What Does the Arctic Teach Us?

An Epistemological Essay on Business-Government Relations

Matthias Finger

The Arctic is where the future of our industrial civilization is currently being played out: the melting of the Arctic ice and of the Greenland ice cover would (and will) not only mean significant sea-level rise; it would certainly also represent an irreversible tipping point in the Earth's climate system. In other words, the accelerating changes in the Arctic affect us all. In addition, and given that industrial development (and economic growth for that matter) remain based on natural resources (fossil fuels and minerals), the Arctic, along with other resources-rich regions of the world, has become one of the new theaters of global natural resources exploitation and international rivalry. Arctic fossil fuel resources represent a significant amount of the still globally available reserves. But exploiting them is not without environmental risks. Burning them will further accelerate global warming and bring the global climate closer to the dangerous tipping point. Ironically, such resources exploration and exploitation are precisely made possible by (some of) the consequences of industrial development in the form of global warming and subsequent receding ice coverage. This means that, in the Arctic, industrial civilization has it in its hands to address the root causes of the looming global ecological crisis, or at least the root causes and consequences of global warming. The Arctic thus serves as a perfect case in point, whereby one can explore whether industrial civilization is capable of slowing down and eventually stopping fossil fuel-based (industrial) development, and who might be able to do so. This is the topic of this article, whereby the Arctic basically serves as a socio-ecological laboratory for analyzing the dynamics of fossil fuel-based industrial development. But, while being a laboratory, it is also an entirely serious case.

Introduction

This is neither a technical, nor an empirical, but rather an ethical and epistemological article. In it, I take the Arctic region[1] as a case in point to reflect on industrial civilization's ability to reduce fossil

Matthias Finger is a Professor at the École polytechnique fédérale de Lausanne (EPFL), Switzerland.

fuel (and resources) extraction and, by doing so, (re-)gain control over its (industrial) development. This is not a typical way to look at the Arctic region, nor is this article really about the Arctic. This is not typically the way academics write about the Arctic either, considering that they have no unified point of view, owing to their disciplines, their nationalities, as well as their scientific and economic interests. Political scientists, along with experts in international law and world affairs, for example, are interested in possible conflicts around Arctic issues, such as, recently, fisheries, oil, gas, minerals, shipping routes, and others more (Anderson, 2009; Byers, 2009; Emmerson, 2010; Osherenko & Young, 1989: Sale & Potapov, 2010; Young & Osherenko, 1993). They also write about nation-building, for example, in the case of Greenland, or territorial aspirations of indigenous peoples around the circumpolar North (Zellen, 2009). International relations specialists are furthermore interested in the so-called "globalization of the Arctic", as well as ensuing possible conflicts, notably shaped by national interests (Fairhall, 2010; Heininen & Southcott, 2010). They actually have a long history writing about the Cold War and corresponding military buildup, and have refocused, recently, on so-called "Arctic security issues", defining global warming as an Arctic security threat (as part of securitization theory) (Huebert, et al., 2012). Anthropologists write about Arctic indigenous peoples and their culture, or about the Arctic as yet another territory where indigenous peoples are being modernized and traditions are being lost (Malaurie, 1955; Golovnev & Osherenko, 1999; Einther, G. et.al., 2010). Economists, along with geographers, write about Arctic development and local, regional, national and even global growth prospects thanks to the Arctic's resources (Einarsson, et.al., 2004). Natural scientists – in particular oceanographers, marine biologists, geophysicists and geologists, in addition to others – write about the Arctic because it is a new territory from where new species and new resources can be discovered. Meteorologists, climatologists and glaciologists have found a privileged terrain where to observe warming and melting ice sheets and glaciers, or, earlier, Arctic haze (Hassol, 2004; Nillsson, 2007). Environmental scientists, finally, observe and write about global pollutants, in particular Pb, PCBs, POPs, as well as others (Wadhams, et.al., 1996). All of this of course warrants research, conferences, publications and academic careers. But what is missing so far, in my view, is a more ethical and epistemological reflection about how the Arctic and its rapid changes relate to military-industrial civilization and its future.

To me there is more to the Arctic than a new territory where one can apply concepts, methods and theories that have already been tested numerous times elsewhere. The Arctic is the territory where the future of industrial civilization is currently being played out and for two paradoxically related reasons. On the one hand, the Arctic cryosphere constitutes one of the main identified tipping points (Fleming, 2008; Lenton, et al., 2008; Nature, 2011; Nuttall, 2012; Wadhams, 2012; Wassmann & Lenton, 2012; Young, 2012): if we are to lose Arctic ice cover, and especially Greenland's ice sheet, then this will trigger an irreversible "dangerous change" of the global climate system. On the other hand, the Arctic holds such an important portion of the Earth's fossil fuel resources (Gautier & Pierce, 2008, Howard, 2009) that, when exploited and burnt, it will inevitably trigger the aforementioned tipping point. As such, the Arctic is a significant part of a broader phenomenon, called the "Anthropocene", i.e., the geological period during which humans – or more precisely industrial civilization – have become an important or the important geological force (Steffen, et.al, 2011). This interlinked process is actually well underway already. Therefore, the question I am asking

in this article is, whether industrial civilization is capable of restraining itself from exploiting the Arctic's resources, so as to give it a chance *not* to reach this tipping point. And who exactly could do that?

In this article I will identify four such actors, namely the ones that are traditionally – and realistically – considered to be the actors that can (or should) address such challenges, namely nation-states, corporations and especially Trans-National Corporations (TNCs), science and indigenous peoples. Among these four, I will especially focus on nation-states and TNCs and, in particular, on the relationship between them. The discussion of both these actors in respect to the Arctic region also structures this chapter. But let me first discuss why the Arctic is so important for humanity.

The Arctic as a Pointer to the Future of Industrial Civilization

Global warming, and especially its consequence in the form of Arctic sea ice melting, leads to a "huge temptation". It is the temptation to exploit these submarine geological resources, in particular oil and gas to the "very end", something which will further accelerate climate change and further endanger the Earth's global habitability (see: Ehrlich & Ehrlich, 2013). The relevant philosophical and anthropological question is whether industrial civilization can resist this temptation. And which actors, exactly, would take the lead? Governments? Firms? Science? Indigenous peoples?

Now, this temptation is actually not specific to the Arctic. Similar temptations exist, such as, for example, the temptation to clear the Amazonian or the Congolese rainforests and, by doing so, access fossil fuel resources or simply "develop" land for biofuels and/or intensive agriculture. Other temptations are a little bit more complicated, yet equally real. These are the ones that are made possible by scientific and even more so technological advances, such as in the case of deep sea drilling. The Arctic actually rather resembles this latter category, given that, even with receding ice, significant technological means (and additional research) will have to be engaged in order to be able to exploit the available resources.

Before discussing below who could resist the exploitation of Arctic resources, let us first clarify who already exploits and in the future will exploit such natural resources. To be sure, natural resources exploiters – that is explorers, drillers, extractors, transporters, refiners and commercializers – are not individuals, nor are they Small and Medium-sized Enterprises (SMEs), who are, at best suppliers. Rather, they are big firms, so called Transnational Corporations (TNCs) with significant financial clout and technical expertise. Increasingly, they are no longer firms anymore. Rather, they are conglomerates of firms with often very complex organizational and legal structures. Generally, these conglomerates are closely related to governments, especially those governments on whose territory the resources lie. Some of these firms, and not the minor ones, are actually state-owned (so-called State-Owned Enterprises or SOEs), such as in the case of Statoil of Norway or Gazprom of Russia. They all compete for accessible natural resources that they can mine at the lowest possible cost and sell at the highest possible price. There is nothing specific about the Arctic here. We are dealing in the Arctic, as elsewhere, with global firms that will go to the Arctic if they can make more money than from other extracting sites to which they have access.

So, what makes the Arctic different? I have already mentioned above the magnitude of the available resources in the Arctic (Gautier & Pierce, 2008; Kontorovitch, et.al., 2010), as well as the related paradoxical nature of Arctic drilling: if, indeed, the Arctic's fossil fuels are exploited, the impact on climate change will not only be significant; it will open further opportunities for Arctic drilling. But the Arctic is also interesting because of the particular role of nation-states: most of the Arctic's territories are actually divided up among nation-states with very few areas still being disputed (e.g., between the United States and Canada in the Beaufort Sea, whereas the conflict between Russia and Norway in the Barents Sea has recently been settled). Furthermore, the areas that are outside the exclusive 200 nautical miles zone (the EEZ) are not said to be particularly resource-rich (Gautier & Pierce, 2008). This means that nation-states, acting in the general interest, would actually have it in their hands to resist Arctic drilling. In this respect, one must also mention the particular nation-state history in the Arctic, shaped as it is by the Cold War (1950 to 1990), and which has led to a substantial militarization of the Arctic (Fritz, 2013). Particular mention must be made here to the United States and Russia, but also of Norway and Canada, as actually little demilitarization has occurred since the end of the Cold War. Moreover, the territorial and military aspects of nation-states appear particularly clearly and purely in the case of the Arctic, as the Arctic territory is sparsely populated, and as settlements are used, at least in the case of Russia as a means to affirm territorial claims vis-à-vis indigenous peoples.

In short, it is fair to say that there are mainly two major types of actors in the Arctic: historically those were nation-states, but increasingly, especially with the need for technical expertise, TNCs (and SOEs for that matter) also make their appearance. This omnipresence of nation-states with the recent involvement of TNCs, and of course the massive nature of the phenomenon, is what makes the Arctic unique and particularly interesting. More precisely, I am particularly interested in the relationship between the nation-states and the TNCs focused around the question of exploiting natural resources. Indeed, neither states, nor TNCs can exploit these resources on their own and therefore need each other: how therefore does their relationship play out? Will the nation-states act in the public interest and try to stem Arctic resources exploitation? Or will TNCs have it their way against the nation-states? Or will both work hand in hand? These are the main questions I will discuss in this chapter, as they are relevant far beyond the Arctic and of crucial importance for the future of the Earth's global habitability.

Nation-States

Political science, international relations and political economy generally consider nation-states as being antithetical to business: while nation-states pursue the general interest, business acts in their own, private interests. If business behavior is contrary to the general interest, it will be regulated by the state. While nation-states can go to war over their conflicting strategic interests, business, so goes the theory, does not. So, what are the strategic interests of the nation-states in the case of the Arctic?

In this section, I will first characterize nation-states in general and then apply this characterization to the Arctic. I will make a distinction between the periods before and after globalization or more appropriately in the case of the Arctic, before and after the Cold War. My approach to nation-states

is somewhat unorthodox, as I do consider states as self-interested organizations operating under certain constraints, in particular financial and legitimacy constraints. My approach is thus inspired by institutional economics, rather than by political science, international relations or political economy.

The Four Eras of the Modern Nation-State

From an institutional economics point of view, the nation-state is before all an organization capable of setting and enforcing its own rules (e.g., monopoly over legitimate power) on its territory (e.g., national sovereignty) and sometimes beyond. This is before all a military matter, the army being the "enforcer" of the rules vis-à-vis the outside, while the police enforces the rules vis-à-vis the inside (but the army is always there as an "enforcer of last resort"). This military nature is, so-to-say, the nation-state's core characteristics (or "core business" in managerial terms). The origin of this core characteristic goes back to medieval times (i.e., feudal lords controlling their territories and populations which inhabit them), but has been carried over to the "modern nation-state" (Tilly, 1975). This "modern nation-state", born with the French Revolution, constitutes a change only insofar as its military nature is now being (democratically) legitimized, the soldier now also being a citizen and thus acting in the general (national) interest, as opposed to the interest of the feudal lord. Until the Industrial Revolution, the core features of the modern nation-state were therefore its army, its police and its judicial system. Basically, the nation-state extracts resources (money), generally from its citizens, so as to finance the army, the police and the judicial system, all of whom are said to act in the general or national interest. Besides financial resources, the nation-state also needs legitimacy as a resource: if it is not (somewhat) legitimate in the eyes of its citizens, then also financial resources are compromised.

This changed with the *Industrial Revolution,* or rather with the consequences of the Industrial Revolution. More precisely, the Industrial Revolution gave rise to so-called "industrial development" with "economic growth" at its core. Over time, the nation-state realized that industrial development in general and economic growth in particular could serve its interests, namely in the form of growing financial resources for its own "development", which in turn leads it to become an ever more enthusiastic promoter of industrial development and growth. This to the point that, since the Second World War, the nation-state has become more or less identical to an "industrial development agency" or "economic growth machine", without however abandoning its original, military nature. In other words, the pursuit of industrial development and economic growth by the nation-state cannot be separated, from an epistemological point of view, from its military nature. The state "conquers" its own national territory by way of infrastructure development (e.g., roads, rail, electricity grids) so as to make (further) development possible. While the pursuit of industrial development and economic growth answers to the state's financial resources needs, its welfare dimension answers to its legitimacy needs. In other words, the nation-state can re-distribute some of the proceeds of industrial development and, by doing so, create more legitimacy for itself. This self-reinforcing virtuous circle went on unstopped until the end of the Cold War and intensified globalization, thanks, in particular, to accessible and therefore cheap fossil fuel resources. The period of the Cold War (1950s to 1980s), i.e., the period between the end of the Second World War and the beginning of globalization, deserves a particular mention here: it constitutes, so-to-speak, the heyday of (military-style) industrial

development (both in the West and the East), as, during this period, the permanent threat of war was used as a means to legitimize ever more aggressive industrial development.

But if the period until the end of the Cold War marked the heyday of the modern nation-state as an industrial development agency of military nature, things have turned more difficult since: while it is of course true that the end of the Cold War and the subsequent era of *globalization* has boosted industrial development to unprecedented levels and expanded it to even the remotest parts of the planet (thanks notably to the free movements of capital, goods and services), such globalization at the same time creates unprecedented challenges to the very organizations that are nation-states (Chang, 2003). Not only can (the Cold) War no longer serve as a means to legitimize the state's grip on society, but moreover, the nation-state also becomes financially challenged as a result of globalization. Indeed, capital has since become mobile and will move to the places where returns are biggest. Consequently, nation-states, as organizations promoting industrial development, become pitched against one another in the same way as firms are. Consequently, they must look out for new sources of income, as well as new sources of legitimacy, as their legitimacy can no longer be grounded on security, nor on security-based industrial development. This is something all nation-states struggle with since the end of the Cold War.

Furthermore, and on top of the challenges posed by globalization, now comes the challenge of what I call "*diminishing returns*". While the era of industrial development (1850s to 1980s) and even the era of globalization (1980s to 2000s) were still built on and made possible thanks to accessible and affordable non-renewable (and renewable) resources – mainly fossil fuels, minerals and fossil fuel based industrial agriculture –, this has substantially changed since the turn of the century. Indeed, in the new era of diminishing returns fossil energy resources (especially oil), the most efficient form of energy from an energetic point of view, has now peaked, along with other minerals (Deffreyes, 2012). In other words, ever more energy (and money) must be spent to obtain be it only the same level of industrial development (Hall & Klitgaard, 2012). Not to mention the fact, that ever more money must be spent (non-productively) on mitigating the negative consequences of industrial development, for example in the case of climate change induced natural disasters. To recall, since the Industrial Revolution, nation-states are industrial development agencies in the same way as corporations. Like corporations, they depend upon natural resources, especially fossil fuels, for their growth and financial well-being. But unlike corporations, nation-states, in addition, also have a legitimacy problem. To recall, thanks to industrial development, economic growth and the ensuing Welfare State they were able to legitimize themselves. Legitimacy has already become more difficult for nation-states during the era of globalization, yet they have tried to legitimize themselves vis-à-vis their own citizens by seeking to become or stay globally competitive (as opposed to fighting wars). But in the era of diminishing returns legitimacy will become a real and probably insurmountable challenge for them, exacerbated as it will be by structural financial problems. The Arctic will help us see what this exactly means.

The Role of the Nation-State in the Arctic

As the exploration of the Arctic progresses, the *nation-state* gradually takes possession of it. This is notably the case of Russia (Rowe, 2009), the United States (Alaska), Canada, Denmark (Greenland),

Iceland, Norway, Sweden, and Finland, all countries which have territories North of the polar circle. However, until well into the Cold War, the Arctic remains peripheral for the different nation-states. This is even more so because the Arctic portions of these countries (except for Iceland) are populated by indigenous peoples, who are neglected, if not oppressed. The centers of these Arctic States lie in the South and natural resources are not yet that actively sought after, as industrial development is still based on relatively easily accessible resources.

However, with the *Cold War*, the Arctic became a military focus where the West, especially the United States but also the NATO countries (Canada, Norway, Iceland), and the East (i.e. the Soviet Union) stationed nuclear weapons, nuclear submarines, as well as other military technologies (Swords and Ploughshares, 2009). Some of the military bases have become well known during this time, such as Murmansk (Russia), Thule (Greenland) and Keflavik (Iceland). As the Cold War put the Arctic on the global map, it also contributed to population growth (thanks to more or less coerced migration), along with the pollution of the Arctic (nuclear pollution, so-called Arctic haze, PCBs, etc.).

The *end of the Cold War* appears as a period, albeit a very short one, of all possibilities. Gorbachev's Murmansk speech can serve as a case in point, where peace and sustainable development were called for. Similarly new governance mechanisms (e.g., the Arctic Council) and various non-state actors, including indigenous peoples' organizations, emerged and sought to play an active role in shaping the Arctic's own future. Similarly, Greenland's aspirations for independence were voiced. This was also the time when some corporations started to actively explore Arctic resources but also Arctic shipping routes (Finger-Stich & Finger, 2012).

But it is in the fourth era – the era of diminishing returns – that the Arctic has really caught global attention. On the one hand, this is because the first signs of global warming are affecting the Arctic, leading to the melting of the Arctic sea ice. On the other hand, this is also because, thanks to global warming, Arctic States – notably Russia, the United States, Canada, Greenland and Norway – are opening up the Arctic for resources exploration and exploitation, mindful of the fact that the Arctic holds a substantial portion of the world's gas, oil, coal, and other minerals reserves. They all have, in recent years, developed their own so-called "Arctic Strategies" (Heininen, 2011). Indeed, resources in the Arctic can only be exploited by permission, and even more so only thanks to the active support of the different nation-states. The fact that the military has never left the Arctic and that many firms exploiting Arctic resources are actually state-owned (especially in Russia and Norway) significantly contributes to such accelerated resources exploitation.[2] Another sign of the "rush to the Arctic's resources" is the fact that non-Arctic States, notably China, Korea, Japan, France and the United Kingdom are not only seeking membership in the Arctic Council, but are themselves actively exploring resources by way of their scientific teams. In other words, the Arctic, in the era of diminishing returns, has definitely become a new theater for nation-states, at least for the big and resource-hungry ones.

Trans-National Corporations

TNCs emerge parallel to industrial development, mostly thanks to conditions created by nation-states (Chandler & Mazlish, 2005). Many TNCs are indeed originally either family firms which have managed to grow thanks to contracts with governments or other forms of government support or they are State-Owned Enterprises (SOEs). More precisely, and especially after the 2nd World War, at least in the West governments have created the conditions for TNC growth. But it is after the end of the Cold War and thanks to globalization that TNCs can, so-to-speak, "step out of the shadow" of governments and enter the global stage. Again, this move was significantly facilitated by governments, which pushed for free trade and global market opening (e.g., thanks to the World Trade Organization), or which helped TNCs enter emerging and developing markets (e.g., thanks to the World Bank). Today, TNCs account for a significant portion of global GDP and at least half of global trade is now actually intra-TNC firm trade (UNCTAD, 2007). It is fair to say that, in the beginning of the 21st century, many TNCs had "freed" themselves from their respective governments; many of them have even overtaken nation-states in terms of economic, and also political power.

In the *era of diminishing returns*, certain TNCs appear to be doing particularly well. These are the TNCs that are active in natural resources extraction, especially in the fossil fuel (oil and gas) sector, but also in the minerals and agricultural sectors, including biofuels. These TNCs especially appear to be crucial for the pursuit of industrial development and industrial civilization more generally. Consequently, nation-states increasingly need to rely upon them, given that they are no longer capable of exploiting these resources in their own country (because of a lack of financial means and skills) or because the resources are located in more and more remote areas where governments of industrialized economies do not reach (e.g., Africa).

TNCs, in the *Arctic*, are thus basically a phenomenon of the era of globalization (1980s-2000) and even more so of the era of diminishing returns (2000 and beyond). To recall, at the end of the Cold War, climate change made Arctic resources more accessible and thus has allowed TNCs to enter the Arctic. But this is also the era of liberalization and privatization, especially in Russia, an evolution that leads to further TNC growth, especially in the natural resources sectors (Roth, 2012).

Furthermore, and as we will see below, TNCs and nation-states, in the age of diminishing returns, team up with one another for basically two reasons: on the one hand, nation-states see a growing strategic interest in natural resources, as such resources are essential for the pursuit of their own (industrial) development (e.g., securitization of natural resources) (Black, 2006; Bruno & Karliner, 2002). Not astonishingly, Russia, for example, has renationalized its natural resources TNCs, considering that these natural resources account for more than half of its GDP. On the other hand, and as climate change accelerates, natural resources' TNCs see new business opportunities and approach governments to help them to realize these very opportunities, for example in the case of Greenland.

Business-Government Relations

In this chapter I use the Arctic as a case in point so as to understand whether governments, or other actors for that matter, can slow down fossil fuel exploitation. The key, in my opinion, to answering this question is the way nation-states (governments) and TNCs (business) relate to each other, in the Arctic and elsewhere. Actually it seems to me that, in the Arctic, this relationship can be observed in its purest form.

Evolving Business-Government Relations

As said above, TNCs emerged most markedly during the era of globalization. Of course, there were some companies that preceded even the Industrial Revolution, such as the East India Company. In terms of business-government relations, these companies are particularly interesting as they illustrate, just as is the case today, how colonization and modernization go hand in hand. Yet, one can argue that these companies are merely predecessors of what happened during industrial development.

During the era of *industrial development*, firms in the West generally grow "in the shadow of" the nation-state, often with the active support of the nation-state, which creates the necessary favorable conditions for them. In many industries, the military also plays an active role, as it is not uncommon that nation-states develop entire industries (e.g., the nuclear industry) based on an originally military agenda (Pringle & Spigelman, 1981). This quite symbiotic relationship between governments and firms in the West (and even more so in the East) during the industrial development era became temporarily obscured towards the end of the Cold War, inspired as it was by an ideological (actually Cold-War driven, yet artificial) conflict between business and government. Yet, in retrospect, this conflict appears to be misguided, as both governments and firms agree on the fundamentals, i.e., industrial development and economic growth. The disagreement actually pertains to the way one should go about furthering industrial development: should it be the firms that reinvest and, by doing so, further industrial development, or should it be governments doing the same? Indeed, for both government and business, industrial development is both a means and the goal. In other words, the conflict between government and business during the industrial development era is rather artificial: both agree that development must go on, and, in the pursuit of such industrial development, both need each other.

When the Cold War ended, the private firms of the West were of course in much better shape than the SOEs of the East. Therefore, during the *globalization* era, some of these private firms of the West have now stepped out of the shadow of their respective governments and became so-called "global players" on the world stage (Bernhagen, 2007; Wilks, 2013). To recall, this stage had been prepared for them by the governments themselves via the World Bank, the International Monetary Fund and, most importantly, the World Trade Organization, and thanks to market liberalization, free trade agreements and all kinds of other active governmental support. But once on the world stage, the relationship between business and governments changed from being symbiotic to becoming predatory in nature. More precisely, TNCs now instrumentalize their own, as well as many other governments, along with international organizations, so as to derive (short-term) business advantages for themselves (Finger, 2013).

In the era of *diminishing returns,* the relationship between the nation-state and TNCs (or more generally the relationship between business and government) changes again, at least in the case of natural resources, be they non-renewable (oil, gas, coal, minerals) or renewable (agriculture, forestry, bio-fuels) (see: Sawyer & Gomez, 2012). Indeed, governments increasingly seem to realize that they are essential, not only for their economic prosperity if they have them within their territories, but more importantly for their own survival, especially if they do not have them. In other words, governments increasingly start to look at natural resources, especially oil, gas and minerals, in strategic terms. Yet, in most cases, especially when it comes to investments and operations, governments are entirely dependent upon the TNCs. On the other hand, TNCs active in the extractive industries are also dependent upon governments, namely when it comes to access to resources (e.g., concessions), as well as the contracts to extract and process them (e.g., operations). In other words, in the age of diminishing returns, governments and TNCs again need each other, but this time it takes the form of a long-term strategic relationship. More generally, this relationship, in the age of diminishing returns, now takes the form of a "true partnership", where neither partner can exist without the other. In short, nation-states and TNCs are now Siamese twins: they will either live together or both die. This is the latest stage of business-government relations.

TNC-State Relations in the Arctic

The Arctic is the region in the world where today's typical business-government relationship can be observed in its most pure form, i.e., the *Siamese partnership* that is characteristic of the era of diminishing returns. On the one hand, TNCs need and get concessions from the governments for resources exploration and exploitation. They also get guarantees for the risks they take and whose bill they could probably not foot (e.g., oil spills). On the other hand, and in return, TNCs invest and operate, as well as let governments have a negotiated percentage of the proceeds. It is obvious that, without TNCs, Arctic governments would not be able to access and sell their resources. This is even true of a country like Russia, where their own SOEs need foreign competencies and even investments in order to play the role their own government assigns them. Yet it is also true that the same TNCs would not be able to operate in the Arctic without government support and protection, considering, for example, that the Arctic remains a highly militarized area.

The extreme case of such "Siamese twinning" between TNCs and nation-states is the SOE, of which the Arctic offers very good examples. To recall, the three SOEs that are the most aggressive explorers and soon exploiters of Arctic resources are Statoil from Norway, as well as Gazprom and Rosneft from Russia. It is in these SOEs that the national and commercial interest come together in the most typical way. These and other SOEs – which behave like TNCs yet are state-owned – prefigure, in my view, best how close the ties between governments and business will become in the future.

The case of *Greenland* also deserves a particular mention here. Greenland is a newly (almost) independent country, majoritarily inhabited by indigenous peoples (57,000 inhabitants). Greenland does already have sovereignty over its natural resources, which aims to exploit so as to become a full-fledged nation-state. While it would not have to exploit these resources for the well-being of its own

population, it has nevertheless given out a significant amount of concessions, thus partnering in all oil, gas, and minerals with extractive TNCs from all over the world.

Let me mention, finally, that the Arctic is also particularly illustrative for the *secretive* relations that emerge in the age of diminishing returns between nation-states and TNCs. Even though we are dealing in the Arctic with civilized and modern countries (e.g., the USA, Canada, Iceland, etc.), the relationship between TNCs and these states is, in the Arctic, particularly opaque, prefiguring probably yet another characteristic of future business-government relations.

In conclusion, it is fair to say that, in the era of diminishing returns, both nation-states and TNCs have a common interest to join hands and exploit the(ir) natural resources. This is valid for Arctic oil, gas and mineral resources, but it is also valid beyond the Arctic, as well as for all other types of resources (e.g., forests, fisheries, agriculture, bio-fuels, etc.). And this statement may well be valid even beyond extractive industries. In other words, in the age of diminishing returns, neither nation-states nor TNCs will stop natural resources exploitation, be it in the Arctic, or elsewhere. Quite on the contrary: they will jointly push for such exploitation wherever they can.

The Role of Science

If nation-states (and TNCs for that matter) will not slow down, much less stop, natural resources exploitation in the Arctic (and elsewhere), can and will science? Science (and its applications in the form of technology) is considered by many to be the answer to the global ecological (and other) crises, including the answer to climate change (e.g., fuel efficient technologies, carbon-capture and storage, green buildings, renewable energies, alternative fuels, and many others more). So, what role is science (and technology) playing in the Arctic exactly, and how does this inform us about its (their) possible contribution to maintaining the habitability of the anthropogenic biosphere.

Until the beginning of the Cold War science in the Arctic was basically naturalistic. It helped map the Arctic and, by doing so, explore and colonize it (to an extent) (Bravo & Sörlin, 2002). But it was during the period of the Cold War that science started to play a much more active role: the harsh conditions led to substantial scientific and technological progress, for example in the case of (nuclear) icebreakers, but also in all kinds of weaponry, communications technologies, and many others examples. But this was also the time when environmental research was started in the Arctic, notably in the areas of climatology, oceanography and Arctic biology and marine studies (Carey, 2007; Conkling, et al., 2011; Launius, et al., 2010).

This type of environmental research took another significant step forward after the Cold War, i.e., during the era of globalization. This is particularly the case of oceanographic, climate change and glaciological research, which has contributed to better understanding the rapid changes that are occurring in the Arctic and has sounded some alarms as to the dangers of this accelerating evolution.[3] Yet, this type of science has not helped stem these changes; rather it documents the trends and their complex dynamics. While this type of mostly environmental science continues in the era of diminishing returns, a new type of scientific activity has recently been added. This is

particularly the case of geology, oil, gas and other minerals research, as well as scientific and technological developments in the areas of drilling, transport and shipping.

All in all, the Arctic nicely reveals the role science (and technology) plays as industrial civilization evolves: from being a means of naturalistic exploration, it transforms, in the hands of the state, into a tool for military conquest and war. Furthermore, it becomes a means to illustrate the global changes that are going on under our eyes, without however addressing these changes. And finally it turns into a powerful tool of the accelerated pursuit of industrial development, notably for exploiting the resources industrial civilization badly needs. At no moment is science (and technology) a means to counter the destructive trends of industrial development, at least in the case of the Arctic, and probably not elsewhere either. As for the social sciences, their role has been largely uncritical in the Arctic, if not overtly promotional of Arctic (industrial) development (Einarsson et al., 2004). Very rarely do social scientist problematize the profound changes the Arctic is currently undergoing. Finally, cultural anthropology, which is part of the humanities and as such not directly involved in the promotion and pursuit of industrial development, often documents these changes, especially as they affect indigenous peoples. At best, it proposes adaptive measures at local levels.

How About Indigenous Peoples?

And how about the peoples of the Arctic? After all, development should be about the peoples, their quality of life, and their emancipation, both in the Arctic and elsewhere. As a matter of fact, the inhabitants of the Arctic appeared as a significant actor only at the end of the Cold War era. At that time, when the Arctic was freed from the Cold War but had not yet become the theater of the global race for resources, peoples, especially indigenous peoples, slowly acquired a voice of their own (Finger-Stich & Finger, 2012). Furthermore, they started to politically organize themselves (e.g., Inuit Circumpolar Conference, Sami Council) and even obtained Permanent Participant status in the Arctic Council. If before they were considered from a southern perspective rather exotic or idealized or did not count at all, they are now acquiring certain political clout. In the case of Greenland, whose majority population are indigenous peoples, and a political force, there is even hope for national independence. Nevertheless, things may well change again for the Arctic indigenous peoples, as the rush for resources, along with climate change, will result in local environmental destruction, and as their caution regarding resource exploitation may well marginalize them again. In this regard, what happens to the indigenous peoples in the Arctic may simply be typical of what happens to indigenous peoples all over the world (e.g., Africa, Amazonia, Philippines, Indonesia) (Sawyer & Gomez, 2012).

What Can the Arctic Teach Us?

In this chapter, I have taken an epistemological perspective on what happens in the Arctic. I have shown that there are two major types of actors – nation-states and TNCs – which have determined in the past and are currently determining the fate of the Arctic, and thus the planet's anthropogenic habitability. I have also shown how their relationship has evolved over time to end up today in a Siamese-type "partnership", at least when it comes to the exploitation of natural resources. SOEs in

the Arctic, I have argued, are the most perfect illustration of this evolution. In other words, and on the basis of the above epistemological considerations, neither nation-states nor TNCs (something nobody ever even claimed) will slow down Arctic resource exploitation. Unfortunately, science (and technology) and indigenous peoples will not be acting towards that end either. The jury is still out as to what extent this conclusion can be generalized beyond the Arctic.

Notes

1. For a definition of the Arctic region, see: Hayes, 2003.
2. For the case of Russia see Safonov, 2009.
3. See: Special issue of *Ambio*, 2012.

References

Anderson, A. (2009). *After the Ice. Life, death and politics in the Arctic*. London: Random House.

Bernhagen, P. (2007). *The Political Power of Business. Structure and information in public policymaking*. London: Routledge.

Black, E. (2006). *Internal Combustion. How corporations and governments addicted the world to oil and derailed the alternatives*. New York: St. Martin's Press.

Bravo, M.T. & S. Sörlin. (Eds.) (2002). *Narrative the Arctic: A Cultural History of Nordic Scientific Practices*. Canton, Mass.: History of Science Publications.

Bruno, K. & J. Karliner (2002). *Earthsummit.biz. The corporate takeover of sustainable development*. Oakland, CA: Food First Books.

Byers, M. (2009). *Who Owns the Arctic? Understanding sovereignty disputes in the North*. London: Doulas & McIntyre.

Carey, M. (2007). The history of ice: how glaciers became an endangered species, *Environmental History*. 12(3): 497-527.

Chandler, A. & B. Mazlish (2005). *Leviathans. Multinational corporations and the new global history*. Cambridge: Cambridge University Press.

Chang, H.-J. (2003). *Globalization, Economic Development and the Role of the State*. London: Zed Books.

Conkling, P., Alley, R., Broecker, W. and G. Denton (2011). *The Fate of Greenland: Lessons from Abrupt Climate Change*. Cambridge, Mass.: MIT Press.

Deffreyes, K. (2008). *Hubbert's Peak. The impending world oil shortage*. Princeton: Princeton University Press.

Ehrlich, P.R. & A.H. Ehrlich. (2013). Can a collapse of global civilization be avoided? (Proceedings of the Royal Society B) . Retreived from, http://rspb.royalsocietypublishing.org/content/280/1754/20122845.full.html#ref-list-1

Einarsson, N., et al. (Eds.) (2004). *Arctic Human development report*. Akureyri: Steffanson Arctic Institute.

Emmerson, C. (2010). *The Future History of the Arctic*. London: Bodley Head.

Fairhall, D. (2010). *Cold Front. Conflict ahead in Arctic Waters*. New York: I.B. Tauris & Co.

Finger-Stich, A. & M. Finger (2012). 25 years of Arctic environmental agency: changing issues and power relations. In L. Heininen. (Ed.). *Arctic Yearbook 2012* (pp. 194-222). Akureyri, Iceland: Northern Research Forum. Available from http://www.arcticyearbook.com.

Finger, M. (2013). Transnational corporations and the environment. In J. Mikler. (Ed.). *The handbook of global companies* (pp. 285-299). New York: John Wiley & Sons.

Fleming, J.R. (2008). *Climate change and anthropogenic greenhouse-warming: a selection of key articles, 1824-1995, with interpretative essays*. NSDL Classic Articles in Context (No. 1). Retrieved from, http://wiki.nsdl.org/indexphp/PALE:ClassicArticles/GlobalWarming

Fritz, S. (2013). *Tracing the Legacies of Arctic Militarization*. UMI Dissertation Publishing.

Gautier, D. & B. Pierce. (2008). *Circum-Arctic Resource Appraisal: estimates of undiscovered oil and gas North of the Arctic Circle*. Washington: US Department of the Interior (US Geological Survey).

Golovnev, A. & G. Osherenko (1999). *Siberian Survival. The Nenets and their story*. Ithaca: Cornell University Press.

Hall, C. & K. Klitgaard (2012). *Energy and the Wealth of Nations*. New York: Springer.

Hassol, S. (2004). *Arctic Climate Impact Assessment. Impacts of a warming Arctic*. Cambridge: Cambridge University Press.

Hayes, D. (2003). *Historical Atlas of the Arctic*. Vancouver: Douglas & McIntyre.

Heininen, L. & C. Southcott. (Eds.) (2010). *Globalization and the Circumpolar North*. Fairbanks: University of Alaska Press.

Heininen, L. (2011). *Arctic Strategies and Policies. Inventory and Comparative Study*. University of Lapland, Northern Research Forum.

Howard, R. (2009). *The Arctic Gold Rush*. New York: Continuum.

Huebert, R., Exner-Pirot, H., Lajeunesse, A. & J. Gulledge. (2012). *Climate Change and International Security: the Arctic as a bellwether*. Arlington VA: Center for Climate and Energy Solutions.

Kontorovitch, A.E., et al. (2010). Geology and hydrocarbon resources on the continental shelf in Russian Arctic seas and the prospect of their development. *Russian Geology and Geophysics*, 51: 3-11.

Launius, R.D., Fleming, J.R. & D.H. DeVorkin (2010). The rise of global scientific inquiry in the international polar and geophysical years. In: Launius, R.D., Fleming, J.R. & D.H. DeVorkin (eds.). *Globalizing Polar Science: Reconsidering the Social and Intellectual Implications of the International Polar and Geophysical Years*. New York: Palgrave McMillan, pp. 1-12.

Lenton, T. M., et al. (2008). Tipping elements in the Earth's climate system, *Proceedings of the National Academy of Sciences (USA)*. 105(6): 1786-1793.

Malaurie, J. (1955). *Les Derniers rois de Thulé. Avec les Esquimaux polaires, face à leur destin*. Paris: Plon, coll. «Terre Humaine».

Nilsson, A. (2007). *A Changing Arctic Climate. Science and policy in the Arctic Climate Impact Assessment*. Linköping University: Linköping Studies in Arts and Science (No.386).

Nuttall, M. (2012). Tipping Points and Human World: Living with change and thinking about the future. *Ambio*. 41: 96-105.

Pringle, P. & J. Spigelman (1981). *The Nuclear Barons*. New York: MV Books.

Osherenko, G. & O. Young (1989). *The Age of the Arctic. Hot conflicts and cold realities*. Cambridge: Cambridge University Press.

Roth, J. (2012). *Gazprom – Das unheimliche Imperium*. Frankfurt: Westend Verlag.

Rowe, E.W. (ed.) (2009). *Russia and the North*. Ottawa: University of Ottawa Press.

Safonov, Y. (2009). Mineral potential of the Russian Arctic: state and efficient development. *Russian Geology and Geophysics*. 51: 112-120.

Sale, R. & E. Potapov (2010). *The Scramble for the Arctic. Ownership, exploitation and conflict in the far North*. London: Frances Lincoln Publ.

Sawyer, S. & E.T. Gomez (eds.) (2012). *The Politics of resources Extraction. Indigenous peoples, multinational corporations and the State*. New York: Palgrave McMillan.

Shepherd, A. et al. (2012). A reconciled estimate of ice-sheet mass balance, *Science*. Vol. 338: 1183-1189.

Special issue on the Arctic: After the ice. (2011). *Nature*. 478(171). Retrieved from, http://www.nature.com/news/2011/111012/full/478171a.html. doi:10.1038/478171a.

Steffen, W., Grinevald, J., Crutzen, P. & J.McNeill. (2011). The Anthropocene: conceptual and historical perspectives. *Philosophical Transactions of the Royal Society A*. 369: 842-867.

Swords and Ploughshares. Global security, climate change and the Arctic. (Fall, 2009). *The Bulleting of the Program in Arms Control, Disarmament and International Security*, 17(3).

Tilly, C. (Ed.) (1975). *The Formation of the National States in Western Europe*. Princeton: Princeton University Press.

UNCTAD (2007). *The Universe of the Largest Transnational Corporations*. Geneva.

Wadhams, P., Dowdeswell, J.A. & A.N. Schofield. (Eds.). (1996). *The Arctic and Environmental Change*. London: Gordon and Breach Publishers.

Wilks, S. (2013). *The Political Power of the Business Corporation*. Cheltenham: Edward Elgar.

Winther, G., et al. (2010). *The Political Economy of Northern Regional Development*. Copenhagen: Nordic Council of Ministers.

Young, O. & G. Osherenko. (Eds.) (1993). *Polar Politics. Creating international environmental regimes*. Ithaca: Cornell University Press.

Young, O. (2012). Arctic Tipping Points: governance in turbulent times. *Ambio*. 41: 75-84.

Zellen, B.S. (2009). *On Thin Ice: the Inuit, the State and the challenge of Arctic Sovereignty*. Estover: Lexington Books.