

THE UNIVERSITY OF WARWICK

Original citation:

Dahlmann, Frederik (2016) Organisational fitness searches in the Anthropocene : integrating paradox and corporate sustainability. Working Paper. Coventry: Warwick Business School. (Unpublished)

Permanent WRAP url:

<http://wrap.warwick.ac.uk/76141>

Copyright and reuse:

The Warwick Research Archive Portal (WRAP) makes this work of researchers of the University of Warwick available open access under the following conditions. Copyright © and all moral rights to the version of the paper presented here belong to the individual author(s) and/or other copyright owners. To the extent reasonable and practicable the material made available in WRAP has been checked for eligibility before being made available.

Copies of full items can be used for personal research or study, educational, or not-for-profit purposes without prior permission or charge. Provided that the authors, title and full bibliographic details are credited, a hyperlink and/or URL is given for the original metadata page and the content is not changed in any way.

A note on versions:

The version presented here is a working paper or pre-print that may be later published elsewhere. If a published version is known of, the above WRAP url will contain details on finding it.

For more information, please contact the WRAP Team at: publicatons@warwick.ac.uk

warwick**publications**wrap

highlight your research

<http://wrap.warwick.ac.uk/>

**Organisational fitness searches in the Anthropocene: Integrating paradox
and corporate sustainability**

Dr Frederik Dahlmann

Warwick Business School

University of Warwick

Scarman Road, Coventry

CV4 7AL

+44 (0)24 7652 2311

frederik.dahlmann@wbs.ac.uk

Working paper

Organisational fitness searches in the Anthropocene: Integrating paradox and corporate sustainability

Abstract

In this paper I explore the notion that ‘organisational fitness’ as conceptualised in complexity theories represents an inherent and enduring paradox in corporate evolution. More specifically, in a changing world – increasingly characterised as the Anthropocene – firms’ fitness is significantly determined by the ability to manage the persistent trade-offs between maximising profit and survival. I develop proposals to suggest that firms with stronger corporate sustainability efforts are institutionalising organisational search and change processes, and therefore that those that internalise the resulting paradoxes as part of their identity are likely to be better adapted and more resilient. In doing so I attempt to explain why corporate sustainability efforts represent an extension of other paradoxes in general organisational evolution and thus contribute to the complementarity of a systems view on sustainability research and paradox theory.

Keywords

corporate sustainability, paradox, complex systems theory, fitness, evolution

Organisational fitness searches in the Anthropocene: Integrating paradox and corporate sustainability

Literature on why and how firms should address sustainability issues such as, for example, through the use of proactive corporate sustainability strategies (Bansal et al., 2014; Hart & Milstein, 2003; Winn & Pogutz, 2013) has grown immensely over time (cf., Bansal & Gao, 2006; Etzion, 2007; Hoffman & George, 2013), yet widespread concerns and questions remain over their actual efficacy given the many negative trends and assessments regarding progress and prospects of sustainable development (e.g., Dahlmann & Brammer, 2011; GEO5, 2012; Rockström et al., 2009; OECD, 2013). In fact, scholars highlight the need to distinguish clearly between firms' symbolic and substantive sustainability efforts to identify those cases where firms addressing non-economic objectives should at best be viewed as window-dressing and greenwash without fully internalising and implementing the necessary practices (Bansal & Clelland, 2004; Bowen & Aragon-Correa, 2014; Delmas & Burbano, 2011; Delmas & Montes-Sancho, 2010).

Despite the field's growth, many conceptualisations of sustainability management remain undervalued and underutilised in terms of their application by general management scholars and practitioners (Starik & Kanashiro, 2013). One key challenge is the need to conceptualise the complexities and interdependences between social, economic and environmental dimensions (Bansal, 2002; Gladwin et al., 1995) as well as the tensions arising from different temporal and spatial contexts (Slawinski & Bansal, 2012; Zuindeau, 2007). For example, research is only just emerging on how managers make sense of these different tensions, particularly as they affect often-opposing time frames to the responses needed for greater sustainability (Slawinski and Bansal, 2015). Equally incipient is our understanding of how cognition shapes managerial perceptions of these tensions that affect their firms and rivals (Hahn et al., 2014b). Specifically, the question arises which mental models individuals use to perceive, interpret and internalise the intensifying range of and impacts from 'global megatrends' or 'grand challenges' including sustainability (ESPAS, 2013; Ferraro et al., 2015; NIC, 2012; Oxford Martin, 2013; UN DESA, 2013)? A growing strand of corporate sustainability literature therefore

seeks to depart from a purely instrumental logic – the business case for corporate sustainability and CSR (Carroll & Shabana, 2010; Dentchev, 2004; Husted & de Jesus Salazar, 2006) – and is instead moving towards a more integrative view (Berger et al., 2007; Gao & Bansal, 2013; Hahn et al., 2010). Importantly, the emphasis is placed on organisations embracing tensions by seeking to address (often incompatible) different sustainability aspects in equal measures through the notion of paradoxical thinking and management (Van der Byl & Slawinski, 2015).

Thus, partly heeding calls for more theoretical contributions on corporate sustainability and strategy (Starik & Kanashiro, 2013; Suddaby et al., 2011), the purpose of this conceptual paper is to explore the notion that ‘organisational fitness’ as conceptualised in complexity theories entails a natural and enduring paradox in corporate evolution. More specifically, I develop the argument that in an increasingly changing world, firms’ fitness is significantly determined by their ability to manage the constant trade-offs between maximising profit and survival. As a result, I propose that firms with stronger corporate sustainability efforts are institutionalising more comprehensive organisational search and change processes designed to maximise and maintain fitness, and that those that internalise the often resulting paradoxes as part of their identity are likely to be better adapted and more resilient.

By framing sustainability challenges through an evolutionary complex systems perspective, this paper seeks to develop new mental models and thus add to theory and discussions on how managers conceptualise addressing systemic mega-challenges and their firms’ impacts on nature and society in strategic thinking and decision-making. In particular, I attempt to explain why corporate sustainability efforts represent an extension of other paradoxes in general organisational fitness searches and consequently develop propositions about the role and value of corporate sustainability efforts in increasingly coevolving social and natural systems. Furthermore, this paper contributes to the emerging strand of literature on developing more integrated, paradoxical perspectives of corporate sustainability by highlighting and embedding the central purpose of organisational fitness in a changing environment. As such, it builds on and contributes to the complementarity of a systems view on sustainability research and paradox theory (Van der Byl & Slawinsky, 2015).

The paper is organised in five sections. The first section begins with a brief review of the challenges in the existing sustainability literature. Section two introduces general complexity theories before conceptualising the impact of fitness landscapes on organisational evolution. Building on these theoretical foundations in the third section I develop an evolutionary systems perspective of the wider changes in the natural and social environments affecting companies' fitness landscapes. Section four draws on these insights in an attempt to specify theoretical implications for the role of managing paradox as part of corporate sustainability strategies. A fifth section discusses broader research implications and concludes.

Challenges in the existing sustainability literature

Within the existing sustainability literature much of the debate focuses on whether corporate engagement with sustainability is or should be viewed from descriptive/empirical or prescriptive/normative perspectives (Starik & Kanashiro, 2013). Essentially, the key question is in how far sustainability represents an issue of importance to business because of inherent ethical and values-based assumptions about the wider natural and social environment, or simply because of strategic organisational self-interest (McLaughlin, 2013; Stead & Stead, 2013; Waddock, 2013; Winn & Pogutz, 2013; Zollo et al., 2013). For example, extant literature has highlighted the numerous trade-offs and tensions facing firms in achieving economic objectives while addressing social and environmental externalities (e.g., Angus-Leppan et al., 2010; Delmas & Blass, 2010; Delmas & Montes-Sancho, 2011; Hahn et al., 2010; Hahn et al., 2014a, b; Hart & Milstein, 2003; Magolis & Walsh, 2003; Pinkse & Kolk, 2010; Van der Byl & Slawinsky, 2015). Particularly in the ethics literature concurrent debates are often framed through critiques of the principle of shareholder wealth maximisation against variations of stakeholder theory (e.g., Harrison & Wicks, 2013; Jones & Felps, 2013; Schreck et al., 2013; Tashman & Raelin, 2013).

Regardless of their assumptions, central to these arguments is the acknowledgement and integration of cognitive frames in driving corporate responses. Mental models affect the way in which individual

managers and executives make sense of their general business environment, and the complex issues and tensions between economic, environmental and social aspects more specifically. The differences in cognitive content and structure are then argued to “influence the three stages of the sensemaking process, i.e. managerial scanning, interpreting and responding with regard to sustainability issues” (Hahn et al., 2014b, p. 463). Additionally, managerial perceptions of risk and control are affected by these different frames, which in turn influence managerial decision-making on ambiguous sustainability issues.

Generally, however, firms already are struggling to configure new and quicker strategic adaptations because of accelerating changes in the wider business environment that are driven by megatrends such as population growth, globalization and sustainability (ESPAS, 2013; Ferraro et al., 2015; NIC, 2012; Oxford Martin, 2013; UN DESA, 2013). In fact, sustainable development bears the hallmarks of a systemic meta-level challenge in so far as that it can neither be solved by existing companies nor policy-makers alone; it simultaneously exists at various levels of analysis; it requires a cognitive shift in societal thinking to reformulate the relationship between the parts (individuals and organisations) and the wider context (both social and natural environments); and it calls for adaptive action across a range of actors (including and beyond business) to develop solutions capable of addressing conflicting constraints (Ferraro et al., 2015).

In this paper I draw on complex systems theories and the concept of fitness landscapes in an attempt to synthesise our understanding of organisational evolution in the context of increasing rates of wider systemic changes. Fitness landscapes are argued to be a fundamental mechanism underlying general change processes. The aim of this paper is therefore to apply this systems perspective to the organisational context in an effort to advance our knowledge about the framing of corporate sustainability.

Understanding organisational evolution from a complex systems perspective

This section provides the theoretical background necessary for understanding the impact of wider systemic changes on organisational sustainability. It is divided into two parts on complex systems theories and rugged fitness landscapes, both of which draw on a range of existing literatures and articles with the purpose of formulating a coherent conceptualisation of the way in which organisations and populations of organisation evolve.

Complex systems theories

Systemic thinking is nothing new. In fact, it was first employed by the ancient Greeks, its application in a more rigorous and widespread manner, however, was arguably started by von Bertalanfy's (1969). Since then, a large literature has evolved across many natural and social sciences aimed at understanding the complex relationships between systems and their parts (e.g., Anderson, 1999; Umpleby & Dent, 1999).

With regard to organisations, complexity theories (Burnes, 2005; Dooley, 2002; Foss & Ishikawa, 2007; Porter, 2006) have much in common with general evolutionary theories (Barnett & Burgelman, 1996; Burgelman, 1991; Lovas & Ghoshal, 2000); additionally, however, they comprise a more advanced understanding of change mechanisms. Rather than relying on pure internal and external selection processes (Burgelman, 1991; Hannan & Freeman, 1984) to explain the creation, evolution, and demise of organisations, complexity science combines paradigms of organisational change and inertia including different types of change behaviour, and extends these perspectives by integrating findings from a wide range of scientific inquiries into the significance of 'self-organisation' and 'emergence' (Corning, 2002; Kauffman, 1993, 1995). This has been repeatedly used in efforts to synthesise theories of organisational adaptation and selection (Anderson, 1999; Dooley, 1997; Kelly & Amburgey, 1991; Levinthal, 1991; Stacey, 1995).

Among others, complexity theories study the characteristics and behaviour of so-called 'complex adaptive systems' (CAS) consisting of individual units, or agents (Dooley, 1996 & 1997; Holland, 1995 & 2000; Lewin & Regine, 1999; Robertson & Caldart, 2008; Stacey, 1996). There are many

different examples of complex adaptive systems (e.g., ant colonies and other social insects, stock markets, the biosphere, the brain and the immune system) and, as is done in this paper, commercial organisations can also be usefully considered as CAS (e.g., Beinhocker, 2006; Girod & Whittington, 2015). CAS are characterised by having open boundaries to their environment in the sense that there is no impermeable layer separating them (and ultimately their agents) from external influences (Chaffee, 1985; Coleman, 1999; Thiétart & Forgues, 1995). The term ‘environment’ here refers to the entirety of all surrounding social and natural influences which an organizational system and its agents might possibly become exposed to.

Rugged fitness landscapes

The concept of ‘rugged fitness landscapes’ is a central element within complexity theories (Kauffman, 1993 and 1995). The concept was originally devised in the context of biological evolution (Kauffman, 1993) but has already been applied to, among many others, strategy (Beinhocker, 1999; Foss & Ishikawa, 2007; Levinthal, 1997; McKelvey, 1999; Rivkin, 2000), innovation (Kauffman, 1995; Rivkin & Siggelkow, 2007) and organisational design (Levinthal & Warglien, 1999; Siggelkow & Rivkin, 2005). Of significance is the term “evolution, which we commonly understand as some form of longitudinal development, as any process of formation or growth¹”. Beinhocker argues “we can think of evolution as the process by which species (or businesses) search for high points in their fitness landscape” (1999, p. 98). Kevin Dooley’s quote² provides a comprehensive summary of the many varying descriptions of the ‘fitness landscape’ concept.

¹ Evolution. (n.d.). *Dictionary.com Unabridged (v 1.1)*. Retrieved July 17, 2008, from Dictionary.com website: <http://dictionary.reference.com/browse/Evolution> American Psychological Association (APA)

² Essentially, “*complex adaptive systems evolve in such a manner so as to maximize some measure of ‘goodness’ or fitness in a dynamic environment. The potential states that a system can attain can be represented by a ‘landscape’, where the coordinates on the terrain represent the organizational configuration, and the height of the terrain represents fitness. The highest point in this landscape and its associated fitness value could be considered the optimal state for the system. When the organization’s fitness landscape is simple—e.g. single-peaked—it is relatively simple to optimize organizational performance. Managers must determine which factors are important, and how those factors should be configured so that an overall organizational configuration best matches the contingencies of the environment. If, however, the landscape is multi-peaked, with many local optima, then organizational optimization becomes difficult. Such complex, or ‘rugged landscapes’ exist in problems where optimality of the organizational system is determined by tightly coupled components. When elements of the organization can be optimized individually without regard for one another, and this leads to global, systemic optimality, the landscape is simple (single-peaked). When individual components of the organization contribute to overall organizational fitness in different ways, depending on the value/state of other*

The main underlying assumption behind this definition of rugged fitness landscapes is that the core purpose of an organisation is to “thrive and survive” (Coleman, 1999); in other words, commercial entities exist to maximise their organisational ‘fitness’, whereby this fitness comprises both ‘economic and social fitness’ (DiMaggio & Powell, 1983). This key assumption is based both on the notions of shareholder wealth maximisation theory (Friedman, 1970) for economic returns *and* on the understanding that survival is *not only* a corollary of a firm’s profit, but also of a host of other non-financial factors as exemplified by the concept of market and non-market strategies (Baron, 1995), obtaining legitimacy vis-à-vis stakeholders (Carroll, 1979; Donaldson & Preston, 1995; Jones, 1995) and general legislative compliance (DiMaggio & Powell, 1983). Profit and survival – while interrelated – are therefore not identical concepts, but are integral components of organisational fitness (Daepf et al., 2015). As such, this conceptualisation acknowledges that, among other factors, “fitness is a complex combination of returns to exploitation, returns to exploration, and returns to reputation, market position, and capabilities built from past adaptations” (Anderson, 1999, p. 225). Similarly, the need for organisational ambidexterity strongly resonates with these broad assessments of organisational fitness (Turner et al., 2013).

Fundamentally, the fitness landscape acts as the selection mechanism of organisational configurations that are designed to maximise goodness/fitness within a dynamic environment, where this environment in turn also influences the shape and evolution of this fitness landscape. Put differently, the fitness landscape can be conceptualised as a metaphorical map representing the efforts of internal organisational adaptation to an external (potentially changing) environment.

Consistent with the notion of complex adaptive systems, however, Cyert and March (1963) argued that rather than being able to maximise a certain goal (such as fitness), various agents within an

organizational components in a contingent manner, the optimal organizational configuration becomes difficult to find, as many configurations that ‘satisfice’ exist. Thus, similar to Perrow’s formulation, an organization (or its environment) is considered complex to the extent that its constituent elements are interdependent upon one another” (Dooley, 2002, p. 17).

organisation tend to only 'satisfice' them. Yet largely the organisation strives towards maximising its fitness, and this overall fitness of the organisation is determined by a wide-ranging, interrelated set of factors (Porter & Siggelkow, 2008; Rivkin, 2000; Starik & Rands, 1995) which can be found in, for instance, the organisational structure and culture, its functional strategies, policies, systems, financial returns, societal legitimacy and operational resilience, or in any combination thereof (Levinthal & Warglien, 1999).

Moreover, complexity theories suggest that corporate strategy can be viewed as an emergent phenomenon in the form of organisational behaviour, which in turn can be conceptualised as agents' adaptive response mechanism to their changing fitness landscape (Hamel, 1998; Mintzberg, 1978, 1994; Stacey, 1995). Collectively, agents are trying to adapt to this changing fitness landscape to guarantee profit and survival, even if this behaviour may be differently enacted at individual or group levels because actors have a tendency to focus their sensemaking and actions on the immediate 'neighbourhood' of the fitness landscape (Levinthal & Warglien, 1999).

This adaptive behaviour also has important consequences for both the organisation and the environment and is commonly summarised by the concept of 'co-evolution' (Kauffman, 1993, 1995b; McKelvey, 1999; Porter, 2006), whereby organisations actively impact and exert a level of control on their industry sectors and wider commercial environments rather than simply being passively influenced by external forces (Mason, 2007). Co-evolution then provides dynamic feedback in the form of information from the environment and other organisations, which either leads to negative (self-limiting) or positive (self-reinforcing) effects (Starik & Rands, 1995).

This aspect is to some extent covered in the more static framework of the impact of the five forces of industry competition (Porter, 1979). The effects of constant co-evolution between an organisation and its environment therefore have a significant influence on the fitness landscape. "The landscape is not fixed, like a mountain range, but is constantly bucking and heaving. As the environment and the strategies of competitors change, the fitness attributable to any given potential strategy will also

change. So the height of any particular point on the landscape is moving up or down over time” (Beinhocker, 1999, p. 98). Success becomes a moving target.

Fitness landscapes ultimately vary from organisation to organisation over time, but similar firms in terms of industry sector and size may have similarly shaped fitness landscapes because of certain shared and relatively constant features of their environment (e.g., industry regulation, customer base and requirements, supply chains, etc.) A firm’s fitness landscape is thus a function of a variety of determinants within which it is trying to configure an optimum strategy in order to maximise fitness (Porter & Siggelkow, 2008). Consequently, fitness landscapes act as the ultimate selection mechanism of firms’ fitness by defining both profit and survival chances.

“Evolution is sometimes characterised by biologists as a metaphorical uphill struggle across a ‘fitness landscape’ in which mountain peaks represent high ‘fitness’, or ability to survive, and valleys represent low fitness. As evolution proceeds, a population of organism in effect takes an adaptive walk across such a landscape” (Kauffman, 1995, p. 122). Fitness landscapes occur in different shapes with lots of peaks and valleys and there is significant correlation between heights of different points across these landscapes, representing similar levels of fitness (Beinhocker, 1999) but as an organisation approaches peaks of fitness, finding even further improvements becomes exponentially harder. In essence, organisational adaptation represents efforts to optimise a system in the face of conflicting constraints (Kauffman, 1995) and changes in strategy can thus be construed as organisational responses to changes in the fitness landscape, which are interpreted by agents as either threats to or opportunities for improved organisational fitness (Sharma, 2000). In order to adapt to this changing fitness landscape organisations adjust and reconfigure all the necessary constituent parts of their corporate strategy. In that sense, fitness landscapes are inherent to the organisation as they are partly influenced by the configuration of organisational resources and other performance factors (Foss & Ishikawa, 2007). At the same time, fitness landscapes represent the instant selection effects of external environmental dynamics, which determine the potential fitness levels for an organisation, but which the organisation must identify and match so as to optimise performance. Fitness landscapes are

thus simultaneously intrinsic and exogenous to complex adaptive systems. They are shaped not only by an organisation's evolution in the form of 'adaptive walks', but also by the constantly changing forces of co-evolution with the wider business environment (macro-economics, competitors, regulators, stakeholders, etc.). Since this is an ongoing process, a dynamic model results explaining the changes in corporate strategy.

At a field level perspective, here wider changes occur as a result of individual organisations' adaptive walks towards fitness peaks as well as through wider evolutionary selection processes, which continuously shape and favour those firms that best match the prevailing fitness landscapes. Finding optimal strategy configurations to the changing fitness landscape thus influences a firm's ability to survive and prosper. Conversely, new organisations emerge which may be better suited for such environments and, given the demise of unsuccessful organisations, it is those entrants which over time have the potential to impact and dominate the wider population (Hannan & Freeman, 1984).

The evolution of organisational populations therefore has two origins: First, it is the result of exogenous factors impacting a firm's fitness landscape to which it responds through strategic adaptation. Alternatively, however, a firm can also deliberately initiate organisational adaptations in expectation of and by preceding changes in the fitness landscape. In that case, an organisation needs to have a strong sense of being able to anticipate the future 'lay of the land' of its fitness landscape. Second, the forces of natural selection operating at the field level ultimately can cause the disappearance (and replacement) of firms unfit to survive and prosper in these respective fitness landscapes (Daepf et al., 2015). Adaptation and selection are thus "fundamentally interrelated processes of change" (Levinthal, 1991, p. 144) and both leadership and all agents' interactions are responsible for the organisational evolution in terms of corporate strategy.

A systems perspective of natural and social systems changes

Having outlined a complex adaptive systems perspective behind organisational evolution and strategy, next I develop a theoretical conceptualisation of firms operating at the intersection of increasingly

challenging business environments. The aim is to explain how accelerating rates of change in the natural and social spheres affect companies' searches for (enduring) fitness peaks.

Complex systems theories seek to understand the characteristics and relationships between interacting or interdependent parts forming an integrated whole (Umpleby & Dent, 1999). At the highest level there are two main systems which influence human life and endeavour: One is the *natural system* which entails all natural resources and forces, wildlife, atmosphere, hydrosphere, lithosphere, biosphere (Starik & Kanashiro, 2013), carbon, water, and nutrient cycles (Griggs et al., 2014). The other is the *social system* which comprises all forms of human activities and tends to be contextualised as and sub-categorised, for example, into the spheres of economy, policy, society, and technology.

Within this nested arrangement of higher-level systems or 'holons' (Gladwin et al., 1995), organisations are located at the intersection (or dyad) of the natural and the social systems from which they draw their constituents and resources (Starik & Rands, 1995). Put differently, business firms are the pivotal 'organising mechanisms' that integrate and convert (parts of) the social and natural systems. Imported energy also plays a vital role in this conversion process as it enables agents inside the organisation to self-organise and thus to maintain this conversion process (Anderson, 1999; Porter, 2006; Prigogine & Stengers, 1984).

The natural system has evolved over billions of years and changes tended to be mostly slow, at least compared to human standards. The social system, too, initially developed more slowly, but since the arrival of the industrial revolution there have been some very rapid developments (Hoffman & Jennings, 2015), which are leading to an ever-increasing evolution of the social system. Although there can be some significant overlap and interaction between the two systems (Waddock, 2013), at least historically this co-evolution was limited because the social and the natural systems were relatively decoupled from one another; rates of changes were not occurring at the same speed or were certainly not 'in sync'.

Schumpeter's (1942) theory of creative destruction argues that capitalism evolves through revolutionary bouts of change and innovation in technology and societal values. As such, most of the changes driving and impacting firms were derived from factors emanating from the social system, e.g., technological inventions such as the steam engine, electricity, and the book print (e.g., Frenken & Nuvolari, 2004; Pascale, 1999), but also the wider application of scientific principles and reasoning. Capitalism therefore derived most of its 'fuel' from the evolution of the social system.

In such a capitalist, market-driven world and in line with the theoretical foundations outlined in the previous section, firms survive and thrive by continuously searching for peaks in their fitness landscapes. This fitness landscape was so far (almost exclusively) shaped by human actions and interactions such as, most importantly, competitors' moves, but also governmental legislation and regulation, new technological inventions (e.g., the internet, mobile phoned), political and economic events (e.g., fall of the Berlin wall, the global financial crisis), social movements (e.g., anti-slavery, fair trade, organic products, ethical investments) and changes in consumer tastes and demands. By contrast, the natural system served as a (relatively) constant, reliable and predictable source of materials and energy inputs for organisations.

Increasingly, however, firms are struggling to configure new, quicker and adaptive searches in their strategy development because of accelerating rates of change in the social system that significantly reduce its predictability. These rates of change are best characterised by several 'megatrends' which include changing demographics (growing and ageing populations), increased mobility (urbanisation and a growing middle class), social challenges (inequality and unemployment), fluctuating geopolitics (power transitions, diffusion and a more polycentric world), health issues (shifting burdens of disease), technological innovations (information and communications revolution but also data privacy and security), and growing levels of individual empowerment (Chand & Tung, 2014; ESPAS, 2013; NIC, 2012; Oxfam, 2015; Oxford Martin, 2013; UN DESA, 2013). In addition, increasing company interdependencies arising from rapid technological changes, shifting economic conditions and global

competition for customers and market shares are responsible for further managerial planning uncertainty (D'Aveni, 1994; Eisenhardt, 2002; Mouzas & Ford, 2006). As a consequence, managers are grappling with increasing rates of CEO turnover and business failures, and greater fluctuations in the composition of the list of major stock indices.

Until the recent past, however, firms were at least able to take their use and availability of a stable natural system supplying 'unlimited' resources, cheap energy and waste sinks as more or less for granted. Combined with the widespread omission to account for externalities and subsidies for environmentally detrimental fuels (Coady et al., 2015), firms were operating in a business environment that sheltered them and decoupled their adaptive strategy searches from the influence of the natural system. Even when there might have been conflict between economic and environmental factors, it was assumed that the determinants of the economic social system would prevail (Drazin & Van de Ven, 1985).

Yet there is now increasing recognition that this too is changing because of the many negative effects organisations are having on the natural system (GEO5, 2012; Griggs et al., 2013, 2014; Howards-Grenville et al., 2014; OECD, 2013; Rockström et al., 2014; Waddock, 2013; Whiteman et al., 2013). Tellingly, all efforts to provide insights into our global future refer to significant challenges from sustainability and sustainable development as another key megatrend to watch (ESPAS, 2013; NIC, 2012; Oxford Martin, 2013; UN DESA, 2013).

In fact, as the natural system begins to change at rates more rapidly than previously experienced (e.g., climate change, loss of biodiversity, resource insecurities, emergence of the food-water-energy-health nexus, and see also Waddock, 2013, p. 198), this directly or indirectly adds to the complicating effects on firms' fitness landscapes from those already generated through the increasing changes in the social system.

Moreover, there is now evidence to suggest that the natural and the social systems are beginning to co-evolve in unprecedented ways (Boons, 2013; Kallis & Norgaard, 2010; Porter, 2006; Stead & Stead, 2013): witness, for instance, the growing number of references to the ‘Anthropocene’ (Crutzen & Stoermer, 2000; Hoffman & Jennings, 2015; Rockström et al., 2014), ‘grand challenges’ (Ferraro et al., 2015) and ‘wicked problems’ (Camillus, 2008; Starik & Kanashiro, 2013). Beyond institutional and moral pressures to act these global phenomena increase the unpredictability, complexity and difficulty of searching for peaks in firms’ strategic fitness. Unsurprisingly, 93 percent of CEOs in a recent survey reported that sustainability would be “important” or “very important” to the future success of their business (Accenture/UNGC, 2013).

Paradox and corporate sustainability in evolving fitness landscapes

How do managers make sense of and react given such trends and phenomena? Are they able to perceive and interpret the systemic and evolutionary nature of organisations and their broader natural and social environments? And if so, how do they respond given the often complex and ambiguous demands on their organisations? In the following I explore how paradoxical thinking may support managerial sense making of the search for organisational fitness in these changing times.

From business-case logic to paradoxical thinking

One implication from the preceding conceptualisation relates to the question to what extent managers’ cognitive efforts draw on the notion of organisational fitness in the first place. Generally, are individuals following patterns of thought and behaviour consistent with implicit or explicit searches for their firms’ fitness peaks? More importantly, do they recognise the inherent effects of wider systemic changes outlined above and how do they integrate them in their strategic search efforts? To what extent do they acknowledge that in addition to the social system increasingly also the natural system will be playing a major role as a new, interdependent driver of corporate evolution and thus capitalism? Given the current trends of widespread environmental degradation, some suggest that in many instances the natural system will become more of an evolutionary limiter or constraint on economic development rather than a “fuel for growth” (Boons, 2013). Notwithstanding some

differences in interpretation, this perspective is in many ways more aligned with the traditional business-case logic whereby environmental and social sustainability issues are perceived as potential profit and risk factors. As such, it is perhaps overly concerned with (some would argue futile) searches for win-win-(win) scenarios (Carroll & Shabana, 2010; Dentchev, 2004; Husted & de Jesus Salazar, 2006), given that research has identified the often insurmountable tensions arising from managing sustainability in different temporal and spatial contexts (Hahn et al., 2014a; Slawinski & Bansal, 2012; Zuindeau, 2007).

More recently, there has therefore been strong growth in the literature on the need to combine different desirable but seemingly incompatible sustainability aspects. Scholars have developed the seemingly alternative perspective of paradoxical thinking and management as a potential way forward (Hahn et al., 2014b; Van der Byl & Slawinsky, 2015). “A paradox approach differs from the win-win (business case) and trade-off approaches to sustainability in that it examines and embraces the tensions between these goals, despite the discomfort associated with juxtaposing opposites” (Van der Byl & Slawinsky, 2015, p. 71). Moreover, organisational paradox theory is predicated on a view of organizations as dynamic and complex systems. It acknowledges and accepts the *coexistence of contradictory but interrelated elements or tensions* where tensions are simultaneously attended to and continuously managed over time. This is done specifically through cyclical responses, which allow actors to balance short-term and long-term organizational goals rather than force them to resist or avoid the tensions between goals. Consequently, paradoxical thinking and efforts are argued to spur creative solutions to complex problems and ultimately stronger organizational performance (Lewis, 2000; Quinn, 1988; Smith, 2014; Smith & Lewis, 2011; Van der Byl & Slawinski, 2015).

How can the framing of sustainability challenges through an evolutionary complex systems perspective create theoretical insights into how managers respond to sustainability issues? Based on the theoretical background and arguments above, I argue that paradoxical thinking is in many ways already endemic to, but largely unacknowledged for driving general organisational change processes in most firms. Moreover, as managers become more sophisticated in their understanding of their

organisation's evolution and purpose they are likely to integrate sustainability challenges more effectively by viewing them as part of their suite of paradoxical management logic and practices.

Recognising the profit/survival paradox

The notion of organisational fitness in particular is predicated on the need for firms to manage the continuing tensions between maximising profits and safeguarding organisational survival. At first glance, the repeated and cumulative collection of economic returns over and above all costs would effectively appear to guarantee survival in most effective and simplistic terms. In that sense, fitness should most easily be maximised through a simple profit-maximisation strategy whereby all the organisational components are exclusively geared towards achieving this objective. Consistent with rugged fitness landscapes then, the fewer the number of organisational components to be managed in this regard, the easier this is achieved and the greater the returns. Alas, life seldom presents itself in a stable, single-peaked fitness landscape.

In fact, it has long been recognised that while such a strategy may be successful for some time, it rarely has enduring qualities and therefore may be challenged by the second contributor to organisational fitness – survival. While profit is definitely a necessary determinant of fitness for commercial organisations, it is not sufficient, particularly over time. Specifically, the need for firms to adjust to changes in the competitive environment and develop dynamic and ambidextrous capabilities of exploration and exploitation has widely been recognised as fundamental and critical to organisational success (Turner et al., 2013; Tushman & O'Reilly, 1996). Yet while the interdependence of profit and survival is instantly recognisable, their contradictory nature is perhaps less obvious. Commonly, tensions are experienced because of a plurality of interests (for instance, from different stakeholders and logics), underlying change (a representation of time affecting the fundamentals of decision making), and scarcity (whereby uncommitted resources – temporal, financial or human – reach inevitable limits or constraints) (Smith & Lewis, 2011). Decisions that may be good from a profit maximisation perspective, may not be contributing towards organisational survival and vice-versa. For example, corporate decisions to reduce spending on health and safety

efforts may be saving money in the short-term, but the occurrence of a single accident may more than offset such savings, and through regulatory penalties even endanger organisational survival both financially and reputationally (Hoffman & Jennings, 2011). Conversely, the exploitation of a current core product or market may be driving up the profit contribution towards fitness in the present, but this may just as easily challenge organisational survival if market conditions rapidly change in the future and which the firm has failed to explore through (costly) investment in R&D and marketing (Smith, 2014; Stenzel and Frenzel, 2008). To that end, at least organisationally, the continuing search for changing fitness peaks consisting of *both* profits *and* survival represents a natural and enduring paradox. Nowadays managers increasingly recognise these tensions and trade-offs and become cognisant of the paradoxical nature of pursuing their firms' purpose. By doing so, they are likely to embrace this persistent paradox as a natural part of corporate strategic thinking and decision-making and its impact on organisational change (Smith, 2014).

Growing challenges for fitness searches in the Anthropocene

Based on this interpretation of organisational fitness as an enduring paradox within organisation evolution I now consider its implications. One way to conceptualise the tensions arising from the growing rates of change in both the social and natural systems on organisational fitness searches as described before is by imagining firms as being connected along a 'patchwork quilt' (Kauffman, 1995). In its abstract form, this complexity theory metaphor represents a summary model of the global effects of increasingly co-evolving social and natural systems and thus acts as the ultimate selection mechanism of organisational fitness. Put simply, it signifies an imaginary dynamic business environment space within which firms compete and which influences commercial success and longevity. As a result organisations are exposed to three key tensions, which affect their fitness searches: hyper-connection; interconnected social and natural systems; and coupling of intraorganisational assets, systems and functions.

Within this 'quilt', each patch represents an individual organisation, which is attached to several other patches (organisations) along the patch boundaries. In the economic sphere this is manifested in

market competition and supply chains tying firms to one another – in reality, there could be many more connections than are physically possible on a two-dimensional quilt. At the same time, each organisation is searching for peaks on its particular fitness landscape. This requires adaptive walks in form of strategic decisions that are both deliberate and emergent and which draw on market positioning as well as resource-based adjustments. But because organisations are interconnected (metaphorically along the patches and in reality through competitive and contractual webs), the result of such widespread ‘selfish’ adjustments means that organisations continually deform the fitness landscapes of all other organisations that are adjoined along the quilt. One potential outcome of this ‘hyper-connectivity’ (Wellman, 2001) and ‘hypercompetition’ (D’Aveni, 1994) is that organisations struggle to reach their fitness peaks. And even if they do, the consequences of constant changes from organisational co-evolution quickly lead to “forever shifting peaks”, also termed the ‘Red Queen effect’ (Kauffman, 1995).

In addition to this hyper-connectivity the already difficult adaptive walks across the fitness landscapes are even further complicated by new factors emanating from the social and natural systems. As described in the previous section, increasing rates of change and co-evolution in both systems lead to even more intensely coupled landscapes and therefore greater levels of ruggedness. The peaks in the fitness landscape represent an optimum organisational strategy configuration to wider external conditions. Since both social and natural system conditions are becoming progressively connected and unstable, fitness peaks rise and disappear more frequently and their height varies more significantly. This high level of interdependency thus affects the complexity of the overall landscape (Robertson & Caldart, 2008). “As the pieces of a strategy become more interdependent, the landscape corresponding to a firm's decision problem becomes increasingly rugged. That is, the correlation between the altitudes of adjacent points on the landscape – points that differ by how one decision is made – falls, and local peaks proliferate” (Rivkin, 2000, p. 830).

Finally, it is these external factors, which ultimately impair firms’ internal search efforts for the highest peak on their fitness landscapes. As executives and managers make resource allocations,

decide on investments, choose target markets, and develop business plans based on estimates, forecasts and assumptions, their ability to combine and configure the internal components of their organisations to enable these adaptive searches are hampered by growing challenges around long-term planning, resource effectiveness and outcome uncertainty. Trying to identify peaks on the fitness landscape and therefore success chances for growth and survival becomes a difficult activity plagued by external and internal volatility. Organisational arrangements and business models that work in one landscape may not be suitable in such a changing environment. For example, hiring policies and incentive schemes may contradict sustainability ambitions. Alternatively, owing to conditions of technological and operational “lock-in”, long and large-scale investment cycles determine firms’ asset and performance levels for years if not decades (Unruh, 2000). Combined with a strong dependence on macro-economic trends and a distinctive lack of alternatives, some firms are therefore by their very nature significantly disadvantaged when it comes to nimble adaptation. In these cases links between industry sector, firm size and environmental footprints essentially act as a fundamental decision-making constraint with the result that wider systemic issues are not viewed as salient organisational priorities (Bundy *et al.*, 2013) and therefore lead to strategic tensions over searches for long-term fitness.

Managing sustainability issues as part of wider organisational paradoxes

As a consequence, the question arises how to make sense of these tensions and respond in ways that are perhaps more aligned with paradoxical thinking in evolving fitness landscapes? Owing to the inherently global and systemic nature of many concerns about sustainability issues, a key aspect of corporate decision-making relates to interpreting them as factors affecting organisational fitness and therefore deciding on how best to internalise their effects in strategic thinking and planning. Complexity theories would therefore suggest that organisations focus their attention on “solving the problem” in order to reduce the influence of these issues on firms’ respective fitness landscapes.

At the smallest level, some firms might selfishly attempt to address these issues by themselves. This would enable them to retain control over their activities and decide on the exact level of resources to

be expended. The downside to this approach is that it may lead to free-rider problems and at worst a sense of a lonely, dispiriting ‘fight against windmills’. Moreover, many firms still seem to reject the necessity to act on the basis of arguing that any such proactive sustainability efforts will put them at a competitive disadvantage. As a consequence, as firms individually attempt to solve general fitness problems in many different ways they fail to recognise that their disparate, ‘chaotic’ behaviour may only lead to further systemic instability by deforming each other’s fitness landscapes, especially with regard to the negative impacts on and from the natural and social systems. For example, in the case of climate change one firm’s sustainability driven strategy may be insufficient on its own to cause a significant reduction in turbulence on the fitness landscape, as there are questions over global boundaries of greenhouse gases and the long-term impacts of short-term measures. Also given the tight coupling between different organisations (and thus their individual fitness landscapes), individualistic searches for solutions become a very difficult and increasingly more complex task.

At the other extreme, another solution would be to identify large groupings of organisations and assign them a common sustainability approach. This ‘one-size-fits-all-firms’ method would essentially require (self-) regulatory approaches mandating common corporate sustainability strategies. To some extent, the Global Reporting Initiative or the ‘Accord for Fire and Building Safety in Bangladesh’ (Reinecke & Donaghey, 2015; Reinecke et al., 2015) represent examples of where organisations are seeking common responses to particular sustainability issues. Yet globally, even if miraculously all organisations somehow managed to agree on a single, ordered ‘evolutionary stable strategy’ (Kauffman, 1995; Maynard Smith & Price, 1973) to address all sustainability challenges collectively, or if somehow global corporate sustainability legislation could be enforced, concerns remain whether this would have to be based on the lowest common denominator given the widely diverging self-interests and business environments; hence a far too sub-optimal solution is likely to ensue in the face of the many enormous challenges at hand.

Beyond these extremes, therefore, the best response to complex challenges would consist of search strategies that find themselves poised in the transition between order and chaos, an area commonly

identified as the 'edge of chaos' (Pascale, 1999). In stark contrast to traditional, business-case based thinking on competition and negotiation, such responses acknowledge the interconnectedness of all organisations and develop new forms of network-type communications and actions (Valente, 2012) designed to increase adaptability as well as fitness search efficiency and effectiveness. At this point another paradox emerges because firms must at the same time continue to compete, potentially even with those organisations they are also collaborating with. Yet such systems have two advantages: first, they offer flexibility in terms of compromise solutions in the face of conflicting constraints; and second, they guarantee dynamic adaptability to changing fitness peaks (Kauffman, 1995).

How should these responses be chosen? Who decides how to select the right levels of interconnections so as to arrive at a system poised just at the edge of chaos? In all likelihood organisations would proactively drive this process themselves in a way that best addresses their particular industry and geographical challenges. More importantly, many different and simultaneous approaches may be considered and include: collaborations and knowledge sharing on policies, governance frameworks, agreements and strategies across supply chains, industries, sectors, nations, regions, cities, customers, employees, and other stakeholders as well as innovations and technologies, investments, issues and challenges, fuel types, owners, and other combinations thereof, all the while avoiding conflicts with competition laws. Firms and managers therefore have to cope simultaneously with the demands of inter-organisational competition, collaboration and coordination (Kiron et al., 2015).

The most important consideration is that "adaptation is most effective in systems whose pieces are connected, but only partially connected. The argument is that too rigid an [organizational] structure will create obstructions, whereas too loose a structure will create chaos" (Eisenhardt & Brown, 1999, p. 80). This 'patchwork' of interconnections allows organisations to be part of more than one (potentially overlapping) response system to address the various tensions arising from managing sustainability issues. These spatial, temporal and organisational tensions inevitably lead to an increase in the number of paradoxes companies face. Expecting, integrating and managing such paradoxes

would therefore become a crucial managerial and organisational capability as being able to separate and synthesise these tensions enables firms to develop and strengthen organisational resilience and responsiveness (Poole & Van de Ven 1989; Smith, 2014; Smith & Lewis 2011). Complex systems theories highlight that organisations have huge impacts upon both the natural and social systems that they draw on for their evolution. Yet events and developments in these systems are increasingly becoming difficult to predict and influence while still providing continuing fuel for economic development. Making sense of the paradoxical nature of sustainability efforts as part of enduring organisational fitness searches for profit and survival could thus enable firms to improve future corporate decision-making and achieve greater control over these influences by limiting the volatility in the fitness landscape.

As a consequence, over time corporate sustainability efforts are likely to embody the institutionalisation of logics and practices designed to manage the continuing paradoxes endemic to fitness searches for profit and survival in the Anthropocene. In other words, firms that regularly expect and manage paradox and tensions are developing dynamic capabilities that can more easily cope with and integrate sustainability challenges. This may mean that in some firms corporate sustainability serves as an organisational response mechanism for managing organisational paradox in general. The better firms become at integrating such corporate sustainability approaches into the fabric of their day-to-day organisational cognition and operation, the more likely they are to anticipate systemic changes and respond to shocks resulting from the co-evolution of the natural and social systems. I therefore suggest the following two summary propositions:

Proposition 1: Firms with stronger corporate sustainability efforts are better at institutionalising organisational search and change processes designed to manage the profit/survival paradox in general.

Proposition 2: Firms that internalise the resulting paradoxes as part of their corporate identity are likely to be better adapted and more resilient to the challenges and opportunities in the Anthropocene.

Discussion and conclusion

The contribution of this paper has been to apply a systems perspective to organisational evolution in an effort to advance theories of corporate sustainability. By drawing on the notions of rugged fitness landscapes and wider social and natural systems changes I sought to synthesise our understanding of how and why organisations evolve. Specifically, I sought to explain why corporate sustainability efforts in many ways represent an extension of other paradoxes inherent in general organisational change processes and may therefore be viewed as enlightened self-interest designed to guarantee organisational fitness in form of profit and survival. More importantly, this conceptualisation also firmly places organisations into wider social and natural systems upon which they depend for their continued collective existence and evolution. It therefore acknowledges the relationship that organisations have with the structures enabling them to survive and prosper and as such transcends organisation-centric and business case motivated instrumental logics for corporate sustainability and social responsibility.

Building on these conceptualisations I outlined propositions about the value of corporate sustainability efforts for organisational fitness searches in coevolving social and natural systems increasingly referred to as the Anthropocene. The need for companies to cooperate with competitors and other stakeholders adds to the other tensions and paradoxes needed to make sense of and address sustainability issues. They can only be accepted and overcome through an understanding of the multitude of strong and weak ties binding all actors and organisations within the natural and social systems across space and time.

As such the theoretical arguments developed above serve as a potential starting point for academic research to explore the intrinsic interdependencies between the social and the natural systems as well as to study firms' necessity to act out of purposeful self-interest. Of course, this view is not designed to denigrate other, more values-based theorisations, which undoubtedly have led to changes in the way in which some firms and managers perceive their business environment (e.g., Banerjee, 2003, 2008; York, 2009). The aim is rather to complement these perspectives by drawing attention to

sensemaking approaches, which are inherently both rational and driven by values (Starik & Rands, 1995). Such cognitive shifts in conceptualising the corporate sustainability paradox are needed in order for organisations to avoid experiencing increasing *ecological* selection pressures (Boons, 2013) in addition to those from the social system issues they are already struggling with.

Searching for organisational fitness in the Anthropocene will intensify the need for paradoxical approaches as part of corporate strategic decision-making. Firms that accept the profit/survival paradox as an inherent characteristic of organisational evolution are likely to integrate sustainability issues in ways that simply expand this recognition rather than see them as sources of new tensions. In the end, personal interpretations and actions will influence and iteratively feedback with organisational, global and environmental information and actions. Drawing on complexity theories may lead to a better understanding of the complex evolutionary processes occurring at all levels while contributing to more enlightened practices that internalise the need for broad paradoxical approaches.

References

- Accenture/UNGC (2013). The UN Global Compact-Accenture CEO Study on Sustainability 2013: Architects of a Better World. *Accenture*, September 2013.
- Anderson, P. (1999). Complexity theory and organization science. *Organization Science*, 10, Special Issue: Application of Complexity Theory to Organization Science, 216-232.
- Angus-Leppan, T., Benn, S., & Young, L. (2010). A sensemaking approach to trade-offs and synergies between human and ecological elements of corporate sustainability. *Business Strategy and the Environment*, 19, 230-244.
- Banerjee, S. B. (2003). Who Sustains Whose Development? Sustainable Development and the Reinvention of Nature. *Organization Studies*, 24, 143-180.
- Banerjee, S. B. (2008). Necrocapitalism. *Organization Studies*, 29, 1541-1563.
- Bansal, P. (2002). The corporate challenges of sustainable development. *Academy of Management Executive*, 16, 122-131.
- Bansal, P. and Clelland, I. (2004). Talking trash: legitimacy, impression management, and unsystematic risk in the context of the natural environment. *Academy of Management Journal* 47, 93-103.
- Bansal, P. and Gao, J. (2006). Building the Future by Looking to the Past: Examining Research Published on Organizations and Environment. *Organization & Environment*, 19, 458-478.
- Bansal, P.; Gao, J. & Qureshi, I. (2014). The Extensiveness of Corporate Social and Environmental Commitment across Firms over Time. *Organization Studies*, 35, 949-966.
- Barnett, W. P. & Burgelman, R. A. (1996). Evolutionary perspectives on strategy. *Strategic Management Journal*, 17, 5-19.
- Baron, D. P. (1995). Integrated Strategy: Market and non-market components. *California Management Review* 37, 47-65.
- Beinhocker, E. D. (1999). Robust adaptive strategies. *Sloan Management Journal*, Spring 1999, 95-106.
- Beinhocker, E. D. (2006). *The Origin of Wealth: Evolution, Complexity, and the Radical Remaking of Economics*. London: Random House Business Books, 2006.
- Berger, I. E., Cunningham, P. H., & Drumwright, M. E. (2007). Mainstreaming Corporate Social Responsibility: Developing Markets for Virtue. *California Management Review*, 49, 132-157.
- Boons, F. (2013). Organizing within dynamic ecosystems: conceptualising socio-ecological mechanisms. *Organization & Environment* 26, 281-297.
- Bowen, F. & Aragon-Correa, J. A. (2014). Greenwashing in Corporate Environmentalism Research and Practice: The Importance of What We Say and Do. *Organization & Environment*, 27, 107-112.
- Bundy, J.; Shropshire, C. & Buchholtz, A. K. (2013). Strategic cognition and issue salience: Toward an explanation of firm responsiveness to stakeholder concerns. *Strategic Management Journal*, 38, 352-376.
- Burgelman, R. A. (1991). Intraorganizational ecology of strategy making and organizational adaptation: Theory and field research. *Organization Science*, 2, 239-262.
- Burnes, B. (2005). Complexity theories and organizational change. *International Journal of Management Reviews* 7, 73-90.
- Camillus, J. C. (2008). Strategy as a wicked problem. *Harvard Business Review* 86, 89-106.
- Carroll, A. B. & Shabana, K. M. (2010). The Business Case for Corporate Social Responsibility: A Review of Concepts, Research and Practice. *International Journal of Management Reviews*, 12, 85-105.
- Carroll, A. B. (1979). A three-dimensional conceptual model of corporate performance. *Academy of Management Review* 4, 497-505.
- Chaffee, E. E. (1985). Three models of strategy. *Academy of Management Review*, 10, 89-98.
- Chand, M. & Tung, R. L. (2014). The aging of the world's population and its effects on global business. *Academy of Management Perspectives* 28, 409-429.
- Coady, D.; Parry, I.; Sears, L. & Shang, B. (2015). How Large Are Global Energy Subsidies? *IMF Working Paper*, IMF Fiscal Affairs Department, WP/15/105, May 2015.
- Coleman, H. J. Jr. (1999). What enables self-organizing behavior in businesses. *Emergence* 1, 33-48.

- Corning, P. A. (2002). The re-emergence of “emergence”: A venerable concept in search of a theory. *Complexity*, 7, 18-30.
- Crutzen, P. J., & Stoermer, E. F. (2000). The 'Anthropocene'. *Global Change Newsletter* 41: 17–18.
- Cyert, R. M. & March, J. G. (1963). *A behavioral theory of the firm*. Englewood: Prentice-Hall Inc., 1963.
- Daepf, M. I. G.; Hamilton, M. J.; West, G. B. & Bettencourt, L. M. A. (2015). The mortality of companies. *Journal of the Royal Society Interface*, 12: 20150120.
- Dahlmann, F. & Brammer, S. (2011). Exploring and Explaining Patterns of Adaptation and Selection in Corporate Environmental Strategy in the USA. *Organization Studies*, 32, 527–553.
- D’Aveni, R. (1994). *Hypercompetition: Managing the dynamics of strategic management*. New York.
- Delmas, M. & Blass, V. D. (2010). Measuring corporate environmental performance: the trade-offs of sustainability ratings. *Business Strategy and the Environment*, 19, 245-260.
- Delmas, M. & Cuere Burbano, V. (2011). The drivers of greenwashing. *California Management Review*, 54, 64-87.
- Delmas, M. & Montes-Sancho, M. J. (2010). Voluntary agreements to improve environmental quality: Symbolic and substantive cooperation. *Strategic Management Journal*, 31, 575–601.
- Delmas, M. & Montes-Sancho, M. J. (2011). An Institutional Perspective on the Diffusion of International Management System Standards: The Case of the Environmental Management Standard ISO 14001. *Business Ethics Quarterly*, 21, 103-132.
- Dentchev, N. A. (2004). Corporate Social Performance as a Business Strategy. *Journal of Business Ethics*, 55, 397-412.
- DiMaggio, P. J. & Powell, W. W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review* 48, 147-160.
- Donaldson, T. & Preston, L. E. (1995). The stakeholder theory of the corporation: Concepts, evidence, and implications. *Academy of Management Review* 20, 65-91.
- Dooley, K. (1996). A Nominal Definition of Complex Adaptive Systems. *The Chaos Network*, 8, 2-3.
- Dooley, K. (1997). A complex adaptive systems model of organization change. *Nonlinear Dynamics, Psychology, and Life Sciences*, 1, 69-97.
- Dooley, K. (2002). Organizational complexity. *International Encyclopedia of Business and Management*, M. Warner (ed.), London: Thompson Learning: 5013-5022.
- Drazin, R. & Van de Ven, A. H. (1985). Alternative Forms of Fit in Contingency Theory. *Administrative Science Quarterly* 30, 514-539.
- Eisenhardt, K. M. (2002). Has strategy changed? *MIT Sloan Management Review*, Winter 2002, 88-91.
- Eisenhardt, K. M. & Brown, S. L. (1999). Patching: Restitching business portfolios in dynamic markets. *Harvard Business Review* 77, 72-82.
- ESPAS (2013). Citizens in an interconnected and polycentric world – Global Trends 2030. *European Strategy and Policy Analysis System (ESPAS)*, European Union Institute for Security Studies: 2013. ISBN 978-92-9198-199-1
- Etzion, D. (2007). Research on Organizations and the Natural Environment, 1992-Present: A Review. *Journal of Management*, 33, 637-664.
- Ferraro, F.; Etzion, D. & Gehman, J. (2015). Tackling Grand Challenges Pragmatically: Robust Action Revisited. *Organization & Environment*, 36, 363–390.
- Frenken, K. & Nuvolari, A. (2004). The early development of the steam engine: an evolutionary interpretation using complexity theory. *Industrial and Corporate Change* 13, 419–450.
- Friedman, M. (1970). The social responsibility of business is to increase its profits. *The New York Times Magazine*, September 13, 1970.
- Foss, N. J. & Ishikawa, I. (2007). Towards a Dynamic Resource-based View: Insights from Austrian Capital and Entrepreneurship Theory. *Organization Studies*, 28, 749–772.
- Gao, J. & Bansal, P. (2013). Instrumental and Integrative Logics in Business Sustainability. *Journal of Business Ethics*, 112, 241-255.
- GEO5 (2012). Global Environment Outlook 5 – Environment for the future we want. *UNEP – United Nations Environment Programme*, 2012, ISBN 978-92-807-3177-4.
- Girod, S. J. G. & Whittington, R. (2015). Change Escalation Processes and Complex Adaptive Systems: From Incremental Reconfigurations to Discontinuous Restructuring. *Organization Science*, forthcoming.

- Gladwin, T. N.; Kennelly, J. J. & Krause, T.-S. (1995). Shifting paradigms for sustainable development: Implications for management theory and research. *Academy of Management Review*, 20, 874-907.
- Griggs, D.; Stafford-Smith, M.; Gaffney, O.; Rockström, J.; Öhman, M.C.; Shyamsundar, P. et al., (2013). Sustainable development goals for people and planet. *Nature*, 21 March 2013, 495, 305-307.
- Griggs, D.; Stafford Smith, M.; Rockström, J.; Öhman, M.C.; Gaffney, O.; Glaser, G. et al. (2014). An integrated framework for sustainable development goals. *Ecology and Society*, 19, 49.
- Hahn, T., Figge, F., Pinkse, J., & Preuss, L. (2010). Trade-offs in corporate sustainability: You can't have your cake and eat it. *Business Strategy and the Environment*, 19, 217-229.
- Hahn, T., Pinkse, J., Preuss, L., & Figge, F. (2014a). Tensions in Corporate Sustainability: Towards an Integrative Framework. *Journal of Business Ethics*, 127, 297-316.
- Hahn, T., Preuss, L., Pinkse, J., & Figge, F. (2014b). Cognitive frames in corporate sustainability: managerial sensemaking with paradoxical and business case frames. *Academy of Management Review*, 39, 463-487.
- Hamel, G. (1998). Opinion, strategy innovation and the quest for value. *Sloan Management Review*, Winter 1998, 7-14.
- Hannan, M. T. & Freeman, J. (1984). Structural inertia and organizational change. *American Sociological Review*, 49, 149-164.
- Harrison, J. S & Wicks, A. C. (2013). Stakeholder Theory, Value, and Firm Performance. *Business Ethics Quarterly*, 23, 97-124.
- Hart, S. L. & Milstein, M.B. (2003). Creating sustainable value. *Academy of Management Executive*, 17: 56-69.
- Hoffman, A. J. & Georg, S. (2013). A history of research on business and the natural environment: Conversations from the field, in S. Georg and A. Hoffman (eds.) *Business and the Environment: Critical Perspectives in Business and Management*, Volume I (Oxford, UK: Routledge): 1-58.
- Hoffman, A. J. & Jennings, P. D. (2011). The BP Oil Spill as a Cultural Anomaly? Institutional Context, Conflict, and Change. *Journal of Management Inquiry*, 20, 100-112.
- Hoffman, A. J. & Jennings, P. D. (2015). Institutional Theory and the Natural Environment: Research in (and on) the Anthropocene. *Organization & Environment*, 28, 8-31.
- Holland, J. H. (1995). *Hidden order – How adaptation builds complexity*. New York: Basic Books, 1995.
- Holland, J. H. (2000). *Emergence from chaos to order*. Oxford: Oxford University Press, 2000.
- Howard-Grenville, J., Buckle, S. J., Hoskins, B. J. & George, G. (2014). Climate change and management. *Academy of Management Journal*, 57, 615-623.
- Husted, B. W., & de Jesus Salazar, J. (2006). Taking Friedman Seriously: Maximizing Profits and Social Performance. *Journal of Management Studies*, 43, 75-91.
- Jones, T. M. & Felps, W. (2013). Shareholder Wealth Maximization and Social Welfare: A Utilitarian Critique. *Business Ethics Quarterly*, 23, 207-238.
- Jones, T. M. (1995). Instrumental stakeholder theory: A synthesis of ethics and economics. *Academy of Management Review*, 20, 404-437.
- Kallis, G. & Norgaard, R. B. (2010). Coevolutionary ecological economics. *Ecological Economics* 69, 690-699.
- Kauffman, S. A. (1993). *The origins of order – Self-organization and selection in evolution*. New York: Oxford University Press, 1993.
- Kauffman, S. A. (1995). Escaping the red queen effect. *The McKinsey Quarterly*, 1995, 118-129.
- Kelly, D. & Amburgey, T. L. (1991). Organizational inertia and momentum: A dynamic model of strategic change. *Academy of Management Journal*, 34, 591-612.
- Kiron, D.; Kruschwitz, N.; Haanaes, K. et al. (2015). Joining Forces: Collaboration and Leadership for Sustainability. Findings from the 2014 Sustainability & Innovation Global Executive Study and Research Project, MIT Sloan Management Review, The Boston Consulting Group and the United Nations Global Compact. *MIT Sloan Management Review*, January 12, 2015.
- Levinthal, D. A. (1991). Organizational adaptation and environmental selection – Interrelated processes of change. *Organization Science*, 2, 140-145.

- Levinthal, D. A. (1997). Adaptation on rugged landscapes. *Management Science*, 43, 934-950.
- Levinthal, D. A. & Warglien, M. (1999). Landscape design: Designing for local action in complex worlds. *Organization Science*, 10, 342-357.
- Lewin, R. & Regine, B. (1999). *The soul at work – Unleashing the power of complexity science for business success*. London: The Orion Publishing Group Ltd., 1999.
- Lewis, M. W. (2000). Exploring Paradox: Toward a More Comprehensive Guide. *Academy of Management Review*, 25, 760-776.
- Lovas, B. & Ghoshal, S. (2000). Strategy as guided evolution. *Strategic Management Journal*, 21, 875-896.
- Magolis, J. D. & Walsh, J. P. (2003). Misery Loves Companies: Rethinking Social Initiatives by Business. *Administrative Science Quarterly*, 48, 268-305.
- Mason, R. B. (2007). The external environment's effect on management and strategy – A complexity theory approach. *Management Decision*, 45, 10-28.
- Maynard Smith, J. & Price, G. R. (1973). The logic of animal conflict. *Nature*, 246, 15-8.
- McKelvey, B. (1999). Avoiding complexity catastrophe in coevolutionary pockets: Strategies for rugged landscapes. *Organization Science*, 10, 294-321.
- McLaughlin, P. (2013). Ecological modernization in evolutionary perspective. *Organization & Environment*, 25, 178-196.
- Mintzberg, H. (1978). Patterns in strategy formation. *Management Science* 24, 934-948.
- Mintzberg, H. (1994). The fall and rise of strategic planning. *Harvard Business Review* 1994: 107-114.
- Mouzas, S. & Ford, D. (2006). Managing relationships in showery weather: The role of umbrella agreements. *Journal of Business Research*, 59, 1248–1256.
- NIC (2012). Global Trends 2030 – Alternative Worlds. *National Intelligence Council*, December 2012, NIC 2012-001, ISBN 978-1-929667-21-5.
- OECD (2013). Environment at a Glance 2013: OECD Indicators. *OECD Publishing*.
- Oxfam (2015). *Wealth: Having it all and wanting more*. Oxfam Issue Briefing, January 2015, Oxford.
- Oxford Martin (2013). Now for the Long Term - The Report of the Oxford Martin Commission for Future Generations. *Oxford Martin School, University of Oxford*, 2013, October 2013, ISBN: 978-0-9927411-1-2.
- Pascale, R. T. (1999). Surfing the edge of chaos. *Sloan Management Review*, Spring 1999, 83-94.
- Pinkse, J., & Kolk, A. (2010). Challenges and trade-offs in corporate innovation for climate change. *Business Strategy and the Environment*, 19, 261-272.
- Poole, M. S., & Van de Ven, A. H. (1989). Using Paradox to Build Management and Organization Theories. *Academy of Management Review*, 14, 562-587.
- Porter, M. E (1979). How competitive forces shape strategy. *Harvard Business Review*, March-April 1979, 137-145.
- Porter, T. (2006). Coevolution as a Research Framework for Organizations and the Natural Environment. *Organization & Environment*, 19, 479-504.
- Porter, T. & Siggelkow, N. (2008). Contextuality within activity systems and sustainability of competitive advantage. *Academy of Management Perspectives*, 22, 34-56.
- Prigogine, I. & Stengers, I. (1984). *Order Out of Chaos: Man's New Dialogue with Nature*. London: Flamingo.
- Quinn, R. E. (1988). *Paradox and transformation: Toward a theory of change in organization and management*. Cambridge, MA: Ballinger.
- Reinecke, J. & Donaghey, J. (2015). After Rana Plaza: Complementary Consumption and Production based Mobilization for Global Labour Rights. *Organization*, Forthcoming (2015).
- Reinecke, J.; Manning, S. & von Hagen, O. (2015). The Emergence of a Standards Market: Multiplicity of Sustainability Standards in the Global Coffee Industry. *Organization Studies*, 33, 791-814.
- Rivkin, J. W. (2000). Imitation of complex strategies. *Management Science*, 46, 824-844.
- Rivkin, J. & Siggelkow, N. (2007). Patterned Interactions in Complex Systems: Implications for Exploration. *Management Science* 53, 1068–1085.
- Robertson, D. & Caldart, A. (2008). Natural Science Models in Management: Opportunities and Challenges. *E:CO*, 10, 61-75.

- Rockström, J., W. Steffen, K. Noone, Å. Persson, F. S. Chapin, E. F. Lambin, T. et al. (2009). A Safe Operating Space for Humanity. *Nature* 461, 472–75.
- Rockström, J.; Falkenmark, M.; Allan, T.; Folke, C.; Gordon, L.; Jägerskog, A. et al. (2014). The unfolding water drama in the Anthropocene: towards a resilience-based perspective on water for global sustainability. *Ecohydrology*, 7: 1249–1261.
- Schreck, P.; van Aaken, D. & Donaldson, T. (2013). Positive Economics and the Normativistic Fallacy: Bridging the Two Sides of CSR. *Business Ethics Quarterly*, 23, 297-329.
- Schumpeter, J. A. (1942). *Capitalism, Socialism and Democracy*. London: Routledge.
- Sharma, S. (2000). Managerial interpretations and organizational context as predictors of corporate choice of environmental strategy. *Academy of Management Journal*, 43, 681-697.
- Siggelkow, N. & Rivkin, J. (2005). Speed and Search: Designing Organizations for Turbulence and Complexity. *Organization Science*, 16, 101–122.
- Slawinski, N., & Bansal, P. (2012). A Matter of Time: The Temporal Perspectives of Organizational Responses to Climate Change. *Organization Studies*, 33, 1537-1563.
- Slawinski, N., & Bansal, P. (2015). Short on Time: Intertemporal Tensions in Business Sustainability. *Organization Science*, 26, 531-549.
- Smith, W. K. (2014). Dynamic decision-making: A model of senior leaders managing strategic paradoxes. *Academy of Management Journal*, 57, 1592-1623.
- Smith, W. K., & Lewis, M. W. (2011). Toward a theory of paradox: A dynamic equilibrium model of organizing. *Academy of Management Review*, 36, 381-403.
- Stacey, R. D. (1995). The science of complexity: An alternative perspective for strategic change processes. *Strategic Management Journal*, 16, 477-495.
- Stacey, R. D. (1996). Emerging strategies for a chaotic environment. *Long Range Planning*, 29, 182-189.
- Starik, M. & Kanashiro, P. (2013). Toward a Theory of Sustainability Management: Uncovering and Integrating the Nearly Obvious. *Organization & Environment*, 26, 7–30.
- Starik, M. & Rands, G. P. (1995). Weaving an integrated web: Multilevel and multisystem perspectives of ecologically sustainable organisations. *Academy of Management Review*, 20, 908-935
- Stead, J. G. & Stead, W. E. (2008). Sustainable strategic management: an evolutionary perspective. *International Journal of Sustainable Strategic Management*, 1, 62-81.
- Stead, J. G. & Stead, W. E. (2013). The Coevolution of Sustainable Strategic Management in the Global Marketplace. *Organization & Environment*, 26, 162–183.
- Stenzel, T., & Frenzel, A. (2008). Regulating technological change—the strategic reactions of utility companies towards subsidy policies in the German, Spanish and UK electricity markets. *Energy Policy*, 36, 2645-2657.
- Suddaby, R.; Hardy, C. & Huy, Q. N. (2011). Introduction to special topic forum – Where are the new theories of organization? *Academy of Management Review*, 36, 236–246.
- Tashman, P. & Raelin, J. (2013). Who and What Really Matters to the Firm: Moving Stakeholder Salience beyond Managerial Perceptions. *Business Ethics Quarterly* 23, 591-616.
- Thiéart, R. A. & Forgues, B. (1995). Chaos theory and organization. *Organization Science*, 6, 19-31.
- Turner, N.; Swart, J. & Maylor, H. (2013). Mechanisms for Managing Ambidexterity: A Review and Research Agenda. *International Journal of Management Reviews* 15: 317–332.
- Tushman, M. L., & O'Reilly III, C. A. (1996). Managing evolutionary and revolutionary change. *California Management Review*, 38, 8-28.
- Umpleby, S. A. & Dent, E. B. (1999). The origins and purposes of several traditions in systems theory and cybernetics. *Cybernetics and Systems: An International Journal*, 30, 79-103.
- UN DESA (2013). World Economic and Social Survey 2013 - Sustainable Development Challenges. *United Nations Department of Economic and Social Affairs*, 2013, New York: E/2013/50/Rev.1, ST/ESA/344, ISBN 978-92-1-109167-0.
- Unruh, G. C. (2000). Understanding Carbon Lock-in. *Energy Policy*, 28, 817-830.
- Valente, M. (2012). Theorizing Firm Adoption of Sustaincentrism. *Organization Studies*, 33, 563-591.
- Van der Byl, C. A. & Slawinski, N. (2015). Embracing tensions in corporate sustainability: A review of research from win-wins and trade-offs to paradoxes and beyond. *Organization & Environment*, 28, 54–79.

- Von Bertalanfy, L. (1969). *General systems theory: Foundations, developments, applications*. New York: George Braziller, Inc.
- Waddock, S. (2013). We are all stakeholders of Gaia: A normative perspective on stakeholder thinking. *Organization & Environment*, 24, 192-212.
- Wellman, B. (2001). Physical Place and Cyber Place: The Rise of Networked Individualism. *International Journal of Urban and Regional Research*, 25, 227-52.
- Whiteman, G.; Walker, B. & Perego, P. (2013). Planetary Boundaries: Ecological Foundations for Corporate Sustainability. *Journal of Management Studies*, 50, 307-336.
- Winn, M. & Pogutz, S. (2013). Business, ecosystems, and biodiversity: New horizons for management research. *Organization & Environment*, 26, 203-229.
- York, J. G. (2009). Pragmatic sustainability: Translating environmental ethics into competitive advantage. *Journal of Business Ethics*, 85, 97-109.
- Zollo, M.; Cennamo, C. & Neuman, K. (2013). Beyond What and Why: Understanding Organizational Evolution Towards Sustainable Enterprise Models. *Organization & Environment*, 26, 241-259.
- Zuindeau, B. (2007). Territorial Equity and Sustainable Development. *Environmental Values*, 16, 253-268.