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POLES APART: THE ARCTIC & MANAGEMENT STUDIES

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"The Arctic is *screaming*."

Mark Serreze, Director, National Snow and Ice Data Center, USA

(quoted in Borenstein, 2007)

If the Arctic is screaming, it's hard for management studies to hear. A search using the word "Arctic" in the archives of the Academy of Management Journal, Academy of Management Review, Organization Studies, Organization Science, Administrative Science Quarterly reveals a blank space. Maybe you haven't noticed – this isn't a premiere destination for management school faculty. But its absence keeps us – a Canadian and Russian transdisciplinary team – awake at night.

Russians refer to the Arctic (Арктика) as "Крайний Север" (Far North) and "Заполярье" (Beyond the Pole). Canadians call it the "Great White North". The Saami, Nenets, Khanty, Evenk, Chukchi, Aleut, Yupik and Inuit call the Arctic "home." The oil and gas industry call it the "Last Frontier". But management scholars don't tend to call it anything. We seek to change that.

This may not be easy. Like any discipline, management scholars have well-trodden paths, and ours rarely goes north of 60°. Yet scientists from other disciplines (oceanography, biology, ecology, climate, anthropology, glaciology) love the thrill of the remote. From our own experiences and through shared storytelling, we recognize that research in the Arctic is not

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for the fainthearted. We know numerous scientists who got stranded, faced polar bears, survived submarine fires under the ice and helicopter crashes on land. In contrast, management scholars are more likely to be found in a conference centres in large cities around the world.

Despite being poles apart, we argue that Arctic change is a critical and emerging management topic for a number of reasons: 1. Arctic change is unprecedented; 2. It will affect societies and economies around the world; 3. These risks will be expensive if realized; and 4. Solutions require risk management at the planetary scale.[1]

1.

ARCTIC CHANGE IS UNPRECEDENTED

The Arctic summer is a time of day-round sun. If you can imagine the glare of bright light on white 24/7, then you can imagine the impact of the solar albedo effect in the Arctic. Every year, the Arctic summer sea ice melts back by a considerable extent, partly driven by the solar heat absorbed by the ice-free areas of the Arctic Ocean. Indeed, a few hundred odd years ago Arctic explorers like Franklin or Barents hoped for a certain amount of open seaways to sail their ships through. It didn't work out that way – Arctic ice was historically vast and inviolable, as both explorers found out before their demise. Despite its ominous

[1] Given the space constraints of an essay, we have avoided footnotes and a full list of references is available upon request.

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strength, Arctic summer sea ice has taken a beating in the last few decades, and neither explorer would get stuck in the same places today.

These changes are not isolated. Arctic temperatures, both on land and over the ocean, are rising at least twice faster than the global average. Satellites have measured continuous decline in summer sea ice over the last few decades, with 2012 unexpectedly falling to its lowest level, some thirty years ahead of climate model projections. The same year, satellites showed that the entire Greenland ice sheet was melting for the first time in recorded history. It was such an unusual event that even Rolling Stone magazine covered it, calling Arctic glaciologists "prophets of climate change". And that's how some of the CEOs we work with learned about the climate risks associated with Greenland – not from the pages of Harvard Business Review or a management journal, but from Rolling Stone.

New records of change continue. For instance, Arctic winter sea ice was at its lowest level in 2017. When there is less winter ice, there is less ice to melt in the summer, which means longer periods of open water, less albedo, more warming and more ice melt. What is less easy to see with the naked eye is that these changes are related to higher global temperatures caused by human-produced greenhouse gases, largely from the production and consumption of goods and services. Organizational and private activities worldwide are driving change in Greenland and throughout the Arctic, and scientists predict an ice-free Arctic in the summer sometime between 2030 and 2050.

2.

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WHAT HAPPENS IN THE ARCTIC DOESN'T STAY THERE

It might be a no-brainer to say that the Arctic doesn't have much in common with Las Vegas. One is cold; the other, hot. One is vast and sparsely inhabited; the other, compact and dense with human activity (and let's not forget the neon lights). But the biggest difference may be this: "What happens in the Arctic, doesn't stay in the Arctic."

In the Great White North, you can't forget your sins and leave them tucked away like you do in Vegas – Arctic-related climate feedback effects are coming back to bite you, no matter where you live. Arctic scientists call these effects "teleconnections" – physical linkages between the Arctic biosphere and other ecosystems thousands of kilometres away. Well-known teleconnections are things like sea-level rise. If we lose the Greenland ice sheet, we are looking at a 6-metre rise in sea level around the world. This type of cataclysmic change will likely take thousands of years for full effects to be realized. But sea level is already rising, and small Island states are feeling the effects today, as are coastal cities struck by storm surges.

Research also suggests that extreme weather in mid-latitude regions, including winter freeze, summer heat waves and storms, all may be related to extensive Arctic change. Climatologists argue that if we change heat exchange patterns in the Arctic Ocean, this may alter oceanic currents worldwide, and with that the pattern of moisture delivered to areas elsewhere throughout the world, disrupting agricultural cycles and food security. While management scholars are studying the organizational implications of extreme weather and climate change, the realization that some of these relate back to Arctic change is missing.

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The science behind many of these effects is still relatively new and the uncertainties are large. Once thing is certain, though: the Arctic is a barometer of climate change and the economic and social costs associated with it. We argue that it's time for the management community to consider how best to manage global risks arising from Arctic change.

3.

ARCTIC CHANGE IS EXPENSIVE

Flying into places like Resolute Bay in the Canadian Archipelago requires a certain basic acceptance of the need to manage risk. With intense fog conditions more common than not, pilots of small planes can make up to three attempts at a landing in the summer and then need to fly out to Cambridge Bay, 700 km away, because after three failures, they won't have sufficient fuel to reach land if they can't make it through the fog at Resolute. Flying in with a Canadian CEO in 2010, I [Gail] know this first-hand – I was so scared that I wanted my hand held in case we went down. While we landed successfully on the third attempt, the following year, in the exact same spot, a plane crashed, killing our scientific host.

Given that the Arctic is an extreme environment for research, why go? Here we argue that organizational scholars need to study the implications of Arctic change because the scale of change in this region will be expensive and disruptive for human societies and economies everywhere.

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Studies are starting to put a price tag on potential global economic impacts of Arctic change. Whiteman et al. (2013a) and Hope and Schaefer (2015) applied an established economic assessment tool called PAGE, which had been used in the Stern Review on the economics of climate change, to explore how the additional increase in global temperatures caused by greenhouse gas emissions from Arctic subsea and land permafrost could impact the global economy. The results are staggering: tens of trillions of extra cost that the next few generations may have to bear, should some of the worst-case scenarios materialise. The impacts will be global and will hit the poorest regions such as Africa and India the most. These are only two of many Arctic-driven feedback effects.

Of course, there are arguably some medium-term economic benefits from developing Arctic resources in the oil, gas and mining sectors, as well as commercial shipping, amounting to billions of dollars over the next few decades. There is, however, a catch. Our research shows that moving large-scale transit shipping operations to the Arctic will cause a non-negligible global redistribution of greenhouse gas emissions, particularly aerosols, resulting in net extra warming globally. This is despite reduced CO_2 emissions from the shipping itself due to the shorter routes and slower navigation speeds in ice-bearing Arctic waters. If the highest sea ice loss scenarios materialise, leading to a considerable growth in transit shipping between Europe and East-Asia from 2030s onwards, the price tag of this feedback loop could be up to $2 trillion over the next two centuries.

In addition, the teleconnections between sea ice conditions in the Arctic and extreme weather patterns in mid-latitude regions like Europe, US and East-Asia will add more costs to cities and companies because of the anticipated increase in extreme weather events. To put these economic losses into perspective, Superstorm Sandy in 2012 caused up to $50 billion in total

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losses (around $10 billion in insured flood losses), and it has been linked to Arctic change (Greene et al., 2013). In January 2014, the polar vortex shift caused deep-freeze in the US and Canada, with estimated economic losses at $15 billion.

4.

MANAGING RISK AT THE PLANETARY SCALE

Nobel Laureate Richard Thaler has said that we "often choose what is easiest over what is wisest." People usually do not see beyond the horizon (literally in space and beyond weeks/months/couple of years in time), and this may be especially applicable to environmental risks. A sign along the highway in the West Coast of the US tells drivers to "wake up and smell the permafrost." The relevance of this to drivers in rush hour traffic may be a little hard for most to fathom.

Yet Arctic change is an important pre-cursor of the things to come elsewhere on the planet, but only if one actively pays attention to complex cues from the natural environment. To develop workable management strategies to deal effectively with Arctic risks at the planetary level, we have to collectively make sense of effects that are several decades and even centuries away, and are spread across different geographic regions. This is a management conundrum.

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Management scholars can make important contributions to unravelling this conundrum. A key value-added dimension of the field of management studies is that we understand how information flows and risk assessments affect the sensemaking processes of decision-makers, particularly with respect to ecologically material risks. Nevertheless, the trouble with managerial sensemaking is that it's hard to know which things we should pay attention to, and many of our organizational sensemaking structures lack experience with interpreting cues from the natural environment. In addition, most of the policy instruments and legal frameworks that the international community draws upon to address climate change are governed by short-lived political and corporate cycles.

To help guide future management studies, we argue that managing systemic risks from Arctic change can be conceptualized as a grand challenge, but one that operates at a higher, more systemic level than normally studied by our discipline (Williams et al., 2017).

---- INSERT FIGURE 1 ABOUT HERE ----

In Figure 1, on the left hand side, we present Arctic change as being part of the wider set of Earth's system constraints referred to as "planetary boundaries". Introduced in the landmark paper by Rockström et al. (2009), the concept of planetary boundaries was used by Whiteman et al. (2013b) to define ecological foundations for corporate sustainability. This natural science concept is based on tracking key changes in the biophysical makeup of our planet, including biodiversity loss, changes in land use, ozone layer depletion and climate change, all of which are unintended by-products of the industrial society. A key implication of the planetary boundaries framework is that risks emerging from one part of the planetary system

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– e.g., the Arctic – affect other social-ecological components because of intrinsic cross-scale linkages.

We know from our colleagues in the natural sciences that Arctic change is an important driver of the global climate system. We argue that the Arctic therefore needs to be recognized more explicitly as a powerful feedback mechanism affecting the long-term sustainability of societies, economies and organizations around the world. On the right hand side of Figure 1, we encapsulate the goal of global sustainability via a depiction of the United Nations' Sustainable Development Goals. Adopted by 193 countries in 2015, these 17 goals set out the most pressing grand challenges facing societies worldwide with 169 targets for effective action by 2030.

Management scholars have begun to conceptualize organizational responses to the sustainable development goals. To this work, we explicitly add in the feedback effects of Arctic change as a key part of global climate system – the ongoing loss of Arctic sea ice, permafrost and glaciers are a result of global climate change and will, in turn, further amplify climate change and accelerate other planetary changes. Critically, Figure 1 suggests that Arctic change will make it harder for the world to meet many of the UN's Sustainable Development goals.

Despite substantial scientific progress in evaluating climate-related risks marked by the 5th IPCC Assessment Report, Arctic change is still characterised by high levels of uncertainty and potentially high extents of damage, which requires a precautionary management approach. This includes continuous monitoring and transdisciplinary research efforts to narrow down the uncertainties. At the same time, the delay and subtlety (at least to those not

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in the Arctic) of the effects of climate change means that the considerable risks associated with it tend to be ignored by the public, which calls for discursive management approach. This involves science-based education needed to change public perception and put contingency measures in place.

If scholars are to help policymakers and organizations understand the managerial and governance challenges of Arctic change, they need to become more pioneering in scientific collaborations and actively engage with a wide range of stakeholders. At the same time, management journals need to prioritize transdisciplinary research. Scholars have to build new networks, new languages, new co-designed research studies.

This is not easy to do – as a qualitative scholar (Gail), it's not always obvious how to understand and add value to quantitative observational scientists and modelers of climate change. Yet it can happen. A compelling example is the European funded ICE-ARC (Ice, Climate, Economics – Arctic Research on Change) project, which combines the expertise of Arctic observational science and modeling with economic models and the sensemaking processes of industry decision-makers and local communities. But scholarship on its own is insufficient.

Ultimately, management scholars need to step out onto the world stage and engage with global decision-makers in order to deal effectively with Arctic change. Publishing our work is still essential, but it is not the end-goal. The end goal is to help manage the mitigation and adaptation plans that are required to deal with the enormity of Arctic change. In order to do that, we believe that scientists – and management scholars – have to influence global decision-makers with innovative forms of science engagement and communication. That's

why we set up the Arctic Basecamp at Davos in 2017 and 2018 at the World Economic Forum's annual meeting – an unusual venue for communicating the urgency of Arctic change. With over 80 scientists, politicians, business and civil society leaders in attendance, we re-frame Arctic change as a barometer of global risk in order to kick-start discussions on potential organizational solutions.

Has Arctic change gone too far to be fixed? Let's hope not. But as the sign says, it's time to wake up and smell the permafrost.

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Figure 1: A Framework for managing Arctic change