market economies can even remotely produce sustainable, or even efficient outcomes, remain.¹⁰⁴

¹⁰² Collingridge 1980, 59.

¹⁰³ Growth is recognised by Nelson and Winter to be one of the main causes for markets' cartelisation and oligopolies (Nelson Winter 1982, 325). While beyond the scope of this thesis, the last few years have seen the rise of a subfield of economics called Degrowth Economics that launch themselves from the acceptance of the failings of the notion of growth. One has to consider whether these approaches can succeed or fail in the defeatist fashion the MLP does.

¹⁰⁴ *ibid.*, 330.

2.2 Actor - Network Theory

Within the MLP literature, capitalism as a system of possession of the means of production, never gets put in the bullseye of even the most so-called revolutionary critiques. Refraining from critiquing any -ism is seen as a central tenet of the second element of the MLP, the Actor-Network Theory. What does ANT support and is clearly in accord with the MLP approach is the need to trace movements, displacements, transformations, and translations between social actors. As opposed to other methodologies that have designated terms for domains of reality, ANT does not make any such assumptions.¹⁰⁵ This leaves them with the duty of explaining what relationships, movements, and agencies are constituted of.

All these seem to be founded upon material, aesthetical, or moral grounds and ontological assumptions - or as any person would call it, society. Instead, if one follows the argument of Michel Callon, society (and scallop farming) is the outcome of negotiations and relationships between agencies and interests.¹⁰⁶ This leads us to a circle of need for foundations as the question that comes next is towards what these negotiations and interests are pointed to? As scallops seek survival, and firms profit, the ANT in its very nascent form falls short in escaping the very thing it sets out to critique, materialism.

While we should concede the point that society gets transformed from these activities that the ANT launches seeks to describe and use, it's idealistic to set society to the background when these movements or transformations render all non-incumbent actors irrelevant to it, if we do. Who moves whom, who displaces whom, who's reporting and interpreting all these, to what goal? The most important events are seldom results of "renegotiating social ties".¹⁰⁷ Or to put it differently, scallops are forced to attach themselves when the conditions for survival are met. Especially if we ignore the inductive leap inherent to any spokesman-centred generalisations concerning scallops' properties and attachment mechanisms.¹⁰⁸

¹⁰⁵ Latour 2005, 64.

¹⁰⁶ Callon 1984.

¹⁰⁷ Latour 2005, 66.

¹⁰⁸ Callon 1984, 214.

To consider scallops - or whatever victim of rule enforcement, whether that rule is social, institutional, or natural - as having an equal negotiative power as its oppressor, or rule enforcer, is to absolve the latter from the material and moral consequences of his actions. In the scallop farming case, we need to form a tangible critique against fish farming, ecosystem disruption, and the interests behind such practices. Drawing the human analogy, sociologists of relations and social ties would let exploitative processes play out, just to study the manners in which rules and interests are enforced, and name it “negotiations”.

To answer Latour’s question about the foolishness of sociologists regarding mythical beliefs and the existence of other worlds other than the real one:¹⁰⁹ is this question coming from a sociologist who is perfectly fine letting people being exploited, murdered, and raped all so that he traces the relations behind these events? Unfortunately for the ANT, there is a very real world of violence and its paths can be clearly traced. If we are so inclined to believe that sustainability will reach the whole world at once, or that the climate crisis affects us all equally, then maybe ANT suits us.

As Geels has shown, even within the MLP frame of work, this is not possible. Different historical and political contexts produce and adopt different technologies and policies in different times. MLP’s ignorance to these geospatial nuances has been a prominent point of attack from its critics. Geels has put effort in taking these critiques into account, and his 2016 study of the implementation of renewable energy sources and the differences between the transitions in the UK and Germany shows exactly that; the disparities and nuances that need to be taken into account when approaching different contexts, even at the same point in history.¹¹⁰

Sociology has to study the exertion of power and its causes - that is exactly why sociology bothers itself both with humans and baboons, even when acknowledging the differences in localities and temporalities. Power matters. A sociologist of the social is not naive or comfortable enough to put his hands on his knees and let the oppressed remain silent. A sociologist does not study baboons but their existence in relation to the human society around them. They would take into account the degradation of their

¹⁰⁹ Ibid., 68.

¹¹⁰ Geels 2016, 910.

natural habitat, the conditions of their captivity, the tranquiliser darts and the electrical fences. Much like war refugees, baboons do not get to speak. Sociologists willing to showcase the violence enacted upon them, do. MLP cannot hope to bear any normative weight as long as it adheres to theories that presume the flatness of agencies that sociologies of relations do.

Contrasting to that, in the MLP framework we witness its authors attempting to use historical case studies to describe and explain sociotechnical transitions. These efforts have yet to produce any generalisations on how these transitions come about. One cause of this that also serves as an explanation is the vast swathes of differences between the contexts studied. No one can claim that study of the change from wells, and barrels to watering pipes in Holland can be organised and theorised in the same way as the implementation of RETs in Germany.¹¹¹

A major reason behind this is the uncritical acceptance of Latour's Actor-Network Theory by these Innovation scholars. For Latour, the "social" means nothing. It has to be redefined, refounded each time a sociologist sets out to inquire on anything. The "social" was supposed to trace connections, to be inspected and composed from empirically wrought elements, not taken as granted, or a hard material to shape theories from.¹¹² According to Latour, sociologists need to recentre their question around what does "social" mean, and the manners of demonstrating it at work.

Where the ANT and the MLP meet, is the point where Latour accepts a quasi-hierarchical structure between social and economic factors - that "possess their own logic" - where the latter are portrayed as more independent and self-containing and the former come as descriptions of them.¹¹³ Within the MLP literature this notion can also be found in its implementations of New Institutional Theory (NIT). The scholars of NIT developed their own framework to induce dynamism and breadth in the understandings of institutional organisations and their workings. For the NIT, and not quite far from what we will see from Bourdieu, the content of the regime-level are "socially constructed, historical patterns of cultural symbols and material practices,

¹¹¹ Geels 2005b; Geels 2016. For more into differences between geospatial contexts and the contextualisations of power, also see Yeung 2005.

¹¹² Latour 2005, 1.

¹¹³ Ibid., 3.

including assumptions, value and beliefs, by which individuals and organisations provide meaning to their daily activity”.¹¹⁴

This approach provides the MLP with fixed sites of research and struggle which seems to contradict ANT’s notions for the need to retroactively construct these, and not presume them. For ANT to be solidified as a relevant tool regarding provision of descriptions, we have to examine five “uncertainties” as Latour calls them. These are:

1. The nature of the groups involved (ie. in the SCT transition that each particular case studies)
2. The nature of the actions undertaken (ie. towards sustainable transitions)
3. The nature of the objects interacting (policies, technological apparatus, etc.)
4. The nature of the facts accepted (science and policy claims)
5. The type of studies attempting to describe all the above.¹¹⁵

This cannot function in the case studies that employ the MLP as their subject matters are quite specific. Most of the STSers that employ it, presume certain kinds of actors and fields of struggle provided from their NIT adoptions such as divisions between groups with different powers (eg. the aforementioned bourgeois Dutch society and the lower strata that had no access to clean water).¹¹⁶ Geels names social movements, publics related to acceptance processes and debates over new technologies, users, and the marginal groups affected by technologies.¹¹⁷ In every particular case, the manner and the degree of representation that each actor gets is ultimately decided upon from the case’s author.

This of course has bearing upon the case studies’ ultimate conclusions. A prominent appraiser and critic of the MLP, Andy Stirling poses policy questions, research agendas, prioritisations of questions, conceptions of peer reviews, constitutions of proof among others, while agency and power-contingent categories, are external to analyses and get excluded from explicit reflection. These domains become easily contestable yet they remained underacknowledged.¹¹⁸

¹¹⁴ Thornton et al. 2012 in Geels 2020, 8.

¹¹⁵ Latour 2005, 22.

¹¹⁶ Fligstein 1996.

¹¹⁷ Geels 2020, 5.

¹¹⁸ Stirling 2007, 275.

A main example of this are the references on labour union unrest and the threat of revolution in the 1800s Netherlands, while Geels ends up not even mentioning them in his conclusions. This is the agency of the author that ultimately is the most absolute in the study of a transition. Yet it helps the authors as this process of having the final say, supports the case of the MLP being self-sufficient enough to describe the transition towards sustainability by employing its 3-leveled approach.

All the above enable the MLP to blend ANT with EE quite easily. If social factors arise as descriptors of economic forces, and the logic behind these forces is randomness, versatility, and adaptability, the MLP needs to make no claim behind non-economic causes of environmental degradation, destruction of peoples for the sake of profitability, or the production of cultural values that promote the inescapability of well defined economic structurisations.¹¹⁹

Thankfully, MLP authors do no such thing as all of their works contain descriptions of non-economic factors at work, such as the process of reinvention of the meaning of personal hygiene as propagandised from the upper classes towards the people in the Netherlands during the 19th century. What Geels fails to condemn is the apparent elitism of the tactics these strata followed and how the meaning of cleanliness and the need for piped water was constructed by them and enforced upon the people that had no access to it.¹²⁰

The core principle of ANT as shown here, is the retention of its ability to find better orderings of the world after having the full deployment of agencies and controversies.¹²¹ This enables the MLP to feel no need to take any critical stances as its direct genealogical predecessor also proclaims its abstinence from interrupting the controversies it sets off to describe.¹²²

¹¹⁹ The disregard of materialist analyses of historical processes of change, and the omission of popular, revolutionary forces at work from historical case studies even from the revolutionary trends within the MLP literature, will be further studied upon in the next chapter around the uses of History and the possibility for a regulative, normative historical methodology.

¹²⁰ Geels 2005b.

¹²¹ Latour 2005, 3.

¹²² Latour 2005, 24.

The “social” is constructed and the economy behind it is a random process. Only issue with that is that it is clearly controlled. It is exactly the point where the MLP fails to produce any valid criticism of incumbency. It cannot. Its ontological presumptions forbid it, it would be contradictory to its core defeatist, hands-off stance to do so.

From this blend of EE and ANT, we also see the corroboration of non-human agency as long as the actors *act*. The definition of the word seems blurry. Latour does support that a hammer has agency as long it enables certain social practices to be shaped around it.¹²³ The issue this solves is that researchers now have the argumentation equipment to study firms, governments, and other non-personified actors behaviours. The problem that arises with these premises around agency is that they provide no evaluation as to which actor’s agency should take precedence, whose pull is stronger.

To support that all nail hammerings are the same and as such we have to stick to a single methodology of study that disregards the wielder of the hammer in himself, or whether the nail is to support a table or to crucify dissidents, leaves off the hook the ones who crucify. Some “participants” are not participants but enforcers, and certainly, not mere actors. They are murderers. The ANT cannot hope to support a change in societies, to describe or explain transitions because if everything is flatly equalised before tracing relations, one can argue that no transitions come about at all. In the name of flatness, "before" and "after" are equalised.

Answers become obvious from studying social happenstance and history. Actors should not be considered as having equal pulls, and whenever the disparities are witnessed and described, we should not put effort in equalising them. To put this in simple terms, no, Tesla should not have any kind of say on the lives of lithium miners. If an MLP account gets put forward describing the shift from Toyota Prius’s hybrid engineering towards Tesla’s purely electrical one, I am sure there will be no account as to how these two companies have exploited African miners or the labour conditions in mr.Musk’s factories, as they would deem it to be outside their context of interest.

The assumptions on flatness plague the already-existing MLP literature. We can easily find Geels disregarding factors such as the resistance of the labourers

¹²³ Latour 2005, 71; see also Callon 1984 for the discussion of the scallops’ agency in scallop farming.

concerning their constitutional rights in the Netherlands, the threat of popular revolution, and indifference of the upper classes towards the people unless their tenets of profit and retainment of the status quo was directly assaulted. All these exist in his descriptions of the transition towards running, piped water in Holland, a case study that while putting effort in its core part to take into account popular uprisings and demands, it completely disregards the inherent elitism, and the power of trade unions regarding the shaping of the transition.¹²⁴ The blend of ANT and EE properly justifies such takes. What remains unabashedly true, is that without the organisation and threatening of the capitalist practices-as-usual by the people, cholera would still exist alive and well. Capitalism does not promote neither innovation, nor transitions except for quite specific, profit-centric, and power-consolidation reasons.

The moral, political, and normative implications of descriptions such as these are apparent. Global South gets neglected, the living conditions and futures of lower social strata are disregarded, and even when they are not - such as passing descriptions of unions' power in 19th century Holland - they are depicted as groups having active pulls on transitions, yet incumbent stakeholders that exert their power on labour conditions, governance, research, and allocation of resources and profits would stifle innovation at every turn unless foundationally threatened. Capitalism and incumbent classes did nothing to promote clean water networks except patronising and reprimanding the people regarding hygiene etiquette.¹²⁵

These issues also stem from the implied notion of abstaining from using any -isms in descriptions that employ the ANT. Latour explicitly goes against this practice when group boundaries are certain, entity range is stable, or sociologists fail to trace the manners that new social connections arise.¹²⁶ MLP authors do not accept any such things to be true in their modelisations. They remain trapped by the demand of the ANT to rediscover the "social", to reconstruct any -ism, any social relation, to not limit actors' potential to act and express their particular interests.¹²⁷

¹²⁴ Geels 2005b.

¹²⁵ *ibid*, 389.

¹²⁶ Latour 2005, 11.

¹²⁷ It is a reason to wonder why on the most seminal book around the MLP, *The Great Reconfiguration*, the word "capitalism" makes only 7 appearances in 338 pages of explaining and studying transitions in capitalist contexts. 6 of them happen in reference to the revolutionary transitional approach as it is the most prominent - albeit defanged - critique of capitalism within Innovation Studies (Geels Turnheim 2022).

Along this line of argumentation, Latour designates the issue to lie with the attribution of privilege to one social group, whereas as he claims, our common experience would provide us with a much more varied range of contradictory group formations, activities, and dismantlements. The question for Latour becomes whether we want to provide a top-down or a bottom-up description of the phenomenae under inquiry.¹²⁸ Yet, within a flat ontological framework lies a contradiction in the acceptance of privileges. Is the ANT a reflection of its user, mutating under the researcher's biases and preconceptions, or does it bear its own agency and its consistency is only a matter of how right one is employing it?

As MLP is founded upon the appreciative take on economics, and tries to bridge the levels of the individual with that of society and communities through Bourdieu's work, it is justifiably predictable that Rip, Kemp, and Geels would subscribe to the adoption of the ANT approach. It is because of these risks of mutation of the original material from the researcher that they - rightly so - seek out spokespersons about the groups they take into account, as they support Latour's take about groups not being silent things, rather than gestalt formations of contradiction and interests.¹²⁹ The appreciative part stemming from EE links with the ANT, as one can "teach" the other to recognise strengths in social relations and the formations or concepts that arise from them. In this manner, the spokespersons of these formations qua-groups, can be deemed as the most appropriate to communicate their interests.

Examples of these presumed spokespersons can be found in Hajer's descriptions of collaborations between NGOs and the Dutch Department of Housing, Spatial Planning, and Environmental Hygiene as these affected the public perceptions on the need for governance that supported sustainable transitions. Niches' spokespersons seem to redefine the relationship between the landscape and regime actors and the empirical level of discourse, namely that of depleted or outright destroyed natural resources and communities.¹³⁰

True to its ANT premises, the MLP would have the world drown in oil sills before characterising the powers-that-be as such in risk of vilification.

¹²⁸ Latour 2005, 29.

¹²⁹ Ibid., 31.

¹³⁰ Hajer 1995, 209. As Smith notes, issues of power also become prevalent in the matter of the representation of problems within and around a transition in the manner that if we abide by the ANT, these

In this construction of the communicative abilities of groups, MLP researchers have to delineate the group's boundaries, trace them so as to define their social existence and/or content. As expected, spokespersons have a say in this process as they seek to define their respective groups in manners that suit them. This stands true even for sociologists, journalists, statisticians, every field that attempts to enforce its gaze upon the world. Sociology exists as long as it's defined as such by its participants.¹³¹

Within the MLP framework, one can find its scholars waving away questions as to *who* participates in these communication networks. One of these shortcomings can be found in the study of the debates around public hygiene and the implementation of new technologies and their costs, in the 1800s Netherlands. To properly study why a national health policy was not developed, we would need to be able to carefully describe and examine the demographics of debates' participants. As the pipeline companies and the soap industries' interests drove the transition, one can only assume that there was a blatant indifference towards the peoples' needs. The disparity between personal pumps in wealthy houses and filthy barrels in the rest of the houses shows that the capital had to first feel actively threatened (as Geels obfuscates in his conclusions) and then search for profitable solutions to cut the cost of the implementation of piped water.¹³²

It seems that an a priori acceptance of the inevitability of capitalism, firms, markets, and incumbent actors bearing the burden of investment and innovation risk, is foundationally contradictory with the approach of the MLP. If the MLP scholars wish to be faithful towards bottom-up descriptions that do not presume the "social" but rediscover it via its actors and their practices, they have to surrender that either capitalism is indeed constructed and can be studied upon solely because several incumbent actors have an active interest in having capitalism come and remain into existence, and possess the means to silence all dissent to that existence, or that capitalism is a notion of some kind of daydreaming Marxist-Leninist Don Quixotes that

mediators and communicators of groups' interests have the power to shape realities and sow conflict or peace among the definitions and prioritisations of the regimes' goals (Smith 2005, 1503).

¹³¹ Latour 2005, 33-37.

¹³² Geels 2005b.

create dragons out of nothing for the mere fulfillment of their prophecies. If the latter is the case, it is quite unfortunate for the MLP that most Marxist-Leninist “prophecies” come to be true concerning capitalism’s cycles, agendas, and practices both through historical happenstance and capitalist economic and social theories.

The hiding of popular, violent, or revolutionary actors serves quite specific agendas. Within the MLP scholarship we find the hiding of unions and anticapitalist organisations to be waved away as if capitalist interests do not exist, or should be constructed in the second degree. Apparently, not only do they exist but are also cognitively prioritised to the “social”. We see this in the ways Turnheim and Geels revert back to the older elaborations of Institutional Theory, moving away from the regulative and normative natures of rules and organisations, veering more towards simple conceptualisations of the rules of the game as governance and policy tools.¹³³ This shying away from the regulative/normative facets of institutions brings once again into focus the power of the author in intentionally obscuring the capacity for rules enforcement and shaping that incumbent actors hold.

ANT does not seem to offer any explanatory or normative conclusions on that power chokehold that exists. Its abstinence from preferring any specific type of social aggregates of beings comes to direct opposition with MLPers constantly accepting markets’ and firms’ existence and taking into account their interests in the normative part of their approach. Preferences become obvious. While Latour states that analysts choose to depict the moves and agencies they deem as more reasonable, MLPers provide no justification for their choices.¹³⁴ The Others remain muted, transparent.

During the act of remaining puzzled about the identity of the participants while they are acting - meaning adopting post-festum descriptive stances regarding groups, agencies, and boundaries - these very actors *act*.¹³⁵ Once again we find models constituted by the ANT, unable to provide any explanatory or normative accounts towards their agendas, namely that of sociotechnical transitions on routes to sustainability. While they are researching and letting acts play out, incumbency establishes strongholds; combatting any of these practices is contradictory to the

¹³³ Geels Turnheim 2022, 10.

¹³⁴ Latour 2005, 57.

¹³⁵ *ibid.*, 47.

distanced stance of Latourians. The world has been interpreted enough, maybe we should consider doing any single thing to change it.

2.3 Habitus

To solidify the niche and regime-levels actors' choices within the broader notion of the landscape, really of society itself, the MLP scholars needed a sociological theory that would respect their actors' agencies while also highlighting the top-down flow of archetypes, mandates, and social norms. Bourdieu's *habitus* claims to do exactly that without promoting the idea that these actors are all that matters and the sole shapers of society that come into it *tabula rasa* without any preconceived notions of actions, routines, choices, and practices.

Within the Bourdieuan framework, the MLP finds a firm ground to found its notions of individual actors influencing and getting influenced by the superstructures where they act. The "subject of knowledge" adopts points of views, and forms its observations and analyses as practical activities that represent it.¹³⁶ It is precisely these practical activities that must come under sociological scrutiny; the manners and modes of adoption and adaptation, not the subject or the object of these practices. These will constitute the main axes, the practices through which we will understand how the objectivity of "objective" knowledge and the subjectivity of its experience are being constructed.

Bourdieu's approach provides us with an explanation of how practitioners, whether that may be individuals, firms, pressure groups, or even materialities and technologies, incorporate and objectify the structure. To escape the "realism" of it, we need to pay attention to the routines that make it seem atemporally *real*. As Bourdieu defines it:

"Structures produce habitus, systems of durable, transposable dispositions, structured structures predisposed to function as structuring structures, that is, as principles of the generation and structuring of practices and

¹³⁶ Bourdieu 2013, 2.

representations which can be objectively regulated and regular without in any way being the product of obedience to rules, objectively adapted to their goals without presupposing a conscious aiming at ends or an express mastery of the operations necessary to attain them and, being all this, collectively orchestrated without being the product of the orchestrating action of a conductor".¹³⁷

The disappearance of the individual within the limits of habitus is clear in this definition. Projects and plans are products of their respective habitus even if it seems that they only result from the actors' efforts to adapt towards the foreseeable future. Within the habitus frame, all agents and practitioners are producers and reproducers of meaning that reach the status of objectivity. This is exactly because they are mostly devoid of any intention within the regulated by the habitus, boundaries of improvisation.¹³⁸

The predetermination that the habitus presumes concerning actors' series of moves-as-strategies and the choices behind them comes to clear contrast with EE's freedom to versatility, diversification, and adaptability of the firms, regarding depictions of actors in the MLP scholarship. Within the EE frame of reference, there is enough space for firms incumbent enough to have both the tools and the knowledge to act and react on their own, towards goals of their own, namely profitability. If profitability is a norm of the capitalist habitus - which it most likely is - we succumb to economic determinism and must view all firm practices as preferable strategies amongst arrays of strategies. Falling behind the line of EE is irrelevant; it becomes an arbitrary choice of MLPers as the habitus removes any kind of real freedom of choice from the actors. The intention of their strategies is a facade that gets reappropriated by the norms of the habitus that mandates the existence of these specific strategies to begin with.

It is either this, or the habitus model of social explanation proves itself wrong as accepting it would undermine the freedom of firms to adapt towards any other norms outside the ones within the spectrum of the capitalist habitus. Is sustainability one of

¹³⁷ Ibid., 72.

¹³⁸ Ibid., 79. We should consider the notion of habitus as a backdrop for the processes of mediation and the subjectifications of mediators themselves (see ft. 57). This research would root itself in a blend of the Bourdieuan habitus theory and the ANT and is beyond the scope of this thesis.

them, one that could supplant all the others? May be so. We would have to clearly define sustainability. In doing so, we would find ourselves creating definitions rooted in materialistic accounts of the world, of conditions of living, and endangered futures. While that may seem sensible, it would contradict both the habitus theory of practice and its connections with the sociologies of relations such as the ANT is.

Sustainability in its truest sense, that of preserving forms of life, thought, and communication, will not be bound by risk assessments, management, agencies, and capital flows. It lies with the people and their quite tangible needs and political actions. As it becomes obvious, sustainability in this sense, also cannot exist under an ANT view of social phenomena as sustainability needs to precede theories that equalise agencies, and not be constructed under the interests of actors that would actively combat it such as oil companies.

As I described Bourdieu's work, within the MLP literature we find the appropriation of the notion of reproduction of regularities through regulated improvisations; regulation that is provided by the habitus.¹³⁹ This is especially prevalent in Geels' study of the redefining of hygiene in the Netherlands. The prevalent elitism and the suppression of labourers' power can be directly linked with the cognitive and motivating structures that make up the habitus both of the field of study (19th and early 20th century Netherlands), and the MLP scholars and their evaluations on the power of respective actors.¹⁴⁰

It is foundational to the notion of habitus that objectivity gets secured by the consensus of meaning as Bourdieu poses it. Agents' experiences get mutually reinforced, and unconsciously or unknowingly to them, ascend in status.¹⁴¹ In this manner, habitus get reproduced as they both provide the frame of regulation for practical improvisations and also arise from this process of unintentional objective-ification.

Habitus is a product of history that produces history.¹⁴² This notion as expanded upon by Bourdieu is the central premise of my thesis. In the last chapter, I will attempt to answer questions around the uses of History in the process of policy making, and detect

¹³⁹ Bourdieu 2013, 78.

¹⁴⁰ Geels 2005b, 383.

¹⁴¹ Bourdieu 2013, 80.

¹⁴² Ibid., 82.

and criticise the kinds of histories that serve well in producing the readings of History we see from the MLP, based upon presumptions and elaborations on the notion of History from Schumpeter, Metcalfe, Geels, Stirling, Paterson, and other central contributors of the MLP literature. This will help me formulate an answer on the power and reach of the MLP as a suggestive, or normative tool or policy making, and critically examine its claims on its self-reforming and self-bettering properties.

The third chapter aims to answer questions centred on the role of History within the field of Innovation Studies, the quality or even, possibility of model and insight development from studying cases past, and whether our understandings of historical, political, and economical forces can or should be reshaped by History. In turn, I will examine whether I can shape the MLP to better fit the needs of policy making today. Along these axes, the MLP as constituted from the EE, ANT, NIT, and habitus elements I have described before, will be put under the lights of the fields of History, Sociology, and Economics of Innovation and Technology more generally.

Through this final analysis of its genealogy and goals, I hope to provide answers as to its relationships and uses regarding its appropriation of theories that have shaped sociological studies founded on historical cases. More importantly, I will try to examine its contingent effectiveness while basing my conclusions on historiographical studies that seem to exist right alongside the MLP and provide it with ontologies and methods of modelisations of History.

In the end, as even the MLPers understand it, the MLP has no single use or interpretation. Even among its ranks one can locate inconsistencies and discontinuities of ontologies, estimations, and political connotations. Some of them being in open contrast to each other, claim to have arrived in the Innovation Studies field to alleviate issues that they deem as all-important. We will see how the very conception of MLP's methodologies and constituents, binds it to an inability of becoming anything more than a descriptive tool of historical appropriations and selective imaginings of contexts.

3.1 The Multi-Level Perspective and Postmodernism in History

Postmodernism as it has been formulated by Lyotard and definitively expanded upon by contemporary historiographers and historians alike, is centred around the decentering of times and places.¹⁴³ In the break away from “grand narratives”, it produces social scientists and historians with questions that cannot exist outside its scope and beyond

¹⁴³ Lyotard 1984.

the adoption of its methodologies and ontologies. Questions such as the possibility of using it as a freedom of freeing the historian from modernist cliches, the knocking down of privileged vantage historiographical points, and the highlighting of non-dominant narratives define its fields of interests.¹⁴⁴

One such field that gets constantly redefined by postmodern monographs and methodologies is the field that within it the MLP resides; the relationship between culture, technology, nature, and history known as Innovation Studies and their parent field, STS. As I pointed out in the second chapter, the depiction of this relationship by the MLP is skewed and foundationally flawed from its acceptance of flat ontologies and the constitutive obfuscation of agencies of the most important historical actors; the non-market ones, the powerless by deliberation.

Within this historiographical climate, Guldi and Armitage put out their *History Manifesto* in 2014. In an effort to push forward an agenda of historians admitting guilt for the effective social powerlessness of History, they search the roots of the issue in the retreat of *longue duree* narratives and historical studies that stray away from exhaustive archival research. For them, “short-termism” has become an uncritically accepted element of the historical vocation, as the interconnectedness of short-termist rhetorics, interests, and institutions are defining the profession and its training methodologies. Even our sense of the past supports short-termist arguments as our instincts guide us to see a static world without political shifts or world-changing events. Bringing up the Occupy Movement is a supportive element to that, as what seemed as an uprising of the US citizens, fell flat. One needs to wonder why that happened, and how these movements get appropriated and systemically flatline.

In their critique against short-termism, we find an analogy to be drawn with my approach against the MLP, as they connote business interests and mindsets to be what plagues professional historical research; investments, returns, and deadlines. This does not get limited to the level of practices (ie. the effect that business practices have on the historians’ evaluations processes of subject matters and methodologies along axes shaped by capitalist practices enforced upon the structuration of higher education) but also on an unconscious level of shaping our historiographies towards the reductively

¹⁴⁴ Southgate 2003.

empirical archive drawer, that gets stifled by the finitude of our physiologies. One cannot study the *longue duree* when the institutionally embedded stakeholders demand academic production in the right now, and the threat of non-publication makes historians chained to claims that are unable to be incorrect due to their being irrelevant; one is rendered able to solely study and ad hoc interpret the archives that interest their employers. History cannot anymore claim the status of a science, even moreso, employ models and reassessments of them, when it becomes malleable at the whims of the relations that shape its curators.

History ceased being historical because business management cannot be historical, as it is bound to the near future and can only be descriptive.¹⁴⁵ The plasticity of History, as this is brought about by historians themselves, is a direct symptom of the overarching capitalist mandates that define academic work. It is to be expected that university practices and research policies will change, catching up with the world, but we cannot hope to keep History historical when the only way for these power relations to survive is to enable and promote short-termism.

These conditions produce the “myopic historical understanding” as they name it, that serves incumbent power and evades explanations. This is not new. Fernand Braudel had identified it and deemed that its relief could only find root on *longue duree* studies.¹⁴⁶ “On the other hand, whenever *longue duree* historical thinking is being employed by the MLP proves that the simple throwing-around of the term “longue duree” is not nearly enough to relieve historiographical issues, as historical sources are being cherry-picked by researchers that typically ignore anything that doesn’t serve their study’s agenda or ignore the grander narrative behind their subject matters.¹⁴⁷

This is not identical or even synonym with the reduced attention that the landscape level gets in favour of the niche and regime ones within the MLP scholarship. The landscape is indeed more loosely defined and less studied than the other two levels, a shortcoming of the MLP that has been recognised by its employers; grander narratives also depend on space and scale that largely outsize the landscape itself, as

¹⁴⁵ Armitage Guldi 2014, 2-11

¹⁴⁶ Ibid. 17; Braudel 1980.

¹⁴⁷ Armitage Guldi 2014, 28.

we will see later. A most prominent example of this is Geels's study on the establishing of clean water infrastructure, as we saw in the previous chapter.¹⁴⁸

Even if one advances forward in more recent MLP studies, they will find examples where the particular prism of study dictated by the MLP, restricts any narrative that should stray away from its emptiness. To that, Fuenfschilling's article on Australian water management provides us a case that exhausts itself in interviews with the spokespeople of the capital. While it mentions - but does it recognise the fault at that? - the neoliberalisation of the water management sector that resulted higher prices for the consumer; shies away from drawing any lines between this particular practice and the need for punishing state practices against consumers, that bore the brunt of the installations' costs; installations that went to waste as soon as the capitalist-induced climate crisis changed direction and started to rain.¹⁴⁹ This article in particular has room for research as it mentions the anti-ecological rhetorics that were mounted by conservative reactionaries. Their relationships with capitalist funds and interests is something that should be put forward in ecological critiques that speak for innovation and transitions. Yet, even when push comes to shove, Innovation scholars cannot bring themselves to critique anything that goes beyond institutions and actors as their ontologies define them. This is what differentiates the landscape level with the "grand narrative". One is studied albeit offhandedly. The other is avoided.

The above may indicate that Innovation scholars and the MLP are constantly failing to mount anything more than descriptions in retrospective, and ad hoc explanations of practices and transitions. This does not in the slightest mean that microhistories and the "short past" offer nothing. Descriptions around racial science's history, evolutionism, phrenology, and racism offered a swathe of arguments against the depreciation of people through the rendering of "science" into the modernist contingency that it is.¹⁵⁰ Yet this did not come without its political price. We cannot ignore the connotations and coinciding of the post-"great narratives" historiographers' argumentations with the more general reformist spirit that runs through Innovation Studies as we will see below.

¹⁴⁸ *ibid.* 59; Geels 2005b.

¹⁴⁹ Fuenfschilling 2016.

¹⁵⁰ Armitage Guldi 2014, 55, 108-109.

In the previous chapter, we saw how these politically hands-off underpinnings are foundational to the conception and uses of the MLP's theoretical equipment. This is to be expected as the MLP creates historical case studies in a specific manner that ignores History as a systematic research of the past, being at odds with the economical well-being of an exclusive mode of living. Equating economic indicators with quality of life is a conscious reformist intention against narratives that would showcase the inherently flawed foundations of capitalism and its academic supporters.¹⁵¹

Should one actively blame economists and business scholars for this handling of History when their education lacks the training to discern actors, agencies, causalities, and perspectives? Is History exclusive to historians? Should it be closed off to "outsiders"? I answer only the latter to the negative as non-historians are at fault when making historical claims while lacking the training to do so. Reading is not an exhaustively sufficient skill to read histories, even more so, explain and use them.¹⁵²

History ought to aspire to be useful ever since Thucydides founded it more than 2 millennia ago. He accepted a specific description of human nature, one of an unchanging inherent, immanent thing; yet even if one challenges this foundational premise that made his historiography ever-relevant due to the constancy of power disparities and violence, we can find other bases of historical critique and responsibility of usefulness. To elaborate on this, I need to turn towards the dialectical materialist approach, one that is based on the constant mutability of contexts. This may ring synonymous with the approaches within the STS fields, especially if we point out the need to study not only connections and dependencies, but also the processes of change, or the irrevocable relationship between quantitative and qualitative changes.¹⁵³

3.2 Historical Sociology, Case Studies, and MLP's Uses of History

STS scholars pride themselves in their achievement of uniting Marxist historiographies with their political cause but one would need to keep in mind that Marx, like Lenin and Stalin was very much concerned with the internal contradictions of the

¹⁵¹ Ibid. 68.

¹⁵² Ibid. 110.

¹⁵³ Stalin 2022.

system he brought under critique. Marx first and foremost, certainly expanded this critique to a political call, he did not settle for descriptions and appropriation of Aristotelian rhetorics on the altar of profit.¹⁵⁴ Recognising the change in social, political, and economical contexts should result in rediscovering the ways in which past and current systems serve their functions in their specific eras.

On the contrary, MLPers, when adopting these stances, they stick only to the quantitative projection of frameworks such as the EE, or the ANT. It is clear that to procure any change in such a grand scale as the one pertaining to sustainability, there needs to come about a qualitative change, a revolution; certainly not a reformation on the quantities abused and milked, whether these are the land, or the workforce that enable the capital to swell with pride for its achievements. Yet as long as the interests of the capital do not align - and they never will as they are fundamentally opposed - to the interests of the colonised, the labouring, and the exploited, no compromise for reformation and as a result, sustainability under capitalism, can be struck within capitalist confines.¹⁵⁵

It is at this point where History and its knowledge comes into play, as its use has a specific function on the origins and rise of revolutionary ideas which in turn will lead to sustainable futures. While dialectical materialists would support the necessary deterministic progress of society, we need to be cautious when talking of progress per se.¹⁵⁶ Ideas and social changes can retrospectively be evaluated as necessary to their concurrent contexts, but one can see how the acceptance of this plays right into the model of Evolutionary Economics. There is no spontaneous rise of ideas and practices; not only do they have definitive and identifiable origins, but they also retain their evergreen property through the constant struggle between social classes and communities that shifts and becomes honed right alongside with them. Reducing cultural and historical forces to market dynamics, disregards the fact that if there was any a priori necessity of transitioning between social practices and belief towards survivability, liveability of the world, and the betterment of the quality of lives, capitalism would have long ago abandoned fossil fuels to avoid the destruction of both labour force

¹⁵⁴ Λένιν 2012· Λένιν 2013· Λένιν 2021· Μαρξ 2018.

¹⁵⁵ Stalin 2022, 15.

¹⁵⁶ Ibid. 28.

and land. On the contrary, History and its case studies showcase the interests according to which capitalists have the world in a chokehold, as they deliberately stifle innovation towards sustainability, and enforce the usage of fossil fuels, thus prolonging the undead state of their system. This binds to our subject matter on the terms that as we saw in previous chapters, the MLP is inspired by and exhaustively employs capitalist ontologies and analysis models. Thus it abandons any claim it bore for policy making supporting sustainability. Both at the level of its conception and its employment, its support for liveable futures remains at the production of empty rhetoric describing past events.

In the matter of SCTs, the History of Technology in particular, holds a special place for researchers. As technology is a prominent historical force of modernity, its history can provide us with insights that would directly affect the manner in which technology governs, is governed, shapes and is shaped by policies and cultures. The contextualisation processes that affect this study of technology are inescapably historiographical in their conception, yet the History of Technology seems to be devalued within the policy-making fora. History has been elbowed out by business analyses, neoclassical economics posing as evolutionary improvements of themselves, and institutional theories that ignore the temporal and variably contextual dimensions of technology.¹⁵⁷ In large, the MLP arrived as a remedy of these approaches, inspired by historical studies and aiming to install the historicity within the reformed but unchanged core of reductive categories of economics, business, and positivist sociology.

In these capacities of the MLP, let us now examine how we can leave short-termism behind to promote the betterment of the uses of History. Additionally, it will help us in distinguishing what other historiographical approaches can lubricate the interfacing of revolutionising microhistorical studies with the need for *longue duree* narratives. The flat ontologies of postmodernism have been proven to be inadequate to highlight the disparities between agencies of both human and non-human actors. In spite of that, several fields continue to utilise words such as “Anthropocene” and “man-made apocalypse” thus simultaneously creating a narrative of individual

¹⁵⁷ Arapostathis 2019.

responsibility that fogs the prospect of mass, systemic change, and reducing the responsibility of these metanarratives that make the individual powerless in the level of practices and their power. A move away from the aforementioned premises towards largely obsolete historiographical and sociological approaches, will provide new ground for research and organisation.

Setting off from the conceptual inspirations of the MLP from the field of Sociology and its historical turns, let us examine Polanyi's *analytical levels* concept. The MLP incorporated it in its attempt to organise its analyses into the three levels of landscape, regime, and niche.¹⁵⁸ Having criticised the ontological premises of the MLP, I now need to look closer to its analytical, methodological core and its analytical roots.

Karl Polanyi was a critic against Marxist economism, but remained nonetheless, intensely critical of capitalism as a mode of social and economical organisation. His elaborations on socialism suggested a system that was focused on individual freedom and gave it a conceptual priority over other spheres of human behaviour, especially those that Marx would deem as ruled by economic forces.¹⁵⁹ He was focused on the development of a methodology that would explain how different communities or societies organise themselves efficiently, while he actively put effort in sidestepping economic principles and descriptions in this endeavour. To achieve that he focused on the functioning of tangible institutions, avoiding the utilisation of motives or agencies that would render all his arguments circular and self-fulfilling.¹⁶⁰

We need to point out that Polanyi's institutionalism does not break away from motives and agencies as he would wish. Institutions, even in their most impersonal realisations, have clear motives, goals, and methods in achieving those.¹⁶¹ One cannot informedly deny that states, multinational corporations, banks, or NGOs have clear-cut motives, more often than not, them being profits and the preservation of capital

¹⁵⁸ Geels Turnheim 2022.

¹⁵⁹ Skocpol 2011, 76.

¹⁶⁰ Ibid. 102.

¹⁶¹ As Geels has posed it, MLP researchers *feel* that this premise also informs the MLP as a model too (Geels 2011).

mobility.¹⁶² While Polanyi steps over motives and agencies, History, in its explanatory power regarding historical causation, ignores him. Most, if not all ground-breaking SCTs, whether that is the expanding usage of steam ships or the Bolshevik Revolution, have the power struggles between historical actors as a core, constitutive element of them. To recognise the economic motives of an actor such as the willingness for “Too Big to Fail” bailouts in 2008, is not economism; it is common sense and recognition of power incumbency.

His inconsistent stance towards economism becomes even more apparent in his usage of the concept of *analytical levels*. Polanyi seems to break away from his staunch dislike of economic analyses as he cannot ignore the macroeconomical forces of nation-states, class struggles, and intra-social conflict between groups.¹⁶³ This acknowledgement should not affect us when critiquing the MLP. While it remains undeniable that ignoring economic forces does not do our transition analyses any good, constantly bringing them centre-stage highlights their atemporal and ahistorical premises and tends to project our quantitative results to all contexts that have any remote relationship with capitalism.

Trade and flow of commodities have existed for several millennia before the rise of mercantilism. Trying to invent clear-cut levels and analytical categories that fit within one’s models, betrays a restricted understanding or willful ignorance of how agencies and incumbencies get distributed and used. Individually constructing the real, is not an option as it is contradictory. The real arises through history, culture, relationships, and struggles temporally and cognitively before any individual sets out to assign properties to it and describe it. One needs to question their sources first, as to the homogeneity of the various capitalist contexts, and secondly, as to our right to project contemporary macro or micro-economic capitalist forces to the totality of our case studies. Capitalism is real, its apologetic rhetoric is constructed. Researchers tend to confuse these.

¹⁶² Profit making and capital mobility, both are dependent upon the core notion of capitalism, that of the continuation of production, the most central tenet of capitalist activity. For more see Marx 1887, chs.3, 4, 7, 9, 12, 18, 24, 32.

¹⁶³ Skocpol 2011, 105.

3.3 Modelisations in the MLP

To recognise the benefits and pitfalls of economism as critiqued by Historical Sociology, we need to examine the differences between these contexts that the MLP is employed within and its more general aspirations. One obvious question that the MLP needs to answer is whether it can be employed successfully and productively in different geographical frameworks so as to attain a more productive status as a model. If we find its “borders”, we will also uncover its advantages and restrictions that affect its ability to study social and economic organisations on a global scale, and examine its potential as an extra-capitalist descriptive and explanatory tool.

For the MLP, space is never addressed as a methodological issue. Most MLP literature is concerned with studies at the nation-state geographical level, while the MLP per se can be interpreted as functioning in 3 different scales of time and space.¹⁶⁴ This claim may seem true at face value, but is rendered irrelevant as the MLP does not acknowledge any hierarchy or power relations between temporal and spatial levels. Its 3 levels, niche, regime, and landscape, all function in different scopes of space and time as a case study may freely fluctuate between a single farmyard to a whole nation, and the months it takes for an innovation to get diffused to the decades or centuries long struggles for systemic change and climate crises to become explicit. Territory and scale must be reassessed by the MLP and an overview of scholarly work on that has been put forth by Chandrashekeran.¹⁶⁵ Yet, in all that literature, time and space as categories become obsolete, and this reduction is an obstacle to any fruitful analysis that would like to go beyond national policy levels that do not ignore the intermingling of cultures and practices.

If the MLPers decided to close down their scope and study communities and groups as sums of people and practices, indeed they would be transformed into anthropologists of technology. Their analytical categories and descriptions would be confined on the level of niches.¹⁶⁶ They would retain their affinity to talk about

¹⁶⁴ Raven et al. 2012.

¹⁶⁵ Chandrashekeran 2016.

¹⁶⁶ One can see that in effect in Essletzbichler 2013. This particular article is bound to a reductive, Schumpeterian, and evolutionary analysis of regional interconnectedness towards technological diffusion, and is a great example of how Innovation scholars have infected fields of Geography, and fail to procure

incubation, grassroots innovations, and resource availability, but they would have something to say that would concern people and their scale; not markets. On the other hand, if the MLP decided to study transitions and innovation on a grander scope, one of systems, economies, policies, or cultures, it would become a tool for Political Science and probably adopt Wallerstein's *world systems* approach, albeit garnished with its own ontological presumptions.

For the MLP to escape this middle-level bog, it needs to reflexively address the issue of choosing temporal and spatial scale in the same way it chooses its subject matters; post-festum. Binz et al. recognise this need and suggest the implementation of the TIS approach that acknowledges the international effect of sociotechnical innovation.¹⁶⁷ The MLP fails to describe how similar needs, crises, and innovations arise, and get diffused, appropriated, and adopted in vastly different places - and eras, at times. An amalgamation with sectoral analyses would put technology forward and showcase its internationality.

Such a combination of the national and sectoral levels of innovation, has been suggested in Markard and Truffer's effort to combine the MLP with the Technological Innovation Systems framework. Drawing on the conceptual and analytical comparison of these two approaches, the authors attempt to formulate a framework through the syncretic conjunction of these two models. This could provide the answer to the MLP's inherent geographical and temporal limitations. Where the MLP delineates the world in 3 horizontal levels, the TIS largely does the same vertically ie. it studies technologies as fields defined by the actors' and institutions' intention and practices.¹⁶⁸ The above are bound to fall into the tar pits of flat ontologies and ignorance towards the power struggles, but they would provide relief for the MLP's categorical shortcomings.

On the matter of scale and its effect on depictions of incumbency, Andy Stirling, one of Geels' critics, has recently elaborated the need for shifts between scopes.¹⁶⁹ Phaenomenae cannot be bound to constructed scopes and ad hoc limited regions or

anything of substance to the people concerned; they can only quantitatively analyse through their neoclassical glasses. Material needs, exploitation, labour rights, true critical sustainability, and the fostering of environmental consciousness all get shadowed by the preservation of "business as usual" practices.

¹⁶⁷ Binz et al. 2013.

¹⁶⁸ Markard Truffer 2008.

¹⁶⁹ Stirling 2019.

eras, and neither can power relations and struggles that define agencies. Stirling notes the inherent ambiguity of the MLP's levels and proposes the closing-down of scale we mentioned before. For him, this focusing on a "worm's-eye view" would illuminate the complexities between actors.

As inspiring as it sounds, this shift would still be bound to the Innovation studies skewed foundations that don't address the only thing that is truly overarching in SCTs, the modes and organisations of production. I cannot hope to find this within the MLP literature, as in the most central monograph in the field, capitalism does not get addressed, not even by its name. In the *Great Reconfiguration*, the authors largely ignore capitalism as a stifling force against innovation towards sustainability. Capitalism is mentioned a whole of 8 times within its 395 pages, with 6 of them within the context of the presentation of the reformist and revolutionary alternative MLP approaches and 1 in an article title.¹⁷⁰

The remaining one provides us all the leverage I need as it shows how the authors differentiate between various forms of capitalism regarding the relationship between governance styles, and markets and regulation.¹⁷¹ Their understanding - or deliberate portrayal - of capitalism as anything more than the exploitation of land and bodies for the continuation of production for accumulation of wealth under the enforceable threats of homelessness or death of the labourers, does not change the fact that capitalism through its imperial, colonial, and neo-colonial limbs ignores borders and establishes itself as a world-spanning system. As such, if the MLP hopes to usefully describe any historical transition within capitalism, it needs to transform its scale of study.

On the diametrical opposite of Stirling's wish to close down the scale of study so as to open up the depictions of relationships, we need to examine the opening up of scale to showcase the similarities between contexts and eras as defined by their power relations and struggles. This homogeneity of capitalism(s) was brought into light from Immanuel Wallerstein. Stemming from Proudhon's works, Wallerstein attempted to reduce capitalism to a systematic theft that spans the world. While not a wrong

¹⁷⁰ Geels Turnheim 2022, ch.1. The situation is largely the same in the MLP's critics' most cited papers, as capitalism is employed only once as a metaphor (Smith 2005; Stirling 2007; Stirling 2014; Stirling 2019).

¹⁷¹ Ibid. 338.

statement per se, Wallerstein's *world system* notion was unable to explain the interplays between the various levels of social analysis and description and resulted in him confusing the three levels into a single one, that of the world system.¹⁷² While this is a criticism that can properly be applied from the scope of the MLP, we need to consider whether the multi-level analysis in the manner that is employed by the MLP is correct to begin with.

Wallerstein definitely does not expand much beyond the scope of capitalism as belonging to the core of a core world system that stands first among other concurrent world systems. His approach might be considered reductive and oversimplifying regarding the interplays and institutions that make up capitalist economies. This consideration has the potential to ring true but it would not be due to the simplification of capitalism; capitalism is simple indeed. Its superstructures, while definite and clear-cut, are immensely multi-layered, but this does not invalidate Wallerstein's work. What Wallerstein fails to consider is that History is not shaped by the world-system on its own but also from the revolutions and dissidence against it.

Power struggles define a context, in this case capitalism, and give it food for ouroboric growth. Capitalism can embed within itself voices that are contrarian to it, especially these that remain purely economical. Wallerstein's model fails at explaining the wins of the people, such as the October Revolution, the anti-colonial struggle, and the workers' wins for labour rights, all fights that succeeded at the behest of the world system. Each context of power struggle needs to be studied separately, but without neglecting the commensurability between them. The grand narrative that links them all together is capitalism and the fights against it. Choices made during portrayal processes of it, are exclusively political.

As the world system concept falters to explain the disparity between different nation, business, technology, or policy trajectories - even if they all end up in exploitation of the labourers and the colonised, as this is the core foundation of capitalism - thus a historiography bound to it, has failed to refine historical studies of technology and policy. Uncritically accepting the omnipotent element of capitalism, is the same as pretending it doesn't exist. It flattens all agencies that do not pertain to

¹⁷² Skocpol 2011, 106.

either technology or economic scale, as these are the main elements that capitalist economic analyses take under consideration when defining policies.¹⁷³ The world system model must be furtherly refined to procure a *longue duree* narrative consisting of case studies, but it does seem as the first step towards a combatting of the MLP's short-termism.

3.4 Reconfiguration vs. Revolution: Needs for Deep Transitions and the Future of the MLP

Stepping on this common failure of Wallerstein, MLP, and TIS to consider cultural and geographical disparities, we need to consider whether Innovation Studies can make informed inductive leaps through their case studies. As shown earlier, the MLP does not get reformed or reformulated; the model remains firmly the same due to its negligence to recognise the limitations of its ontological premises. Despite its claims and active effort to become a more overreaching model that would acquire productive power, as long as it picks and chooses questions, depictions, scales, and conclusions to only validate itself, it will remain a tool that can say and offer nothing external to it. Policy makers do not need to consider it as the interests that shape History and sustainability are much grander than simple efforts at ad hoc posturing-as-science. The MLP cannot hope to become scientific as its ontological boundaries limit it to only describe simple unique events; there can be no scientific explanation in that methodology.¹⁷⁴

Simplicity does have its advantages, especially when one seeks to validate the status quo and never criticise, or even say anything of substance against climate crises, exploitation, and social and natural degradation. If the MLP would ever attempt to escape this, it would transform into a Sociology of Technology, a History of Technology

¹⁷³ Skocpol 2011, 367

¹⁷⁴ Roehner 2002, ch.1.

per se, or an Anthropology of Innovation.¹⁷⁵ While claiming to incorporate these fields within them, Innovation Studies are an example of interdisciplinarity gone wrong.

With the understanding that innovation and its transitions run much deeper than meso-level and ex-post chosen scales, the Deep Transitions scholarship claims it has recognised the limits of theories stemming from Polanyi and Wallerstein. For Kanger and Schot, both of these approaches ignore the material context of the cases they study and reduce technology to simple functions of grander social systems. The accusation against Wallerstein's position on the industrial revolution as an epiphenomenon of capitalist world-economy, is a defensive move. It is exactly the position that brings down idealist approaches such as the one formulated by them.¹⁷⁶

While I propose that Transition Studies shift to more macro-historical fields of research, this will not have any effect on the politics and outcomes of the field's research, if it is not undertaken from a materialist point of view. Technologies, cultures, and infrastructure are outcomes of conscientious fields of power exertion qua-discourse and struggle, and they in turn, get deployed from their subsequent controllers. While technology does affect, or even shape History and technological trajectories, it does not do so if it is not controlled and used by another agent with much clearer interests and material status in relation to the means of production.

We see how the MLP manages to simultaneously utilise a multi-level analysis of its constructions of the social and material world, and behold qualitative descriptions and explanations on the block of flat ontologies that would suggest one - if any - single descriptive level of study. History becomes an amassment of events that their context can be reduced or reinforced at the will of any researcher wielding the MLP. Sources are irrelevant as the archetypes and methodologies forced upon them are contingent

¹⁷⁵ Manners in which the MLP could improve itself by studying incumbent actors' interests, motivations and appropriations has been put forth by Genus and Coles (Coles Genus 2008). These questions would reveal the incumbency's systemic exploitation of power, barring the deliberate misrepresentation that goes on and the muting of dissent in publications. This article has been waved away by Geels by a simple claim of alignments enacted by groups with agency (Geels 2011). It has been shown through this thesis that misrepresentation and obscurement of power struggles does not constitute a show of actors or motives, whether the MLPers "feel" they represent it or not, inexplicitly or not. In general, any criticism mounted by Genus and Coles is being brushed aside as having been already answered in past research or as a simple "strange remark" by the authors. All answers given against critics, highlight the limitations of the MLPers to break away from their bent-into-shape interdisciplinary ontologies, the ones criticised throughout this thesis.

¹⁷⁶ Kanger Schot 2018.

exclusively to the researcher's agenda. When all contexts are equal results of historiographical projectivism and agency-flating procedures, the ultimate servant of capitalism ensues; solipsism.

This exegetical solipsism is the enemy of Bourdieu and the reason behind the MLPers conscious choice to incorporate his work on the *habitus* in their descriptive methodologies. Bourdieu puts active effort to overcome the contradictions stemming from the antithesis of structure and agency within the study of societies.¹⁷⁷ To achieve that, Latour would claim that he imposes his descriptions upon social groups that himself would supposedly "let speak for themselves". Latourians fail to realise their own place within the academic nexus, and the hegemony that has been awarded to them as individualist (or even solipsist) historiographical and sociological motifs, play right into the goals of a system that ignores *their* agency in turn. They remain voluntarily blind to the fact that every field of knowledge - both the social or historical fields I study, and the meta-levels of our methodologies-as-fields - exists in constant correlation with fields of power; every field *is* a field of power.

This blend of fundamentally contradicting approaches of Bourdieu and Latour, lead to the MLP's empty rhetorics that give it the ability to create ex nihilo or outright kill the agency of any groups, depending on what would suit the model to be evaluated as useful and effective. Yet it is forbidden to blatantly confirm itself; it needs to retain the illusion of reformability, as inspired by the legend that its capitalist roots can reform and even regulate themselves.

This element stains the sum of Innovation Studies as founded by Schumpeter. The partial integration of economics, business studies, and mostly positivist sociologies, render the field into an applauder of the short-termism that enables the exploitation of peoples. If we want to study technologies under the lights of material and social innovation as innovation per se, we need to define the context within which an innovation is evaluated as such. We have to begin from the question of what good is an innovation if it does not better the conditions of the ones that thought of it and realised it. Innovation Studies must be morphed into a mixture of a History of Production, and an

¹⁷⁷ Schinkel 2007, 709.

Anthropology of Labour, that takes into account the creators, the realisers, the exploited, and the victims of exclusivity.

When a Tesla car goes into circulation, today's Innovation scholars would gladly study its carbon footprint, the production chain, the management, and the electric car market. We need Innovation scholars that will demystify the electric car, a notion that has existed for more than 100 years, the reasons behind its emergence in the last 20 years pertaining to the myth of capitalist reformability, the conditions of work and death of Tesla's employees, and the irrelevance of narratives around Elon Musk concerning the fight against the climate crisis.¹⁷⁸

These researchers would need to confront the issue of technology as a historical force in itself, and the manners in which people invent, adapt, and manipulate the apparatus depending on their needs as these have been shaped by their contexts. Depictions of technology vary, and affect the ways in which its History can be put to use by other fields, especially when determining policy in a post-capitalist world. This call is not anything new; it is what brought the STS field as a whole into being. What must differentiate contemporary researchers from the ones that came 40 years ago, is the need to study the STS and the Innovation Studies in the meta-level of inherent political connotations in a shifted political context. Scholars need to examine their ontologies and words such as economism, determinism, or realism, that have uncritically become buzzwords to inspire fear and grind research to a short-termist halt just to avoid their assumed traps. What is more real than people being homeless and starving, and why would Technology scholars ignore the very real repercussions of their proposed policies and studies that darken these facts?

Historiographical determinisms around technology, as described in Chapter 1 of this thesis, misrepresent the historical force that technology undeniably is, as they ignore technological shifts and changes.¹⁷⁹ While the MLP strives to alleviate this issue, it falls flat as it utilises ontological equipment that it focuses solely on describing change as a series of static photographs that lock into each other. Evolutionary Economics provide the positivist, reductive cogs, while the ANT along with its contradictory

¹⁷⁸ Bladh 2018; Evans Perry 2018; Kirsch Mom 2002.

¹⁷⁹ See ch.1, fts. 24-28.

Bourdieuian garnishes pull the levers and feed the machine with stunted or outright uncreated agencies. While that would seem plausible and functional as long as it would be argued for within the philosophical confines of the bourgeois academia, historians of technology need not forget that “agencies” equals “human lives”. When the MLP blurs the waters of the powers of organisation and unionisation in historical settings with methodologies that ignore the continuities *and* discontinuities of History, what he solely achieves is to serve the prominent narrative of individualist politics and the power of the markets.

Historians of technology in their shift towards or blend with STS analytical categories, have undeniably provided us with arrays of conclusions that have aided us in recognising the power of technology in remorphing its contexts and users. But the question remains: do historical studies - or even sociological, as is the case of the MLP - in these subject matters affect policy making in the slightest of breadths?

Researchers of policy making - ie. twice removed from the processes enforcing of actual policies - consider their methodologies as effective and astoundingly, useful. This kind of policy-making methodological suggestions not only are so hands-off and ignorant to the real peoples affected by and affecting technology, that cannot hope to manipulate mechanisms, or anticipate technological change. They can only wait out historical change that depending on the incumbent actors' interest will either pay them no heed, or verify their analyses via enforcement of practices and the starving of dissidence. They can never explain, only non-scientifically modelise and describe.

As technologies, so systems and organisations of production have social effects. MLP scholars fail to consider the social outcomes of systemic transitions as they focus on the conditions of alignment that will bring them about. Viewing capitalism and its mechanisms as a necessary condition for innovation and transitions, has that effect. But it is the reason why their models fail outside the static framework it provides. They capitalise on this political stagnation by suggesting empty reformations (laughingly branded as “revolutions” at times), and ignoring that society may be constantly reshaped and exists ontologically and historically prior to the existence of capitalism (and at large, in spite of it).

Despite all academic rhetorical flailing about, policy making and technology should have a very real goal: to prevent people - and not institutions for the sake of institutions - from starvation, fatal illnesses, and suffering. In the capitalist mode of social and economic ordering, this comes second to last, at the very best. Capitalist relations of production of materials, technologies, and policies, favour our flattening of capitalist contexts as hunger is hunger despite its context. Suffering has this funny way of ignoring individualist posturing, academic peacocking, and conventions in the name of a sustainability that would rather see Sudanese and Peruvians eradicated as long as batteries need lithium and nickel.

We need to ask whether this short-termism, this studying of separate microhistorical cases, and the rendering of History into a buffet of incommensurable events, can be incorporated within the broader scope of studying History as a means to examine the culprits of the crimes of capitalism. As Guldi and Armitage did for academic historians and their training routes, let us inquire as to the path dependency, competition, and lock-in mechanisms of MLPers themselves, while they study History as a progressive account towards capitalist reform. To replace it, we need to search for a quasi-gestalt macrohistorical narrative that while it recognises and respects the various peoples' geographies, traditions, and practices, still manages to unite them under the one common enemy of them: capital.

This combination - albeit, not the goal - is the essence of comparative historical analysis (CTA) as Mahoney and Thelen describe it. Within the confines of the efforts of both contemporary historians and the MLPers, one must not forget that while macro accounts may contradict micro narratives, and vice versa, this is not prohibiting to any one researcher's work or approach to find causal links between the various analytical levels. The historiographical choice of an approach towards a certain object of study does not a priori characterise it as "good" or "bad". What evaluates it as such is us, the peers, the audience, and above all, the morality upon which one founded their practices and towards what goals.

Macrohistories cannot be exhaustively described as the sum of the observed behaviours and practices within their microhistorical components. This sounds

counterintuitive as even macrohistories are compiled from the study of several smaller and shorter events.¹⁸⁰ What distinguishes the macro from the micro in historiography, is not any kind of difference between our readings of original sources. All histories are histories per se, albeit not necessarily professional, respectful, inclusive, or ethical. The line between different types of accounts are the presumed ontologies that provide the groundwork to our explanations as to the causes that link historical events, changes, and transitions.

Under the guise of empiricism and abundance of unstudied sources, historians that are employed within the Innovation Studies fields have shied away from going beyond their comfort zones. Employment instability, the “publish or perish” mentality, and the search for external validation combined with historians’ justified will to overspecialise in hopes of creating a specific niche for a community of their own, result in researchers that are very much willing to limit themselves in the archival drawer in front of them. Simultaneously with that, they come equipped with theories passed down upon them from privatised institutions that claim to promote education but guide scientists away from questioning their field's premises because “it’s just not their job to do so”. Was there ever any hope for the MLP to change that, when it both employs academics that have fallen victims to the context above, and assumed ontological and methodological premises that have skewed their approach from its foundation?

It would be historically short-sighted and border on the *ad hominem* facet of critique, to reduce MLP’s failures to either personal aspirations to obfuscate historical agencies of the powerless, or propagate theories that support the capitalist mode of production, albeit reformed. This mechanistic view of History and historiography, as a series of rods and cogs that turn and lock into each other, producing historical events, is certainly not new. Quantising the exegetical spectrum between the extremes of natural events and social happenstance and assigning each piece to one specific “science”, has been a running practice since the early modern times when qualitative explanations gave their place to quantitative descriptions about the world. Science as a whole, and History along with it, have progressively become more and more about “solving puzzles”, settling in their Kuhnian “normal science” mode, with fewer and fewer

¹⁸⁰ Mahoney Thelen 2015, 6-8.

revolutions taking place when the scientific or historiographical mechanisms work “as intended”.¹⁸¹

This model of the history of science - or the history of History, if one wills - is what gave rise to accounts purporting the accumulation of scientific knowledge, and provided Ranke with the podium from where he proclaimed the scientific character of History within a positivistic context.¹⁸² Comparing and combining historical cases to form a macrohistory as a gestalt of micro-cases, aims to break away from this mechanistic view of historiography as a field.

First of all, historians that wish to produce macrohistories of systems, transitions, or series of events, must choose their cases *right*. Picked one by one, case studies serve no heuristic purpose, as much as the MLPers wish to claim otherwise. As detailed as an account about the shifts from wind to steam can get, it cannot properly portray the downtrodden sailors, the effect of and on the Atlantic slave trade, and the changing relations of power within the shifting mercantilist context that laid the foundation for contemporary capitalism to exist. It can only speak about the transition from sails to steam from an institutional perspective as if institutions don't contain themselves interpersonal disputes, power struggles, and don't belong within a greater-than-landscape material context. Of course, that would require the MLP scholars to break away from pale empiricism and fearful study of meso-levels that do not either ask questions or offer answers, even for their reformist agenda. New problematisations that ground new argumentations can only come from combining case studies and showcasing the contradictions between their conclusions, as the CTA scholars claim.¹⁸³

Supporters of the MLP would be quick to claim that the reformative power of their model does exactly that, that the framework informs and rearranges itself through its failures.¹⁸⁴ As we saw in the previous chapter, this is not true. The MLP remains bound to its ontological - and inherently political - presumptions. It cannot claim a status of

¹⁸¹ Kuhn 1962

¹⁸² Evans 1997

¹⁸³ Mahoney Thelen 2015, 15.

¹⁸⁴ Geels 2011; Geels 2012.

“theory” for itself, it is simply a static model with specific descriptive and reductive powers. Its modelisation cannot be projected on future transitions as it always arrives *post-festum* due to its EE foundations; it only hopes to influence policy makers to better recognise the lock-in mechanisms that participate in sociotechnical changes.

Ironically, diametrically across to its rigidity, stand its depictions about the fluidity, or plasticity of politics. In the ever-shifting Latourian sands of agencies, social groups, and representatives, there is left no room for static power relations such as the struggle between capital and the people that exists outside any case study. One cannot deny that power distributions and their study are themselves path-dependent.¹⁸⁵ I do not wish to assign personal responsibility to any one MLPer - some walls are just too thick to break - but it becomes apparent that the so-called empirical research ignores one central empirical methodology: the “eye check”, the transparency of human suffering and its causes.

Atomisation and individualisation of social groups and actors, while they provide better suitors for the description of networks, reduce the explanatory power of any historiographical model regarding events that are produced by more unbending groups. A powerful historical or social node may disappear the more ingrained and developed it becomes. Ignoring the “systems in place”, the institutional, impersonal oppression and violence, the shaping of consciousnesses, and the a priori nature of capitalist interests, is only an obstacle in the study of power.¹⁸⁶ Researchers cannot have explanatory power based on agencies, when they cannot designate the origins of these agencies in power disparities and struggles, anywhere beyond the interpretations of our archival drawers.

Innovation scholars mostly defend their hands-off positions as non-deterministic or non-teleological, characterisations that sound positive in the flattened framework they have chosen to employ themselves in.¹⁸⁷ By their own admission, their approaches not only can but do fall victim to the actors that would avoid any transition to retain an “open-ended” character. The interests behind any SCT are much too high for capitalists to relinquish their chokehold on sociotechnical affairs. It would be naive to claim there

¹⁸⁵ Mahoney Thelen 2015, 133.

¹⁸⁶ Ibid. 130.

¹⁸⁷ Kanger Schot 2018, 3; van der Vleuten 2018, 9.

would be a possibility for any SCT to be totally uncontrolled or remain un-co-opted, as there would never exist any field of discourse without power struggles bred into it.

More specifically, regarding the Deep Transition subfield of Innovation Studies and consequently, the MLP, while there exist scholars recognising the need for deep transitions to come about, they do not accept the responsibility of describing any way that would happen. They have focused on bringing into the spotlight the transitions' key actors and connections between them, but do not critique neither their interests or their modes of exertion and magnitude of power they hold over these transitions.¹⁸⁸

Voices of dissent against the homogenisation of Innovation scholars would quickly arise, as they claim to always belong in more than a single approach regarding STCs. Any research towards the description of any SCTs claimed to be required for our world(s) to survive, will almost always fall under one of three categories; the reformist, the revolutionary, and the reconfigurationist. As the seminal MLP monograph of Geels and Turnheim describe them, the first two suffer from conceptual issues that the latter seeks to alleviate.¹⁸⁹

Regarding the reformist approach, they recognise the shortcomings in the portrayals and study of non-market actors, agencies, and non-technological innovations. They fail to answer how, within the confines of the capitalism they purport and the reformists outright support, innovations can conceivably be non-market. Furthermore, as it has been shown earlier in this thesis, the depiction of agencies is skewed regardless of any stated political position. Innovation Studies in their whole, cannot hope to use agency as an analytical category in manners that prove the power disparities as these become apparent on the level of material struggles. To answer as to what these distinctions are between the non-market and the non-technological, and between processes and innovations, within a field that at the practical level flattens and conflates all these, let us go back two chapters. This confusion is a symptom of the MLPers goal to fill pages with words that betray the MLP's inflated uselessness regarding theory-making, historiography, and policy influence.

¹⁸⁸ Van der Vleuten 2018.

¹⁸⁹ Geels Turnheim 2022, 3-6.

Turning to the revolutionary approach regarding SCTs and their coming about, Geels and Turnheim describe it as the deep critique of status quo stemming from Neo-Marxist, and critical political economy scholars that call for the overthrow or transformation of capitalism. Let us now state that Neo-Marxism is by definition non-revolutionary, and the so-called transformation of capitalism through markets is reformist and not a revolutionary suggestion. Market economies are contradictory to revolutionary Marxist theory as that was expanded upon by Lenin to support the centralisation of economic activity. Not everything that goes against the rampant neoliberalism - if they can even claim to do that - is revolutionary. Degrowth economics and shifts towards non-economic indicators do not suggest any shift away from neoliberalism qua individualism and economism. On the contrary, they lean even more towards it as they support its foundational concepts, specifically because no one is formulating arguments for an actual, material revolution, centred on the toppling of power and the redistribution of the means of production, and subsequently, their employment, development, and use.

The authors' critique on the above is as inconsistent as we would expect from those who attempt to critique something not realising it actually stands in accordance with their own sayings. The mono-faceted element of the revolutionary approach - the inherent *reductionism* as they name it - the explanatory method that reduces all events into single root causes is not only reminiscent of Wallerstein's *world system* but is also giving the revolutionists too much credit. First of all, there can be no "explanatory" anything within the confines of the MLP. It is a non-scientific descriptive model. Additionally, both sides employ economist, positivist, and intra-capitalist ontologies and methodologies.

Reconfigurationists should not claim to be that different from "revolutionists". This is because these "revolutionists" are much closer to reformists who in turn, are a mere rhetorical niche of reconfigurationism, than they are to actual revolutionary critique. The MLP can only be employed, study, and serve the capitalist mode of production. When the reconfigurationists form their research around the flattening of actors and processes, they do not answer how that differentiates them from the aforementioned revolutionist world system that is presumed. The reconfigurational world system is one

that functions solely under a material system that survives on the obfuscation of power struggles and imposition of oppression.

In their correct assessment of the failures of revolutionary approaches to address the linkages between grassroots-level change, activism, and their supported need for a change in a massive scale, reconfigurationists find themselves allies in the revolutionist circles. No revolutionist forms a critique founded upon actual revolution and the toppling of capitalism.¹⁹⁰ Revolutionists are no more willing to speak about revolution per se than reformists or reconfigurationists. That is what sets them together. The apparent differentiations between approaches that otherwise, all call for the salvation of capitalism are fake; the use of the same ontologies, methodologies, and political mandates forms the MLPers into a unified front of capitalophiles that are unable to study transitions as transitions per se. They can only form descriptions and modelisations of a system that systematically kills and starves, and call it an “effort towards sustainability”.

On the matter of Deep Transitions, technological determinism comes into the forefront, as prominent scholars seem to identify technological deep transitions, as historical transitions in a whole, while ignoring the political and productive stasis of Europe.¹⁹¹ For the most prominent researchers of Deep Transitions, society is headed towards a Second Deep Transition, with the First having been the establishment and expansion of socio-technical systems regarding transport, energy, health, and communications among others.¹⁹² The MLP informs the Deep Transitions scholarship to

¹⁹⁰ Prominent revolutionists considered are Andy Stirling, Adrian Smith, and Frans Berkhout as these are the most cited critics of the MLP. We cannot in good conscience consider Persson and Runhaar, or Peter Newell as revolutionists as they exhaust their works in asking questions on the uses of incrementality, the changeable nature of capital movement, and the delegation of resource management to communities as short-sighted and ignoring the power held by the status quo and their willingness to violently suppress any challenge to their dominance (Persson Runhaar 2018, Newell 2021). Revolution is among all else, the responsibility to espouse a clear stance and issue callings. Activism and indigenous struggle is needed and welcome, but what does it serve if it only plays to the same relations the destroyers of the planet do, what does it offer other than a “ventilation” method for the masses to express their discontent and forget about it the next day? Organisation, unionisation, and striking need to be consistent and bear clear political motives and goals for them to challenge anything. Regulating capitalism is not the same as revolting against it.

¹⁹¹ Van der Vleuten 2019.

¹⁹² Kanger Schot 2018.

the extent that any pervasive transition can be analysed to its smaller constitutive elements, exactly where the MLP resides given its NIT, and EE roots.¹⁹³

Deep transitions, in the manner that van der Vleuten chooses to define and study them, seem to be about the expansion of networks and the repurposing of their technological and organisational nodes. His chosen approach, that of *following the entangler*, seems to disregard the fact that transitions - by this particular definition - may take place, and have done so, in an array of social and economical orderings. In spite of that, he is opting into the study of the incumbent actor, the “prime mover”, the one powerful enough to influence development and diffusion.¹⁹⁴

Whether this incumbent actor leads the researcher and the reader to focus on capitalist actors, thus, ignoring that for one to entangle anything, there is a power nexus that enables them to do so at the expense of others, remains unaddressed. Questions on the space left open for extra-sociological, extra-historical, and financial interests to kick in the researcher’s integrity are not worthy of consideration. The choice of the cases, the questions asked, the prioritisation and choice of methodologies and ontologies, the scholar *indici*, the citations, the funding needs, and the waving off of the burden of proof are all core issues raised for the disciplines around innovation and SCTs.¹⁹⁵ The bonds between academic production and capitalism are clear cut and opaque enough for anyone to discern, yet remain unacknowledged; almost as if there is a fear that their public admittance would bring about their damnation. That is the nature of power, to make its wielder seem as the only alternative even if it is riddled with exploitation and war.

We can attest to that if we study one of the most well-known subjects in the History of Technology, the solidification of the ICE automobile “against” the electric. Bladh’s MLP study on the study never addresses the capitalist interests behind the immediate profits that could be made through the exploitation of the constructed needs for speed and panache during the early 1900s. It relies on the modelisation of the MLP and the reasoning provided behind the transfer of the car from the niche level to the

¹⁹³ These elements are what constitute the MLP unsuitable for any policy making or historiography; one can predict the failures of the Deep Transitions movement even if the subject does not concern this thesis directly.

¹⁹⁴ Smith 2005, 1497.

¹⁹⁵ Stirling 2007, 275.

regime one, are the transformations and alignments with the rising changes in the landscape.¹⁹⁶

His research is supposedly informed from the 16 years of criticisms against the MLP that had been published up to 2018, yet he still fails to portray the powerlessness of the individual user against the branding and advertising tactics of the networks of incumbency. No responsibility is being allocated to the ones pushing technologies that retrospectively proved to be degrading and destructive. One might come to the researchers' defence claiming that if they did criticise practices from the 1910s when we didn't have the knowledge of the oncoming climate crisis, they would be labelled as anachronists and projectivists. While this defence is of course fair, one must not forget that the Innovation Studies field utilises History to its own ends, and hopes to procure studies that will inform the present and influence policy-making through the provision of alternative paths to sustainability. The MLP simply fails to do anything more than sustain the status quo of climate crisis and unsustainability, by being devoid of meaning.

Kanger and Schot elaborate on how their proposed Second Deep Transition's pathway scenarios take the above into account through the explicit expression of alternative paths.¹⁹⁷ Coming from a place of realising the immanent inequalities and conflicts in the world - which does not get named as "capitalist" in this instance - they suggest that for the next, much needed Deep Transition to come about, there needs to happen either a restructuring of the relationships between state, markets, and society, or the admittance of social responsibilities by the societies themselves and the reformation of their practice and the ways they innovate per se. These suggestions are called Breakthrough and Transformation paths respectively.

For the Breakthrough alternative, the authors fail to mention how these new relations and interactions would be put to place. The "powerful political forces" as they call them are the capitalist, civil societies whose incumbent political and financial actors actively support the current modes of production, organisation, and labour and land exploitation. Their Transformation counter-suggestion is built upon a premise of advancement of social innovation from the bottom upwards. Excluding the obvious

¹⁹⁶ Bladh 2018. For a more extensive approach that gives a nod to the role of the capital in this cultural shift, see Kirsch Mom 2002.

¹⁹⁷ Kanger Schot 2018.

individualist, neoliberal roots of this option, how would the system react against such initiatives - if they ever came to conception, even moreso, fruition? Colonial forces, both inter- and intra-nationally have historically stifled the efforts of peoples to equip themselves with technologies that would promote steady agriculture, education, and healthcare.¹⁹⁸ How, if not by recognising the colonial historical causes behind the First Deep Transition ie. that the networks used labourers, if not slave force, and resources ripped from their homelands at the expense of peoples, can I hope to uncover the real nature of the capitalist economy?

It is within these economical confines that the MLP and Deep Transition research wishes us to expand our practices towards sustainability. When everything that binds them methodologically and rhetorically to their ontologies and these ontologies per se ie. markets, flattened actors, ontologies that have provenly worked for and solely for capitalism, we should not be surprised as to why the MLP scholarship can do nothing and has nothing to say beyond empty modelisations of what they deem as “transitions” past, and assigning quasi-personal responsibility. How does the MLP and its scholars, so bent on building sustainable futures, plan to establish such a future on foundations that have initiated wars and starvations and they themselves actively support them through their research if not by outright exonerating them?

To take the example of food availability and variety, specifically for the approach of van der Vleuten who absolves the *entanglers* of their political responsibilities, let us wonder how potato, sugar, and coffee became staples in Western cuisine. There is a specific number of eradicated indigenous peoples and peoples that remain serfs to transnational mega-corporations for agrifood interests. While colonialism as a historical force does get its place within the analyses of Deep Transitions, it comes under the scholarly light only as a failure, as an externality. It cannot be otherwise, as *following the entangler* provides the much-required moral high ground to the capitalist entanglers and deterministically ends all arguments to reformist positions that deem capitalism salvageable.¹⁹⁹

¹⁹⁸ Nkrumah 1966.

¹⁹⁹ Van der Vleuten 2019.

While van der Vleuten leaves the space for failures and conflicts to arise, his focus on the developed societies - even by the historical standards - gives an idea of the restrictions these prisms of study have. It is apparent that even conflict is single-sidedly portrayed as we view transitions solely from the perspective of the *system builders*, which is a definition that bears questioning; who are the builders if not the workers? For Innovation Studies, the answer is transparently technocratic and entrepreneurial, even if they claim they do not mean it so, favouring a Saint Simonian approach supporting infrastructural change towards sustainability. Van der Vleuten's approach begs the questions and it reaches its Euro-centric, capital-centric conclusions almost inevitably. It is ironic given that he suggests caution against Kanger and Schot's approach accusing them of essentialism towards the First and Second Deep Transition notions of them. Delineations are indeed contingent upon the questions asked, the concepts used, and the sources. Within the Innovation Studies fields it seems that this always is in effect for the ones under criticism but never for the critic. The question and concepts assumed in the "following the entangler" approach (or the MLP in general) are never explicitly critiqued - only, "reformed".

With their foundations set in Evolutionary Economics and Institutionalism, what these studies forget besides proper reflexivity, is crucial. As van der Vleuten analyses, food production, trade, consumption, and variety spiked.²⁰⁰ The cost of that is darkened. Colonialism, the systematic exploitation and annihilation of peoples is not a capitalist externality or failure. It is a core, constitutive element of a system that could not exist otherwise. Utilitarian apologetics that base their analysis on the quantity of people that saw their quality of life improved, not only sustain it but are also wrong.²⁰¹ Piling on that, any power analyses that do critique colonialism and the capitalist mode of production, need to go further than recognising power as an ability to initiate or influence change, even if they so much as refer to power at all.²⁰² Incumbency does not only establish

²⁰⁰ *ibid.*

²⁰¹ We need to consider the magnitude of neo-colonialism on the peoples of Latin America, Middle East, and Africa, where the West had obvious interests regarding the production of oil, or minerals and destabilised or outright massacred whole regions in order of safekeeping the western monopolies. The expansion of food variety, or the lowering of costs for transportation - whenever they came and weren't rolled back as soon as the technologies were firmly within the basic needs of the people - came at severe costs for tens of millions of people. For more on these, see Fanon 1982; Galeano 1997; Nkrumah 1966; Rodney 1985; Sankara 2007.

²⁰² Smith 2005, 1503.

itself via material apparati and military intervention, but also through an academic politicking that remains blissfully blind to its own servitude.

Epilogue

The MLP has merits; it would be short-sighted to deny that. While it is unable to reform itself, correct its past failures, reconcile its internal contradictions, or speak in any shape or form free of anachronisms and projectivism, we cannot imply it will leave the historical and sociological worlds as it found them. It came within an amorphous mixture of failing economic theories, useless postmodern sociologies, and institutions that were removed from the ones they affected, and it attempted to do something with them. It combined them as they suited it and set its course to describe the biggest steps societies may take, socio-technical transitions. In this effort, it mangled History and its actors, yet it achieved its goal. It did describe the transitions that interested it, albeit in restricted manners.

Its effect on how we view and study History is not wholly negative; to view it as such would be to condemn our own view on it as well, it would make this thesis completely irrelevant, bothering itself with a modelisation archetype bound to perish. I view the MLP as a much needed graft on the Innovation Studies fields that by its conception exonerates its capitalist inspirers of their failures. If only for that, we should be thankful for it. Its potency on describing market tendencies and highlighting the self-portraits of the incumbent players - whether these are historical actors or their doxographers - is undeniable.

In this thesis, I consciously attempted to judge it outside of the scope of its claims. The MLP never aims to act as a political tool, it does not have a core of ideological production, it does not mean to shake things up. For these, it is one of the best examples of an academia that has lost touch with its objects of study. While the MLPers reduce, misrepresent, and mute, the academic world is idly watching. Hailed for its use of three interconnected levels and its core-to-its-concept interdisciplinary equipment, the MLP produces the perfect descriptions for the ones that would have them. Most of all, it asks one question; should we want them?

The answers to these questions pertain to similar ones such as “what’s their actual use?” and “can the MLP inspire or even affect change?”. As I hope that my thesis has shown that the answers do not forebode well for the MLP, there comes the next

step, the need for a post-MLP study of Innovation, one that realises that innovation and technology as a whole, while they do affect History, they are wholly human endeavours. And as both humans and their histories are ever indescribable, so should we study them.

Modelisations of History such as the ones the MLP employs have cemented their academic place. Historians, walking through the bogs of funding, changing disciplines, research policies, and fiscal mandates, were and still are forced to reform their vocation to cease studying History and be content in the attempts to modelise it and homogenise it. If the MLP inspires anything, it should be for academics to store it somewhere, and start looking at whether the reasons behind their struggles bear any similarities to the ones behind the struggles of the misrepresented, the muted; most of all, whether they could make them hopeful for a profession rid of capital dependencies, empty case studies, and manipulated archives.

The MLP had and probably still has its day in the sun. Through the devoted work of its authors, we have an arsenal to study socio-technical transitions in an exhaustive manner, albeit a limited variety of them. Its buzzwords, its nexi of citations, and its marketability confine the model to specific subject matter and geographical choices. Beyond that, they are reminders that historians should appreciate these models for what they are; stepping stones to History as a science, History as a profession, as a story or a narrative, but most and above all, History as an instrument of inspiration and liberation. Descriptions will have to just not do any more. Explanations, assumptions of political responsibility, and action are the new axes of historians for the betterment of their lives and any one other affected by History.

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