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Technology Transfer and Dominance: Creation and Expansion, Adoption and Elimination

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MSc Global Development Studies

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Declaration

I, Kornelius Hafstad Mork, declare that this thesis is a result of my research and findings. Sources of information other than my own have been cited and a reference list has been appended. This work has not previously been submitted to any other university for award of any type of academic degree.

Date.....15.05.23.....

Signature:... Kornelius Hafstad Mork

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Abstract

The intent of this thesis is to explore possible indicators to the (re)production of dominance in technology transfer to developing countries, through the expandatory and eliminatory implications of scale and the principles of scalability. The study investigates the sociocultural preconditions for technological creation through systems of mental representation, and the relationship of conceptualizing the world and worldmaking through the expandatory and eliminatory implications of scale, which is demonstrated by reviewing Henry Ford's establishment of a rubber production town in the Amazon. In addition, the study applies a critical sociocognitive discourse analysis of the World Bank report 'The Innovation Paradox' to capture how systems of mental representations and underlying ideological structures may operate to problematize and describe issues and subjects in biased ways. The study concludes that the (re)production of dominance may occur, especially due to the expandatory and eliminatory implications of scale, and particularly when technology transfers are oriented around adoption.

Key words: Technology transfer, dominance, creation and adoption, mental representations, scale, scalability, innovation, expansion, elimination, development

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Chapter 1. Introduction

“The potential gains from bringing existing technologies to developing countries are vast and dwarf foreign aid. “

- William Maloney, October 3rd, 2017, The World Bank

1.1 Introduction

Throughout the ages of modernity, the social production of wealth has been tightly linked to the advancement of technology and has by the same token been considered one of the, if not *the* most instrumental good for global development incentives in transferring means for prosperity through increased efficiency and productivity growth. However, while the centrality and significance of potentials in advancing and diversifying the technological inventory to the rise of developing economies should not be undermined or disregarded, the past two decades have seen an increasing body of literature within the development nexus concerned with various negative social implications resulting from technology transfer, and the heavy high-tech orientation of global institutions in directing mainstream research and policy (see for instance Nightingale 2020; Beck 2005; Fagerberg et al 2010). Issues raised by critical scholars often involve concerns with regards to power and dominance, capabilities, and the social or cultural compatibility of policy or project incentives, as the transfer of technology also implies the transfer and adoption of knowledge and may thus lead to the elimination of existing technologies and knowledge. It also implies the interference with foreign states of affairs, in influencing, or directing the course of local, national or regional development and international engagement.

Similarly, this thesis intends to explore the sociocultural preconditions for technological creation, and the expandatory and eliminatory implications of ‘scale,’ to indicate the (re)production of dominance in technology transfers to developing countries. The thesis is particularly concerned with the expansion of advanced-world technology, ideas, and markets, to the elimination of other existing forms of knowledge and techniques associated with technology-use and innovation, that are inspired by the various distinct sociocultural and environmental settings across the globe. Put differently, the purposeful creations and

expansion of the advanced world to the adoption and elimination of meaningful diversity in the developing world.

For clarity's sake, technology may be defined in various ways, in this thesis however, technology is understood to be both physical and immaterial entities that are created through the use of knowledge, thinking power (imagination, creativity, reasoning) and craftsmanship or other physical work, with the intention of creating something useful,' (Godø, 2008; 16). In other words, technology encompasses not only products, tools, and instruments, but also processes, knowledge, ideas, services, and systems. Accordingly, technology is herein *formed* by the surroundings, but also involved in *forming* its surroundings (Skjølsvold, 2017; 108).

Drawing on a varying range of literature sourcing from schools of anthropology (sociology, psychology, development, history, STS (social technology and science), political science, and economy. The literature is selected with the aim to explain the relationship between conceptualizing the world and the making of it, while also providing critical connotations to implications of power and dominance to indicate whose and which conceptualizations that persist in the makings of the world and applies literature from historical and recent events to illustrate such relations. Similarly, the reasoning for the selection of literature, has its background in the author's concern to the unequal distribution of power, prosperity, and opportunities across the globe, and the seemingly increasing reach of power that are produced through incentives backed by 'compassionate' concerns, such as poverty, hunger, climate change, and other urging matters. This concern may be captured in Dos Santos's (1970) account of dependence theory, by which the economy of a country (dependent) is conditioned by the development and expansion of another economy (dominant) that can expand and be self-sustaining, whereas the former are limited to perform only a reflection of that expansion (p.231).

Furthermore, the thesis is a qualitative study and relies on secondary literature for carrying out the research. The study incorporates theories on the formation of *systems of mental representation*, through 'intentional worlds' (Ingold, 2000), and *bricolage* (Levi-Strauss, 1962) for the externalization of such internalized systems in the creative endeavours of creation, as well as *institutional bricolage* (Cleaver & de Koning, 2015) for the institutional processes of such systems. In turn, these enables us to capture some indications to when such

systems are contested, altered or deprived (i.e. disempowered) in the face of external forces, and what this may imply for future states of affairs, which the study explores through the conceptualization and externalization of scale and the principles of scalability (Tsing 2012; Scott 1998). Then, the study demonstrates how the mental representation of others may motivate the (re)production of dominance when exercised through prominent global institutions, by conducting a critical sociocognitive discourse analysis of The World Bank report 'The Innovation Paradox' (Cirera & Maloney 2017). Lastly, the conclusion of the thesis is drawn from a discussion at the end of the paper, which draws on all the theories and findings listed in this paper and relate them to the findings of the analysis to provide a broader picture of the indications to and implications of the (re)production of dominance through technology transfers to developing countries. The study concludes that the (re)production of dominance can occur as a due to the expandatory and eliminatory implications of scale, especially when technology transfer are solely oriented around adoption.

The paper is structured accordingly; first, an account of the theoretical framework and methodology of the study; second, addressing the 'internalization of externality' through *intentional worlds*, and the process of externalization of internality through *bricolage*; third, an account of the conceptual externalization of scale and its expandatory and eliminatory implications; fourth, an illustrative effort in presenting the relationship between conceptualizing the world and the making of it, through Henry Ford's implementation of a rubber production town in the middle of the Amazon rainforest; fifth, addressing the formation of power and institution, and introducing the contents of the examined report for analysis; sixth, the analysis of 'The Innovation Paradox' (2017) published by the World Bank, to demonstrate the relationship between the mental representation of others and the (re)production of dominance and suppression; seventh, a discussion drawing from all the presented theories and findings of the thesis, in relation to the analyses to provide conclusory remarks on the (re)production of dominance through technology transfer; and finally, the "conclusion" summing up all the findings, and providing further connotations.

1.2 State of the Art

The modern history and discourse surrounding national and global development has been heavily oriented around the unrealized potential of technological advancements and innovation. This fixation has supported the inconceivable rapid progress of technological development since the industrial revolution and seen the world's greatest powers heavily invested in being at the front of the so-called 'technological race'. In this regard, much of the discourse and policy surrounding the global development nexus has been particularly concerned with the increasing technological catch-up gap faced by developing countries to frontier countries, with regards to their ability in adapting to changing climate and market circumstances, and the potential consequences implied in the lack-there-of. Consistent to consensus, research and development initiatives has paid much attention to the adoption of advanced country technology and innovation (see for example, Cirera, Maloney & William 2017; Eriksen et al. 2021; Eriksen 2015; Fagerberg et al. 2010; Nightingale 2020).

Furthermore, the urgency for action as evoked by the alarming calls of scientific assessments, and further politicized and crystalized through political and mainstream discourse, pose great concerns regarding the great accelerated haste at which decisions and assessments for policy, initiatives, research, and prioritization takes place. Particularly with regards to the compatibility of intervening initiatives towards developing countries to comply with local relativities of knowledge, interests, capabilities, environmental settings, and their broader implications to the (re)production of dominance and suppression. The acquisition of new technologies may contest cultural identities and values, as traditional practices and technologies are replaced by adopted ones and may alter the transmission of cultural heritage and prior identity formations to future generations. Additionally, technology transfer may affect a country's sovereignty, by becoming reliant on external technology or mineral sources, leading to a loss of autonomy and control over their own development, making the country vulnerable to external pressures and influence. In this fashion, states of dependence may arise, by which the economy of a country (dependent) is conditioned by the development and expansion of another economy (dominant) that can expand and be self-sustaining, whereas the former are limited to perform only a reflection of that expansion (Dos Santos 1970; 231).

By the same token, capabilities associated with pre-existing technologies or practices, may not be adequately compatible with adopted technologies. Additionally, technologies incentivised particularly to advantaged actors, deemed responsible and detrimental to cover local subsidies, may increase the domestic catch-up, and further alter the local, regional, or global market conditions, for those ‘others’ not capable of competing with the production capacity and cost-effectiveness of such advancements (Eriksen et al. 2021; 5). In sum, there are many critical considerations to make when influencing the course of a foreign nations’ development through technological transfers with regards to the (re)production of dominance and suppression.

The thesis is structured accordingly; first, an account of the theoretical framework and methodology of the study; second, addressing the ‘internalization of externality’ through *intentional worlds*, and the process of externalization of internality through *bricolage*; third, an account of the conceptual externalization of scale and its expandatory and eliminatory implications; fourth, an illustrative effort in presenting the relationship between conceptualizing the world and the making of it, through Henry Ford’s implementation of a rubber production town in the middle of the Amazon rainforest; fifth, addressing the formation of power and institution, and introducing the contents of the examined report for analysis; sixth, the analysis of ‘The Innovation Paradox’ (2017) published by the World Bank, to demonstrate the relationship between the mental representation of others and the (re)production of dominance and suppression; seventh, a discussion drawing from all the presented theories and findings of the thesis, in relation to the analyses to provide conclusory remarks on the (re)production of dominance through technology transfer; and finally, the “conclusion” summing up all the findings, and providing further connotations.

1.3 Problem statement and research questions

In accordance with the objective mentioned above, the issued problem statement of the thesis concerns:

- (1) ‘Despite efforts to promote technology transfer to developing countries as an central and instrumental part to the rise of developing economies, the expansion of advanced world creations risk reproducing positions of dominance and suppressing existing forms of knowledge and innovation in the developing world. This research aims to explore the sociocultural factors that inform technological creation and investigate the expandatory and eliminatory implications of scale in order to increase the awareness around the negative power implications (domination), as well as to motivate development projects that positively incentivises and enables the use of local-led knowledge, techniques, and innovation.

Further, to guide some sufficient insights to this statement, the following research questions are applied.

- (1) ‘What are the sociocultural preconditions that inform, inspire and coordinate individuals and groups in technological creation?’,
 - (a) How do these preconditions they relate to the (re)production of dominance?
- (2) What are the specific mechanisms by which the principles of scalability contributes to the (re)production of dominance in technology transfer to developing countries?

1.4 Reflexivity.

Given the abstract, complex, and broad scope of this study, some acknowledgments and reflections need to be made with regards to the papers intent and the authors’ positionality. The study does not intend to provide (over-)generalized or specific evidence, or to propose changes to current trends, but rather intends to critically explore possibility of past and current trends in the geopolitics of technological transfer to indicate negative implications to power asymmetries, capabilities, market positionalities, sovereignty and states of (inter-)dependency, as to recognize potential induced barriers to the national development course.

The academic background of the undersigned consists of a bachelor's degree in social anthropology, including one year exchange in various psychology courses (incl. cognitive neuroscience, social psychology, evolutionary psychology and more), and is currently writing this master thesis in Global Development Studies at the Norwegian University of Life Sciences. Significantly, anthropology has equipped the author with the knowledge, perspective, and interest that influenced the pick of topic. A science involved and persuaded in making generalized claims of universal truths about the social conditions that are indicative for the commonalities and varying relativities of human action, interaction, classification- and conceptualization systems, and the social implications of social change and -processes to past, current, and future states, with a prominent characteristic emphasis on the significance of cultural relativity. In turn, the undersigned author risks presenting, seemingly, overly generalized and simplified notions or assertions, that may undermine the independent intellectual property of individual actors, communities and institutions, or the complexity of reality. However, for the sake of clarity, I re-assert that this is not the intent of the paper, yet exploring the possibility of such requires the possibility of such to be presented, of which critical considerations may be difficult to establish provided the complex and abstract nature of claims or suggestions made, and the limited time and size of this task. Nonetheless it provides the scientific discourse with critical insights and recognitions that may serve significant value in future development research, policy, and initiatives. However, that is not for the author to decide.

Furthermore, the critical characteristic of this paper has been heavily influenced by the ongoing Global Development study program. Particularly, much focus has been on the negative imprints of the western colonial and imperial past, conflicts, hegemony, capitalism and other intervening activities that disempower or otherwise influence foreign states of affairs or development course. Surely, such connotations may induce a negatively conditioned bias, and risk exaggerating the negative implications of certain initiatives, or the positive value of local relativities. Lastly, some of the issues discussed may present ethical dilemmas or phenomena that may be understood either as a positive or negative (for example, the provided beneficial gains of development initiatives versus the loss of local sovereignty or autonomy), according to how the perceiver distributes the weight of priority across the moral foundations (i.e. i) care/harm (compassion); ii) fairness/reciprocity; iii) ingroup/loyalty; iv) authority/respect, and ; v) purity/sanctity (cleanliness) (Haidt & Graham

2007)), which by no means represents “right” or “wrong” by themselves, but rather the expression of their moral priorities, to which the extent of represented diversity positively enables greater virtue through the consideration of all foundations. Nonetheless, this paper will not argue for one side or the other, but rather present a potential set of concerns that may enable further considerations.

Chapter 2. Theory

This chapter provides both the theoretical background and methodology applied in this thesis. First, the chapter presents the theoretical framework in order to explain how the various phenomena presented are *understood* and how they *relate* to the problem statement.

2.1 Theoretical Framework

The theoretical framework of a study provides insights as to how the researcher has opted to understand a given phenomenon through theory, and how this relates to the issue studied. The main objective of the thesis is to explore possible indications to the (re)production of dominance and suppression in technology transfers to developing countries, through the expandatory and eliminatory implications of scale to the systems of mental representations associated with technological creation, that coordinates, appropriates, valorises and categorises the action towards and thus the course of technological-use, -creation and further -advancement. As such, this section first provides the underlying theoretical perspective that has guided the research carried out at all levels; second, the theoretical methods that has been applied in order to understand the various phenomena, including the *systems of mental representation*, as the internalization of externality, and the process from internalization to externalization; thirdly, theories of main concepts applied, including power and domination, scale, technology and innovation, institutions, and scale.

2.2. Perspective of Dependence: Creation and Expansion, Adoption and Elimination.

The underlying theoretical perspective that inspired the topic and used as lens to guide the research throughout all stages, has been heavily inspired by the so-called ‘dependence

theory’, but re-worked by the undersigned according to better fit the abstract level of the topic, as well as in response to critiques of the theory.

In 1970, the Brazilian economist, Theotonio Dos Santos published *The Structure of Dependence*, in an attempt to demonstrate that the dependence of Latin American countries on other countries could not be overcome without a qualitative change in the internal structures and external relations, by showcasing that the relations of dependence conform to a type of international and internal structure that leads towards underdevelopment, or more precisely, towards a dependent structure which deepens and aggravates the fundamental problems of Latin American people. As mentioned earlier, according to Dos Santos, dependence occurs when a economy of a given country (dependent) is conditioned by the development and expansion of another economy (dominant) that can expand and be self-sustaining, whereas the former are limited to perform only a reflection of that expansion (1970, p.231). The theory quickly popularized throughout the Latin and South American region, especially amongst politicians and scientists. However, without going too much in detail, although dependency theory represented an advance over prior evolutionary theories of development and underdevelopment in its time, it also posed severe difficulties for analytical assessments, by posing a lot of latently loaded beliefs and vast generalizations. Moreover, it also proved troublesome as it was popularly adopted by right-wing leaders and served as a prominent instrument in constructing and popularizing new, sometimes radical, nationalist beliefs. Yet, its fundamental observation, that the expansion of another country, can function as to produce states of dependency to the subjected country, remains critical to this research.

The theoretical perspective applied herein, serve as an abstract representation of the way in which the dominant trends of development research, policy, and projects targeting the developing world, presents an overarching narrative by which the ‘advanced world’ is expected, responsible, and encouraged to define and create the means of progress and advancement, to which the ‘developing world’ is expected to adopt and adapt, in order to rise developing economies. This narrative the undersigned has coined “creators and adopters”, to which the theoretical perspective represents the ‘creation and expansion of the advanced world, to the adoption and elimination of the developing world’. Different to dependence theory, this perspective does not presume dependence, but rather the trends of activities that

may facilitate or induce dependence, and which emphasizes the sociocultural power and sociocognitive effects of these activities. Importantly, the perspective does not claim that only the advanced world creates the means for progress and advancement, or that these are absent across the developing world, but rather that this is the way in which development issued to developing countries tends to be framed at its fundament (i.e., that the wealthy advanced world should help out the poorer developing world, not only out of compassion, but also because their achievements are evident of relevant competence, and are best equipped to direct and advance countries in their catch-up towards self-sufficient creators.).

2.3. Intentional Worlds and Systems of Mental Representation

Mental representations is a core concept within social psychology to understand how various things, people, attitudes, impressions, and any further internal and external stimuli are processed, stored, activated, consolidated, and recalled. However, following an anthropological perspective, the thesis is more concerned with the '*system*' of mental representation. In short, mental representations are objects and structure in the mind with semantic properties, or in other words, the information-containing, physically realized structures in our minds which allows and enables us to perceive, process, understand, relate, and recall all stimuli, as well as to coordinate subsequent actions or performance towards, or off the stimuli (Krcmar & Haberkorn, 2020).

The '*system*' of mental representations refers herein to Richard Shweder 'intentional worlds' (1990); the pre-existing design that provides the meaning to the respective objects and structures, through a process of appropriation, categorisation, or valorisation, which people respond to under any form of engagement to it. The design of this *system* is "transmitted across generations in the form of received conceptual schemata, and manifests physically in the artificial products of their implementation, a design commonly known as 'culture'" (Ingold, 1996; 40).

The thesis is concerned with the alteration, deprivation, or at worst, elimination of such systems in the face of external forces (technology adoption). Elimination herein entails significant deprivations, alterations, or otherwise changes induced by external forces, that in effect re-constructs the system such that perceived structures and objects can no longer be as

effectively acted towards, conceived, or otherwise processed in relation to the original structures or properties. The system may operate in various dimensions: social, cultural, and, or psychological. The social aspects refer to the broader abstract sets of structures and objects that operates at the macro level, they may be considered more *sterile* than the others, wherein the appropriation, categorisation, or valorisation operates to project normative and standardized structures and objects, they tend interpreted consistently by individuals across a given respective region, and may involve jurisdictions, political structures, societal hierarchies and so forth. The cultural dimension operates at the group, community or national levels and concerns the local construction and reconstruction of mental representations, that are evolved through interactions between individuals, groups, other communities, and nature, and formed by the distinctive features of the social and natural environmental setting, which in turn produces cultural variety. The psychological dimension refers to the individual perception, interpretation, and articulation, as informed by the social and cultural setting, but performed and mediated through the individual's distinctive personal features and abilities. In sum, the 'intentional worlds' in the systems of mental representation, represents the product produced by the process of 'the internalization of externality'.

2.3. Bricolage: The Externalizations of Internalized Systems

Provided the thesis emphasis on *creation*, we also need a theory on the processes involved in 'the externalization of internality', to understand the dialectics of '*the internalization of externality and the externalization of internality*' (Bourdieu, 1977; 72). In this part we will attempt to understand how techniques and technologies are formed through the concept of bricolage (Lévi-Strauss 1962) and the performing 'bricoleur', by illustrating the interplay between the cultural formation of techniques, and the creation of technologies and institutions.

The theory of bricolage explains how the processes of creation or recreation of objects and structures, always involves the earlier ends that are called upon to play the part of means; the signified changes to the signifying and vice versa. Bricolage expresses how an implicit inventory or conception of the total means available (for creation) must be made in the case of mythical thought (i.e of the *sensible* world in *sensible* terms), so that a result can be defined which will *always* be a compromise between the structure of the instrumental set and

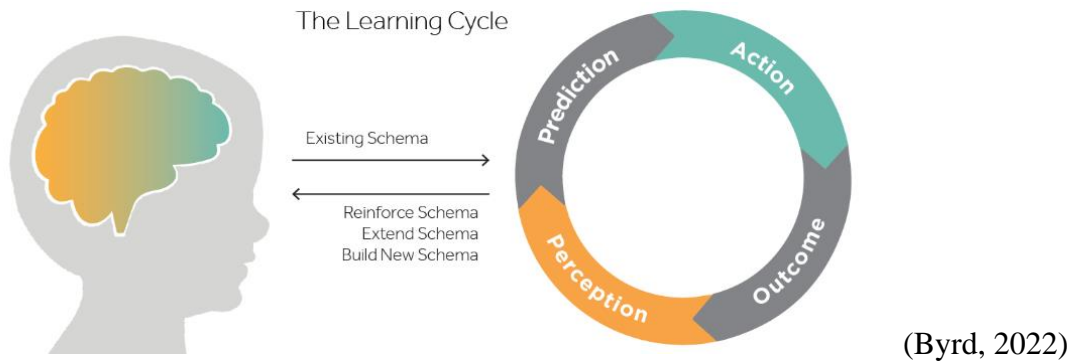
that of the project (Levi-Strauss, 1962; 14). The ‘bricoleur’ relies on their culturally formed “intentional worlds”, and embodied techniques, that conditions the way in which their interplay to the external enquiry is externalized (articulated, performed and created) accordingly.

The ‘bricoleur’ is one who is skilled at performing many diverse tasks, an Jack of all trades, or a kind of professional do-it-yourself person. Unlike an engineer, he does not subordinate his tasks to the availability of raw materials and tools conceived and procured for the project at hand. His universe of instrument are closed and the rules of the game is to always make use of ‘whatever is at hand’, the set of tools and materials that is always finite, and heterogeneous as its content are of no necessary relation to the project concerned, they are the contingent results of all the occasions there have been to renew or enrich the stock or to maintain it with the remains of previous constructions or destructions. As such, the set of the bricoleur’s means, are defined only by its potential use, because the elements are collected or kept on the principle that “they may always come in handy” (Levi-Strauss, 1962; 11). This form of engagement and performance are resembled in various everyday-life activities, for example, think of children playing on the beach, and the many different ways in which they creatively engage with the sand (formed (e.g., to sit, lay, cover items, hold drinks) constructed (e.g, castles, dams, body-sized graves, tossing, blanks for writing, measure instrument, and so on).

In illustrating the historical manifestation of *bricolage*, one may think of the revolutions or defining periods with reference to technological advances (stone, bronze, iron age, and so on, or the agricultural and industrial revolution). Or, on the contrary, how would any one come to think of attributing the enormous advances of establishments such as civilization, pottery, weaving, agriculture and the domestication of animals, to simply an fortunate accumulation of a series of chance discoveries, or believe them to have been revealed by the passive perception of certain natural phenomena (1962; 9). Inevitably, the seeking of knowledge and creative endeavour of creation, cannot, by their nature, be passive acts. (Rather, it is the engagement with current environment settings, and the previously determined sets of associated *appropriation*, *categorisation*, or, *valourisation* of earlier ends, which are, in Levi-Strauss’ word, ‘called upon to play the part of means; the signified changes into the signifying’ (1962; 14), (the signified externality, is processed and internalized by the

subject(s), which is then externalized into a new signifier in accordance to prior associations and the uniqueness of personal or inter-personal performance.) This is the creative result of the dialectic process of the internalization of externality, and the externalization of internality. The psychological model for perception-action cycle also captures process in a illustrative manner, to which the *intentional world* represents the *existing schema* as presented in fig 2.1.

Fig 2.1



2.4. Power and Domination

Power entails various forms of definitions and meanings, in which a common agreed-upon definition, seems to be somewhat of an impossible task. Rather, the definition of meaning are heavily context dependent, as what would be considered a *mean* of or to power, relies on the given context. This study, however, seeks to explore certain indications to the (re)production of dominance in technology transfers to developing countries, with a focus on dominance through knowledge (i.e. expandatory and eliminatory implications to systems of mental representation). Fundamentally, power is herein defined in terms of specific relationships of control between social groups or organizations, and not as a property of interpersonal relations, whereas dominance is the exercise of power of the controlling group (Wodak & Meyer, 2015; 71). As such the thesis is concerned with the power of *knowledge*, referring to ‘controlling the development and distribution of knowledge and its conceptual frames which implies the specification of what the issues are, how they should be understood and dealt with, and what demands action. Conversely, creating ignorance becomes a mean to disempower, to which being ignorant about an issue or phenomena, may legitimately disallow any respective action (Vatn, 2015, p.89).

In line with the emphasis on the *power of knowledge* in the framing of power, the thesis applies Foucault's theory of power/knowledge, is a crucial lens through which to understand complex and often hidden dynamics of power in society. According to Foucault (1980), power is not simply a top-down force exerted by individuals or groups, but its diffused throughout social structure and exercised through discursive practices. This means that power is not just simply about overt acts of coercion or dominance, but is also embedded in the way we think, speak, and represent reality. Power and knowledge are thus inextricably linked, with knowledge being produced and shaped by power relations.

Moreover, Foucault's view of knowledge as an active and productive force that helps to constitute reality itself (Foucault, 1977) has important implications for understanding how power operates in the context of global development. As Tremain (2017) argues, dominant knowledge systems can be used to exert and maintain power over subjected systems of knowledge (such as *systems* of mental representation), with the concept of 'scale' being a prime example (see chapter 4.). By privileging certain ways of understanding and representing reality, dominant knowledge systems can eliminate or deprive other forms of knowledge in the developing world.

As such, in the context of technology transfers to developing countries, it is essential to understand the way in which power and knowledge operate to reproduce dominance. By focusing on the power dynamics inherent in technology transfers (i.e those creating and transferring the technology, and those adopting and adapting to it) and the role of knowledge in these processes, this thesis aims to contribute to a better understanding of the way in which power operates in global development. By drawing on Foucault's theory of power/knowledge and Tremain's (2017) insights on the elimination of knowledge systems, as illustrated through the expandatory and eliminatory implications of the concept of scale (Tsing, 2012), this thesis seeks to critically address and analyse the ways in which power may be exercised through dominant knowledge systems in the context of technology transfers to developing countries.

2.5. The Eliminary and Expandatory Theory of Scale

In the context of global development and technology transfers to developing countries, the concept of scale plays an important role in understanding how power is exerted and how knowledge is produced and disseminated. As Anna Tsing (2012) argues, dominant knowledge systems often rely on precise, nested scales that are amenable to measurement and standardization, which enables the expansive ease of scalable projects. This has the effect of privileging certain ways of understanding and representing reality, while eliminating or depriving other forms of knowledge that do not fit within these ‘precision-nested’ scales. Both the expansion and elimination processes are accelerated by the progressive purpose of the scale through expansion, and by its precision-nested design that enables the narrowing of vision wherein the ‘valuable’ of the object (for example the timber of the tree) appears at the centre of the *field of view*, in turn opposing vectors of relationship, which by its unpredictable nature may disrupt progress. According to scalability, relationships are the enemies of progress.

James Scott’s (1998) work on “Seeing Like a State” provides further insights into the ways in which dominant knowledge systems can be eliminatory in nature. Similar to Tsing, Scott argues that modern states and bureaucracies often rely on standardization and simplification to manage and control populations. Both Tsing and Scott argue that this can have the effect of erasing or ignoring the complex social and ecological relationships that exist at local scales. In the context of technology transfers to developing countries, this can lead to the imposition of Western-style models of development that are incompatible with local knowledge systems and social structures.

Together, Tsing’s (2012) and Scott’s (1998) work help to illuminate the ways in which dominant knowledge systems can reproduce and maintain power over subjected systems of knowledge. By privileging certain ways of understanding and representing reality that fit within narrow scales, dominant knowledge systems can eliminate or deprive other forms of knowledge in the developing world. The concept of scale is thus a key component in exploring the relationship of power and knowledge in the context of global development and technology transfers to developing countries.

Chapter 3. Methodology

The purpose of this section is to address the steps taken in order to carry out the research. The chapter map out the various choices made and argues for their selection. Also, limitations and quality criteria are briefly addressed. The background to the methodology is to enable the explorations of possible indicators to the (re)production of dominance in technology transfers to developing countries, with aims to uncover the sociocultural preconditions for technological creation through systems of mental representation, and the power produced by the expandatory and eliminatory implications of scale and the principles of scaleability.

3.1 Research Strategy

In accordance with the research objective, problem statement and research questions, and the ontological and epistemological orientation of the undersigned, this is an qualitative research (Bryman, 2019). In such fashion, the research follows an interpretivist position which emphasise the dialectical relationship between conceptualizing the world and making it (Tsing, 2012), with concerns to the way in which advanced-world conceptualizations and creations expands at the cost of depriving or eliminating developing-world (systems of) conceptualizations and creations. This very focus follows the notion that our worldviews and understanding of worldly matters is affected by our environmental, social, cultural, and psychological positions and contexts, and in the interactions with and reactions of these settings. The research attempts to explore the role of the pre-existing systems of mental representations in understanding and coordinating activities related to technological creation, and how such systems may be affected by other external systems. In this paper, the external system is that of the advanced world, and how the conceptualization and use of scale may imply for such systems in the developing world, to indicate the (re)production of dominance.

Applying a qualitative research strategy in this form, enables us to gain a more comprehensive and relational understanding of the underlying sociocultural and sociocognitive structures that may produce power in the interaction with other such structures and settings, and the interplay of knowledge and systems of mental representation to the formation of conceptualizations, technological creations and ultimately worldmaking. Bryman (2019) makes the argument that theory is essential to social research in providing the

framework by which social phenomenon can be understood and findings explained. Thus, I opted to apply both the theory of intentional worlds and bricolage to understand the full process of *what* the pre-existing sociocultural conditions for technological creation are, and *how* they work in the performance of such creations. Further, the eliminatory and expandatory theory of the scale, has been inspired by the works of both James Scott (1998) and Anna Tsing (2012), which through induction helped to produce the theoretical perspective that informed the objective and topic of the thesis, and in carrying out the thesis, which the undersigned has coined ‘creators and adopters. This theoretical perspective claims that the expansion of advanced-world creations (markets, knowledge, ideas, technology, and further material and immaterial creations) incentivised through global development initiatives, reflect a world in which the ‘advanced’ is expected to and responsible for determining and creating the means of progress and advancement, to which the developing world should adopt and adapt.

Further, the thesis explores Greg Gardin’s (2009) work on ‘Fordlandia; The Rise and Fall of Henry Ford’s Forgotten Jungle City, to illustrate the relationship between conceptualizing the world and the making of it, with emphasis to the use of scale. Next, the thesis conducts a critical sociocognitive discourse analysis (CSDA) of The World Bank’s report ‘*The Innovation Paradox*’ (Cirera & Maloney, 2017), to demonstrate how the *systems of mental representation* may(re)produce dominance through the discursive framing and problematization of issues, group descriptions and ideological adherence and expressions. Finally, the thesis presents a discussion on the (re)production of dominance in technology transfers to developing countries, by using and relating the findings gathered from the analysis to the prior investigations.

3.2 Data collection and strategy

This study relies on secondary literature, and applies a purposive sampling strategy, which involves sampling of data that is likely to be a rich source of information for the objective of issue under study, which helps to secure continual relevance of the selected data (Bryman, 2019; 232). For this thesis, the data was sampled in accordance with the objective, except the sample of analytical theory, which was sampled in with the report, prior findings, *and* the objective in mind.

The data used for this thesis draws from history of significant events (Beck 1992; on the modern transition towards ‘risk societies’ in which the production of wealth has become systematically linked with the production of risk; Gardin 2009, on Henry Ford's establishment of corporate rubber town in Amazonas; Scott 1998, on the implementation of standardized measures; Tsing 2012, on the introduction of scale and the principles of scalability, and its conquest of nature and the world), and a report on technology adoption and innovation outcome trends of technological transfers to developing countries over the past two decades (see Cirera & Maloney, 2017, on the lack of developing countries in adopting advanced-country technologies and innovations, despite the vast potential returns).

The intent of the selection of data can be described as follows.: First, according to the topic of interest, the theoretical framework posed by Ingold (1996), Levi-Strauss (1962), and Cleaver and de Koning (2015) helps to understand the pre-existing systems that are involved in conditioning and performing technological creation; Tsing (2012) and Scott (1998) expresses how scale, as a part within such systems, has expandatory and eliminatory qualities, which may in turn deprive or eliminate other systems; Gardin (2009) and Beck (1992) helps to illustrate the devastating effects of such ‘scale’-included systems onto other environmental and social settings; whereas the report of Cirera and Maloney (2017) demonstrates such systems at play, in the framing of issues, descriptions of represented groups, as informed by their ideological adherence and expressions; the report, is by applying critical sociocognitive discourse analyses as accounted by Wodak and Meyer (2015).

3.3 Selection of topic, theory and method

The background for the authors’ interest and motivation surrounding this topic, emerged in the early stages of his master studies. Drawing on characteristic anthropological concerns over cultural autonomy, and the rich and varying potentials of human creative abilities to produce magnificent products and services across cultures and environmental settings, combined with the introduced notion that development trends at the international, or global stage, are dominantly formed and directed by quite specific knowledge forms, popularly ascribed to the global “North”. The author, then, envisioned an image of the world in which a privileged few (countries or institutions) are positioned to take on the responsibilities to

direct, form, and create the means of what “progress” or “advancements” are recognized to be, to which the others should effectively adopt and adapt.

This imagery the author coined, “creators and adaptors”, to which the “advanced world” is expected and responsible for determining and creating the means for progress and advancement, to which the “developing world” should adopt and adapt. The ‘critical’ concern herein regards the power dominance as represented by external forces intervening and influencing the development course and state of affairs in foreign sovereign states, that may bear reminiscence to the colonial enterprise, which is legitimized by an evolved sophisticated form of global “compassionate” concerns, from the ‘white man’s burden’, to global social political legislations such as ‘human rights’ that are rooted in culturally conditioned and defined notions of ‘righteousness’. Also, the knowledge, abilities, techniques and technologies, used to direct the course of development within a country or community, may be replaced by such introduced standardized forms, which implies the loss of culture, knowledge, and abilities, or otherwise the elimination of a unprecedented range of unrealized potentials, functions, and -purposes, as well as the alteration, deprivation, or elimination of existing systems of mental representation, which may be deemed obsolete with regards to the introduced form. This is the background and rationale for the thematics and narratives applied to the study, while the specific to technological transfers was established as a result of periodic relevancy, personal background in STS courses, and a shared point of interest with the supervisor.

In identifying theories and methods viable for the analysis, the author wanted to be able to both; i) establish the preconditions that inform, coordinate, and mediate the formation of human techniques and technological creations across the world, (e.g. ‘intentional worlds, bricolage, and institutional bricolage); ii) to inform and capture ways in which such external conditions may be expanded upon other cultural and environmental settings with different conditions (i.e., informed by the ‘scale’ and the principles of ‘scalability’), and may thus alter, deprive, or eliminate the existing conditions, and; iii) applying a critical sociocognitive discourse analysis for The World Bank report, in order to demonstrate how such systems coordinates the framing of issues and the descriptions of in- and outgroups, as informed by expressions of ideological adherence, to indicate the (re)production of dominance in the research that guides policy and frames issues and interests, towards technology transfers to

developing countries.

Therefore, with regards to the preconditions for technological creation, the author opted for Tom Ingold's (1996) reading of "intentional worlds", to inform how the individual manifests a mental representation of the external world, and why they may produce different structures of categorisation, appropriation, valorisation, which coordinates further knowledge, meanings, beliefs, norms and values, and further consolidates them through the association and relations of further interactions and experiences. In turn, with regards to the technical 'processes' of technological creation, the concept of 'bricolage' (Lévi-Strauss 1962) and the performing 'bricoleur', helps to illustrate how the individual or group, is informed and makes use of their "intentional worlds" of "mental representations" in their creative endeavours of creation. Also, both theories and concepts complement each other in their expression of the transmission of associated knowledges and techniques through generations, to which the outcomes of creations anywhere, may be seen in its totality to represent both the material and immaterial manifestation of history in its settings (the creation, mediation, and articulation of the the past, present, and future). Similarly, institutional bricolage (Cleaver & de Koning, 2015), follows similar patterns but in the institutional context; a *'process through which people, consciously and non-consciously, assemble or reshape institutional arrangements, drawing on whatever materials and resources available, regardless of their original purpose'* (Cleaver & de Koning, 2015, p.4).

Otherwise, the introduction of the standardized form of measure, the scale, represents the conceptual externalization informed by the internalized formations of 'mental representation' and their 'intentional worlds'. Anna Tsing (2012) critical reading of the use of "scale" and the principles of 'scalability', in her proposition for a non-scalable theory, is fundamental to the critical perspective of the study, and to inform how adoption may be conceptually forced, and diversity (e.g., biodiversity, cultural, knowledge) altered, deprived or eliminated, through its ever-expanding force. Scalable projects eliminate potential vectors of relationships, as the uncontrollable, and unpredictable nature of relationships may disrupt progression. In turn, the use of scale, and projects of scalability, are easily managed and controlled, and through its expanding reach, it makes for a great and effective tool in conquering nature, lands, and people.

Furthermore, for analysis and discussion, the author opted for applying critical sociocognitive discourse analysis (CSDA) for the report, and inductive method for concluding the discussion of the. Critical discourse analysis (CDA) is a specific type of discourse analysis that focuses on examining the ways in which language is used to reproduce or challenge power relations and social inequalities. As opposed to regular discourse analysis, CDA by contrast, is much more explicit in exposing the political nature of the text examined. CDA is helpful to capture a range of underlying power-related issues, such as the effect of power hierarchies, structural inequalities, and historical political struggles, and may also bring to the research a commitment to social change and the empowerment of the oppressed (Bryman, 2019; 298). Whereas all of the approaches in CDA study the relations between discourse and society, the sociocognitive approach claims that such relations are cognitively mediated (Wodak & Meyer, 2015; 64). Therefore, provided the focus on *systems of mental representations*, which represents a sociocognitive system of structures and objects intertwined in a associative network that are called upon too coordinate and appropriate performances of individuals or groups in contexts and situations of social, personal, or environmental interactions and settings.

3.4 Analysis

This section will describe the steps I took to organize and analyse the data, the tools used to support the analysis.

The analysis was structured in several steps. The data was collected from the report “The Innovation Paradox” (2017), which served as only the examined report. Then, the data revised, transcribed and coded according to themes and patterns related to the problem statement, with a focus on the *framing* of issue and problematization, the *group descriptions* of the advanced in-group and developing out-group, and lastly identified ideological affiliation through expressed norms of good conduct and values. The goal of the analysis was to capture how *systems of mental representation* of dominant groups can result in discourse that (re)produces or reaffirms dominance.

Similar to discourse analysis (DA), CDA focuses on underlying, structural, or latent issues that may be both explicitly or implicitly expressed in the text. CDA generally adhere to a anti-realist and constructionist approach, which according to Karl Popper, “*emphasize the*

way versions of the world, of society, events and inner psychological worlds are produced in discourse” (1997; 146), with *discourse* referring to the sets of linguistic categories that relates to a given object, frames peoples understanding of that object (Bryman, 2019; 294). Importantly, being constructionist, it recognizes that DA entails a selection from a infinite range of interpretations of a given event or object. By this nature, it is also important to remain reflexive in that the author, in the process of analysing, interpreting, and writing, the author is also constructing a particular form of reality, that may not comply to other such constructs. I opted for the sociocognitive approach to the critical discourse analysis as explained in the previous section. This helped to explore underlying assumptions, values, ideologies, and structures of associations that shaped the report.

First, this involved analysing the introduction of the topic, by focusing on the *narrative* in *framing* the issue and the ascription of empowering or disempowering associations, through the use of metaphors, exaggerations, emphasis, and problematizations.

Second, an analysis of the mental representations of the advanced in-group and developing-outgroup, through expressed group descriptions, focusing on associated or related words, adjectives, and subjective used to describe and relate the two groups. This part also presents two illustrative figures in the form of associative networks, regarding how the two group categories activates associated concepts and themes in the underlying cognitive structure of mental representations, only applying those descriptions addressed in the chapter. Herein, each stimulus (the advanced- or the developing world) trigger links of relationships to the associative network of concepts (nodes) within our system of mental representation. The closer the node appears to the stimuli, the stronger the relationship. The strength of the associated concepts is determined by the frequency of expressed occurrences, as well as by familiarity, similarity, and connectedness.

Third, the analysis attempts to target discourse associated with ideological affiliation, through the expression of norms for good conduct and values. This was done by focusing on the methods, principles, and practices promoted, and what concern or benefit they seek to avoid or produce, and the claimed centrality of these. For example, what is that which is considered to be ‘*critical*’ associated with, what should be *exploited*, and what benefits do they focus on, and what do they produce?

Finally, the analysis ends with making an argument for the prevalent (re)production of dominance inherit in the report, by addressing, relating and connecting all the three different parts of analysis to the problem statement. This argument is then applied afterwards in the final chapter which discusses, relates, and connects all the findings of the thesis in order to provide some conclusory remarks.

In conclusion, the CSDA approach should fit remarkably well with the theoretical framework of the study, including intentional worlds and bricolage, as well as for the focus on the dominance of knowledge and power symmetries present in the intent and objective of the thesis. Additionally, the examined report, “the innovation paradox”, represents a great prospect for CSDA method, being published by a powerful global institution (The World Bank) directed by the advanced-world, reporting on issues amongst the developing-world in adopting advanced-world technology and techniques, and of adapting to advanced-world markets, services, systems, and techniques.

Trustworthiness.

The quality of the qualitative research tends to represent in terms of *trustworthiness* instead of ‘validity’ and ‘reliability’. In such fashion, trustworthiness is made up of four criteria: *i) credibility; ii) transferability; iii) dependability, and iv) confirmability* (Bryman, 2019; 204). This section will briefly cover the idea behind all these four criteria and assess the quality of this study in accordance with each, and in sum.

Credibility

The idea of credibility is connected to the idea that different people may interpret the social world in different ways, and therefore the researcher has to ensure that the interpretations presented in the study conform to the experience of the people observed. As such, in order to achieve credibility, the researcher must arrive at a *credible* account of the reality they present, and that the data corresponds with the conclusions being drawn (Bryman, 2019).

achieving credibility means following proper research procedures establishing credibility entails both (Bryman, 2019; 204-205). This study relies solely on secondary literature and is primarily concerned with abstract group; therefore, credibility has been performed by citing the work of the relevant authors rather than paraphrasing them, neither has any reference

been attempted translated from its source (excl. Godø 2008; Skjølsvold 2017), and certain claims has been corroborated with supervisor, and other students. Nonetheless, credibility cannot be considered sufficiently ensured, particularly the sociocognitive analysis runs the risk of misinterpreting and misrepresenting the position of the subjected authors.

Transferability

Transferability concerns the applicability of results, processes, and conclusions outside the study. Put differently, whether the results can be transferred and, or generalised to other settings beyond this specific study. Given the design of this study, we may assess its transferability according to the relevance and applicability of the literature to our research objective and context, and how that may apply to other contexts or settings. The transferability of this study is according to the author, the strongest quality criteria of this study. The transferability is herein enhanced by rich detailed accounts of the *systems of mental representation*, and the surrounding Ford's Amazon jungle city, as well as for the World Bank Report, and the expandatory and eliminatory indications of scale. Furthermore, the topic ((re)production of dominance in technology transfers to developing countries) is a very popular theme of study within the development nexus, to which the claims made within this study very much aligns with current views. Also, the perspective (i.e. creators and adopters) taken in carrying out the research offers a similar but somewhat different conceptual frame which may be of benefit to future research and policy formations. The perspective differs from similar conceptual perspectives (such as dependency), in that it emphasizes the *power of knowledge and activity*, to which the *power* is produced by the very process and outcome ("the power of creation") of that creation, not only by structural or systematic asymmetries. This perspective may be applied to any event in which creation and adoption of that creation occurs, whether through technology as in this thesis, or any other material or immaterial matter (e.g. policy, products, services, legislations and so on), in turn, rather than emphasising people and groups. Put differently, if one think of the three different kinds of people that Nicholas Murray Butler claimed made up any population, this perspective helps to capture "... *the few who make things (i.e creation) happen*".

Dependability

Is the research dependable? Dependability of the research refers to the consistency and stability of the findings over time and across different researchers. Working with secondary

literature, it is important to document the research process and selection criteria, and to use a systematic and transparent approach to enhance dependability. For this criteria, precise and correct references are used, schedules, notes, and selections has been done neatly. Otherwise, the thesis has been continuously revised by the supervisor, and has taken further steps to emphasize its aims, limits, and the reflexive position of the author. Otherwise, discussions, seminars, group meetings, and private discussions with past and current thesis writers has helped to ensure some quality to this criterion.

Confirmability

Refers to the degree to which the findings are neutral and grounded in data. Herein we critically evaluate the findings and arguments presented in the study and consider any biases or conflicting interests prevalent in the text. Importantly, from the very outset of the study this thesis is somewhat biased, and most certainly conditioned. For example, the theoretical perspective, whilst being inspired by a various range of academic literature, it nonetheless is a original contribution of the undersigned, who recognize his lack of expertise, knowledge and experience, to realistically be positioned to offer any relevant self-made contributions. Yet, I have not found any contradicting evidence, and it has gained support by the supervisor and other professors in being representative of a certain abstract reality but has warned that it may greatly overlap with existing perspectives or theories. Otherwise, it has been heavily conditioned by the authors educational background and critical perspective, however this has been addressed in the reflexivity chapter. Lastly, the confirmability of the thesis has been significantly strengthened by section on *reflexivity* in the first chapter, which emphasize the explanatory intent of the thesis.

Limitations

Provided the broad and abstract scope of this study, there are various limitations. First, the thesis only intends to explore the possibility of the concerns and implications posed, not to uncover or provide evidence. Second, the research risk expressing over-simplified notions or remarks that neglects the diverse intellectual properties of individuals and institutions, provided its abstraction of groups. Thirdly, the study may also be seen as to exaggerate certain connections or functions, which makes some of the truth value compromised. However, the thesis should be read according to the reflexive account, and the intent presented. Also, as with any discourse, this thesis may be seen as to represent a personal

construing of reality, which may not be compatible to the experienced reality of others. While true for any discourse, it is especially true for this thesis, as it concerns sociocultural and sociocognitive phenomena, that are heavily loaded with theory and interpretation. Provided the inductive fashion of this thesis, none of the results should be considered objectively true.

Chapter 4.

Systems of Mental Representations

4.1 The Internalization of Environmental Externalities

“Humans are unique in that they occupy ... ‘Intentional worlds. For the inhabitants of such a world, things do not exist ‘in themselves’, as indifferent objects, but only as they are given form or meaning within systems of mental representation. “(Ingold, 1996, p.40)

Following the citation above, individuals belonging to different ‘intentional worlds’, may perceive the same objects, environments, events, or phenomena to project different meanings. Thereby, their acts towards them may differ, corresponding to the subjects’ pre-existing system of mental representations that has been transmitted through the generations in the form of received conceptual schemata, and manifested physically in the artificial products of their implementation, by which the object has been appropriated, categorised or valorised to prepare and coordinate any future acts towards them. This design is commonly referred to as ‘culture’, and by this standard, we may understand the environment of human beings as culturally constituted, and ‘nature’ - the parts consisting of animate and inanimate things - as culturally constructed artifacts (Ingold, 1996: 40-41). Mental representations refer to the objects and structures in our minds with semantic properties, they are the cognitive structures that allows us to perceive, process, and understand anything in a meaningful manner.

As such, one may start to imagine the different perceptual and interactive externalities found across different environment settings, and what these imply to the respective course for the internalization and externalization of human action and conceptualization. Generally, it is well-known that the natural diversity of plants and species occurring in a tropical setting is much greater than that of the temperate setting, to which an acre of tropical forest contains a

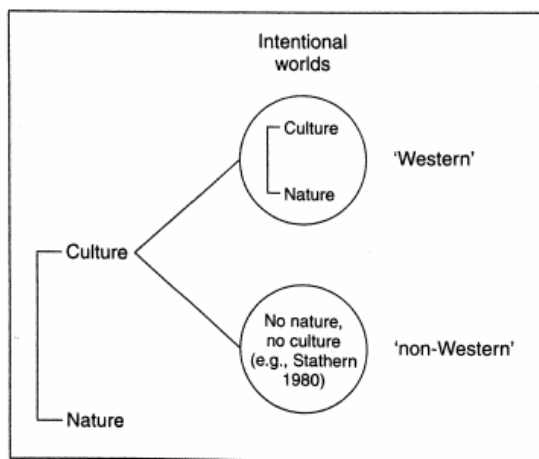
far greater range of biological species, but with fewer individuals for each species, than in the temperate forest (Scott, 1998; 273-274). By this notion, we are able to grasp the fundamental insight that such different environmental settings, presents different precondition for the various systems of mental representations and associated knowledge, intuition, conceptions, institutions, customs, techniques, technologies and further artificialization and reconstruction of the environmental externality to face present and future challenges of existence, survival and thrival, as well as for the subjects aesthetic or artistic aspiration.

Human-beings of the tropics experience a nearly unfathomable complex and abstract web of nature, that is maintained through a complex set of intimate relations of inter- and intra-dependent species, providing a rich habitat of nutritional abundance amongst substantial predatory and toxic threats, accompanied by temperature- and weather conditions that supports the physical disposition of mankind. Conversely, those of the temperate environment experience a more simple and orderly nature, with scarce nutritional means and lesser competition. The natural orderliness allows the different plants and species to be more readily available, making the process of identification and categorisation of the environmental externalities more practically available than in the tropics. Additionally, while being situated in periods of harsh temperature- and weather conditions, that would require artificial constructs of resistance for successful livelihood, one may argue that the more susceptible the temperate is for large-scale human reconstruction and artificialization than the tropical. Aligned with Ingold's (1996) distinction between the 'constructed' western-, and the non-western apprehension of nature (fig 1.1), in which the 'western' may be characterised as the construction of a view, in a process of mental representation, whereas the 'non-western' is understood as a matter of engagement, not of construction or reconstruction, but dwelling, not of taking up a view *of* the world, but of taking up a view *in* it (Ingold, 1996; 42).

From these two important and contrasting views, new insights unfolds: First, in order to effectively and sufficiently survive and thrive in the tropics, it would be effective to acquire the knowledge of how to live '*in*' nature, as the great intimate, complex and abstract environmental setting provides a surplus of human life-supporting means, with what may seem as a inconceivable complexity that would not as effectively coordinate individuals from rigidly ordered systems of classification or mental representation. Second, those in the temperate would rather want to acquire the knowledge of how to live '*of*' nature, provided the

resource scarcity and harsh weather conditions threatening human life, and the comprehensible available natural order of things, that may effectively benefit from establishing clear distinctive representations manifested in a rigid system of classification. Consequently, there is no guarantee that the formation of knowledge, techniques, and technologies produced by the experience of living and doing in one environment setting and the challenges they pose, would be compatible with that of the other. This notion testifies to the significance of the locally formed systems of mental representations, knowledge, ideas and lived experiences in directing the course of technological development to match the relativities and challenges posed the respective environmental setting.

Fig 1.1



(Ingold, 1996 ; 42)

Importantly, in understanding more of the underlying details of processes involved in the notion established above, the socio-technical theory, ‘the social construction of technology’ (SCOT) provides some valuable insights (see also, for instance, domestication theory and actor-network theory (Latour)). Drawn from the sociology of scientific knowledge, and the ‘empirical program of relativism’ (Collins, 1983), SCOT holds that technology emerges in society as a ‘seamless web’ (Bijker and Pinch, 2012), in a constitutive nature with individual users and other social factors, which argues that knowledge (whether previously regarded as true, false, or ambiguous) involves material resources, psychological processes and social practices (Sovacool & Hess 2017; 717). The SCOT framework divides these processes into four conceptual elements: relevant social group, interpretive flexibility, closure and stabilization, and technological frame. First, relevant social groups consist of the actors and organizations that share a relationship with, and set of meanings attached to a certain technology, and plays a critical role in forming and defining issues in their course of

technology development and -use. Second, throughout the course of development, the outcome is negotiated by the interpretive flexibility available within that group. Third, the occurrence of closure and stabilization takes place when the consensus considers the problems arise throughout the course of development to be alleviated. Fourth, similar to the concept of paradigm, technological frame refers to the system of meanings (e.g., goals, conceptualizations and assumptions) that arise in the network of relationships; comprising all elements that influence the interaction within social groups and lead to the attribution of meanings to technical artefacts. Lastly, another contribution by SCOT worth mentioning is the understanding of diffusion or technical change as a socio-cognitive process with evolutionary characteristics, to which the initial variety of meanings attached to an artifact, becomes reduced through inter-group selection processes and build-up of a shared cognitive frame, typically by a process of selection and variation (Sovacool & Hess, 2017; 718). In sum the above may be seen as the social process of technological creation within the given intentional worlds.

As such, the effective display of technical skills and technological creation, may be seen to resembles one of, if not the most significant human performance in directing the course of human evolution and history, illustrated in the various terms used to describe different periods of the human era (e.g. stone-,bronze, and iron-age, or agricultural-, and industrial age), and may be justified to be considered an innate human ability (i.e. programmed prior to birth, to intuitively engage with technological articulation, utilization, modification, or creation.)

Similarly, following the theory of bricolage, the bricoleur (i.e the ‘creator’) relies on their culturally formed ‘intentional worlds and embodied techniques, that are utilized in the creative interplay of the internalization of externality and in the externalization of that internality. In other words, the mediation of pre-existing system of mental representation with the bricoleurs embodied techniques and creativity to form the creation to be. Hence, from an historical perspective, the processes of ‘bricolage’ constitutes the product manifestation of history that is acquired and transmitted through prior generations and affiliated history, to inform and coordinate the technical and technological performance expressed by the affiliated individual or community. As such, the resulting creation represents both the manifestation of the affiliated historic past, which is filtered through the subjects’ modern

presence of personal uniqueness, ability, skill, experience, and interests (also inspired and engaged by that manifestation), and the re-manifestation of its advanced states and visions for future states. In sum, the process of bricolage and the creations of the bricoleur, represents the material (e.g., physical beings, objects, and structures) and immaterial (e.g. systems of mental representation, knowledge, techniques, customs, ideas, interests, and so on) manifestation of human history. Importantly, the theoretical process of bricolage poses critical considerations to the sovereignty of history making, and in decision-making process in the development course of any given community, sparking critical questions as to whose cultural formation and systems of mental representations are used in directing the course of a given development in a given environmental setting?

As such, we may conclude that any innovation or advancement of technology rely on the pre-existing systems of mental representation that coordinate human perception, interpretation and action, that are based on the lived experiences of prior history of engagements through the generations, and the resulting appropriation, categorisation, or valorisation of objects and structures of the sociocultural and natural environmental settings, which provide the technical, material, and customary means, which preconditions and guides the bricoleur to combine and articulate the creation to be.

The next chapter explores the relationship between conceptualizing the world and making it, through investigating the conceptual introduction of scale and the principles of scalability, and their expandatory and eliminatory implications. As such, the chapter provides a illustrative effort of how components within systems of mental representation may influence and coordinate perceptions, actions, ideas, and design.

Chapter 5.

The Expansion and Elimination of Scale

The concept of scale is a very tangible concept, which by its cohesive precision, orderliness and simplicity, influences human perceptions continually, whether consciously or not. Scale is the concept that seeks to describe relationships in a proportional manner, and while often being the product of observed relationships, the scale itself - and the levels that are defined in

relation to different scales - are social, political and technological constructs (Nightingale, 2020; 347). To scale well is to develop the quality named *scalability*; the ability to expand-, and expand, and expand, without changing the basic elements (Tsing, 2012; 515). Scalability is a triumph of precision design, whether in computers or business development, in the ‘conquest’ of nature, and world making, that set-in motion new ideas and notions about productivity and growth. As such, it is a form of design that has a long history of dividing winners and losers. Yet, such divisions are disguised by blocking our ability to take notice of the heterogeneity of our world; rather, its design scalability allows only uniform blocks to be seen, ready for further expansion in a “great acceleration” (Tsing, 505).

This prominent, and visible speeding up of human intervention on a global scale, has been coined the ‘Great Acceleration’; the ever-expanding flurry of human activity in various interrelated domains, is also descriptive of the metaphor “overheating”, with the exponential growth curve being the symbol of our overheated times (Eriksen & Schober, 2018; 416). A illustrative testament to this overheated expansion, is represented in the increasing energy consumption over the past two centuries. In 1820, the worldwide energy use was on average 20 gigajoules (GJ) a year, two centuries later, the figure stands at 80 GJ. Between 1975 - 2013, the worlds energy consumption doubled, with climate change concerns is only slowing down the pace by the margins (Eriksen & Schober, 2018; 416-417). Yet, there is something disturbingly beautiful about the precision of the scale, even if it clearly fails us. A century ago, people stood in awe at the precision of the factory; today the precision of the computer (Tsing, 505).

Importantly, some of the difficulties in slowing down the earthly interventions of the expansive scale, are rooted in the virtuous commitments and connotations associated with growth and productivity. The introduction of scale and the principles of scalability, facilitated and enabled new heights of growth and productivity to be imagined and carried out, accompanied by the ‘Great Acceleration’ made possible, to uncover the mass unprecedented volume of unrealized potentials to be gained for the prosperity and well-being of mankind. Paradoxically, historicizing scale as a modern logic of growth and productivity, helps to both grasp the naturalized connection between scale and ideas about efficiency and growth, and to denaturalize this connection. Its uniform aesthetics and destructive imprints on earth, services

as a symbolic testament to the planetary limits of its accelerated expansive reach, and the non-amenability of the eliminatory precision-nested scope to our living planet.

5.1 The Narrowing of Vision: Precision-nesting

“Certain forms of knowledge and control require a narrowing of vision. The great advantage of such tunnel vision is that it brings into sharp focus certain limited aspects of an otherwise far more complex and unwieldy reality. This very simplification, in turn, makes the phenomenon at the center of the field of vision more legible and hence more susceptible to careful measurement and calculation. Combined with similar observations, an overall, aggregate, synoptic view of a selective reality is achieved, making possible a high degree of schematic knowledge, control, and manipulation.” (Scott, 1998; 11)

The above cited, may be seen to represent the logic of scalability, addressing the preconditions, purpose, function, and benefit of such ‘narrowing of vision’. In his book ‘*Seeing Like a State*’ (1998), James Scott investigates the implementation of the metric system in early modern Europe to illustrate the significance of such narrowing of vision to state control and standardization, and applies the metaphor of ‘scientific forestry’, to describe the forms of knowledge and manipulation that are characteristic of powerful institutions with their sharply defined interests (1998; 11).

5.2 Standardization of measure: Introducing the metrics

It was not before the introduction of the metrics, that neutral and standardized calculation was made possible. Earlier, the regarded “reliable” format for calculating taxation, required the state to discover the subjects’ economic condition, in order to predict the thresholds for when exactions would be resisted, as tax overexploitation could spark dissatisfaction by flight (1998; 23-24). Earlier forms of measurement often relied on local knowledge, for example, the pint in 19th century France, could differ from .93 to 1.99 litres, depending on location (Paris .93, Seinen-Montagne 1.99). Additionally, local forms of measure where often relational and ‘commensurable’, with predicted measures allowing a range of varying responses, to which the customs of measurement where temporally, situational and

geographically bound (for example, in Malaysia, a likely local response to “how far is it to the beach”, could be “three rice-cookings” - expressing time through local meaningful units, not in minutes) (1998; 25-26). Provided the potential for conflicts in cross-local trades and unpredictable taxation measures, with inconsistencies, and room for manipulation, a tangible, manageable, neutral, standardized and readily available form of measurement was much welcomed. Scott presents three particularly important factors that conspired to make the ‘metrical revolution’: First, uniformity in measures was encouraged by the growth of market exchanges. Second, throughout France, both mainstream opinion and present Enlightenment philosophy favoured a single standard of measure. Third, the French revolution and Napoleonic state building in France and the Empire (1998; 31)

5.3 Scaling value: The Timber for the Forest.

The metrical revolution further inspired new ways to think, particularly in scalable production sectors, such as forestry production, and associated management. To which scientific forestry was fostered as a subdiscipline of the so-called ‘cameral’ science, in efforts to shift from the fiscal management of the state, towards scientific principles that allowed for systematic planning. As such, the “fiscal forestry” which valued and measured the tree in terms of its range of potential purposes, was replaced by an abstract tree that would only represent the volume of extractable lumber or firewood (1998; 13). Similar trends would transmit throughout most, if not all, European enterprises, but of conceptual significance to the European extractive customs of nature, was the shift to only focusing on the aspects of nature considered appropriate for human use, replacing the term “nature” with “natural resources”. Thus, flora and fauna (crops and livestock) were considered valuable, whereas competing plants and beings would be classified as “predators” and “weeds”, while flora and fauna ingesting insects would be stigmatized as “pests” (1998; 13). As such, the narrowing of vision would eliminate, ignore, or eradicate any non-human-appropriate aspects, and strictly focus on aspects considered valuable to humans. This meant clearing all the underbushes (weeds), reduce further contesting, or intervening surrounding species, often down to monocultures which would be planted simultaneously in straight rows, resembling the well-managed army. As captured by Henry Lowood, these new trends...:

“(...) produced the monocultural, even-age forests that eventually transformed the Normalbaum from abstraction to reality. The German Forest became the archetype for imposing on disorderly nature the neatly arranged constructs of science. Practical goals had encouraged mathematical utilitarianism, which seemed, in turn, to promote geometric perfection as the outward sign of the well-managed forest; in turn the rationally ordered arrangements of trees offered new possibilities for controlling nature.” (1998; 15)

Hence, scalable projects banished the free play of diversity from plantations and factories and would gradually shrink diversity beyond its uniform fields to self-sustaining ecologies, like the forest. Its potential use would further be demonstrated by the colonial enterprise and their desire for expansion, which formed the model for modern scalable project design. By the mid-20th century, the U.S government played the role to educate citizens for a role as interchangeable unit of labour in industry, as well as to regulate natural resources, to facilitate their use as scalable raw material. Thus, in the 20th century, projects of training and regulation were spread around the world with great enthusiasm for the unrealized potential it posed to global development. Developing nations of the global south, wanted to remake their citizens and resources for scalability projects. Expansion was advancement. (Tsing, 2012; 515)

As such, the “political ecologies of production” - the production of materials, citizenship, and knowledge would be the norm across states of the Global North throughout the 20th century, and would eventually adopt amongst the Global South, in which unappropriated nature would be diminished as it got in the way of what expansion imagined as necessary for well-being; expansion was progress. Diversity, whether biological or cultural, where the enemies of progress - as their unpredictable and uncontrollable nature promoted potential relationships which could have distorted and transformative effects on any project. Scalable projects, therefore, banish meaningful diversity as project elements must be stabilized, so that adding more elements for expansion would not change the program or project at all. This process is known as “precision nesting”; in which the small is encompassed neatly by the large only when both are crafter for uniform expansion. As such, an important question with regards to current trends, is ‘what legacy has this form of progress left us’? (Tsing, 2012; 506).

In sum, the introduction and conceptualization of scale enabled the narrowing of vision, which brought the valuable into sharp focus (for example, the ‘timber’ of the tree) ready for extraction, whilst eliminating all surrounding and interfering sources beyond the valuable. In turn, scalable projects were easily adaptive to schematic designs, and management would not require much more skills than being able to read. The resulting uniformed plantations and sterile production sites, would be able to expand without changing its design, simply multiply inputs, for relatively greater outputs. Yet, with its seemingly unstoppable ‘Great Acceleration’, it would ignore, exclude, eliminate, or otherwise diminish surrounding biological sources and ecological systems, or put differently, sources of information - of unrealized potentials and complexities. Scalability would not stop for human needs, nor for the destruction of nature, it knows no limits, only expansion, transforming natural complexities to artificial/cultural simplicities.

As captured in this part, scalable projects imply the simplification and uniformization, of an otherwise multifaceted diverse and complex environment, through an “unstoppable” accelerated pace. While bearing clear connections to the experience of the temperate environment (i.e., emerged within the more orderly, readable, less complex and diverse environmental setting), one may critically assert whether its transformative simplicity would impose even greater devastating consequences when applied in a tropical setting, without any regard for the extensive biodiversity or associated local knowledge. As such, the next part looks into the historic event when Henry Ford implemented his corporate rubber-plantation village in the middle of the Amazon rain forest.

Chapter 6.

The Externalization of Scale

Technological Dread and Ford's Amazon Rubber Town

In this chapter we focus on significant historical events of technological transfers towards the developing south, that further illustrates the relationship of conceptualizing the world and worldmaking. This part first presents a brief collection of past events that informs potential significances or impacts of technology transfers, which are followed up by a more extensive outlook on the establishment of Henry Ford's jungle city.

6.1 Technological Dread

In many respects, the history of human warfare cross nations and continents, has divided winner and losers by their respective heights of technological progress and human ability. However, it seems, according to the differences in technological progression between the victorious and defeated, that at certain evolved stages, technological advancements outscore any heights of human abilities. Certainly, this was not as clearly the case when, for example, the Norse Vikings ravished around Europe against opponents with considerable tougher armour and steel, to which history ascribes them with little or no fear of death, and some sense of sturdiness, eagerness, ravagery, or a demon-like possession to their victorious conquers as well as for their suicide-like missions.

Conversely, at the end of the 15th century, the technological superiority of Europe enabled conquers and colonization all over the world, with Portugal serving as a symbol of this superiority, being amongst the weaker states of the Occident, yet able to become, and to remain for a century, mistress of the East Indies. Importantly, the technology of Vasco da Gama and Albuquerque, was first and foremost built by empiricism, and did not bear much inspiration from science (White 1967, p.2). During the Victorian empire, the use of fossil fuels was tied up with political domination from its inception, both within Great Britain and globally. The human ecology author, Andreas Malm, describes how "*a clique of white British men employed steam power as a literal weapon against the best part of humankind, from the Niger delta to the Yangzi delta, the Levant to Latin America*". The fossil-driven technologies of transportation and communication, were instrumental in the expansion of new European

colonies, as in Africa, as well as in the extension of greater control over already existing regimes, such as in India or Southeast Asia. In its extension, the fossil fuel-driven capitalism, required an unjust circulation of materials and bodies; the concentration of wealth in some sites occurred at the expense of others, necessitating authoritarianism in certain sites and moments (Daggett 2019; 132).

Lastly, in what was considered the dirtiest chemical town in the world, Villa Parisi in Brazil, corrugated iron roofs had to be changed every year due to the acidic rain that ate them away, its citizens developed rashes, or “alligator skin”, as the locals called it, and most of the children had asthma, bronchitis, amongst various or respiratory diseases, and skin rashes. The town had become a centre for industrial deployments, which started in 1954 and progressed throughout the boom phase of Brazilian capitalism, including oil, steel, fertilizer, car manufacturer, chemical, and further industrial companies, such as Cosipa, Copegras, Fiat, Pegropàs, Dow Chemicals and Union Carbide, while amongst others. The military government invited foreign companies to produce environmentally harmful products in the town. “Brazil can still afford to import pollution”, said Planning Minister Paulo Velloso at the year of the environmental conference in Stockholm, 1972, claiming that the only ecological problem in Brazil was poverty. “The main cause of disease are malnutrition, alcohol and cigarettes” said the spokesman for Pegropàs, Brazil’s largest oil company at the time... “The people are already ill when they come from Copataò, and if they get worse, they blame it on us. That’s simply illogical,” agreed Paulo Figueiredo, boss of Union Carbide. Nevertheless, on February the 25th 1977, 700 thousand liters of oil, spilled from a Pegropràs oil tank, and flowed into the swamp on which a pile of buildings of Villa Soco stood. Within two minutes, a massive firestorm erupted, rushing through the favela. Over 500 people burned to death, while the corpses of small children were never to be found (i.e., evaporated) (Beck 1992, 44)

The brief collection above, goes to show various dreadful ways in which transferred technologies may contest and alter local settings.

6.2 Henry Ford's Forgotten Jungle City

“If the machine, the tractor, can open a breach in the great green wall of the Amazon jungle, If Ford plants millions of rubber trees where there used to be nothing but jungle solitude, then the romantic history of rubber will have a new chapter. A new and titanic fight between nature and modern man is beginning.” (German Daily in Gardin 2009; 18)

Drawing on the work of Greg Grandin (2009) in his book *‘Fordlandia; The Rise and fall of Ford’s Forgotten Jungle City*, this part will review the efforts made by Henry Ford to establish a rubber plantation town in the middle of the Amazon jungle, named *‘Fordlandia’*, in order to further illustrate the relationship between conceptualizing the world and making it, and how the dissociation between knowledge and place, may turn in disaster.

Back in the early 20th century, the name of the modern industrial revolutionist, Henry Ford, was in many respects synonymous with the ideas of modern life, efficiency and productivity. Also, for many representatives of a hero, or, saint whom heightened the prosperity of the labour force to new levels, through higher wages and increased leisure time to enjoy the fruits of efficiency (Grandin, 2009; 118). The Ford Motor Company was able to introduce such prosperity to the labour force, by abiding to its peculiar methods including maintaining ownership and control of all resources used in production, the obsession of precision to measurement, task divisions, time, and costs, and the anti-expert employee policy enabled by the prior, allowing employees to simply follow the instruction sheet. Yet, by 1925, latex was the one important natural resource that Ford was yet to control, and despite the company’s best efforts to produce domestic of synthetic rubber, they were not able to match the ‘natural’ quality.

Having been made aware of Ford’s interest in cultivating rubber, the Brazilian New York-based consular inspector, José Custódio Alves de Limas, sent Ford samples of Amazon rubber, minerals and some carved-designed hardwood. The Brazilian diplomat had beforehand received permission from the governor of Pará - one of the largest states in the Amazon - to offer Ford “special inducements”, involving tax and land concessions, in the belief that the industrial revolutionary would help resurrect the regional economy, which had been depressed since Brazil lost its rubber monopoly to Asia in 1910 (2009; 118). Long story

short, Ford caught on, the expectations boomed, and in the end, Ford landed a deal giving him 2 ½ million acres of forest.

News that the deal was done, prompted media to speculate on Ford's ability to revive the Amazon economy, hoping that the capital-intensive and high-wage industrial development would overcome the jungle's poverty and backwardness (2009; 174). Ford's entry to the Amazon brought about much excitement amongst locals, even those afar, persuaded by the promises of higher, "American", wages, and prosperous working conditions. National newspaper all over the world covered the story; Ford was bringing "*white man's magic*" to the wilderness, wrote the Washington Post, while Brazilian writers would ascribe nicknames such as the "Jesus Christ of industry", or the "New World Moses", despite Ford's resentment to Jews. Yet, the economy in Brazil had been at a depressed state ever-since they lost their rubber monopoly to Asia, invoking a new wave of nationalism amongst Brazilian citizens and politicians, of which the tensions between the promises of development and the fear of loss of sovereignty was especially acute in the Amazon (2009; 175). The concerns of sovereignty was particularly with regards to the institutional facilities that Ford would implement, including their own autonomous bank, schools, and police force, and the "Americanist" fashion in which these, and the project itself would be carried out. Overall, by the looks of it, critics pointed out that it was as if Ford had the right to run 'Fordland' as a separate sovereign state.

Furthermore, another, less visible threat to the sovereignty of the Amazon, may be ascribed to Ford's peculiar independent ways of doing things by his own accord, as represented in the extreme by his refusal to expertise, whether in hiring or collaborating. As such, having deliberately rejected expert advice, he set out to turn the Amazon into the Midwest of his imagination, and states at the outset of the project "*What the people of the interior of Brazil need, is to have their economic life stabilized by fair returns for their labour paid in cash and their mode of living brought up to modern standards in sanitation and in prevention and cure of disease*". A formula of which had brought great success to Michigan, Ford saw no reasons for why this couldn't be transferred to Brazil, stating that "*There will not be, any great difficulty in accomplishing these things.*" (2009; 35-36). Importantly, one should note that in the early to mid-20th century, the Western civilizations were unfamiliar with what life in the Amazon entailed, relying heavily on reports and documents from earlier colonial expeditions

and other adventurous quests of the past. The sense of unfamiliarity, to one of the most complex and abstract webs of nature on earth, combined with the Western enlightenment culture of orderliness, predictability, cleanliness, advanced technologies, and the ever-expanding scale, contributed to form a devilish representation of the Amazon, as represented in Theodore Roosevelt's account of his expedition: He painted the Amazon as a malevolent place, where things...

"...sinister and evil" lurked in the "dark stillness" of its groves. Ancient trees didn't just fall and decompose but were "murdered," garrotted by the ever-tighter twists of vines. A place largely "uninhabited by human beings," portraying its challenges as nearly wholly natural, even preternatural, captured in gothic depictions of "blood-crazy" fish and "bloodsucking" vampire bats." (2009; 23)

In many ways Amazon represented the opposite of Western civilization; chaotic, unpredictable, filthy, and primitive, untouched by the moral of the 'enlightened' man. Nonetheless, in 1926 Ford's crew began to set-up the area, and would finally have settled ready for business by September 1928, in the village "Fordlandia". Rather than provoking thoughts of morality or mortality, the Amazon tended to instil melancholy in Ford's pioneers, a desire to re-create a bygone America. Ford granted the concession of 10 000km² of land, he spent tens of millions of dollars founding two American towns, located on the east banks of the Tapajós river, 300 kilometres south of the city Santarem, situated in what was presented as "the most fertile and healthy region in the tropical world". Fitting to expectations, during a military visit to Fordlandia, Major Lester Baker described the village as "an oasis, a midwestern dream complete with electric, lights, telephones, washing machines, victrolas and electric refrigerators" (2009; 24). Reminiscent of an typical American town, built with materials from the Ford Rouge Factory in Dearborn, Michigan, the towns were complete with central squares, sidewalks, indoor plumbing, hospitals, schools, churches, manicured lawns, movie theatres, swimming pools, golf courses, restaurants, cafes, bars, gambling houses, brothels, tractors, steamboats, all surrounded by Model T's and A's rolling down their paved streets. Otherwise, of great symbolic and productive significance, the 50meter tall water tower comes to mind, holding 150 000 gallons of water, the tallest construction present in Amazonas to this day, reaching over the forests with the prominent Ford logo marking its

territory, and the towns sawmill responsible for providing lumber for all the construction around, both of which still stands today (see recent picture below).



The water tower seen from inside the sawmill (Palin, 2014).



The water tower peaking up behind the church and some houses near the riverbank (Palin, 2014)



Early picture of the sawmill and water tank with the Ford logo in-tact (Canales 2020)

The American way of life set in full motion deep in the Amazon, what could possibly have gone wrong? In brief, Ford's plans for his company to produce all their own rubber went to disaster, as disease continually destroyed trees, and ill health and aggravated tensions sapped the workforce (BBC, 2014). How could this happen for Ford, the man who "*never fails*", the man obsessed with accuracy, order, and cleanliness, the man obsessed with "*doing things right*" (Gardin 2009;129)? As to be presented, these "western-like" aspirations interactively engaged with the unprecedented diverse complexities of the Amazon, combined with the industrialist conviction that economic success should, by extension, allow capitalists to try their hands "*with equal success*" at "*every other occupation*". As journalist Walter Lippman insisted, "*Mr. Ford*" is "*merely the logical exponent of American prejudice about wealth and success,*" representing the essence of Americanism, with an embodied confidence born of money, and "*our touching belief that the world is like ourselves. Why shouldn't success in Detroit, assure success in front of Baghdad*"? And if Baghdad, then certainly Brazil (2009; 37-38)

Ford's obsession with order, cleanliness, predictability, and effectiveness were prominent. As represented in his words "*One cannot have morale, without cleanliness,*" and his restless

eagerness to effectively ‘get-going’ as described by his friend Charles Lindberg: “*Once they get an idea, they want to start it right now and get action tomorrow, if not today. Their policy is to act first and plan afterward, usually overlooking completely essential details.*”, or as told by the principal manager Charles E. Sorensen “*Don’t forget, when you want to do something, the most important thing is to get started.*”, which also explained the refusal to “experts” as advised by the head of production at the Rouge, “*keep it on the drafting board; they’ll keep on drawing lines as long as you’ll let ’em*” (2009; 199 ; 423-425). Furthermore, the obsession to order and predictability are explicitly presented in Ford’s calculation of the amount of distinct tasks it required to make a Ford car, as part of his quest to reduce the complexities of the production process to their simplest components, divided by the physical and mental capabilities of his workforce: It took 7 882 tasks, of which 949 were ascribed to “*strong, able-bodied and practically physically perfect men*”, 670 could be done by “*legless*” men, 2 637 by “*one-legged men*”, 2 by “*armless men*”, 715 by “*one-armed men*”, and 10 by “*blind men*” (2009; 412).

However, the Amazon rainforest is a place in which 7,882 organisms can be found within a few hectares of forest, it is the most ecological and biological diverse system on the planet, in which the total absence of simplicity represents its complexity (2009; 412). A single tree may serve a home to a massive variety of insects, animals, plants or fungi. Around ten percent of the world’s five to ten million species live in the Amazon, being home to over 2 500 kinds of fish, as well as birds, over 50 000 plants, and an incalculable number of invertebrates, here, a single leaf includes more “*species of lichens, liverworts, mosses, and algae growing on the upper surface of a single leaf of an Amazonian palm than there are on the entire continent of Antarctica.*”(2009; 412). As of 1913, it would take a year to reduce the time required to produce a Model T from twelve hours and eight minutes, to one hour and thirty-three minutes. In the Amazon, however, half of its species are yet to be discovered by various estimates, and even after centuries of observing the region, scientists are still uncertain as to why the leaves of Amazon trees grows green and lush first after the rain stops, as opposed to brown in dry seasons elsewhere, or what this reverse pattern of photosynthesis implies to the broader seasonal distributions of water throughout the seasons. As such, the slightest of interventions, onto the most complex ecological system the world has to offer, could produce changes far beyond Fords’, or his engineers ability to foresee, and much less control: When clearing the forest for rubber, they removed the leaf cover that sheltered the tiny creeks

running to the river, to which the added sunlight enriched the algae which subsequently increased the snail population. These snails were the vectors of the parasitic worms causing the disease schistosomiasis, which affects human bladders and colons, and didn't exist anywhere in the Amazon up until Ford's introduced his scalable project (2009, 412-413).

As year went past without any positive returns to show for, it was in 1931 that the newly deployed manager of Fordlandia at the time, Archie Johnston, engaged the Dearborn office that the sale of milled wood had the potential to cover plantation expenses up until rubber was ready for tapping. However, not all of the trees logged met the requirements to be sold, which required them to burn lots of timber, a waste Ford would typically oppose. Felled trees too soft or hard, piled up and rotted away. Milled wood that were not to be shipped before the rainy season, swelled the Tapajos to the extent that oceangoing cargo ships could be enter the docks at the plantation, while being warped in the humid climate, and heavily infested with termites. According to Johnston, if they facilitated for proper drying and storage, they would have three million board feet of milled, kilned hardwood sold to the American market per year. His program involved a rapid expansion, to run logging roads through 200 000 acres of the Ford concession, felling as many trees as possible. Johnston estimated it would only be a few years until they had 100 000 acres planted with over 10 000 000 trees, producing 54 000 tons of rubber a year (2009; 414-415). Now, success seemed in reach, *"the lumber is there, and we know that the Ford organization can order any equipment and do anything within the power of man,*" Johnston claimed. Yet, according to the Dearborn's office calculations, assuming they could produce 4 000 000 board feet of lumber a year, they would still loose \$12 000. Even more alarming was the rubber issue. From its inception, it was assumed that Ford with his perfected mass industrial production techniques, would produce rubber in a fluent manner. However, Johnston strove to reintegrate the same kind of regimentation to the rubber plantation as Ford did to his factories, which involved spacing trees neatly together, and effectives labour (believed two well-trained men could plant between 160 to 200 trees within eight hours, at two and a half to three minute per tree), yet he could not make the math work, as the pace of planting was altered by further 'uncontrollable conditions', particularly concerned with weather conditions, and the tempo of an assembly line (2009; 415-418).

Unknown to Ford and his crew, there was a reason rubber trees in the Amazon grows wild, scattered among other trees, not in neatly put rows of uniform blocks. First, the tree Hevea is

native to the Americas, which also means its natural predators, South American leaf blight, are also native. The wild spread of trees, typically about two to three per acre, slows down the propagation and spread of fungi and bugs that feed on their leaves. This phenomenon contrasts the rubber planting trends in Southeast Asia, wherefrom the Ford company took its primary external source of inspiration from. *“Rubber, we are informed, is planted successfully in the East under the same conditions as ours,”* responded Johnston, when questioned on whether it was fair to assume that seeds growing in a shady forest somewhere will plant as well in a hot denuded area elsewhere? Not surprisingly, the trees grew sickly, resulting from their neatly tight spacing, scorched soil and reliance on seeds and seedlings of unproven quality, and the non-amenable period of planting (dry season, with high heat), yet they “stuck in the ground anyhow”, and was plowed under. While the Amazon pose a fairly consistent dry and wet season, the exact ratio between sun and rain can differ significantly across the connected regions.

Thus, whilst Fordlandia’s rainfalls measured to 2.2 meters per year on average, which is well within rubber’s tolerance, the variation within this average is considerable. In 1929, recorded 2.6 meters of rainfall on average, in 1930 it was 1.77 meters. Such fluctuation is another key reason why Hevea thrives in the wild Amazon but suffers in plantations: The concentrated and diverse root systems of jungle foliage defend against the heavy wet season erosions, and sustains and regulate the distribution of water during the dry seasons. Even more troublesome, Fordlandia stood at a hilly of flat-topped plateaus with steep declines, which led to deep undulating ravines and hollows. The Amazon Hevea rubber tree did well as long as it was scattered amongst other trees buffered in a dense forest, but without this buffer, the rain and sun would become too powerful: Seedlings at the hilltop proved vulnerable to the wind, whilst the fields were hit by sun like rays through glass, scorching exposed leaves, dead plants, and desiccating the plateaus (1930 was an especially dry year). As such, clear-cutted and free of roots, the 30 plus degrees inclined slopes, gave their topsoil away to the eroding rains, exposing the stony sterile soil, while ravines were flooded due to poor drainage. To compensate, Johnston decided to terrace the slopes and plant cover crops so that it would hold the topsoil and add further nutrients. To Johnstons’ infortune it proved costly, terracing added around \$25 of expense per acre, and the sun dried out most of the ground cover, which then stood at risk to catch fire. ground cover (2009; 418-420).

As a result, the managers of Fordlandia became obsessed with the extreme, varying, and unpredictable weather, as reflected in the weather reports Johnston had issued to Dearborn in his nearly decade tenure:

“The unusual dry weather continues”

“The unusual drought continues ...”

“Crops is very dry and dangerous from a fire point”

“The plantation is exceedingly dry, cover crop in many places burned down...”

“During this period we have had an unusual amount of rain...”

“Everything is bone dry, there has been no rain for approx. 120 days.

“We had three small fires but managed to get them out ...”

“The river draws rain clouds from the plantation ...”

“Due to more rain than usual for this season of the year, we have not made as good progress as we would have liked ...”

(Gardin 2009, 420-421)

Ford’s reluctance to so-called “experts”, had seen Fordlandia run its work from 1928 through 1932 without any expert counsel, with the exception of some odd evidence that suggests the use of some local native naturalists, *mateiros*, who were believed to possess invaluable knowledge about the jungle. The manager at the time, Johnston, was himself a structural engineer who knew little of the land and represented a company that prided itself on having revolutionized industrial production by non-expert, hands-on experience. Like many other managers and directors at Ford, Johnston also felt to the kind of crackpot realism to which decisions that had been “supposedly” justified by observation, were in fact formed by a sense of infallibility born of success, the belief that the company could “*do anything within the power of man*”, as Johnston himself puts it (2009; 421-423).

6.3 Conclusory remarks

In conclusion, Greg Grandin's work on Fordlandia (200) illustrates how the principles of scalability can lead to both expandatory and eliminatory implications. On the one hand, Ford's vision for Fordlandia as a scaled-up model of industrial efficiency was designed to maximize production and profits. On the other, in doing so, it ignored the complex and abstract nature, and persisting cultures in the Amazon rainforest, resulting in a failed experiment that ultimately collapsed under its own weight. This case highlights the need to approach scale with caution and awareness of its potential consequences. While scale can bring about significant benefits in terms of efficiency and productivity, it can also lead to unintended consequences if not properly aligned with local contexts, relativities, and realities. The expandatory and eliminatory implications of scale must be carefully considered, with a focus on balancing the benefits of scalability with the need for sustainability and sensitivity to local environments and their relativities.

As we move forward in an era of increasing globalization and technological advancement, the lessons of Fordlandia serve as a reminder of the importance of taking nuanced and critical approach to scale, one that recognizes its potential benefits and drawbacks, and seeks to harness its power in a way that is responsible, ethical, and sustainable. Otherwise, scalability spreads - and yet its projects remain continuously abandoned, leaving ruins. (Tsing, 2012; 506)

Chapter 7.

Formation of Institutions and Power

In this chapter, we will present the formation of power and institutions, and the a brief summary of the content in the World Bank report, 'The Innovation Paradox', introducing the content and context of the following analysis conducted in the next chapter.

7.1 The Formation of Institutions

As institutions may take on a variety of forms, it has been proven difficult to land on a common definition of the term. In this study, the primary focus remains on global institutions, with institutions being defined as:

“Institutions are the conventions, norms and formally sanctioned rules of a society. They provide expectations, stability and meaning essential to human existence and coordination. Institutions support certain values and produce and protect specific interests.” (Vatn, 2015, p.17).

The above definition describes institutions according to both their *‘form’* and *‘what they do’*, with emphasis on its influence to people’s attitudes, behaviours, customs, conducts, interests, meaningfulness, values, well-being, and coordination, which aligns well with the scope of this study in observing the *power of knowledge*. Furthermore, the body of critical institutionalism (CI) will be applied whilst exploring the institutional reports, emphasizing how institutions dynamically mediate relationships between people, natural resources and society. The focus of the CI approach aims towards the complexity of institutions intertwined in everyday social life, their historical formation, the interplay between formal and informal, traditional and modern arrangements, and the power relations that animate them (Clever & de Koning, 2015, p.1).

Institutional bricolage is the process by which people, both consciously and unconsciously, reassemble and modify institutional arrangements using available materials and resources, regardless of their original purpose. This process involves the modification of existing arrangements and the creation of new ones. Institutional components from various origins are constantly reused, reworked, or transformed to serve new functions. These modified configurations of rules, practices, norms, and relationships are given meaning and authority. Such refurbished arrangements are a necessary response to everyday challenges and are embedded in daily practice. Bricolage is a dynamic process that exhibits varying levels of institutional visibility and functionality (Clever & de Koning, 2015).

To illustrate the bricolage process; in the process of reworking existing institutional arrangements, actors engage in innovation, while being constrained by their available resources, social context, and perceived legitimacy. As de Koning (2011) adapting Lévi-Strauss, argues, the bricoleur can transform an umbrella stand into a lampshade, but cannot turn the same stand into a space shuttle. Over time, the layering of these arrangements, changes in policy environments, and shifts in political and social discourses ensure that the

mechanisms that form institutions can be constructed from various sources. These institutions, as a result, are a patchwork of both new and reused elements, encompassing habitual practices, well-established routines adapted to new circumstances, and organizational arrangements that are either invented or imported from elsewhere (Cleaver & de Koning, 2015).

In short, institutions form relationship between people and structure human interaction. During our upbringing we learn about the institutions of our society, and eventually embody its teachings as to be able to act and coordinate ourselves according to the customs presented in society by the institutions. By large, institutions represent “the way things are done” in any given society (Vatn, 2015, p.77). In this sense, institutions may be considered essential, if not fundamental, to human existence, as illustrated by Daniel Defoe through the tale of Robinson Crusoe: Who had lived alone for many years on an isolated island, yet Crusoe was able to carry on with his life, but he was not a self-contained individual. Rather he was an individual who continued to live life according to the institutions he had adopted in England before being shipwrecked. Significantly, what we ascribed as particularly human about Crusoe, was the institution of which he was a carrier, the social constructs which gave meaning to his life and formed his character and personality. Accordingly, institutions are not just external rules, they also form the individual as they learn about the expected or meaningful thing to do in various situations (Vatn, 2015, p.79)

According to the definition stated above, institutions are composed by three aspects: *conventions, norms, and formally sanctioned rules*. First and foremost, conventions is the ‘meta ‘ordering that provides the structure which allows-for and enables the exerted human formulation of communication (e.g., the syntax, semantics and taxonomy of language), measurement (e.g. scale, time, length, temperature, value, pressure, etc) coordination (directions; north/south, latitude/altitude etc;), social conducts (e.g. types of food utensils, greetings, dress codes, accepted speaking volumes, etc) and codified perceptions (i.e, models of interpretation of physical and social ‘facts’). Secondly, ‘norms’ combines certain situations with *required* act(s) or solution that associates or supports an underlying *value*, with the intent to inform and prescribe certain definitions of how to act or behave in certain situations, and how to treat each other. Lastly, formally sanctioned rules, are simply put ‘formal rules’,

that combines certain situations with *forbidden* or *required* acts, and are governed by a third-party sanctioning (e.g, the state, organisations, etc) (Vatn, 2015; 81-82).

In this thesis, the institution concerned is The World Bank, the global institution which is comprised by five constituent institutions; i) the International Bank for Reconstruction and Development (IBRD); ii) the International Development Association (IDA); iii) The International Finance Corporation; iv) the Multilateral Investment Guarantee Agency, and; v) the International Center for Settlement of Investment Disputes (Chossudovsky, 2023). In this context of such a global institution that is prominently involved with international development, can, as argued by Duffield (2006), be seen as a form of governmentality.

As expressed by Foucault, the ability of society to protect life is a key characteristic of the developmental stage of a given society, as well as a modality through which power can be exercised. For instance, organisations such as the World Bank and IMF becomes the purveyors and constituting spaces for normative notions of technology transfers in development, to which their own technical knowledge builds upon calculative processes that are promulgated through states (i.e returns by national governments), banks and so on. Hence, such organisational institutions are ultimately positioned as active producers or agents of knowledge within the nexus in reference (the technology-development nexus), while also constituting their own legitimacy in shaping the language of development (Raghuram 2009, 108-109). Unravelling such modalities around which discourses of technology and development are being produced, and framings of issues and problematizations perceived, is critical for unsettling debates and making the organisatory grounds less normative.

As pointed out by Foucault, this form of visibilisation and calculation is central to the shift from concerns over the individual to the population, or in other words, from sovereignty to biopolitics. Furthermore, he remarked that during the end of the 17th and early 18th century, rapid growth in populations and industrialisation processes meant that disciplinary mechanisms over individual bodies were supplemented by regulations that centred not upon the body but rather the populations, trying to control and modify events that may affect the overall equilibrium of the society as a whole: “ *Both technologies are obviously technologies of the body but one is a technology in which the body is individualized as an organism endowed with capacities, while the other is a technology in which bodies are replaced by general biological processes* ’ (Foucault 2003; 249).

As such, technological transfers are not just the transfer of net positive goods, but also implies the transformation of individual organisms, and related capacity building. Therefore, the argument made by Callon and Law for re-imagining the migration-development nexus, also applies here.

What is important is that we make sure that calculation does not get itself attached to a narrow understanding of space-time framing. The character of comparability, and manipulability, this needs to be left open. At a guess, for instance, judgment is often distributed across time and geographical space. It flows, unfolds and reflects local specificities. It cannot be drawn together at a single common sense place and time.'
(Raghuram 2009; 113-114)

Accordingly, this notion implicitly sparks up the significance of knowledge and experience of local institutions and communities to capture the environmental and cultural relativities to successful technological innovation, advancement, or adoption.

7.2 The Formation of Power/Dominance

The concept of power is central to understanding the ways in which institutions and individuals interact with one another. Foucault's (1980) theory of power as the production and reproduction of knowledge, rather than a static possession, helps shed light on how power operates in a society. In this view, power is not something that one group has and another group lacks; rather, power is something that is constantly being produced and reproduced in social relations.

Furthermore, Foucault (1977) argues that power is not simply repressive, but also productive. Power produces certain forms of subjectivity, and it does so through the use of discourse. By shaping the ways in which people think and talk about themselves, power produces subjects who are willing to submit to certain forms of authority (or knowledge).

The idea of power as productive and its relationship with knowledge is particularly relevant to understanding the (re)production of dominance through the implications of scale. As Vatn

(2005) argues, institutions and individuals often see the concept of scale to further their own interests. By scaling up certain practices or technologies, they can expand their influence and consolidate their power. This can have eliminatory implications, as those practices or technologies that are deemed less profitable or efficient are left behind, as well as for associated knowledges that are no longer compatible to the newly introduced and can thus result in the exclusion of certain groups or individuals.

This process is further reinforced by the global institutions such as the World Bank, which can't act as purveyors and constituting spaces for normative notions about the use of scale in technology transfer. As Escobar (1995) argues, these institutions often promote a particular set of ideas about development and progress that are rooted in Western, neoliberal and capitalist ideology. In turn, this facilitates for a hegemonic discourse around development that reinforces dominant power structures and marginalizes alternative perspectives.

In sum, Foucault's theory of power and knowledge provides a useful framework for understanding the ways in which power operates in society, and how it is produced and reproduced through discourse. This understanding is essential to analysing the (re)production of dominance through the implications of scale and the role of global institutions in promoting certain norms and values, that are represented in the underlying cognitive structures of discourse.

7.3 The World Bank: The Innovation Paradox

In 2017, drawing on available data and meta-analyses, the World Bank released a report on the occurring trends for innovative produce, technological advancement and -adoption across developing countries, which emphasizes that despite the vast potential returns to innovation, developing countries do far *less* innovation, measured along a variety of dimensions, than advanced countries. Hence, this observed occurrence was coined the "*Innovation Paradox*". This section focuses on mapping out the ideas, assumptions, methods, and discourses from the report addressing developing country challenges, and the application of advanced country experiences to inform developing country solutions and direct policy, as to represent the knowledge pool of "global" institutions. The viability of this representation is reflected in the range and variety of global institutions and actors represented in the report, and the efforts

made in presenting the common analytical traditions applied across global agencies in dealing with related issues, including science, technology, and innovation (STI), research and development (R&D), National Innovation Systems (NIS), and Schumpeterian catch-up and more (World Bank, 2017).

The report poses that the lack of investment in innovation despite vast potential gains in efficiency, quality, and diversification, and the lack of effective policies to facilitate these returns, are suggestive of existing barriers to the flow of knowledge and effective governance, which leads the authors to examine the three following barriers (WB, p.4). First, i) weak firm capabilities to undertake meaningful innovation, ii) the general absence of critical innovation complementarities, and iii) weak government capabilities to manage increased complexity and breadth of the innovation policies implied in the previous two.

The method, objectives and aims of the analysis are as follows. The analysis is conducted by a sociocognitive approach of critical discourse analysis (CDA), to analyse the ways in which dominant mental models of the discourse expressed, is used to construe reality and the issues within that reality, to convey meaning, and in the (re)production and legitimization of dominance (advanced world), to uncover underlying sociopolitical structures (such as ideology) to which dominance is exercised through discourse in the report. In doing so, the analyses are conducted in line with the following problem statement; that ‘the ideas, principles, knowledge, and research that guide the global policy formation on technology transfer to developing countries, may produce or reproduce skewed power relations, through the dominance of knowledges associated with the advanced world, and by the exclusion or elimination of associated local knowledge, interests, abilities, and resources. Furthermore, the analysis presumes the notion that the associated global institutions, and particularly the World Bank, abides to principles that reflects the conceptual narrative of “creators and adaptors,” to which the advanced world is expected to, and responsible for directing, defining, creating, and implementing the means of progress and advancements, which the developing world are expected to adopt and adapt. The analysis attempts to capture identified discursive features (e.g., metaphors, idioms, rhetorical devices and other linguistic and stylistic features) that are used to construct meaning and power relations, and discursive strategies (e.g., framing, legitimation, and persuasion) that contribute to the construction and reproduction of power relations. In addition, emphasis will be given to the social and

historical context in which the text was produced, including the ideological, political, and cultural influences that shaped the discourse. The aim of the analysis is to identify the power relations that are constructed and reproduced in the text, including the actors and institutions that are involved and included in the discourse, to analyse the implications of the discourse for power relations and how they relate to dominantly held knowledges, particularly ideas and principles associated with the “scale” and “scalability”.

Chapter 8.

Analysis: Creators and Adopters

8.1 Critical Sociocognitive Discourse Analysis of The Innovation Paradox

Prominent multilateral global agencies or institutions, such as the World Bank, the United Nations, and other international development, finance and investment agencies, are by and large responsible for guiding, framing, and determining the policies, and the appropriation of concerns and conducts in the global development agenda. The World Bank has a long history of *only* funding projects if they were already scalable, i.e. if the projects could expand to other areas without changing project elements (Tsing, 2012). Additionally, critics of the World Bank particularly emphasize how their ‘*structural adjustment loans*’ are mechanisms for forcing free market economies on countries through coercion, to which countries with large debts agree to the bank’s package of legal and economic reforms in order to be lent money (Abbasi, 1999).

As an example of this, the main theme of the analysed report concerns itself with the low *adoption* rate across the developing world in adopting advanced-world innovation and technology, despite the vast returns. This unrealized potential, the authors coin “the innovation paradox”. The issued topic already implies notions of dominance, by framing development in the developing world as best done through the guidance and adoption of advanced-world creations and epistemics, reflecting the “creators and adaptors” narrative, to which the “advanced world” is expected and valorised to create the means for progress and advancement, to which the “developing world” should adopt and adapt. Similarly, this narrative parallels remarkably well with Dos Santos notion of dependence, to which “*the*

economy of a country (dependent) is conditioned by the development and expansion of another economy (dominant) that can expand and be self-sustaining, whereas the former are limited to perform only a reflection of that expansion” (1970; 231). Importantly, beyond the examined text, the analysis refers to “innovation” and “technology” as “creations” to emphasize the creative exercise of knowledge, techniques and abilities that are representative in the process and performance of technological creation. As such, the intent of this analysis is to explore the prevalence of dominance, in terms of underlying mental representations of knowledge and ideologies, accounted for in terms of their sociopolitical functions to the (re)production of dominance. This involves description of discourse structures used to describe or present the issue, actors, interests, and ideological descriptions, and to capture the underlying cognitive structures (models for mental representation) that are implicitly expressed through affiliated norms, values, attitudes, and ideology of certain epistemic communities. The respective models of mental representation are identified by capturing texts of discourse that represents matters of appropriation, valorisation, and categorisation, and relate these to other structures through theory.

8.2 Introduction of topic: Framing and problematization

When prominent Global Institutions such as the World Bank release extensive reports on significant global issues, they have publicity privileges that reaches out to a broad international audience, while also having instrumental privileges in guiding and framing related policies. Therefore, the way in which the issued topic is introduced and framed, stimulates and conditions the way in which it is perceived, interpreted, associated, validated and “instantiated” in the construction of personal mental models, as well as in the broader sets of socially shared knowledge (Wodak & Meyer, 2015; 68). The introduction of issues bears the primary functions to validate the topics of concern or interest, and the appropriation of presented response. Negative presentation of issues functions to transmit concerns, compassion, and urge calls for solving the issue to diminish suffering, while also bearing the risk of rendering the concerned subjected parties as vulnerable or, at worst, failures. In turn, this further valorises presented solutions as a remedy of suffering, and the authors or organization as guides for alleviating suffering, which enhances their credibility and legitimacy. As such, we are particularly concerned here with the positive or negative emphasis in the framing of topic (definitions, valorisation, appropriation, and

categorisation/identification),and their relation to the (re)production dominance.

- (1) *“The centrality of innovation to the rise of advanced economies was captured by David Landes’ classic metaphor of The Unbound Prometheus, referring to the Greek god who released the power of fire to mankind. Defined as the introduction of new products, technologies, business processes, and ideas in the market, as well as the invention of new ideas, innovation drives Schumpeter’s creative destruction process, underlies modern growth theory, and is the critical ingredient in historical accounts of how countries achieve prosperity.*

- (2) *In turn, the gains from Schumpeterian catch-up afforded to follower countries— arising from the radiation of ideas, products, and technologies to developing countries—represents an externality of truly historic proportions that should rise with increased distance from the technological frontier. Yet Prometheus remains bound in developing countries. This study documents that, despite the vast potential returns to innovation, developing countries invest far less, measured along a variety of dimensions, than advanced countries. Firms and governments appear to be leaving billions of dollars on the table in forgone productivity growth and lost competitiveness. Indeed, policy advice to move into production baskets thought to be more growth-friendly misses the critical point that countries unable to innovate in their present industries are unlikely to do so in new industries. “ (Cirera & Xavier, 2017; xxi ; 1)*

First, the topic is introduced by valorising ‘*innovation*’ through the metaphor, ‘*The Unbound Prometheus*’, to which the ‘*Greek God*’ that provided humans with the power of fire, to capture the ‘*centrality of innovation*’ to the ‘*rise of advanced economies*’. In effect, the use of metaphors may relate or associate to other metaphors or descriptions in the same discourse and are important as they can radically change the way scientists and following readers understands the operation of a system (Wodak & Meyer, 2015; Payne & Cameron, 2013). Herein, ‘*innovation*’ becomes connoted with a “God-like” value (i.e. the fire by Prometheus), that has been essential in ‘*the rise of advanced economies*’ by effectively making use of such “God-like” ‘*power*’, implicitly indicating that non-advanced economies are not as “God-

like”. The central theme ‘*innovation*’ is defined in terms of the ‘*creative destruction process*’ (Schumpeter, 1942), and ‘*modern growth theory*’, and puts particular emphasis on the *introduction and invention of new ideas* (i.e., invention only concern ideas). Of the two interlinked capitalist theories, the former describes the process over time wherein innovations replace existing, obsolete alternatives (Adler, 2019); whereas the latter connote that the human desire and their unlimited wants fosters ever-increasing productivity and economic growth, assuming that gross domestic product increases due to humans pursuit of profits (Liberto, 2021). Accordingly, this notion of innovation is presented as the “*critical ingredient*” for achieving “*prosperity*”. As such, “*the critical ingredient*” for ‘rising’ to “*prosperity*”, is the adoption of “advanced-” world *products, technologies, business processes, and ideas*, and the elimination of existing *products, technologies, processes and ideas*. In other words, the ‘adoption’ of others ‘valuable’ (narrowing of vision) creations and knowledge, and the elimination of their existing, obsolete creations and knowledge. The topic is here appropriated through emphasizing the “critical” and “central” feature of innovation, and by the valorisation of “*the rise of advanced economies*”, by descriptions of “*prosperity*”, “as undisputed associated functions accompanied by much desired outcomes.

Second, the introduction of the topical issue (i.e. the innovation paradox), first represents the gains from adopting innovation in terms of “*Schumpeterian catch-up*” (i.e. the “creative destruction process”), as “*an externality of truly historic proportions*”, to the “*follower*”, “*developing countries*”. Such valorisation of the effect (“*truly “historic proportions*) of developing countries to adopt (‘*Schumpeterian “catch-up”*’, “*follower countries*”) advanced-world technologies, both legitimizes and exemplifies the ‘creators and adaptors’-narrative, through the positive connotations and thus association of outcomes, and the description of subjects as *followers*. Combined with the God-like quality, the critical and central nature of innovation to “prosperity”, and the seemingly ‘uninventive’ nature of developing countries (“*follower countries*”), a moral quality also arises; the advanced-world virtuous effort in expanding their superior creations for a more prosperous world for those who do not create sufficiently. “*Prometheus remains bound in developing countries*”, thus the advanced world must act to ‘evangelize’ the developing world with their “*fire*”.

Finally, the issue present itself;” developing *countries invest far less*” in innovation ... “*than advanced countries*”, which results in “*firms and governments ... leaving billions of dollars*

... *in forgone productivity growth and lost competitiveness.*”. Put differently, developing countries are missing out on “*gains ... of truly historic proportions*” as “*firms and governments*” are not adopting enough advanced-world creations. Lastly, the report claims that policies advising a move towards “*production baskets*” (i.e self-sufficient production), “*indeed*”, do not grasp the fact that “*countries unable to innovate in their present industries are unlikely to do so in new industries*”. However, the claim makes no reflexive distinction between innovation through *production baskets* and through *adoption*, even though they imply significantly different processes (e.g., creation versus adoption) and relies on different sets of abilities (e.g., creativity versus imitation). In turn, the report risks rendering the developing world as innovative, reactive (as opposed to proactive), and reluctant (not adopting technology, despite the promise of prosperity).

Thus, the topic is framed in accordance to advanced-world experience of the centrality of “*innovation*” in their “*rise*” to “*advanced economies*”, as enabled by “the creative destruction process” and underpinned in “*modern growth theory*”, and the observation that “*developing countries*” are not doing enough to realize these high potential gains. According to the definition of “*innovation*,” developing countries are represented as innovators through *adoption* as “*followers*”, whereas a advanced countries innovate through *creation* as prosperous, fire-powered, advanced economies. Following capitalist theories ascribing to ever-increasing productivity and growth resulting from maximizing individuals, that continuously eliminates existing products and services for introduced new ones, the topic is framed through a narrative resembling “creators and adaptors”, in which the creations (e.g. innovations and technologies) are posed by the creators (the advanced world), and afforded to the adaptors (developing world), aiming for prosperity.

8.3 Group Descriptions: Mental representations of the Advanced and the Developing

As informed above, the topic is situated around two broad groups in which members of the ‘*advanced*’ world represents the ingroup and members of the ‘*developing*’ world the outgroup. Accordingly, the framing of the topic may have critical implications to the way in which the in- and outgroups are further represented and issued within the report and beyond, by enabling and activating certain associations linked (relationship) to certain nodes (concepts) within a system of mental representation, that coordinate and direct further processing of information. This is a vital point, as “*we do not experience the world as raw*

data. When our consciousness experiences the world, the unconscious discarding of sensory information has long since interpreted things for us. What we experience has already acquired meaning before we become conscious of it” (Nørretranders, 1998; 187).

Nonetheless, in this section the analysis will focus on the group description, of features, associations, links, and concepts, in order to identify the underlying structure of mental representation exhibited. First, an account will be made for the ‘*advanced*’ group, followed by the ‘*developing*’ group.

(3) *“The adoption of new processes and products by firms constitutes a central dimension of productivity growth and hence of economic development. The fruits of innovation - Mokyr’s (2002) “Gifts of Athena” - have powered the advanced countries to levels of prosperity unimaginable even a century ago. And, as Schumpeter noted, the ability of lagging countries to tap into a now massive stock of global know-how and technical knowledge - to be able to adopt what has already been invented - is a potential transfer of wealth from rich to poor of historic proportions. Yet relatively few developing countries have proven able to leverage this stock of knowledge to achieve sustained catch-up with advanced countries.*

(....) These low rates of technological adoption represent a missed opportunity for reducing global poverty and inequality of equally historic proportions. Indeed, the apparent reluctance of firms and governments to pursue these opportunities in an aggressive and sustained manner poses an “innovation paradox”: low investment in projects that by some measures would yield returns exceeding any other investment that poor countries could consider. “ (p.183)

Herein, the “*advanced countries*” are ascribed with several further descriptions, such as being “*powered*” to previously “*unimaginable levels of prosperity*”, they are “*rich*”, and evidently capable accumulators of knowledge (intelligent). Also, they are opportunistic, as evident of successful adoption of new processes and products, in contrast to the “*missed opportunity*” of ‘*developing countries*. Conversely, developing countries are described as “*lagging countries*” (e.g. slow, ineffective), “*poor*”, and as incapable accumulators of knowledge (unintelligent)(“*relatively few developing countries have ‘proven able’ to leverage this stock of knowledge*”). Additionally, they are described as non-opportunistic (“*missed opportunity*”)

through “low” adoption rates that would have reduced “*global poverty and inequality*” of “*historic proportions*”, an outcome ascribed to “*the apparent reluctance*” of developing countries to “*purse these opportunities*”. In short, the advanced countries are described as ‘powered, intelligent opportunists, with stupendous levels of prosperity and wealth’, whereas; developing countries are described as ‘poor, lagging, non-opportunistic, unintelligent, and reluctant’.

Beyond the examined text, there are some further descriptions posed by the report worth mentioning: Advanced countries: Innovative (creator activity), competent (associated with highly educated labour (p.129), high quality of managerial-, firm-, and technological-capabilities and -practices), high effectivity and productivity; leading, highly developed countries (frontier), and mature. Developing countries: Followers, ‘moving countries’ (towards the frontier), low-income, emerging economies, underdeveloped, “non-frontier” (technologies). In sum, the advanced are presented as both the creators of prosperity and competence, whereas the developing countries may be conceived as obsolete adaptors.

Figure 4.1 and 4.2 provides a very basic illustration of how these descriptions activates themselves in the underlying cognitive structure of mental representations, only applying those descriptions addressed in this section. Each stimulus (Red, yellow text) trigger immediate links to primary associations (turquoise, yellow text), and their further interconnections in the associative network of concepts (nodes) within our system of mental representation. The closer the node appears to the stimuli, the stronger the relationship. Ultimately, associative networks are a product of the encoding of categories and the consolidation of connoted values acquired through experience, which are then stored in the cognition in which they are retrieved when associations are called upon. Typically, such models are significantly more complex with greater emphasis on the strength of relationships and interconnections, but given the limited information presented in this section, and time constraints, this example will sufficiently demonstrate the fundamentals of content and activity. Importantly, these associative networks.

Fig 4.1. Associative network of ‘The Advanced World’

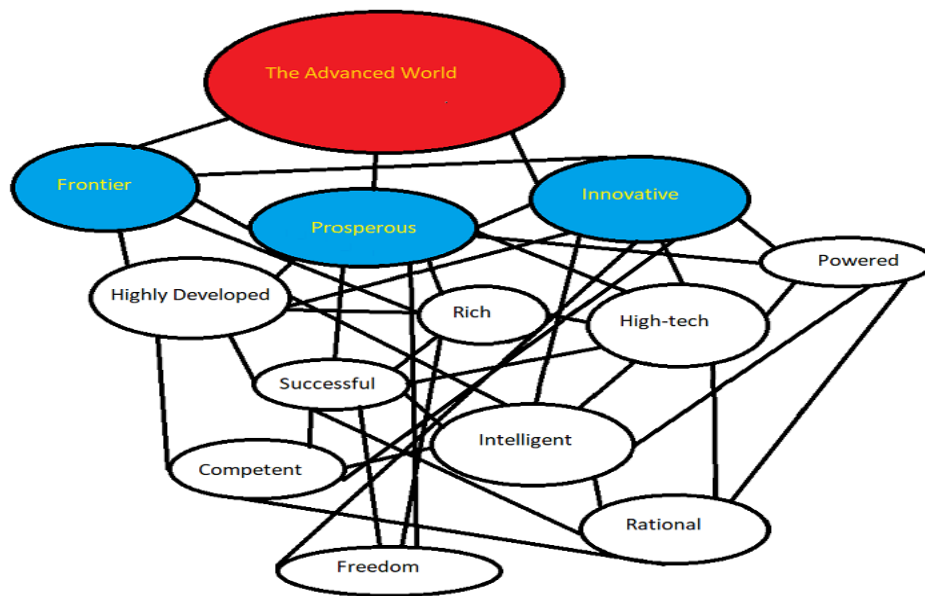
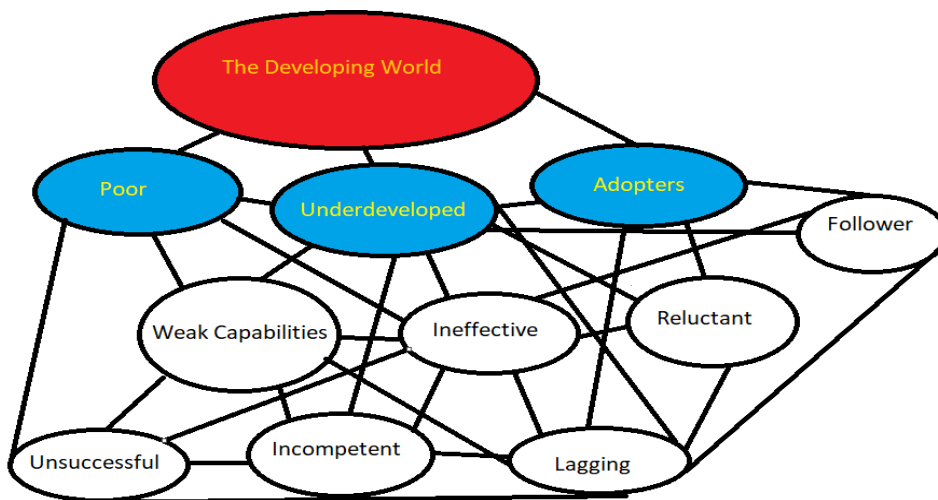


Fig 4.2. Associative network of 'The Developing World'.



8.4 Ideology: The Neoliberal Expansion and Elimination

Whereas the previous parts have been concerned with the presentation of topic (the discursive framing of issue) and group descriptions (system of mental representations), this part is concerned with the ideological expressions in the discourse of the presenting organization, The World Bank. As already captured in the previous sections (text examples 1-3), the framing and understanding of the topic, issues, and aims expressed in the report are underpinned by a theoretical adherence to the *creative destruction process* (1-3) and *modern*

growth theory (1), and emphasises concerns related to *productivity growth, global poverty and inequality, adoption rates, low investments, the innovation paradox*, and so on, which are indicative of a neoliberal economic ideology, that prioritizes market expansion, effectivity, and innovation. Yet, the World Bank is also a massive global organization serving global interests, and has been, in company with the International Monetary Fund (IMF), displayed as ‘Guardians of Global Capitalism’ (Monibot, 2003; Tabb, 2001; Rosalsky 2019), or similarly. Therefore, we expect to capture expressions in the report reminiscent of *neoliberalism* and *global capitalism*.

(4) *“Productivity growth is critical for accelerating development. Poverty across the globe cannot fall unless poorer countries raise their per capita income. Some of this income growth will come from investing in better physical and human capital. However, we know that a significant share of income growth derives from productivity growth, an specifically from innovations that render physical and human capital more productive.”* (2017, xi)

(5) *“Perhaps one of the most valuable external sources of capabilities is participation in GVCs (global value chains). GVCs are complex production systems made of multiple firms located in different countries linked together by multi-layered sourcing networks and fast-evolving, technology-enabled business models. Firms in such production networks ... enjoy significant opportunities for transferring capabilities and absorbing foreign technology and innovation. Firms embedded in multinational production earn higher returns on innovation, face lower costs for R&D, and exploit scale better than firms selling to domestic markets.”* (2017, 100-101. Bracket added by author)

The fourth example is the initial foreword of the report and presents arguably the most “basic” formulation of an issue within the report. In turn, such simplifications drawn from an otherwise complex and abstract reality are often representative of foundational or fundamental concerns, and herein indicative of ideological expressions in forms of activities (*“investing in better physical and human capital; “we know” that a significant share of income growth “derives” from ‘productivity growth’*) and interests (*‘Productivity growth is “critical” for accelerating development’ innovation that renders physical and human*

capital more productive). The emphasis (‘critical’) on growth (productivity, income), focus on ‘*per capita income*’ across the globe, ‘*innovation*’, ‘*physical and human capital*’, could reasonably be seen as “indicative of a neoliberal economic ideology, that prioritizes market expansion, effectivity, and innovation,” aligned with a global concern.

Similarly, the fifth example explicitly shares such a global concern, emphasizing participation in global value chains as possibly (‘*Perhaps*’) ‘*one of the most valuable external sources of capabilities*’ to which participants of such GVCs ‘*enjoy significant opportunities for transferring capabilities and absorbing foreign technology and innovation*’. As such, the external solution to increased production growth (interest) and capabilities (interest) to reduce poverty (activity) across the globe (Interest), is best done through global participation amongst ‘*countries linked together by multi-layered sourcing networks and fast-evolving, technology-enabled business model*’, in which the participants (*firms*) ‘*earn higher returns on innovation, face lower costs for R&D (research and development) and exploit scale better than firms selling to domestic markets.*” In sum, the concerned interest (increased productivity growth, capabilities, capitals) and associated activities (Global participation in GVCs, innovation,) expresses an ideological formation that values the expansion (‘*fast-evolving*’, ‘*exploit scale*’) of global of markets (GVCs), and the adoption of affiliated products (technologies), services (*multi-layered sourcing networks, business models*) and ideas (innovation, technology; ‘*better than firms selling to domestic markets*’), rather than the expansion of and positive engagement with ‘*domestic markets*’. Thus, the norms and values expressed is reminiscent of a neoliberal and global capitalist ideological formation.

8.5 Argument: Creation and Expansion, Adoption and Elimination

In this final part of the analysis, I will attempt to argue for the prevalence of dominance posed by the examined text, and its implication to the (re)production of dominance between the groups concerned (advanced- and developing world). Before the argumentation I will briefly address how we may understand power and dominance according to the examined text.

Power and domination are herein defined as a specific relationship of control (e.g. global and national development) between social groups (advanced and developing) or organizations.

On the one hand, it concerns the control of the actions (and hence discourse) of dominated groups and their members, and, on the other, control of their personal and socially shared

cognitions - such as systems of mental representation, knowledge, attitudes and ideologies. Importantly, discourse plays a crucial role for the exercise of power. Like any other social action that may control dominated groups and their members (e.g., by laws or commands), discourse also expresses social cognition, and may therefore ‘manage the minds’ of other groups and fellow members. Material power resources such as capital, technology, or property, and symbolic power such as knowledge (e.g. how to innovate), status (e.g. advanced creators, developing adaptors), and access to public discourse and domains, are the basis for group power (Wodak & Meyer, 2015; 71). In defining the crucial notion of power, we conform to the three main components of the discourse-cognition-society triangle; the social component defines society in terms of controlling groups and organizations at the macro level (e.g. The World Bank, Advanced- and developing group), and members and controlling interactions at the micro-level (e.g. the authors, readers and subjected members); the cognitive component are concerned with power in terms of the personal mental models (e.g. situation and context models - remember to add), shared systems of mental representations (e.g. semantic associative networks of appropriation, valorisation and categorisation), or, the shared knowledge and ideologies of groups and organizations and; the social component, in terms of the discourse of members of groups or organization as forms of controlling interaction, as well as expressions and conducive of underlying personal and social cognition (2015; 72). Accordingly, ‘dominance’ thus occurs when the interests or activities are controlled by and aligned with the powerful group.

Based on the examined text and the organizations’ emphasis on advanced world creations, and global expansion of these creations as the critical valuable mean; and developing world adoption, and elimination of existing, obsolete alternatives (e.g. the creation destruction process) as the central essential issue, and solution, we may capture a certain formula.: creation (products, services, knowledge, ideas etc) and expansion (of the creation) = domination, or adaption (of expanded creation) and elimination (of existing, “obsolete” creations) = suppression. More precisely, the World Bank as an organization, and publisher of the report, effectively provides a moral (e.g. to reduce global poverty) and intellectual justification (e.g. advocates for prosperity, global capitalism, and the recognition of ‘*unrealized potentials*’) for group-based oppression and inequality (e.g. creators and adaptors), and organise individual (e.g. authors, affiliated peers, audience, and subjects of the developing world), group (e.g. advanced- and developing world), and institutional (e.g. the

World Bank and global agencies, firms, and governments) behaviour (i.e. we create, they adopt) in ways that sustain dominance (advanced-world creators and creations persists and takes place over obsolete developing-world creations) and leads the subordinates to collaborate with dominants in the maintenance of oppression (i.e. developing world reaps the benefits of advanced creations, while the advanced expands and incorporates their market interests and associated systems of mental representations) (Pratto, Sidanius, S. Levin 2006; 275-276).

According to the discourse-cognition-society triangle, dominance is first exercised by the dominant group framing the issue in terms of severity, concerns, and solutions, in other words determining the interests of concern and the activities and means to solve them, which are categorised, appropriated, and valorised according to their own system of mental representation. Secondly, as presented in the associative network, the group descriptions ascribe solely positive social values to their own advanced group (such as rich, intelligent, prosperous, competent), and primarily negative social values to the developing group (such as weak, poor, incapable) (note that some positive values are ascribed beyond the examined text), which may render the developing world as helpless without advanced-world interference. Thirdly, the indicated ideological formation is underpinned by interests and activities of extensive expansion and elimination, which allows for swift take-overs.

In sum the (re)production of dominance and suppression occurs as the varying creative potentials across the finite sources for inspiration (nature, humans, culture) of internalization and externalization are eliminated - leaving the unrealized potential of human-earth interactions, forgone in covers of scale.

Chapter 9. Discussion: Creation and Expansion, Adoption and Elimination

The final chapter of the thesis draws on all the previous chapters, including the the analysis, in an attempt to relate their various implications in a discussion arguing for the (re)production of dominance in technology transfers to developing countries. This chapter is the end-product of the thesis, the melting pot of all that has been presented. The discussions takes on the creators and adopter perspective, and applies the expandatory and eliminatory implications of

scale in order to draw connections to and from Henry Ford's incompatible efforts devastating their surroundings in the Amazon Jungle, Brazil's industrial menace, to the sociocognitive analysis of 'The Innovation Paradox', which also opens up the discussion of defining and framing technology and innovation in development discourse. First this chapter presents the perspective and narrative construed by the thesis and connects it to the events surrounding Ford's Amazon rubber-town, and the Brazilian industrial menace in Villa Parisi. Second, we connect the analysis of The Innovation Paradox with the (re)production of dominance, by applying the creator and adaptor perspective to the discourse of the report, and the implications of scale upon the *systems* of mental representation,

9.1 Creators and Adopters

For humans to construe a sufficient creation, there must be a system of appropriation, valorisation and, or categorisation by which the individual or group can coordinate themselves to identify the externality of structures and functions, and the accessible tools and instruments to make use of these. These *systems* of mental representations are the pre-existing designs, which are construed through the generational transmission of the historical experiences in living, surviving, and thriving off the respective institutional and environmental settings that have inspired and produced the systems by which they were created. As a result, any system and their creations are thus unique, with its unicity being a result of the unique conditions that informed the internalization and externalization of the social, cultural, psychological and technological trajectory of the institution and its people, particularly through the history of responding to the challenges in the alleviation, avoidance, and reduction of suffering, and the pursuit, adoption, and enhancement of pleasure and satisfaction. As such, the history of responding to these challenges are not only expressed through the resulting creations, but also through the unique performances of shared human abilities. In sum, this means that the varying systems, affiliated creations, and techniques across the various environmental and institutional settings around the world, pose the total magnitude, complexity, and potentials of the intellectual, creative, and technical abilities of humankind. Nonetheless, the scale and the principles of scalability, only values simplistic, linear, predictable, and narrowed down, precision-nested creations, and desires the elimination of complexities, unpredictability, relationships, and ultimately the bricoleur's *creativity*. In short, the scalable aim for progress and narrowing of vision, blocks our ability to take notice of the heterogeneity of the worlds, in turn it has led to the alteration,

deprivation, or even the elimination of pre-existing *systems*, abilities, knowledge, techniques, and technologies in rapid and extensive ways, increasingly limiting the available potentials to better the human condition, leaving rich, complex sources and functions forgone in covers of scale.

It was in such scalable fashion that Henry Ford went on to implement and carry out his rubber production town in the Amazon. Ford attempted to create a scaled-up version of his vision for industrial production, but his narrow focus on efficiency and standardization led him to ignore the complex natural, social, and cultural environments within. While well-suited to his automobile factories in the United States, they were in-fact counter-effective when applied in Amazon context. In such fashion, Ford prioritized the expansion of industrial production through the elimination of inefficiencies and standardization of progress, an approach that is fundamentally eliminatory in nature, as it sought to eliminate variation of diversity in order (such as the planting of trees, burning of bushes, and the sterilization of livelihoods) to achieve maximum efficiency. Ultimately, this led to the destruction of local ecosystems, the exploitation of indigenous populations, and the imposition of a top-down model of development that ignored local knowledge and practices, disrupting their existing practices and ways of life. For example, Ford's attempt to impose a rigid, eight-hour workday on Brazilian workers failed to consider the seasonal rhythms of life in the rainforest, where work and leisure were intertwined in a more flexible and organic way. Also, the attempt to clear vast tracts of rainforest and impose a monoculture of rubber trees failed to appreciate the complex interrelationship between different species and the delicate balance of the local ecology. Ford was the creator, imposing his vision of industrial production on the local populations, who were expected, and sometimes ordered, to adapt to his introduced way of life. The resulting power imbalance reinforced the marginalization and exploitation of the local population leading to resistance and strikes, while the reluctance to adhere with existing *systems* of mental representations led the expanded creation to alter, deprive, and even eliminate parts of the existing through its adoption.

Similarly, the industrialization plantation implemented in Villa Parisi was part of a larger push for economic development and industrial expansion during the boom phase of Brazilian capitalism (Beck, 2005; 43). With hopes and beliefs of massive returns in reach, they were explicitly uncritical for the potential risks and hazards that the adoption of such rapid

industrialization may endure on its citizens. The rapid and extensive growth of industry, led to the elimination of natural habitats and ecosystems, significant pollution of air and water, soil erosion, further exacerbating the environmental impact of the industrialization process. In addition, and similar to Ford's case, the lack of regulation and oversight from the government, allowed industrial enterprises to ignore the potential risks and negative consequences of their actions. This resulted in the creation of an intentional world where industrial enterprises prioritize profit over the wellbeing of the local environment and population. Similarly, the intentional world of these creators, and seemingly the World Bank, reflects that of creators and adopters, whether by good or bad intent, they present creations (concepts, ideas, markets, technology, services etc) that are scaled to expand over large foreign land, with uncritical expectancy of local adoption and adaption, even though it is designed to simplify (i.e eliminate) existing complexities, and any interfering vectors of relationship.

9.2 Creative Empowerment and Adoptive Disempowerment is not a Paradox.

The 'paradox' that represents the core of The World Bank report, namely the 'innovation paradox' brings about some quite unsettling notions about the nature and magnitude of challenges developing countries face in facilitating for effective innovation. Yet, the very framing of the paradox, and the way in which 'innovation' is defined may be seen to exaggerate the problematization of the claims and may not really be representative of a *real* 'paradox'. The innovation paradox pose that, "despite the vast potential returns to innovation, developing countries *do far less* innovation, measured along a variety of dimension, than advanced countries", with 'innovation' being defined as "the introduction of new products, technologies, business processes, and ideas in the market, as well as the invention of new ideas".(Cirera & Maloney 2017; 1). In other words, the paradox concerns only the *adoption* of innovation, and the invention of the new ideas that arise from this adoption. On the contrary, the more classical approach to innovation typically concerns innovation as the creation of *innovating*, which is explicitly downplayed in the report, claiming that a move into production baskets would be ineffective or less appropriate, since "countries unable to innovate in their present industries are unlikely to do so in new industries" (2017; xi). Consistently, the report further strengthens their position by citing the opinions of public economist Thomas Piketty (2017), a scholar popularly associated with critiquing capitalism

and neoliberalism, claiming that “... Knowledge and skill diffusion is the key to overall productivity growth as well as the reduction of inequality both within and between countries”.

Based on the above, I would suggest that a much more appropriate and precise name for the paradox would be ‘the adoption paradox’. This is important, as the concept of ‘innovation’ is loaded with empowering features through its projection of the self-made creation and positive change, creativity, originality, independence, progress and advancement, the manifestation of great techniques, abilities and capabilities, and the sociocultural context that inspired and informed these, as well as the sociocultural or subjective extroversions and externalizations of intelligence, and so on. Conversely, adoption is often loaded with disempowering connotations, particularly in context such as projected by the report, in adopting to the creations of foreign external powers on the basis of the superior effectivity posed by the creations, and the superior capabilities of the creators. Simply put, the power to create, is the marvellous ability to make something under your own power, whereas adoption is to take on someone else’s power. To create, is to ignite the flame, the creation is the empowered product of the *fire*. Ignition and fire is absent in adoption, it has already been lit, combusted, and extinguished. One may question whether in-part, is the incentives to adoption that keeps Prometheus bound in developing countries. The ‘adoption paradox’ may have sparked the question differently; provided the vast returns of using advanced-world products, why the lack of adopting advanced-world things and ways? While reasons and challenges are multiple, it is nothing new that people prefer the empowerment of doing things by their own accord, rather than the disempowerment of being told, guided, advised, or commanded to do something. Similarly, people often prefer to learn how to *create* by one’s own power, rather than *imitate* someone else’s power. In this sense, one may question if it could even be considered a paradox, provided the explicit nature of creative empowerment, or adoptive disempowerment.

However, for the sake of clarity, it should be mentioned that adoption can, and should also be considered in a positive and empowering manner, such as in the successful *acquisition*, or *embodiment* of desirable, favourable, beneficial, or contributing assets. Nonetheless, the purpose of the critical stance taken in this study, is to investigate the dark side of this phenomena with regards to the (re)production of dominance in technology transfers to

developing countries. In short, I do not intend to imply that the ability to adopt is insignificant, but rather that *innovation* when defined as an instrument for development in the developing world, could serve greater empowering ends if oriented around creation.

9.3. Scale: Release or Extinguish the Fire?

Beyond intent, aim or desire, the purposeful framing of innovation as adoption, aimed towards developing countries, both enables, and allows for, a far more extensive expansion of advanced-world products, technologies, markets, services, ideas and knowledge, and likewise a much greater incentive for eliminating such existing features across developing world, than what the framing of innovation as creations, aimed to *unbind* the power of fire in developing countries would probably do. Yet, the creation of technology poses a far more complex process than what adoption do, and may be a lot more time consuming, while challenges may differ, it seems inevitably true that “innovation in the developing world faces barriers that are orders of magnitude more challenging than those found in the advanced world” (Cirera & Maloney 2017; 183). As such, it may be ill-advised to propose that global institutions and development agencies should prioritise innovation as creation as opposed to adoption and may be best considered per context or situation.

However, following a similar broad definition of innovation, Fagerberg et al (2010) work on *‘The Role of Innovation in Development’*, attempts to address the various theoretical schools, methods, perspectives, and definitions that drives policy, research, and decisions regarding innovation to developing countries. All taken into account, they conclude that in order “to be able to exploit technology to their own advantage, developing countries need to develop the necessary *capabilities* for doing so”, and that the available technological knowledge in any given society, are “deeply rooted in the specific *capabilities* of private firms and their networks/environments, and hence not easily transferable”, requiring a lot of effort and capability-building (2010; 1; 4). The concept of ‘technological capability’ was introduced by Linsu Kim (1980) as a analytical device used to assess the rise of Korea from severe poverty to a first world technological powerhouse within three decades, defined as;

“the ability to make effective use of technological knowledge in efforts to assimilate, use, adapt and change existing technologies. It also enables one to create new

technologies and to develop new products and processes ...” (Fagerberg et al. 2010; p.5).

Technological capabilities commonly consider three aspects: i) Production capability, which is needed to operate productive facilities efficiently and to adopt production to changing market circumstances; ii) investment capability, needed to establish new productive facilities and adjust project design to suit the circumstances of the investment, and; iii) innovation capability, required to create new technology, e.g. develop new products or services that better meet the specific requirements of the market (2010; 6). As such, this framework concerns both the adoption and creation of innovation, and aims in its totality to represent the structural components required to facilitate for the sustainment and improvement of associated abilities and capabilities that are instrumental in ensuring the continuation of proactive technological creation, and an empowering balance between creation and adoption.

Another important, contrasting insight from this study is that developing countries do in fact carry out a lot of self-made innovation, and whilst not identical in every respect, they are found to be a powerful force of growth in both advanced and developing countries (Fagerberg et al. 2010; 20). Yet as we have seen, how innovation is framed and defined, may alter our ability to recognize and make use of these performances and associated abilities. Therefore, we may assert that while conceptualizing the world and making the world are wrapped up with each other, it seems only to be particularly true for those privileged to turn their dreams into action, at least in the context of innovation. Unfortunately, this may be emerging as increasingly true as the ability to imagine and take notice of the heterogeneous nature of innovation in the developing world, and the complexities, and probable ambiguity posed in prioritizing features of local relativities in each context, are heavily limited or blocked by the deep roots of scale, and the desire for scalability. This desire of scalability that nourishes the obsessive relationships to maintaining order, scrutiny, and precision, narrows the field of vision to the targeted valuable, to expand it without changing its designs or elements, only expansion. In turn, to consider any surrounding relativities, or other alternatives beyond the scale, would be considered a unprofessional negative distractive concern that obscures progress. As such, the (re)production of dominance through expansion may occur without taking notice of it, as the simplicity of the scalable, which rather than seeing the ‘forest for

the trees' or the 'trees for the forest,' sees 'the *timber* for the forest', or simply the 'scaling of prosperity'. Thus, in the 'scaled' context of *innovation as adoption*, Schumpeter's creative destruction process, may as well be seen as a scale destruction process, in which the expansion of advanced creations takes place for existing creations, and may eliminate existing complementarities for the expansion of advanced complementarities.

Thus, the scale may help to effectively transfer prosperous fire-powered creations, but may also extinguish the local fires through its eliminatory expansion, whether taking place on the ground, or in *systems* of mental representations, institutions, or markets.

Conclusion

The intent of this thesis was to explore possible indicators to the (re)production of dominance in technology transfers to developing countries, through the expandatory and eliminatory implications of scale. Following the critical perspective coined 'creators and adopters', the study started by addressing the *systems of mental representation*, through the theory of intentional worlds, to represent the process of the internalization of externality, and the theory of bricolage to understand and represent how individuals or institutions makes use of such systems in the externalization of that internality. In turn, this helped to understand how the conceptualization of the world as resulting from these systems, informs and inspires the various ways in which creations are performed and made to be, as indicated by the heterogeneity of the world. Next, the thesis addressed the introduction of scale and the principles of scalability, to be illustrative of a conceptual externalization as inspired by systems of mental representations associated with *temperate* environments, and to address its expandatory and eliminatory implications in its worldmaking. Thereby, the relationship between conceptualizing the world through scale and the making of it, was demonstrated by reviewing the book *Fordlandia* (Gardin 2009), which address the efforts made in implementing and sustaining Henry Ford's rubber-producing town in the Amazon jungle, as well as the events that led up to the disasters in Villa Parisi, Brazil during the countries industrial boom phase. Thereafter, the study briefly elaborated on the formation of institution and power, accompanied with a summary of the World Bank report, 'The Innovation Paradox', in preparation for the analysis of the report. The analysis was then conducted by

applying a sociocognitive approach in a critical discourse analysis, which aimed at covering; i) the framing and problematization of the topic and issue; ii) group descriptions of the ‘advanced world’ ingroup, and ‘developing world’ outgroup, with two illustrative figures of the presented associative networks of the systems of mental representations held by the authors, as representatives of their affiliated organization, and ; iii) identification of ideology, by emphasising discourses presenting various interests, activities, principles, and methods, to indicate underlying ideological structures. Lastly, the thesis presented a discussion to draw all the pieces of the study together to argue for the (re)production of dominance in technology transfers to developing countries.

In response to the problem statement and affiliated research questions posted in the introductory chapter, the thesis concludes that technology transfer may (re)produce dominance, particularly when oriented around the adoption of technologies, which may disempower society by altering, depriving, or eliminating existing alternatives and associated systems of mental representations. Further, this may occur in accelerated fashions, as the sterile simplicity of the scale enables manageable expansion with ease, without changing any elements, and by its precision-nesting narrowing of vision, may alter, deprive or eliminate any existing surroundings beyond its scope. By its very design scale purposefully expands its desirable, and purposefully eliminates everything else that may stand in the way of expansion, a process which is further accelerated by its outstanding functions to effectivity and predictability, and the moral ‘obligation’ and perceived urgency to “evangelize” the developing world to prosperity.

Yet some critical remarks should be made. As mentioned at various points, this thesis does not intend to provide evidence for the (re)production of dominance in technology transfer, but rather to investigate some of the possible indicators of such at the dark side of the phenomena. As such, the study may be used to raise awareness and recognition to the eliminatory and expandatory implications of scale, and the alteration, deprivation, or elimination of systems of mental representations and existing alternatives, particularly with regards to products, technologies, services, ideas, knowledge, markets, infrastructures and further complementarities of the existing. Furthermore, the study also admits to cherry-picking of discourses, especially in the report, which could have presented a more diverse selection, but constraints in time did not allow for this to happen.

References

Adler, David (2019). Schumpeter's Theory of Creative Destruction. *Engineering and Public Policy*. www.cmu.edu/epp/irle/irle-blog-pages/schumpeters-theory-of-creative-destruction.html

Abbasi, Kamran (1999). The World Bank and World Health: Under Fire. *British Medical Journal*, vol. 318, no. 7189. doi: [10.1136/bmj.318.7189.1003](https://doi.org/10.1136/bmj.318.7189.1003)

Bourdieu, Pierre (1977). Structures and the habitus (fyll ut)

Bryman, A. (2019). *Social Research Methods* (5th ed.). Oxford University Press.

Beck, U. (1992). On the Logic of Wealth Distribution and Risk Distribution. *Towards a New Modernity*. London: Sage

Byrd, Christine (2022). What the Perception-Action Cycle Tells Us About How the Brain Learns. *MIND research institution*. blog.mindresearch.org/blog/perception-action-cycle

Canales, Katie. (2020). Henry Ford Built 'Fordlandia,' a utopian city inside Brazil's Amazon rainforest that's now abandoned - take a look around. www.businessinsider.com/fordlandia-henry-ford-city-brazil-rainforest-ghost-town-photos-2018-12?r=US&IR=T

Chossudovsky, Michel (2023, 3. May). World Bank. In *Britannica Encyclopaedia*. <https://www.britannica.com/topic/World-Bank>

Cirera, Xavier; Maloney, William F.. 2017. The Innovation Paradox : Developing-country Capabilities and the unrealized Promise of Technological Catch-Up. Washington, DC: *World Bank*. <https://openknowledge.worldbank.org/handle/10986/28341>

Cleaver, Francis, & de Koning, Jessica, (2015). Furthering critical institutionalism

Dos Santos, Theotonio, (1970). The Structure of Dependence. *The American Economic Review*, 60 (2).

Eriksen, Siri, et al. (2021). Adaptation interventions and their effect on vulnerability in developing countries: Help, hindrance or irrelevance?. *World Development*, 141.

Eriksen, Siri, (2015). Reframng adaptation: The political nature of climate change adaptation.

Eriksen, Thomas Hylland, & Schober, Elisabeth, (2018). Economies of Growth of Ecologies of Survival.

Fagerberg, Jan., Srholec, Martin. & Verspagen, Bart. (2010). The Role of Innovation in Development. *Review of Economics and Institutions*, 1 (2). pp. 1 - 29.

Fletcher, Breitling & Puleo (2014). *Barbarian Hordes* (fyll ut)

Foucault, Michel (1977). Nietzsche, genealogy, history. In D.F. Bouchard (Ed.) *Language, counter-memory, practice: Selected essays and interviews*. *Cornell University Press*.

Foucault, Michel (1980). *Power/Knowledge: Selected interviews and other writings, 1972-1977*. *Pantheon Books*.

Foucault, Michel (2003). *Society Must Be Defended. Lectures at the Collège de France, 1075-1976*. Trans. David Macey. Ed. Arnold I. Davidson. *Picador, New York*.

Godø, Helge (2008). *Innovasjonsledelse*. Trondheim: Tapir Akademisk Forlag.

Grandin, Greg, (2009). *Fordlandia: The Rise and Fall of Henry Ford's Forgotten Jungle City*. *Metropolitan Books*. (Read in digital PDF format, with a size reference of 577 pages)

Haidt, Jonathan; Joseph, Craig (2007). "The moral mind: How five sets of innate intuitions guide the development of many culture-specific virtues, and perhaps even modules"

Ingold, Tim (1996). Hunting and gathering as ways of perceiving the environment, In R. F. Ellen & Katsuyoshi Fukui (eds.), *Redefining Nature: Ecology, Culture and Domestication*. Berg. pp. 117--155

Johnson, Christopher., (2012). *Bricoleur and Bricolage: From Metaphor to Universal Concept*.

Krcmar, Marina and Haberkorn, Kristen (2020). Mental Representations. *The International Encyclopedia of Media Psychology*. <https://doi.org/10.1002/9781119011071.iemp0191>

Lévi-Strauss, Claudé., (1962). *The Savage Mind*

Liberto, Daniel. (2021). What Is New Growth Theory? Definition, How it's Used, and Example. www.investopedia.com/terms/n/new-growth-theory.asp#:~:text=The%20new%20growth%20theory%20is,of%20people's%20pursuit%20of%20profits.

Nightingale, Andrea J. et al. (2020). Beyond Technical Fixes: climate solutions and the great derangement. *Climate and Development*, 16 (4). pp.

Nørretranders, Tor. (1998). *The User Illusion: Cutting Consciousness Down To Size*. Penguin Group

Palin, Michael. (Producer). (2014). *Brazil with Michael Palin* (TV-series). British Broadcasting Company. <https://www.bbc.co.uk/programmes/b01nqm81>

Payne, Keith B. & Cameron, Daryl C. (2013). Implicit Social Cognition and Mental Representation. In D. E. Carlston (ED.), *The Oxford handbook of social cognition*. Oxford University Press.

Pratto, F., Sidanius, J. & Levin, S. (2006). Social Dominance Theory and the Dynamic of Intergroup Relations. *European Review of Social Psychology* 17(1), 275-276.
[doi:10.1080/10463280601055772](https://doi.org/10.1080/10463280601055772)

Scott, James (1998): *Seeing Like a State*. Yale University Press.

Skjølsvold, Tomas Moe. (2017). *Vitenskap, teknologi og samfunn: En introduksjon til STS* (1). Oslo: Cappelen Damm AS.

Sovacool & Hess (2017) . Ordering Theories: Typologies and conceptual frameworks of sociotechnical change

The World Bank (03.10.2017). Low Innovation is a Critical Barrier to Developing-Country Growth: Building Managerial and Innovation Capabilities is Essential to Prepare for Technological Adoption. *Who We are*. <https://www.worldbank.org/en/news/press-release/2017/10/02/low-innovation-is-a-critical-barrier-to-developing-country-growth>

Tremain, Shelly (2017). Foucault and Feminist Philosophy of Disability. *The Oxford Handbook of Feminist Philosophy*.

Tsing, Anna (2012): On Nonscalability: The Living World is Not Amenable to Our Living Planet. *Common Knowledge*, 18(3).

Vatn, Arild (2015): Environmental Governance: Institutions, Policies, and Actions. *Edward Elgar Publishing*.

White, Lynn. (1967). The Historical Roots of Our Ecologic Crisis. *Science*, 155 (3767), 1203–1207. <http://www.jstor.org/stable/1720120>

Wodak, Ruth & Meyer, Michael. (2015). Methods of Critical Discourse Studies. *Introducing Qualitative Methods* (3).doi.org/10.4135/9780857028020



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