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Climate Change, Business and Society:

Building Relevance in Time and Space

Abstract

Climate change is one of the most pressing issues facing humanity and has become an area of growing focus in *Business & Society*. A review of climate change discussion within this journal highlights the importance of time and space in addressing the climate crisis. We extend existing research by theorizing and politicizing the co-implication of time and space through the concept of “space-time”. To illustrate this, we employ the logical structure of “the trace” to advance business and society scholarship on climate change by shifting the focus to a place-bound emphasis on climate impacts and directing scholarship towards climate change’s temporal markers and material effects. By operationalizing “the trace” we contribute to *Business & Society* debates in three ways: (i) reimagining complex stakeholder relations, (ii) advancing a performative understanding of climate risk, and iii) foregrounding planetary systems and the physical environment.

Key words: climate change; time; space; the trace; materiality, politics.

Humanity faces no greater challenge than climate change. The severity of the issue is detailed in the latest Intergovernmental Panel on Climate Change (IPCC) Assessment Report: the planet is experiencing warming unseen in 125,000 years and atmospheric carbon levels are at their highest in over 2 million years (IPCC, 2021). Climate change has led to a procession of unprecedented heatwaves, droughts, fires and storms, with projected warming presenting an apocalyptic future likely incompatible with continued organized human civilization (New et al., 2011). As UN Secretary-General António Guterres grimly declared, we have now reached a “code red for humanity” (Harvey, 2021).

However, in addressing climate change, business and society research continues to support an agenda of climate enlightened business-as-usual (Bansal & Knox-Hayes, 2013; Tregidga et al., 2018). Much of the research in our field appears to take for granted an assumed compatibility between business interests and the protection of the planet, evident in the emphasis on climate responses that benefit firms through competitive advantage (Furrer et al., 2012), superior financial returns (Busch & Hoffmann, 2011), or improved environmental performance (Rekker et al., 2021). Current business theories and practices are expected to continue only in a “less unsustainable” manner (Ehrenfeld, 2008, p. 6).

This instrumental position is also reflected in the overlapping organizations and natural environment (ONE) literature, where climate change is interpreted mostly through discourses of “business strategy”, “resilience” and “corporate sustainability” (Delmas et al., 2019; Hahn et al., 2017). Within this literature, climate change is generally translated into a “business case”, addressed through the familiar language of market opportunity and performance (Backman et al., 2017; Pinkse & Kolk, 2010; Weinhofer & Hoffmann, 2010). An underpinning thread weaving through much of this research emphasises how firms identify and manage regulatory, market, technological and physical risks related to climate change (Hoffman, 2005; Kolk & Pinkse, 2007; Thistlethwaite, 2012).

Against this, a more critical scholarship on climate change and business has emerged within the broader field of management and organization studies, which questions assumptions of a “win-win” relationship between business and environmental outcomes and highlights how the economics of capitalism is a key driver of the climate crisis (Wright & Nyberg, 2015). This critical scholarship focuses on issues such as the limits to “sustainable development” (Banerjee, 2003); climate change denial (Hoffman, 2011); corporate political activity and fossil fuel “hegemony” (Ferns & Amaeshi, 2021; Levy & Egan, 2003; Nyberg et al., 2013); the limits of market-based responses to climate change (Böhm et al., 2012); and the broader implications of living within “planetary boundaries” (Whiteman et al., 2013). These scholars, echoing many of the same concerns voiced by early critical work on business-natural environment relations (Gladwin et al., 1995; Purser et al., 1995; Shrivastava, 1995), warn of the futility of relying on the same thinking that has contributed to the planetary crisis in the first place. Indeed, as recent reviews of corporate sustainability in *BAS* suggest, “an almost obsessive concern with firm-level financial and social/environmental performance” (Tregidga et al., 2018, p. 293) has resulted in *BAS* research losing its early “ideological and paradigmatic zest” (Hahn et al., 2017, p. 159).

Given the urgency and the catastrophic impacts of climate change, there is arguably a need to take a bolder approach to theorizing the intersection between business, society and climate change. Here, the business and society community can take much needed inspiration from the broader social sciences and humanities, where scholars remain passionately determined to understand how structural barriers and contradictions within capitalist relations shape practices and discourses of climate change. For example, classical studies in political economy explain the contradiction between capital accumulation and climate change (Foster, 2002; O'Connor, 1998). Moreover, detailed historical investigations have revealed how business has funded the denial of climate change and obfuscated political action (Oreskes &

Conway, 2010). There are also ample sociological studies exploring the social construction of climate denial (Norgaard, 2011). What this critical research highlights is that business, and especially fossil fuel companies, have successfully *delayed* taking substantive action to address climate change (Lamb et al., 2020), and continue to *displace* responsibility (Supran & Oreskes, 2021).

In addressing the temporal urgency and place bound impacts of climate change, recent scholarship within the field of business and society has suggested theoretical shifts around two key concepts: time and space (Bansal & Knox-Hayes, 2013; Mazutis et al., 2020; McKnight & Linnenluecke, 2019; Slawinski et al., 2017; Valente, 2012). While these concepts appear somewhat abstract, they are individually and jointly productive in theorizing business responses to climate change.

First, time is central in understanding the predicament of climate change. The inability to adequately address climate change is to a large extent due to the framing of particular (often short- or medium-term) timeframes, evident in the focus on quarterly and semi-annual financial reporting (Bansal & DesJardine, 2014). This is exemplified in recent commitments by firms to be carbon neutral by mid-century, which can be seen as a form of “predatory delay”, serving to push much-needed decarbonisation into a distant future (Kramer, 2020). Further, as Slawinski and Bansal (2012) illustrate, how time is conceptualized can have a significant influence on how businesses, as well as societies, respond to climate change.

Second, despite the increasing physical impact of climate change, the operating space of businesses is foremost treated as a context or resource (Bansal & Knox-Hayes, 2013). Firms’ embeddedness in specific locations often only accounts for those elements that can be priced through markets, with other elements viewed as “externalities”. Moreover, firms operate at a level of generality that often fails to consider place in its “sociocultural historical specificity” (Shrivastava & Kennelly, 2013, p. 86). Nevertheless, the material embeddedness of

communities and organizations within socio-ecological spaces significantly influences how actors make sense of and seek to adapt to climate change (Bowden et al., 2019; Edwards et al., 2021; Williams et al., 2021). This raises ethical concerns as disadvantaged groups—e.g., women and indigenous communities in economically emergent countries—are those most significantly affected by the impacts of climate change, despite having done the least to contribute to the problem (Alston, 2013).

We argue that, taken together, these two dynamics—time (climate change is already happening) and space (physical climate impacts are occurring here)—are crucial in developing ways to address the current climate crisis. More specifically, we aim to conceptually develop the co-implication of time and space, or “space-time” (Massey, 2001); that is, there is no temporality of climate change without spatiality of its effects and no spatiality of events without the inscription of temporality. As such, and in response to recent calls within *BAS* (Mazutis et al., 2020; Slawinski et al., 2017), the aim of our article is to develop spatiotemporal perspectives that open up new research avenues for business and society scholars. These new directions shift the current firm-centric approach in the field towards a greater focus on the material and societal implications of the climate crisis.

Looking ahead, our article seeks to guide future research on climate change in business and society toward different space-times currently neglected in the literature. This includes rethinking stakeholder dynamics, the meaning of risk, and the role of the physical environment. In doing this, we seek to better locate firms’ impacts, events, and negotiations in their spatiotemporal marks (Mazutis et al., 2020), promoting accountability and addressing firms’ articulated responsibilities (Gond & Nyberg, 2017), and developing theory that contributes to more radical climate action.

Our article is structured as follows. First, in reviewing the published research on climate change within *BAS*, we highlight the importance of time and space in understanding both the

impacts of climate change and limitations in addressing the climate crisis. We then show how the development of the concept of space-time provides an alternative perspective. We employ Derrida's (1982) notion of "the trace" to explain how the concept of space-time offers new ways to see and act on climate change. In the final section of the article —"Looking ahead"—we operationalise the concept of "the trace" to extend existing themes of discussion in *BAS* and highlight specific future research agendas in a call to arms to address the climate crisis.

Looking Back: The Emergence of Climate Change in Business and Society Research

Despite the general neglect of climate change within mainstream business scholarship (Nyberg & Wright, 2020), *BAS* has published a steady stream of research addressing the business implications of climate change (for example Backman et al., 2017; Furrer et al., 2012). In reviewing *BAS* publications over the last twenty years (2001-2021), we found 158 articles (28 per cent of a total of 570 articles) mentioning "climate change" or "global warming". This suggests that the journal's authors and audience recognize the importance of this issue. Of these, 25 articles draw on climate change as a primary focus. Within these articles, three, at times overlapping, themes have been especially salient: (i) how firms engage with climate change through (multi)stakeholder relations; (ii) how climate change represents different forms of risk for businesses' operational and financial performance; and (iii) how climate change brings forward the importance of physical aspects of the natural environment for business.

Business Stakeholders and Climate Change

A central theme in *BAS* focuses on how firms engage with climate issues through various types of stakeholder relationships, partnerships, and governance networks. This research emphasises how multiple actors engage with climate change, either in collaboration with one another (Kolk & Tsang, 2017), or through confrontation and contestation with, for instance, social movement

organizations (Carberry et al., 2019; van Huijstee & Glasbergen, 2010) or shareholder pressure (Clark & Crawford, 2012; Guenther et al., 2016). A central undercurrent in this literature is how actors can address challenges posed by climate change by finding synergies and establishing consensus where possible (Kolk & Tsang, 2017). As Albareda and Waddock (2018, p. 640) elaborate in their study on governance networks, “[a] main challenge [...] is how such systemic thinking processes can result in change that guides the system in desired directions, through a degree of reconciliation of different and conflicting interests, values, and power endowments.” Similarly, in relation to multistakeholder partnerships, *BAS* scholarship stresses the need to foster shared, collective responsibility between actors with contrasting interests in responding to climate change (Pinkse & Kolk, 2012).

However, in these accounts climate change is commonly seen as a lens through which to analyse stakeholder interactions, resulting in actors being materially disconnected from both local environments and the physical realities of climate change. Scholars emphasise climate change as a context to advance organization and management theory (e.g. regarding multistakeholder partnerships), instead of considering how such theories and management practices impact or can be used to protect the environment (for example Pinkse & Kolk, 2012). There are studies that foreground the importance of politics in studying, for example, the competition to claim definitional authority over the science behind climate change (Rothenberg & Levy, 2012) or meanings of “sustainability” (Ferns & Amaeshi, 2019). However, these are concerned with elite actors and power games involving major stakeholders (big business, national governments, and powerful NGOs). This overshadows the consequences for natural habitats and local communities, which are frequently marginalized from stakeholder deliberations (Driscoll & Crombie, 2001).

Climate Risk for Operational and Financial Performance

A significant proportion of *BAS* articles frame climate change around uncertainty and risk, emphasising how such factors impact firms' operational and financial performance (Okereke et al., 2012; Rekker et al., 2021). This includes the impacts of climate risks on business stability and strategic decision-making (Furrer et al., 2012) as well as managing risk through improved environmental performance (Puppim de Oliveira & Jabbour, 2017; Rekker, Humphrey, & O'Brien, 2019). Here, scholars stress how climate change creates uncertainty as businesses attempt to manage increasingly scarce physical and natural resources (Backman et al., 2017; Tashman, 2020). For example, in response to climate change uncertainties, Thistlethwaite (2012) details the development of best practice standards for industry as key players leverage technical and political authority to effectively price climate risk. Scholars have also pointed out that managing uncertainty, for instance by reporting carbon emissions or pricing climate change risks, may have positive financial outcomes for firms (Busch & Hoffmann, 2011).

However, risk is framed around business concerns and short- to medium-term profit motives, with little attention given to the risk climate change poses for communities or the natural environment. Furthermore, the dangers of climate change are located in large datasets and the minds of managers trying to make sense of their business environments (Friedrich & Wüstenhagen, 2017) where the physical materiality of the changing climate exists mostly as a dislocated abstraction—i.e., in the form of financial modelling and risk management systems (Busch & Hoffmann, 2011).

Business and the Physical Environment

A third, nascent theme in *BAS*, part of which addresses the concerns above of risk and uncertainty related studies, elevates the importance of the physical environment (Edwards et al., 2021; Linnenluecke & Griffiths, 2010; Pinkse & Gasbarro, 2019; Williams et al., 2021). While these studies take various perspectives, a central theme concerns reducing uncertainty

and improving climate resilience of firms by attending to different types of threats posed by the physical environment (Haigh & Griffiths, 2012). In this vein, scholars stress the importance of developing organizational structures, models and other risk management capabilities that help firms anticipate and plan for extreme climactic events and minimise threats to firms' operational activities, often with the potential of identifying opportunities for new value creation (Pinkse & Gasbarro, 2019).

Through direct experience of extreme climactic events, researchers argue that greater attention is accorded to climate change by businesses. For instance, in Haigh and Griffiths' (2012) study of Australian electricity companies, managers placed much greater emphasis on climate change in strategy making once climatic events were, as the authors frame it, "closer to home" (p. 91). Similarly, Pinske and Gasbarro (2019), studying the oil and gas industry, suggest that "Whether firms will experience and notice potentially disruptive climate stimuli largely depends on the specific location of their operations" (p. 339). Yet, despite taking the physical environment seriously, these studies remain fixated on temporally isolated climactic events, primarily interpreted through the lens of firm-level activity (for exceptions see Edwards et al., 2021; Williams et al., 2021). We are, therefore, left with fragmented snapshots of extreme climactic events, or "surprises" (Haigh & Griffiths, 2012), causing reactive changes to strategy and planning processes.

Reframing Business Understandings of Climate Change Around Time and Space

Whilst this literature stresses how businesses adopt a short-term strategic position in the face of growing climate uncertainty, it also places the understanding of climate change within an abstracted, global space, which is dislocated from those severely affected by climate change, such as marginalized communities and entire ecosystems. This perspective is likely to be counterproductive for firm performance in the long run, since, as Williams et al. (2021, p. 95)

argue: “a narrow focus on optimizing organizational resilience from one firm’s perspective may come at the expense of social-ecological functioning and ultimately undermine managers’ efforts at long-term organizational survival.” Thus, a more expansive approach is needed to extend current debates beyond the confines of the firm and its immediate business environment. This can be achieved by developing greater appreciation for the temporal and spatial dynamics of climate change.

Time in Climate Change Research

Time has become an increasingly central consideration in the field of business and society in understanding the human-nature relationship and explaining organizational responses to climate change (Lê, 2013; Nyberg et al., 2020; Slawinski & Bansal, 2012; Slawinski et al., 2017). This is not surprising considering the temporal urgency in addressing climate change. Even though time is a multifaceted concept with diverse theoretical categorizations (Orlikowski & Yates, 2002), there are two dominant conceptualizations of time within the field of business and society: clock time and process time (Mazutis et al., 2020).

Clock time refers to an objective understanding of time as something that exists independently from human experience (Mosakowski & Earley, 2000). This perspective represents the most common understanding of time in business, given the tendency to divide organizational life into measurable units that are clearly defined and, for the most part, fixed (Ancona et al., 2001; Reinecke & Ansari, 2015). With such a static and universalistic view, time is often viewed as a resource or commodity. For example, businesses can make trade-offs by forgoing something in the present in order to obtain benefits in the future (Kim et al., 2019). This view is further exemplified in practices such as just-in-time inventory systems, billable hours and quarterly earnings reporting (Orlikowski & Yates, 2002).

Research in *BAS* that addresses climate change largely adopts this clock time perspective. For instance, studies focusing on the relationship between specific climate change impacts and the firm are often represented as short-lived and happening in the present or near past (Backman et al., 2017; Tashman, 2020). Alternatively, research in the broader field has examined corporate responses to defined regulatory changes around carbon emissions mitigation, which are themselves time-limited (Hoffman, 2005). This time-framing favours easily quantifiable near-term events over phenomena that occur over longer temporal spans or scales that are harder to commodify or predict (Lê, 2013; Slawinski et al., 2017). By relying on financial reporting cycles for their data sets, which commonly involve analysing yearly corporate reports (Boiral & Henri, 2017) or self-disclosed information (Backman et al., 2017; Guenther et al., 2016), climate change is strictly ordered into contained annual blocks. Even in cases where longer time frames are considered, the tightly delineated time periods remain disconnected from one another.

The second, process-orientated approach to time, provides an openness to temporal multiplicity and challenges the ontological understanding of objective time existing in discrete measurable units (Chia, 2002; Hassard, 2002). The concept of “process time” highlights how the human experience of time is subjective rather than an objective external entity (Ancona et al., 2001; Hussenot et al., 2020). That is, any understanding of time is based on its embeddedness within a particular (organizational or societal) context, which is dependent on individual and collective norms, beliefs, and customs (Orlikowski & Yates, 2002) and its material effects (Hernes et al., 2021). From a process perspective, “time is inextricably linked with our consciousness and involves the continuous progress of the past that gnaws into the future” (Chia, 2002, p. 864). Thus, in this view, time is socially constructed and experienced through the interpretation of actors that assign meaning to events or cycles.

While not as prevalent as clock time, process time does feature in *BAS* climate change research (Hoffman & Jennings, 2021; Kolk & Tsang, 2017). In this vein, studies consider temporal dynamics that emerge from managers' interpretation of climate change (Albareda & Waddock, 2018; Haigh & Griffiths, 2012). For example, Ferns and Amaeshi (2019) and Rothenberg and Levy (2012), emphasise how major "field configuring events" (such as the United Nations climate negotiations or major scientific climate reports) influence socially constructed temporal brackets; specific events are placed in "created" time lines "in order to gain a sense of historical development" (Rothenberg & Levy, 2012, p. 38). The experience and context of time illustrates how social dynamics and natural systems shape managers' understanding of time. A notable example is Pinske and Gasbarro's (2019) study of the oil and gas industry's response to the physical impacts of climate change, where the authors illustrate how organizations, in some instances, consider "hindcasting [...] of data on wind, currents and wave height over 1,000 years", and timescales that are expected to materialize at "anytime" (Pinkse & Gasbarro, 2019, p. 347).

However, it should be noted that whether clock or process interpretations of time are employed, time "...remains something to be categorized and managed: we organize time, it does not organize us" (Holt & Johnsen, 2019, p. 1557). In both interpretations, prioritization is given to the unfolding of time from the perspective of managers, the organization, its stakeholders, or the organizational fields within which organizations are embedded. There is limited consideration of temporal dynamics beyond human categorizations (e.g., hours, days, months) or experiences (e.g., 'quiet time' or 'flow'), with the planetary dynamics of climate change confined to a particular horizon of possibility rooted in dominant business trajectories or cycles.

Space and Place in Climate Change Research

Similar to time and temporality, space and place have gained increasing attention in business and society studies that address the natural environment (DeBoer et al., 2017; Guthey et al., 2014; Shrivastava & Kennelly, 2013; Slawinski et al., 2021). While space often denotes an abstracted and indirect reference, place emphasises a more tangible, direct experience of what is often a physical location (Lawrence & Dover, 2015). Studies of the natural environment often take “place” to encompass the “material reality” of natural systems, for instance in the form of: “ecological embeddedness” (Whiteman & Cooper, 2000, 2011), “ecological environments” (Crane et al., 2008), or “landscape” (Shrivastava & Kennelly, 2013).

However, in relation to the natural environment, the degree of attachment between business organizations and place is unclear (Guthey & Whiteman, 2009; Peredo & Chrisman, 2006). Indeed, business and society scholars have argued that business organizations’ “sense of place” (McKnight & Linnenluecke, 2019, p. 832) is often “disconnected” (Mazutis et al., 2020, p.12) from a broader spatial context. This leads to a situation referred to as “placelessness”, which is problematic for addressing environmental issues, since these organisations “seem detached from the local environment and tell us nothing about the particular locality in which they are located” (Cresswell, 2004, p. 43).

This is evident in *BAS* research on climate change, where articles consider how firms engage with climate issues by emphasizing abstracted and globalized non-places (Mazutis et al., 2020). This includes studies focusing on how firms engage with climate issues through globalized financial markets by analysing sustainability ratings and indexes (Furrer et al., 2012; Rekker et al., 2021). While these financial markets are in a sense a material place of big data centres with increasing carbon emissions, they are far removed from the natural and social systems most adversely affected by climate change. The locality generally occurs through the organization as place, which is often a single firm (Thistlethwaite, 2012), industry (Kolk &

Tsang, 2017; van Huijstee & Glasbergen, 2010), or organizational field (Rothenberg & Levy, 2012). These places become the space where climate change happens; an oversimplification that neglects how organizations are embedded within broader natural systems and local places (Williams et al., 2021).

The few studies that do focus on concrete places predominantly consider the *physical* impacts of climate change and climatic events on organizational operations (Linnenluecke & Griffiths, 2010; Linnenluecke et al., 2013). While these studies highlight the material impacts of changes in the natural environment (e.g. extreme weather events) to local areas, communities, and spaces where firms operate, it remains uncertain whether these organizations are embedded, belong, or share any sense of place with surrounding communities and their environment (Shrivastava & Kennelly, 2013). Firms can, after all, relocate their operations in response to climatic impacts and this is one way in which companies can respond to the physical risks of worsening climate disruptions (Nyberg & Wright, 2016). Indeed, in the few climate-related studies that consider place explicitly, the sorts of organizations emphasised are typically resource-extractive firms that enjoy asymmetrical power relations with local contexts in which the firm clearly dominates (Pinkse & Gasbarro, 2019). When community-based responses to climate impacts are explored, studies show the importance of local specific knowledge in understanding experiences of climate change impacts (Bowden et al., 2019; Wissman-Weber & Levy, 2018).

Climate Space-time and the Logical Structure of “the Trace”

Thus far, we have explored how time and space are deeply implicated in how business and society scholars investigate climate change. We have also problematized how business and society scholarship reproduces a constrictive understanding of time and space, privileging particular organizational actors and relationships at the heart of climate politics. This occurs by

constructing time as subject to human control and space as immaterial and distant. In this section we engage with the concept of space-time (Massey, 2001), with the aim of placing business organizations in a spatially grounded timespan that foregrounds the politics of climate change. This is followed by a brief comparison of different perspectives on time and space within *BAS* to clarify how, in the final section of this article—‘Looking ahead’—we can extend discussions in the field.

The conceptualization of space-time points to the mutually reinforcing and intertwined relationship between the spatial and temporal dynamics of climate change. This is a non-linear temporal succession that is spatially located. That is, the moving of time is marked by the spacing of intervals that separate past from future (Derrida, 1973). As such, space-time is the movement—the in-between—that illuminates a difference in time and space. This means that there is no temporality of climate change without spatiality of its effects and no spatiality of climatic events without the inscription of temporality.

The co-implication of space and time, or space-time, can be illustrated using the logical structure of “the trace” (Derrida, 1982). A trace refers to a visible material marker that exists independently of individual experience and subjective consciousness. Traces show the co-implication and movement of space over time—for example paw prints in the snow or a dotted line on a piece of paper. The physical marks left behind by a trace are not identical as they are spaced and separated. This is a repetition that supplements, and thus changes, the previous meaning of the mark in the trace (Cooper, 1989). As such, the trace is not an objective measure or nomination, since it is always in deferral to the next sign or clue. This movement—the in-betweenness—is simultaneously a movement in space and time (hence, space-time). This does not mean succession in a chronological linear sense; rather, the trace shows the constative delay or deferral inherent in temporality.

Emphasising traces or the spacing of time helps engender an affirmative succession of time (Derrida, 1976). That is, without the marks of time, a past cannot be retained for a future. The co-implication of time and space therefore links spatial inscription to a sense of temporality, which, in turn, persists through time. Any sign or mark exists in time as a deferral or succession in the sense that it always refers to elements that exist before or after. Each trace only makes sense by referring to its own succession and, simultaneously, something other than itself by showing a contrast to what it is not and where it has been.

Examining the traces of climate change helps account for time through material markers or place-bound events that give a temporal trajectory to space, thereby moving the concept of time beyond both universal and experience-based temporality. Simultaneously, local events or traces of climate change provide temporal movement or progress—i.e., traces show temporality. This has important implications for climate change research in the field of business and society by placing human (and organizational) operations in time, theorizing their marks on the planet, and exploring impacts on both humans and non-humans.

Table 1 outlines how space-time differs from dominant conceptualizations of time and space in *BAS*. While this is a synthesis of the different perspectives and debates on both time and space, the table illustrates basic assumptions underlying the spatiotemporal approaches to climate change and can be read from both left and right with the conceptualization of space-time in the middle column.

===== INSERT TABLE 1 ABOUT HERE =====

First, as illustrated on the left-hand side of the table, the position on time differs between clock and process time. Clock time is ontologically seen as an objective reality, with the clock metaphorically representing the linear progression of time—e.g., without a drastic fall in

emissions by 2030 global warming will surpass 1.5 degrees Celsius, leading to irreversible loss of the most fragile ecosystems (IPCC, 2021). The process view of time, often represented by the metaphor of a cycle, is socially constructed by humans and becomes meaningful through the subjective experience of lived time and events—e.g., the Copenhagen climate summit in 2009 was experienced as a failure by many (Vidal et al., 2009). Time also differs in terms of our knowledge of it: while clock-time is a representation of time in quantifiable units—e.g., the hands on a watch, the months on a calendar, or the daily schedule on our phones—process time is firmly located within human experience by placing human consciousness at the centre. Typically, there is a privileging of time and temporality over space, both as chronology of linear time (clock) or a duration of experience (process). This contributes to a deferral of time, including substantive climate action, since the measure or experience of time has no visible present within an identifiable place.

In contrast, our conceptualization of space-time, as illustrated in Table 1's middle column, is an affirmative succession of time (Derrida, 1976). The trace records temporality, including how the past relates to the future, and vice versa. Deferral of time is accounted for in the different physical markers of the trace, which refers to temporal progression and, simultaneously, spatial contrast. Derrida (1973) coined the term “différance” by combining the French for “difference” and “deferral” to emphasize variance from the previous mark, its context and as deferral of a final point or experience. For instance, historic atmospheric carbon concentrations in an extracted ice core are distinguishable from one another through analysis of air bubbles trapped in the ice. As such, the trace precedes human consciousness—in contrast to either clock or process time, climate traces cannot be represented nor experienced subjectively. Since there is no origin, or ‘real’ source from which an experience can be derived, the trace transcends opposition between subjective and objective ontologies (Derrida, 1976).

Second, as represented on the right-hand side of the table, dominant conceptualizations of space in many ways mirror those of time. On the one hand, ontologically space may be seen as an objective, or ‘real’, resource that firms exploit and extract monetary value from (Tashman, 2020). In this vein, the classic image of a globe or map is often used to measure and control space. For example, emissions trading schemes such as the European Union ETS, are typically place-bound by geographic regions; anything occurring outside a predefined territory, such as emissions from ships that sail in international waters, are expressly excluded (Stone, 2021). On the other hand, space may take on a subjective meaning for people, groups and communities. Based on this view, organizations and their members are embedded in a location with a particular landscape (e.g., Gulf communities seriously affected by weather cycles and hurricanes), which form the interaction with stakeholders and the natural environment (Edwards et al., 2021). However, whether space is seen as an exploitable resource for business (Pinkse & Gasbarro, 2019) or a meaningful subjective experience (Shrivastava & Kennelly, 2013), dominant conceptualizations mostly privilege space over time, with control of space influencing the dominant history and future trajectories.

In contrast, we argue that in space-time material resources or locations are markings of time. These marks, that are different to both previous marks and the environment of the marks (i.e, *différance*), are performative in that they interact in the present. This interference occurs in that which is absent—the difference in relation to what is “no longer or not yet” (Hägglund, 2008, p. 82). Since there are no self-identical objects or subjects, Derrida (1994) formulates a “hauntology” instead of the classical “ontology” to describe what leaves (i.e., “haunts”) a trace without being either present or absent (Royle, 2003). In politicizing climate change, what is haunting the trace are exclusions, created for instance in the drawing of borders and hierarchies. As discussed next, such exclusions highlight the responsibilities towards voices no longer heard

and the anticipation of demands from marginalized humans and more-than-humans. Turning to the past and the future, it is this indeterminacy that affirms and interconnects the present.

Looking Ahead: Developing Climate Change Research in *Business & Society*

We argue that by engaging with the concept of space-time, business and society research can make a more significant contribution to understanding the climate crisis and promote climate action. Space-time assists in highlighting the urgency of the issue and representing voices of people, communities and natural habitats haunting business practices. By interjecting the logical structure of the trace upon the three themes already evident in the journal, the following section outlines a broad agenda for *BAS* research on climate change by (i) reimagining stakeholders, (ii) advancing a performative understanding of climate risk, and (iii) foregrounding planetary systems and the physical environment.

Reimagining Stakeholders

As we have seen, existing business and society scholarship on climate change highlights the importance of stakeholder-firm interaction in how firms understand and respond to climate issues (Guenther et al., 2016; Pinkse & Kolk, 2012). In this vein, climate-related traces can be utilized to broaden our conceptualization of what it means to have a “stake” in the climate debate beyond the narrow boundaries of the firm. In doing so, scholars can extend current theorizations of stakeholder relations to encompass a much wider set of actors, places, and non-human entities grounded firmly within space-time.

For instance, a key issue raised by several studies on stakeholder relations focuses on the need to include marginalized voices (Ramus et al., 2021; van Huijstee & Glasbergen, 2010). While often considered peripheral to business operations, these voices are frequently silenced or forgotten as too radical or immaterial in the drive for economic growth. Klein (2014, p. 169)

argues that these forgotten voices are sequestered within “sacrifice zones”, or “places that, to their extractors, somehow don’t count and can therefore be poisoned, drained, or otherwise destroyed, for the supposed greater good of economic progress”. These are materially “haunted” places of temporal decay and the trace can be employed to understand the constructions and effects of boundaries around sacrifice zones and the marginalization of people that inhabit them. Traces are spatial by physically marking out particular locations and boundaries, and temporal in their entanglement with power struggles, often associated with violent colonial histories (Mahony & Endfield, 2018). Indeed, the trace illuminates hierarchical and dualistic differences between self/we and the Other (see Rhodes, 2016), and between the boundaries that separate global North over South, man over woman, and human over animal. This is important in not only challenging the prioritisation of privileged actors as “legitimate stakeholders” (Phillips, 2014), but also in recognising that forgotten “stakeholders” can retaliate and cause reputational damage by publicly shaming firms over their environmental and social destruction (Ferns et al., 2021).

Accounting for a diverse range of stakeholders and acknowledging pluralism and dissensus can also be productive in challenging prevailing assumptions and institutionalised practices (Rhodes et al., 2020; Vachhani, 2020). An especially salient arena in which critical voices play a crucial role, and where the trace may offer fruitful research possibilities, concerns climate negotiations, meetings, and other related gatherings (Banerjee, 2012; Ferns & Amaeshi, 2019; Schüssler et al., 2014). Consider, for instance, how Pacific Island nations were able to create powerful coalitions that negotiated the need for the more ambitious goal of avoiding 1.5 degrees Celsius global warming during the final Paris Climate Agreement. Their crucial involvement can be studied, as Carter (2015, p. 216) exemplifies, by analysing traces, including “lobbying in [...] meetings, dialogues, and, in some cases, in airport and hotel lounges”, and various forms of e-diplomacy, such as YouTube videos, tweets and online blogs.

Another example of how the trace could be utilized in stakeholder considerations of climate change is to consider the example of Fridays for Future which have become a powerful global challenge to business-as-usual practices. In these protests, school children themselves mark the intergenerational effects of climate change. Their claims, such as Greta Thunberg's speech at the 2019 UN Climate Action Summit—"How dare you. You have stolen my dreams and my childhood with your empty words"—provide temporal and spatial markers of how current generations have destroyed the ecosystem for future generations (Milman, 2019).

Exploring the temporal and spatial dynamics of these traces provide novel insights into the way marginalized groups gain voice as climate stakeholders. For example, how do these groups win support by employing traces strategically—e.g., Pacific Island nations utilizing last minute backstage tactics to force a significant change in climate policy; indigenous groups using materials from their lands to show connection to the earth and evidence of destruction of their land; or young people's strategic use of temporal arguments and rhetoric surrounding intergenerational justice.

Moreover, these traces are not artefacts that exclusively engender dissensus and contestation; rather, a trace could be a potential "nodal point" that fosters a sense of collective solidarity between disparate groups (Hajer, 2005). However, a central issue remains, namely the complexity of untangling the web of asymmetrical power relations between multiple actors (Okereke et al., 2012). Traces could be especially useful here to democratize the stakeholder dialogue process (Moriarty, 2014); after all, there is no specific privileging of one actor over another. Traces dissolve single actor agency and reveal their creation by a constellation of actors in a particular context.

Performative Climate Risks

While risk and opportunity have been strong themes in *BAS* as well as the broader business and society literature on climate change (Busch & Hoffmann, 2011; Lash & Wellington, 2007; Thistlethwaite, 2012), employing the concept of the trace can serve to highlight not only the historical trajectory of business-climate relationships but also the performative aspects of risk markers. Risk calculations, after all, not only seek to represent potential threats, but are also traces themselves that connect trajectories and anticipations in forming business decisions, thereby (per)forming the future to come (Nyberg & Wright, 2016). In this vein, the trace can both show and account for temporal and spatial shifting of business constructions of climate impacts.

For instance, the performative nature of business risk calculation has been recognised in a range of organisational literature, which highlights how the calculation of a risk creates practices that shape the very phenomena risk models seek to predict (Hardy et al., 2020), i.e. they become self-referential (MacKenzie, 2006). However, the modelling of business climate risk always excludes forces and relations that are difficult to account for within a calculable, market rationality. Research into business efforts to model climate risk are replete with examples of energy, resource and financial organisations continually haunted or surprised by unprecedented climate-fuelled weather events in which nature bites back and the risk calculations misfire (Haigh & Griffiths, 2012; Nyberg & Wright, 2016).

By acknowledging the performative aspects of risk, the concept of the trace can assist in understanding the spatiotemporal dynamics of climate change. The marks of a trace are never identical nor in the same place but “move” across time and space, made explicit, for instance, in biological processes such as evolving tree rings or shifting ice packs. While a clock perspective reading of these traces suggests the linearity of years or seasons, a more productive analysis shows that the inscriptions are never identical. It is in between the tree rings and the variability of the marks that change happens, including in relation to the tree’s surroundings

(notably disruptive human activities). Likewise, the unprecedented increase of carbon emissions over the last two hundred years have left marks on places around the world; visible, for instance, when analysing changes in ice core composition extracted from Greenland's glaciers, observing eroded coastlines and disfigured mountaintop mining sites, or mapping the bleached corals of the world's tropical reefs.

Indeed, this more granular approach to locating and predicting climate impacts is exactly what climate scientists are now seeking to apply by working with insurance and financial analysts to better identify climate risks (Fiedler et al., 2021). Such efforts, which use sophisticated climate models, are centrally concerned with spatial and temporal dynamics—e.g., climate modelling that predicts climate impacts within 100×100 km spatial grids and estimates how climate impacts vary over decades. Not only do such efforts utilize traces, mostly from climate science data, weather events, and atmospheric patterns, but they also produce traces, for instance in terms of climate imaging and geo-visualizations (Goudine et al., 2020). This offers business and society scholars opportunity to explore how traces, whether in the form of long-range data visualizations or changes in land use and population, impact business understandings of risk, including the performativity of engaging with risk analysis (Nyberg & Wright, 2016). To investigate these, researchers could draw from multimodal methods to understand how different trace-types (Höllerer et al., 2019), such as a financial report, images, and scientific data, concurrently shape understandings of risk.

Moreover, thinking in terms of space-time can also be applied to understandings of regulatory, market and reputational risks that flow from government, competitor and consumer responses to a worsening climate crisis (Hoffman, 2005). For instance, while many firms and countries are currently making optimistic climate commitments towards carbon neutrality, such pledges privilege the present with a linear certainty of the future, while downplaying past actions and responsibilities which have created the current crisis (Supran & Oreskes, 2017). In

such cases, future impacts are articulated in the present without showing any differentiation or context of the next “step” or “mark”—i.e., future commitments often lack concrete steps in how these commitments are to be realized. In this way, business-as-usual is continued through a predatory delay of responsibilities. Placing emphasis on the trace offers scholars new research avenues to address this practice of deferral. For instance, scholars interested in the symbolic versus substantive debate over corporate “greening” (see for example Böhm et al., 2012; Furrer et al., 2012; van Huijstee & Glasbergen, 2010), can draw from climate traces to track how space-time dynamics affect the framing and “greenwashing” of climate commitments. Whether firms fulfil their ambitious promises, or whether such commitments were a dangerously irresponsible bet on humanity’s future, will arguably be central to the climate debate given what is at stake (see Kramer, 2020).

Instead of framing climate change as a threat occurring sometime in the future within a placeless global arena, the trace shows climate change as a phenomenon created and enabled (and potentially addressed) within *concrete* places and times. Climate traces, such as rising sea levels or extreme weather events, cannot be deferred nor greenwashed; they offer scholars (and firms) a way to materially account for climate impacts over time and within localized place-bound areas (Gond & Nyberg, 2017; Shrivastava & Kennelly, 2013). While examples of corporate irresponsibility are often collectively forgotten by stakeholders over time (Mena et al., 2016), focusing on climate traces can help affirm promises made by firms (and governments) and hold promise-makers to account. A climate progressive future needs to be made present through the already existing markers of climate impacts around the world; after all, the temporal span or trace requires materiality to matter and for this to be translated into political and social accountability. For instance, Nyberg, Wright and Kirk (2020) explain this through the idea of temporal portability, that is, making climate change meaningful to act on in the present by providing stepping-stones to a favourable future. Rather than relying on

promises and predictions, the trace evidences the succession of environmental destruction in concrete terms.

Privileging the Physical Environment

There are promising studies in *BAS* that locate the firm and its operations within the limits of natural systems (Edwards et al., 2021), and acknowledge spatial and temporal dynamics (Williams et al., 2021). However, missing from current work is an agenda that challenges the binary construction of human/nature and foregrounds natural systems instead of considering non-human entities as a mere context to advance management practice and theory. Existing *BAS* discussions can be contrasted with the emphasis placed on natural systems in foundational texts that gave life to the study of human-nature interactions, such as Rachel Carston's *Silent Spring* (1962), or early work theorizing business and the natural environment (Gladwin et al., 1995; Purser et al., 1995; Shrivastava, 1995). In these instances, nature is framed as the driver of firm-level theorizing, and not the other way around.

Focusing on the physical environment provides a sense of agency to the non-human world. After all, we now live within an age of consequences where nature is biting back, evident in daily newsfeeds of worsening extreme weather events and climate extremes. Climate related research in *BAS* thus needs to pay closer attention to the profound place-bound changes in natural systems that are now unfolding, such as fires and drought, coral bleaching, biodiversity decline and wholesale species extinction. These human-induced changes to the natural environment in turn impact business and society in profound ways. A good example of such “feedback loops” between human actions, the natural environment and climate disruption is the case of the pine beetle (Lesk et al., 2017). An endemic part of the northern boreal and temperate forest ecosystem, pine beetle populations have in recent decades grown dramatically because of climate-induced warmer winters. The explosion in pine beetle numbers has in turn resulted in the death of many hundreds of thousands of kilometres of forests, which have

dramatically exacerbated worsening summer wildfires, further contributing to increasing carbon emissions and accelerated climate change. These material traces situate climate change within specific space-times, highlighting the agency of the natural environment in amplifying historic human perturbations to the climate system. By engaging with similar traces of species and ecosystem relations, business and society scholars can better understand how social and economic relations are fundamentally determined by changes in the natural environment which underpins life on the planet (Daly, 1996).

Moreover, beyond considering how businesses need to operate within ecological limits, prioritising the natural environment also offers to reinvigorate business-society debates over ethics and justice (Tregidga et al., 2018). The hauntology of the trace is useful in that it marks out, in a material way, *where* injustices inflicted on natural environments have occurred and who are responsible for these injustices. For instance, rising ocean temperatures now mean that as much as 90 per cent of the world's coral reefs are critically endangered; following recent unprecedented coral bleaching over half of the corals on Australia's Great Barrier Reef—the largest living structure on the planet—have now died (Hughes et al., 2018). By analysing these traces, it is possible to attribute responsibility to particular industries, firms, and nation states (Otto et al., 2017). For instance, the trace sheds light on the actions of specific actors—such as the fossil fuel industry—which have contributed the most to the current climate crisis (Heede, 2014). There are myriad examples marking the space-time of business disruptions to the natural environment and local communities, such as the Deepwater Horizon oil spill (Kessler et al., 2019; Vadlamannati et al., 2020). The traces left behind by this disaster—e.g., the huge quantities of crude oil and chemical dispersant on the sea surface and seabed, dead seabirds, fish and mammals, the vast areas of coastline denuded and destroyed—act as remnants, providing a clear link between corporate activity and localized planetary impacts.

The fact that the bulk of historic carbon emissions have come from the activities of a very small part of the world's population, affluent consumers in industrialized countries, and resource-intensive companies, means that consideration of the physical environment also has profound political implications. Considering the traces of climate impacts provides scholars with “evidence” or material effects to hold actors to account for their climate impacts (Gond & Nyberg, 2017). A particularly revealing example here is the scandal surrounding Exxon Mobil and their three decades long misinformation campaign, which aimed to obscure the science behind climate change. In this case, a particular trace was used as “evidence” to hold the company to account—documents and emails, which detailed that the company knew of the direct relationship between burning fossil fuels and climate change. These documents, the 400 pages of which have all been made publicly available via the Union of Concerned Scientists, are material evidence temporally spread over a period of time and have been used by academics, lawyers, and journalists to hold Exxon (and other fossil fuel companies) to account for deceiving the public about climate science (Supran & Oreskes, 2017).

As such, climate-related traces offer a “reality check” for businesses, forcing scholars to fundamentally rethink businesses’ position and power in relation to the broader Earth system. Focusing our attention on these traces firmly situates humanity within a particular period and concurrently within an identifiable place, telling a story of humanity’s role in altering natural processes. Bringing these “place-based” examples of the climate crisis to the fore show how the trace is political in that it is a demarcation in space-time; a before and after, a here and there.

Conclusion

In this article, we have explored the role of climate change in business and society scholarship and emphasised the importance of space-time in advancing thinking around this issue. Our

review shows how the construction of climate change narratives in *BAS* has become defined along three major themes: stakeholder relations, climate risk and the physical environment. We note that these themes engage with time and space in distinct and often narrowly defined ways, for example by centralising the present and deferring time along global, placeless lines—something to be dealt with in the future. This creates temporal and spatial logics where businesses can take positions on climate change but project them into the future (a form of “now but not quite yet”) where climate change remains a floating signifier, that is to say, framed as a nebulous, global issue that either limitedly connects it to specific locations or disconnects it entirely from places of local suffering. Thus, a curious lacuna is created whereby the urgency of climate change is buried or denied in favour of a selective response in both focus and timing. How communities and organisations are positioned and materially embedded in climate change discourse shapes what and who is worthy of attention and how actors respond to and address these issues (Edwards et al., 2021; Williams et al., 2021).

Our aim in this article has been to re-energise and reframe the agenda for climate change research in business and society scholarship by turning to space-time and “the trace” as performative ideas that become an important way of understanding why these political processes of inclusion and exclusion occur and how businesses can better engage with the physical world and take the agency of under-represented human and non-human actors seriously. For example, critical perspectives on sustainable development initiatives and corporate social responsibility (CSR) efforts rightly demonstrate how large corporations cement agentic, instrumental business concerns (Rhodes & Fleming, 2020; see also Wickert, 2016). The co-implication of space-time assists in exploring how, for example, the expansion of fossil fuel extraction and carbon economies become ruled in as “common sense” while other responses such as saving indigenous lands or endangered ecosystems are seen as less important. It does so by shifting temporal and spatial boundaries of who and which communities matter

and how a different approach to the material world is necessary. As Klein (2014, p. 25) has argued, speaking through a language of fire, floods, droughts and extinctions the planet is “telling us that we need to evolve”. Space and time play an integral role in mapping these material (physical, social and emotional) impacts by tracing a past into a future through already existing markers. These devastating traces can re-sensitize our scholarship making it open to the injustices and suffering experienced in a climate shocked world.

In sum, the concept of space-time is useful for critically questioning the temporal span of supposed climate responses, the space in which these changes are supposed to happen, the human and non-human actors that are affected, and the political effects of these circumstances. The distancing of the future and the non-place of change show that there is still much work to do to achieve climate commitments from corporate and political leaders. It is our role as scholars to reinject business and society scholarship with a sense of disruption and dissensus, to restore an original ideological and paradigmatic zest that reinvigorates a political imaginary and hope for business and society research (Hahn et al., 2017). This is a form of intellectual activism (Hill Collins, 2012) and action-orientated research that advocates for those consistently silenced and marginalised in climate discussions. It centres the entanglements of human-nonhuman-nature relationships that inscribe our responsibility towards the Other. Our call for urgent action must be coupled with robust, theoretical resources that enable a broader imaginary to take hold. Politicising our efforts as theorists and scholars to transform and push the margins, calls for further accountability and a material, trace-based conception of the climate crisis through the performativity of space-time. Our research needs to overcome placelessness and temporal deferral and ensure the climate change is integral to stakeholder relations and accountability. It is time for urgent action and that time is now!

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Figure 1. Perspectives on time and space in the field of business and society

Dominant conceptualizations of TIME			Concept of SPACE-TIME	Dominant conceptualizations on SPACE		
<i>Dominant metaphor</i>	Clock	Cycle	Trace	Landscape	Map	<i>Dominant metaphor</i>
<i>Position on time</i>	Universal	Process	Succession	Embedded	Resource	<i>Position on space</i>
<i>Ontology of time</i>	Objective	Subjective	Hauntology	Subjective	Objective	<i>Ontology of space</i>
<i>Knowledge of time</i>	Representation	Human experience	Difference	Meaning	Value	<i>Knowledge of space</i>
<i>Hierarchy</i>	Time → Space	Time → Space	Space – time	Space → Time	Space → Time	<i>Hierarchy</i>
<i>Examples</i>	Backman et al., 2017	Rothenberg & Levy, 2012		Shrivastava & Kennelly, 2013	Tashman, 2020	<i>Examples</i>