Fifty shades of green: How microfoundations of sustainability dynamic capabilities vary across organizational contexts

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Abstract

Since making progress on sustainability related challenges will require organizational change for most organizations, understanding sustainability dynamic capabilities is of utmost importance. In this theoretical paper, we aim to identify the microfoundations of such sustainability dynamic capabilities on the one hand but, consistent with recent work in this research stream, we do so in a way that is sensitive to the dynamism of the organizational environment. We propose that the microfoundations of sustainability dynamic capabilities will take different forms in different contexts. We contrast moderately dynamic contexts characterized by frequent yet relatively predictable change with highly dynamic contexts in which changes are rapid and not predictable. Achieving sustainability in these different types of contexts poses different types of challenges, relies on different forms of employee behaviors, and is consequently enabled by different individual-level characteristics and different organizational practices and processes. Our paper calls for a more serious consideration of context in investigating how employees' behaviors can affect sustainability at the organizational level, and outlines the implications for organizational policy and practice. We explore directions for future interdisciplinary research on sustainability that focuses on individuals and their interactions while also taking the environment within which organizations operate into account.

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Organizations pursuing a sustainable development strategy do "not merely seek to do less environmental damage but, rather, to actually produce in a way that can be maintained indefinitely into the future" (Hart & Dowell, 2011, p. 1466). To understand how sustainability, as a collective phenomenon at the organizational level, can be achieved, we "need to understand the constituent parts that make it up: individuals and their social interaction" (Barney & Felin, 2013, p. 139) – in other words, its microfoundations.

To date, a substantial body of research on sustainability has employed an organizational-level approach, focusing on, for example, how sustainability at the level of the organization is related to financial performance (Albertini, 2013; Etzion, 2007). On the other hand, there has been a surge in organizational behavior and organizational psychology research on individual-level employee behaviors that are presumed to contribute to sustainability, such as pro-environmental or "green" behaviors (see Lo, Peters, & Kok, 2012; Lülfs & Hahn, 2014; Norton, Parker, Zacher, & Ashkanasy, 2015; Young et al., 2015, for reviews). This growing literature has provided useful insights into how these behaviors are motivated (e.g., Graves, Sarkis, & Zhu, 2013), how organizations can promote them through their practices (e.g., Norton, Zacher, & Ashkanasy, 2014; Paillé, Chen, Boiral, & Jin, 2014) or through targeted interventions (e.g., Unsworth, Dmitrieva, & Adriasola, 2013), and how leaders can support them (e.g., Kim, Kim, Han, Jackson, & Ployhart, in press; Robertson & Barling, 2013).

However, there has been little research bridging organizational- and individual-level approaches to sustainability. Although sustainability is assumed "to result to a large extent from the aggregation of a multitude of green behaviors in the workplace" (Boiral, Paillé, & Raineri, 2015, p. 12), we know little about how these employee behaviors can enable organizations to

become more capable of dealing with the challenges of sustainability. Yet the value of individual-level theories of employee "green" or pro-environmental behavior ultimately lies in their link to sustainability at the firm level (cf. Devinney, 2013). In this paper we aim to bridge this macro-micro divide in sustainability research by providing a framework that outlines how the microfoundations of sustainability dynamic capabilities across different contexts.

We contribute to the literature in the following ways: First, we develop the concept of sustainability dynamic capabilities. Organizations engaging in "proactive environmental" or sustainability strategies are confronted with specific challenges, because incorporating sustainability as a business concern requires the balancing and alignment of business objectives with environmental outcomes. As a specific subset of dynamic capabilities, we therefore propose sustainability dynamic capabilities as those capabilities that enable an organization to reconfigure its resource base, to deal with the dynamism resulting from such "proactive environmental" or sustainability strategies.

Second, we take a microfoundational approach to sustainability dynamic capabilities which considers the individual-level components of these organizational-level capabilities (Felin, Foss, Heimeriks, & Madsen, 2012). We specifically focus on employee behaviors as key microfoundations. Focusing on employee behaviors – which have been the focal point of much organizational behavior and organizational psychology research on "greening organizations" (Boiral et al., 2015; Norton et al., 2015; Ones & Dilchert, 2012) – allows us to integrate this body of research with the strategic management literature on sustainability.

By integrating strategic management theory with organizational psychology research on pro-environmental behavior we aim to contribute to both bodies of literature and provide directions for future interdisciplinary research on sustainability, proposing bridges between the macro-micro divide that focus on individuals and the interactions between them, while also

taking into account the context within which organizations operate. Doing so is important, as we have learned that, in moving towards more sustainable organizations, details matter too much to be overlooked. If we want to bridge the gap between good intentions and actual behaviors, we must be sensitive to the details that may hamper our intentions to turn into environmental progress (Blok, Gremmen, & Wesselink, 2015; Derksen & Gartrell, 1993; Ertz, Karakas, & Sarigöllü, 2016).

Importantly, we propose that we are likely to get to a better understanding of how organizational sustainability can be realized *only* if we take a more contextualized perspective on the microfoundations of sustainability dynamic capabilities. Extant literature suggests that the efficacy of organization level capabilities depends on the context in which they need to operate. In contemplating the micro-level drivers and facilitators of organizational sustainability, we must be careful not to consider them as generic to all different contexts:

> "We strongly advise avoiding the temptation to apply general prescriptions to the analysis of environmental strategies, and recommend using a contingent lens instead. Improving corporate environmental performance is urgent for a sustainable world, but environmental management demands a specific analysis of each firm and its business and general context" (Aragón-Correa & Rubio-López, 2007, p. 375).

Although organizational contexts can vary on many dimensions (Dess & Beard, 1984; Milliken, 1987), our focus in this paper is the unpredictability of the context in which a firm is operating. Drawing on Eisenhardt and Martin's (2000) conceptualization of dynamic capabilities we argue that the microfoundations of sustainability vary depending on the dynamism of the situation in which an organization finds itself which results, at least in part, from an organization's sustainability strategy. In moderately dynamic contexts, different capabilities are

likely to be required to achieve sustainability than in highly dynamic contexts (Eisenhardt, 1989). Consequently, the microfoundations for sustainability are also likely to vary.

In organizational psychology and organizational behavior research, however, individual "green" behaviors and factors at the organizational level (e.g. pro-environmental leadership) are generally considered to contribute to sustainability irrespective of the context within which the organization operates. By outlining how the microfoundations of sustainability dynamic capabilities vary depending on the dynamism of the organization's context, we provide a framework that allows for a more nuanced (and hopefully more practical) perspective. We highlight that factors which constitute microfoundations of sustainability in some contexts paradoxically fail to support sustainability in others. Our model also brings microfoundations of sustainability dynamic capabilities into focus which have not yet been investigated. We back up our theoretical arguments through recourse to a range of practical examples from a wide range of industries.

Organizational capabilities for sustainability

Research on sustainability has shown that going beyond simply complying with environmental regulations is difficult, and requires a specific set of capabilities (Aragon-Correa and Sharma, 2003) to deal with the changes and complexities involved. The concept of capabilities is rooted in the resource-based theory of the firm (Barney, 1991; Wernerfelt, 1984). In this perspective, organizational performance is the result of an organization's resources, defined broadly as "anything which could be thought of as a strength or weakness of a given firm" (Wernerfelt, 1984, p. 172), or the organization's tangible and intangible assets. While it initially started as theoretical project to refocus the emphasis of strategy scholarship away from an exclusive interest in the external environment and towards explaining superior organizational

performance as a result of organizational features (Barney, 1991; Wernerfelt, 1984), the resource-based view of the firm was also challenged on a lack of attention to the external environment and in particular its changing nature (Teece, Pisano, & Shuen, 1997). In seeking to understand dynamic capabilities, Teece et al. (1997) provided a framework to explain superior organizational performance in the face of changing environmental conditions, and the concept quickly gained traction after its initial introduction. Dynamic capabilities are defined as repeatable organizational patterns of action that enable the organization to evolve its resource base and keep it aligned with the changing demands placed on it by its context, or to initiate these very changes (Eisenhardt & Martin, 2000; Sanchez, Heene, & Thomas, 1996; Teece et al., 1997) . The concept of dynamic capabilities focuses on the processes by which organizations are capable of integrating, reconfiguring, gaining, or releasing resources and competences to generate superior performance in response to a dynamic environment, but is not concerned with the origins of this dynamism. Eisenhardt and Martin (2000), however, went further in outlining the interplay between organizational capabilities and the external environment, arguing that the nature of dynamic capabilities as drivers of superior performance is dependent on the dynamism of the market in which the organization is operating.

Consistent with other work on the differences in organizational environments (Burns & Stalker, 1961; Lawrence & Lorsch, 1967; Milliken, 1987), Eisenhardt and Martin (2000) considered two types of market dynamisms, moderately dynamic and highly dynamic markets, which differ most importantly in their levels of uncertainty or lack of knowledge on how actions contribute to success. Moderately dynamic markets are ones in which change occurs in relatively predictable and linear patterns, and in which the roles and templates for action are relatively stable. In contrast, highly dynamic markets are characterized by non-linear, and thus more unpredictable, change. Such unpredictability emerges when change happens in highly

interconnected and interdependent systems, where chains of cause-and-effect are hard to identify (Maguire, Allen, & McKelvey, 2011). While in moderately dynamic markets dynamic capabilities consist of a set of detailed, analytic, and stable processes focused on generating predictable change, highly dynamic markets require trial-and-error-based experiential tinkering processes that lead to unpredictable changes governed by simple prioritization rules (Eisenhardt & Martin, 2000).

Previous work that has applied the concept of dynamic capabilities to sustainability has been primarily concerned with predicting organizations' strategic approach to the natural environment, and with determining how effective different strategic approaches would be. Aragón-Correa and Sharma (2003) argued that the dynamism of an organization's environment would determine whether it develops a proactive environmental strategy, i.e., "a pattern of environmental practices that went beyond compliance with environmental regulations" (p. 71), and whether a proactive environmental strategy results in a competitive advantage. Hart and Dowell (2011) build upon this model by distinguishing between different environmental strategies, such as pollution prevention and clean technology, and propose that these strategies would require different capabilities to generate success.

In the present paper, we follow Aragón-Correa and Sharma (2003) in focusing on those environmental strategies that can be considered "proactive": while environmental strategies can consist of mere compliance with regulations, proactive environmental strategies have as their objective to go beyond regulation. We extend extant literature on proactive environmental strategies in several ways. Proactive environmental strategies can be characterized along a continuum that varies in terms of disruptiveness of the changes required (Hart, 1995; Hart & Dowell, 2011). We propose that this continuum can be characterized at its extremes by moderate and more dynamic change, in ways that mimic the extremes of organizational markets suggested

by Eisenhardt and Martin (2000). Hence, we focus on the dynamic capabilities that are associated with a more or less dynamic context resulting from adopting a proactive environmental strategy. As we will argue below, proactive environmental strategies impose specific challenges on organizations that require "sustainability dynamic capabilities" to effectively deal with them. Consistent with the contingent view of dynamic capabilities as proposed by Eisenhardt and Martin (2000), however, we acknowledge that different changes require different sustainability dynamic capabilities, and that these different sustainability dynamic capabilities will in turn have different microfoundations.

Sustainability dynamic capabilities

Research on proactive environmental strategies has shown that internalizing environmental concerns into an organization's business model is challenging because of the changes and complexities involved (Aragón-Correa & Sharma, 2003). Indeed, the natural environment as a business concern is specific in that it is associated with market failures (Coase, 1960; Cohen & Winn, 2007; Hardin, 1968; Pigou, 1920). A market failure is "the failure of a more or less idealized system of price-market institutions to sustain desirable activities or to stop undesirable activities" (Bator, 1958, p. 351), generally as a result of the absence of the necessary conditions for markets to play their role as an optimal mechanism of allocating resources. Indeed, the "services" the natural environment provides us with (clean air, clean water, climate stability, etc.) are rarely "owned" by any particular person or organization, and even if the natural environment is owned, the consumption of these services is difficult to prevent. These services therefore fail the condition of "property rights" and "excludability" that would make it possible to integrate them into market mechanisms and put a price on their scarcity, which would be necessary for efficient allocation of resources (Coase, 1960; Samuelson, 1954). Over and above

the lack of prices for environmental degradation, a lack of awareness of who consumes, and how this affects the environment, results in a missing feedback-loop for producers of environmental degradation to indicate the effects of their actions. As a result, economic activity produces negative "externalities" on the environment: costs for society as a whole that are not taken into account by any individual or organization causing them. Conversely, because it is hard to privately appropriate the societal benefits of environmental preservation or even improvement, sustainability does not, in and of itself, provide sufficient incentives for individuals and organizations to engage in the production of positive externalities, i.e., benefits to a third party.

Organizations that are willing to take the natural environment into account are thus considering a variable of performance that adds additional complexity to the assessment of alignment between the organization's resource base and the environment. In particular, as the heart of sustainability lies in the production of positive externalities, or the avoidance of negative externalities, engaging in sustainable strategies imposes variables on strategy formation and execution that increase its dependence on assessments of the external environment on the one hand, and which may put a strain on its resources on the other. The dynamism of the organizational context is therefore not entirely exogenous, but in part endogenously created by the organization's proactive environmental strategy itself. Sustainability dynamic capabilities are therefore those capabilities that enable an organization to reconfigure its resource base to deal with the changes in the context that are the result of its "proactive environmental" or sustainability strategy, requiring it to balance business objectives and environmental externalities. Sustainability dynamic capabilities are therefore a specific subset of dynamic capabilities, emanating from complexities not prevalent in other settings.

Varying Levels of Dynamism of the Context

As argued above, proactive environmental strategies inherently involve change, and the changes they imply can be moderately or highly disruptive, involving different levels of complexity and uncertainty (Hart, 1995; Hart & Dowell, 2011), paralleling the extremes of organizational environments suggested by Eisenhardt and Martin (2000).

At one end of the continuum, organizations may aim to reduce the environmental impact of existing products or services, or the way their products are manufactured (Hart, 1995; Hart & Dowell, 2011). These "pollution prevention" strategies rely mostly on the kind of continuous improvement and gradual changes that are characteristic of moderately dynamic environments. The changes undertaken in these kinds of sustainability strategies are of low complexity, because they are not focused on radically changing the interdependencies between functions or operations in the company. Examples of pollution prevention strategies include programs that aim to reduce waste or pollution by increasing resource efficiency or recycling programs, car-pooling programs for home-work transport, constructing low-resource and energy-use company facilities, or adding new sustainability requirements in procurement policies. Such programs do no dramatically alter the company's business model and often involve incorporating off-the-shelve innovations or practices into the company's operations.

On the other side of the continuum are environmental strategies that Hart (1995) categorized as "sustainable development" or Hart and Dowell (2011) as "cleantech". In such strategies, the environmental impact of the company's products and services is reconsidered in a more systemic way, opening up changes in value chain configurations, business models and other radical innovations. An example of cleantech and sustainable development strategies is the decision of Interface, one of the world's largest carpet manufacturers, to shift from a business model driven by selling as many carpets as possible to a leasing-based carpeting services

business model. In turn, the latter gives the company an incentive to produce more durable carpet tiles, which can be recycled depending on their local wear. Following the decision of Ray Anderson who was shocked after realizing the damage of Interface's operations and business model on the natural environment and wanted a complete redesign of the company, implementing this business model required a shift in balance sheet financing, an operating model that includes a closed loop supply chain, and completely new product design and marketing philosophies (Johansen, 1998).

Pollution prevention strategies on one hand and sustainable development or cleantech strategies on the other hand thus result in moderate versus high levels of dynamism. This has implications for how strategic decisions are made, how change is implemented, and how lessons for the future are extracted (Eisenhardt & Martin, 2000). While in moderately dynamic contexts effective dynamic capabilities consist of a set of detailed, analytic, and stable processes focused on generating predictable change, highly dynamic contexts require trial-and-error-based experiential tinkering processes that lead to unpredictable changes governed by simple prioritization rules. This in turn has consequences for the microfoundations of sustainability in these contexts.

Microfoundations of Sustainability Dynamic Capabilities

To integrate existing conversations on sustainability from the strategic management literature on the one hand with organizational psychology and organizational behavior research on "green" behavior on the other, we explore the microfoundations of sustainability dynamic capabilities. A microfoundational approach aims to explain "how strategic dynamics may be rooted in individual characteristics and behaviors" (Foss, 2011, p. 1414). Since the mid-2000's, an increasing number of papers have called for research on the microfoundations of macro-level

concepts such as capabilities (Foss, 2011). Proponents of a microfoundational approach argue that organizational capabilities are "ultimately […] best understood at the microlevel" (Abell, Felin, & Foss, 2008, p. 489), and that individuals are the origin of routines and capabilities (Felin & Foss, 2005).

While there is considerable disagreement about the precise nature of microfoundations, and about their role in theories of organizational capabilities (Barney & Felin, 2013; Felin & Foss, 2011, 2012; Hodgson & Knudsen, 2011; Winter, 2011, 2013), there is also common ground: a greater understanding of the origin of capabilities requires a consideration of multiple levels of analysis. While individual-level components such as individual behaviors are critical to understand the phenomenon of organizational capabilities (Felin et al., 2012), a micro-foundational approach is not solely about individuals but also requires consideration of how these components are aggregated (Barney & Felin, 2013). Microfoundations refer to individuals, processes and interactions, as well as structures which influence the development and enactment of a capability (Felin et al., 2012). In our exploration of microfoundations of sustainability dynamic capabilities, we therefore not only focus on individual-level behaviors, but also consider the organizational-level processes and practices which enable them. As we argue below, depending on the dynamism of the environment resulting from an organization's sustainability strategy, sustainability dynamic capabilities are based on different forms of employee behaviors, and consequently enabled by different individual-level characteristics, and different organizational practices.

In fact, a microfoundational approach makes it possible to move beyond single levels of analysis to explore how theories at different levels relate to each other (Devinney, 2013). It can provide a framework to "look across levels of analysis" which "is not as simple as it seems, and hence, goes far beyond just arguing for multilevel analysis" (Devinney, 2013, p. 83). A

microfoundational approach thus holds the promise to bridge the micro-macro divide in sustainability research.

Individual-level behaviors as microfoundations of sustainability dynamic capabilities

Individual-level components, such as characteristics, abilities, or agency, are key to understanding the collective phenomena of routines and capabilities (Felin et al., 2012). Based on Eisenhardt and Martin's (2000) conceptualization of the patterns of dynamic capabilities in contexts of varying dynamism, we identify individual-level components that are likely to contribute to sustainability dynamic capabilities in these respective contexts. We begin by describing how employee behaviors can contribute to sustainability dynamic capabilities. Using employee behaviors as a starting point, we then discuss the individual differences and contextual factors that promote these behaviors.

In extant literature, employee behaviors have been associated with microfoundations of sustainability dynamic capabilities in two ways. First, strategy scholars have argued that sustainability strategies are complex, thus requiring employee involvement (Bansal, 2003; Etzion, 2007; Russo & Fouts, 1997). Empirically, employee behaviors have been found to play an important role in linking environmental strategies to environmental performance (Brío, Fernández, & Junquera, 2007; Chen, Tang, Jin, Li, & Paillé, 2015); this provides support for the idea that employee behavior are critical microfoundations of sustainability dynamic capabilities.

Second, employee behaviors that contribute to sustainability have been the focal point of much organizational behavior and organizational psychology research on "greening organizations". Focusing on employee behaviors as microfoundations of sustainability dynamic capabilities allows us to integrate this body of research with the strategic management literature on sustainability.

Although this literature has provided for significant progress in our knowledge on the role of "green behavior" of employees, we believe it has taken a perspective on employee behavior that has overlooked the important role of context in shaping the effectiveness of certain employee behaviors on the one hand, and the role of employee behaviors in shaping differences in organizational context on the other. Indeed, in current conversations in the organizational behavior and organizational psychology literature, several different conceptualizations of pro-environmental or green employee behavior have been proposed (see Boiral et al., 2015, for a review). For example, Ones and Dilchert (2012) distinguish between behavior avoiding harm, behavior aimed at conserving, working sustainably, influencing others, and taking initiative. Boiral and Paillé (2012) distinguish between three types of organizational citizenship behavior for the environment, that is, "individual and discretionary social behaviors that are not explicitly recognized by the formal reward system and that contribute to a more effective environmental management by organizations" (Boiral, 2009, p. 223). Eco-initiative is akin to taking charge (Morrison & Phelps, 1999) and voice (LePine & Van Dyne, 1998) aimed at improving the environmental performance in the organization. Eco-civic engagement reflects voluntarily participating in existing sustainability programs in the organization, while eco-helping refers to voluntarily encouraging other members to contribute to, and support, sustainable practices in the organization. Recurring in this literature is a strong emphasis on the divide between required and voluntary pro-environmental employee behaviors (Boiral et al., 2015; Norton et al., 2015), or between task-related pro-environmental behaviors, completing required tasks in environmentally friendly ways, and proactive green behaviors, showing initiative in regards to sustainability (Bissing-Olson, Iyer, Fielding, & Zacher, 2013; Norton et al., 2014).

We provide a different perspective on individual-level behaviors in relation to sustainability. First, we go beyond the distinction between required or prescribed versus

voluntary or proactive employee behaviors and instead discuss how different types of behavior may enable organizations to reconfigure their resources to align them to a more or less dynamic context result from their sustainability strategy. This provides a systematic way of considering the role of the context within which employee pro-environmental or "green" behaviors occur.

In discussing different types of behaviors that constitute microfoundations of sustainability dynamics we therefore focus on how different behaviors enable organizations to develop their resource base and keep it aligned with changing demands arising from their sustainability strategy. By acknowledging that sustainability necessarily involves change we highlight the role of employees' adaptivity which has received little attention in existing frameworks of behaviors. Adaptivity refers to behaviors that reflect a positive behavioral response to change, such as adjusting to new processes (Griffin, Neal, & Parker, 2007). This is distinct from conceptualizations which focus on individuals' ability to cope with change (Hesketh & Neal, 1999; Pulakos, Arad, Donovan, & Plamondon, 2000) by focusing on their attempts to accommodate and support changes (Griffin et al., 2007).

In moderately dynamic as well as in highly dynamic environments, individual employees may be at the origin of capability routines (c.f. Barney & Felin, 2013). Proactive behavior, self-initiated behavior aimed at bringing about change (Parker, Bindl, & Strauss, 2010), can thus contribute to sustainability dynamic capabilities across different contexts, albeit in different ways. The role of proactivity or initiative has been highlighted in a number of frameworks of pro-environmental employee behavior, and this behavior is often conceptualized as voluntary. However, as Grant and Ashford (2008) argued, the key characteristic of proactive behavior is not whether it is voluntary or required, "but rather whether the employee anticipates, plans for, and attempts to create a future outcome that has an impact on the self or environment" (p. 9; see also Griffin et al., 2007; Parker, Williams, & Turner, 2006). Table 1 summarizes our arguments.

Insert Table 1 about here

Individual behaviors as microfoundations of sustainability dynamic capabilities in moderately dynamic contexts

Adaptivity. If achieving sustainability requires change, employee behaviors that reflect coping with, responding to, and supporting change constitute a key individual-level foundation of sustainability dynamic capabilities. In moderately dynamic contexts, it is possible to set goals and specify the way in which organizations achieve sustainability. The way the organization moves towards greater sustainability is thus linear, and while changes may be frequent, they are relatively predictable. Research shows that when employees feel that change in the organization has been implemented in a deliberate, planned way and with preparation, they are less likely to experience uncertainty (Rafferty & Griffin, 2006), a psychological state of doubt about what the change signifies or entails (DiFonzo & Bordia, 1998). The extent to which organizational change is perceived as planned indirectly affects outcomes such as employees' job satisfaction and turnover intention, through its impact on the experience of uncertainty (Rafferty & Griffin, 2006). Unpredictability is thus likely to be lower in moderately dynamic environments, compared to highly dynamic environments.

Nevertheless, even planned change along predictable lines nonetheless requires adaptivity, i.e., it requires individuals to adjust to changes that affect their individual task, their role in the team, or their role in the organization (Griffin et al., 2007). This may involve adjusting one's plans, goals, or actions, as well as learning new approaches and technologies (Pulakos et al., 2000). Moderately dynamic environments involve learning-before-doing. Skill requirements

can thus be anticipated and adaptivity involves learning new skills in anticipation of changes in tasks and procedures.

For example, Boiral (2005) described how chemical factories in Canada implemented proactive environmental strategies aimed at preventing pollution, a sustainability strategy which, as we argued above, relies primarily on gradual improvements and require moderately dynamic change. He highlighted that reducing pollution results in changes to the work practices and production operations of the organization, providing support for the idea that sustainability capabilities in this context would require individuals' compliance with, and support of, behavior change. While none of the three organizations studies by Boiral (2005) had systematically evaluated the role of employees' involvement in their pollution prevention strategy, evidence from an aluminum production factory (case 2) suggested that variations in emissions from technically equivalent equipment could be largely explained by operators' adaptivity in relation to changes in working methods. Operators who were new to the industry received training on work procedures that could impact pollution. The skills they required had thus been anticipated in advance. This group of operators produced lower atmospheric emissions. On the other hand, operators who had previously worked in one of the organization's other facilities brought old working habits with them which "proved to be very difficult to change" (Boiral, 2005, p. 354), which supposedly lead to the higher levels of emissions this group produced.

In moderately dynamic environments it is possible to specify with a high level of concreteness the actions required by employees to contribute to sustainability. In these contexts, setting goals and providing incentives may be effective in achieving compliance with changing requirements, and environmental initiatives which aim at pre-specified behavior change are likely to contribute to sustainability (see Unsworth et al., 2013; Young et al., 2015, for reviews). Training interventions and awareness campaigns in organizations have been found to improve

recycling behavior (Jones, Jackson, Tudor, & Bates, 2012) and energy preservation (Schelly, Cross, Franzen, Hall, & Reeve, 2011).

Support for this argument comes from two further examples of moderately dynamic contexts. Lingard, Gilbert, and Graham (2001) describe a goal setting and feedback intervention on the construction site of a sports stadium in Australia. This involved setting performance targets for the reduction and recycling of waste materials. Feedback was then provided about, for example, the percentage of total waste disposed as landfill during the current and preceding fortnight. The authors found that this intervention significantly reduced waste and improved material usage efficiency, suggesting that employees adjusted their ways of working to comply with the specified target. Similarly, Tam and Tam (2008) reported that implementing a stepwise incentive scheme in which employees received a reward proportionate to the percentage of materials saved improved waste management performance on a Hong Kong hotel redevelopment project. In summary, in moderately dynamic environments, behaviors that reflect adjustment to, and compliance with, changing requirements in relation to sustainability can be an important behavioral microfoundation of sustainability dynamic capabilities. We propose:

> ***Proposition 1: In moderately dynamic contexts, sustainability dynamic capabilities will be based on forms of adaptivity that reflect compliance with behavior change guided by specific goals and the development of skills in anticipation of requirements.***

Proactivity. Far from merely responding to change, even in moderately dynamic contexts employee proactive behaviors play a key role, albeit in different ways than in highly dynamic contexts. In moderately dynamic environments, strategic decisions rely primarily on leaders' existing knowledge. Leaders can systematically analyze situations based on their own knowledge and their previous experience. In these environments, effective decision making by leaders

involves gathering extensive information, identifying and analyzing alternatives, and choosing between them (Fredrickson, 1984). Leaders can thus specify the ends to be achieved, such as by setting a target for emissions. However, they may not always be able to specify how exactly, for example, emissions could be reduced, and sustainability dynamic capabilities depend on employees throughout the organization being proactive in identifying ways of achieving this target. According to Grant and Ashford (2008), proactive behavior may involve "behaviors enacted to achieve specified ends before being asked to do so, inventing new means, or negotiating new ends" (p. 9). In moderately dynamic contexts, where organizations are able to specify ends to be achieved, employees can be proactive in acting upon these specified ends as well as in identifying new means to achieve them. Consequently, organizations aiming to achieve sustainability in moderately dynamic contexts rely upon employees in particular to contribute to continuous improvement, that is, to invent new means. While it may be possible to set specific goals and prescribe some specific behaviors at the level of concrete actions as discussed above, organizations also require employees to find ways of incrementally improving processes, either by speaking up with suggestions (LePine & Van Dyne, 1998; Morrison, 2011) or by taking initiative to implement changes themselves (Frese & Fay, 2001; Morrison & Phelps, 1999; Parker et al., 2006). We suggest that in moderately dynamic contexts, employees may be proactive in finding more environmentally friendly ways of completing their core job (individual task proactivity, Griffin et al., 2007). They may also make suggestions and aim to initiate change in order to improve environmental performance at the level of the team or the organization as a whole (team member and organization member proactivity, Griffin et al., 2007). In moderately dynamic contexts, employees may be proactive to initiate change within existing structures and processes in order to improve environmental performance. In these contexts, suggestions to improve sustainability may be effectively framed in ways that conform to extant organizational

practices (Dutton, Ashford, O'Neill, & Lawrence, 2001), and the process of communicating and implementing them may follow established pathways which have been developed slowly over time (Eisenhardt & Martin, 2000).

For example, Boiral (2002) described the case of an oil refinery concerned about reducing pollution (case 1). While the ends were specified (reducing emissions), employees were critical in identifying the means. In the oil refinery, certain routine operations during the production caused significant emissions of butane into the atmosphere. Only workers directly involved in these operations had the opportunity to observe this problem. Following an environmental awareness training program, an employee highlighted the problem during a meeting of the environmental committee, which allowed the organization to prevent further butane leaks. In this example, an employee is proactive in suggesting improvements to current working methods, and this is proactivity follows procedures developed by the organization. The organization has implemented a training program to raise employee awareness of environmental issues, and the environmental committee provides a forum for raising suggestions. However, employees' tacit knowledge puts them into a unique position to contribute to pollution prevention (Boiral, 2002). As an environmental supervisor in another case (case 7) described by Boiral (2002) notes: "When a company does pollution prevention, it's the production employees that work on the problems" (p. 305). Organizations which aim to achieve sustainability in moderately dynamic contexts thus need to specify ways in which employees are expected to contribute to sustainability as well as harnessing employees' contributions to continuous improvements.

Proposition 2: In moderately dynamic contexts, sustainability dynamic capabilities will be based on forms of employee proactivity that occur within existing processes and are aimed at identifying new means for achieving specified ends.

Individual behaviors as microfoundations of sustainability dynamic capabilities in highly dynamic contexts

Adaptivity. Highly dynamic contexts pose different challenges. In these environments, templates for responding to the changes involved with moving towards more sustainability are unavailable and largely have to be invented on the go (Eisenhardt & Martin, 2000). For example, even though electrical vehicles have been suggested as a way to make mobility less fossil fuel dependent, the electrical vehicle market is quickly evolving, with both new and incumbent actors taking up new roles with new technologies in new value chains. Car manufacturers like Tesla are also investing in the infrastructure and production of energy that will move the car, a role which automotive companies previously left to the oil industry. The entire electrical vehicle industry is still unclear on how to resolve range anxiety – the fear of car users to run out of energy before they reach their destination (e.g., Franke, Neumann, Bühler, Cocron, & Krems, 2012) – and several technological options are still open. In addition, whether or not these different actors and constellations represent the future of the electromobility market and whether they will lead to more sustainability is still unclear to all of the actors involved at the time of writing.

For organizations in such highly dynamic contexts it is thus often not possible to specify exactly how employees are expected to contribute to sustainability. While a general philosophy or vision may exist, numerous practical questions and challenges hindering its direct implementation turn it into an uncertain endeavor. Promoting changes in pro-environmental behavior through a planned series of actions and templates is therefore impossible and sometimes even counterproductive (Garud & Karnøe, 2003). In fact, such planning may be unhelpful as it could promote and reinforce behaviors which may no longer be relevant in a rapidly changing context. In these contexts, changes in the requirements of individuals' roles are difficult to define (Griffin et al., 2007). While this does not mean that there are no role expectations regarding

individuals' contributions to sustainability, roles are more likely to be emergent. Role expectations are likely to change and evolve over time, and outlining such expectations relies not on particular actions towards a specified goal, but on a vague vision of the future. Rather than being determined and specified, role expectations thus rely on individuals' active exploration (Nicholson, 1984).

For example, in their comparison of the emergence of the wind turbine industry in Denmark and the US, Garud and Karnøe (2003) demonstrated that the strong pre-defined programs to generate technological breakthroughs in the US were actually blocking the necessary learning processes to make progress. In contrast, the Danish wind turbine industry was characterized by a network of people involved in trial-and-error, resulting in a collective, yet distributed learning process that was able to make much faster technological and commercial progress. The prescription is therefore much more on the sharing of information for collective progress, rather than to follow exactly preset procedures.

In highly dynamic contexts, where change is less likely to be implemented in a deliberate and prepared way, employees' perceptions of uncertainty are therefore likely to be higher than in moderately dynamic contexts (Rafferty & Griffin, 2006). In these contexts, it will thus not be clear what change will entail and how it will affect individuals, which may make it more difficult to accept change (Wanberg & Banas, 2000). The higher levels of uncertainty in highly dynamic contexts require employees who feel confident that they will be able to deal with change, even if they cannot predict how it will affect them. As argued above, role expectations are quickly evolving (Jackson & Schuler, 2002), making a high tolerance for uncertainty a particularly important individual-level component of dynamic capabilities in these contexts (Eisenhardt & Martin, 2000). Adaptivity will involve learning-by-doing (Pisano, 1994), and skills need to be developed without a clear link to anticipated requirements. Learning-by-doing involves extracting

knowledge from successes as well as from failures. At the individual level, adaptivity in highly dynamic contexts therefore requires a rapid recovery from setbacks which is facilitated by the psychological resource of resilience, the "capacity to rebound or bounce back from adversity, conflict, and failure or even positive events, progress, and increased responsibility" (Luthans, 2002, p. 702). While a range of personal characteristics may be seen as relevant for sustainability dynamic capabilities in highly dynamic contexts, resilience is particularly important as it "uniquely searches for and finds meaning despite circumstances that do not lend themselves to planning, preparation, rationalization, or logical interpretation" and "recognizes the need for flexibility, adaptation, and even improvisation in situations predominantly characterized by change and uncertainty"(Youssef & Luthans, 2007, p. 780).

Proposition 3: In highly dynamic contexts, sustainability dynamic capabilities will be based on forms of adaptivity that reflect active exploration of emergent role requirements and involve the development of skills without a clear link to anticipated requirements.

Proactivity. In highly dynamic contexts, employee proactivity takes a different form than in moderately dynamic contexts. In highly dynamic contexts, leaders may be able to provide a broad vision of the future but they cannot specify how this future will be attained. Leaders relying primarily on their previous experiences and pre-existing knowledge may be at a disadvantage (Argote, 2012). Instead, organizations operating in highly dynamic contexts need to quickly gain new knowledge (Eisenhardt & Martin, 2000). This involves "learning-by-doing" (Pisano, 1994, p. 86), i.e., trying out different initiatives and courses of action which generates quick feedback while keeping losses to a minimum (Sitkin, 1996). For leaders, this likely requires a broader focus in attending to sustainability-relevant information (Hahn, Preuss, Pinkse, & Figge, 2015).

This also means that individuals outside the top management team come to act as potential initiators of strategic change, and that change processes can unfold in emergent and pluralistic ways (Dutton et al., 2001). In other words, in highly dynamic contexts, employee proactivity needs to aim at identifying the ends to be achieved as these cannot be clearly specified. Rather than providing suggestions for improvements in a known environment and suggesting new means towards given ends, they must contribute to knowledge generation, and promote ideas that reconfigure or fundamentally challenge the way the organizational resource base is made up or deployed. In highly dynamic contexts, champions of sustainability may challenge existing logics in the organization and will therefore need to be "immune" to the push-back such disruptive behavior may induce (Lepoutre & Valente, 2012). Such a process requires strategic scanning, "proactively surveying the organization's environment" (Parker & Collins, 2010, p. 635) to acquire information about events and opportunities (Howell & Higgins, 1990). This process may involve "scanning sources such as environmental and industry conferences, public libraries and databases, meetings with knowledgeable colleagues and external consultants, and environmental and industry periodicals" to "monitor organizational, public, and regulatory priorities and stay abreast of competitive trends and future environmental legislation" (Andersson & Bateman, 2000, p. 550). In a second stage of this process, the idea needs to be framed and presented in a way that is going to appeal to others in the organization (Dutton & Ashford, 1993). Employees need to communicate the strategic meaning of the idea, persistently promote it, convince top management of its viability in order to secure resources, and garner the support of others throughout the organization (Howell, Shea, & Higgins, 2005). Information gathering, however, in highly dynamic contexts also requires trial-and-error, the setting up of experiments to test hypotheses and contribute to the generation of knowledge. As such, proactivity requires

employees to engage in action prior to knowledge being available about the possible results of these actions.

For example, the mission of home cleaning products company Method is to change how home cleaning products are made. The innovation efforts of the company have not just focused on making products that are based on green chemistry, but also on packaging and sales methods that reinvent how cleaning products are purchased, consumed, and disposed of. Operating in a highly competitive industry and with a mission to force competitors to copy them, Method relies on constant innovation of new products and services that mostly come from their employees or their customers. In order to ensure such employee proactivity, employees are asked at recruitment how they can "keep Method weird" and are encouraged to "live in a constant state of make", i.e., to test their ideas as quickly as possible. Employees are trained with improvisation classes, change roles and responsibilities frequently, and interact with customers in a community fashion, so as to have a direct exchange with them for both ideas and feedback (Mittelstaedt, 2012).

Proposition 4: In highly dynamic contexts, sustainability dynamic capabilities will be based on forms of proactivity that are explorative in nature, challenge existing processes, and are aimed at identifying new ends to be achieved.

In sum, sustainability dynamic capabilities in moderately and in highly dynamic contexts will be rooted in adaptive and proactive behaviors, but the level of abstraction, scope, and nature of these employee behaviors differs across contexts. Across moderately and highly dynamic contexts, employee behaviors that constitute microfoundations of sustainability dynamic capabilities contexts vary in the extent to which they are guided by a concrete, pre-specified goal focused on the short- or medium term, or by a vague and abstract vision of the future. Having proposed employee behaviors as a critical microfoundation of sustainability dynamic capabilities,

we next identify individual characteristics and organizational processes and practices that facilitate them. This allows us to explore how factors that have been identified as important in the organizational behavior and organizational psychology literature on "greening" organizations play out across different contexts, and identify how what constitutes a microfoundation of sustainability in one type of context paradoxically fails to support sustainability in another. We also bring factors into focus which have not yet been investigated. Table 2 provides a summary of our propositions.

Enablers of individual-level behaviors for sustainability dynamic capabilities across different contexts

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Insert Table 2 about here

Individual characteristics

As mentioned earlier, in moderately dynamic contexts, sustainability dynamic capabilities will be guided by pre-specified goals. In these environments, employees thus need to be attentive to deviations from the pathway towards sustainability that has been specified by leaders in the organization, adapt to required changes, and take initiative in achieving prescribed ends. Consequently, individual-level characteristics which support working towards specified ends can contribute to sustainability. In highly dynamic contexts on the other hand, individuals need to be open to radical change, take initiative in specifying new ends, and look towards a more distant future.

Regulatory focus. We argue that aiming to achieve sustainability in moderately dynamic contexts constitutes a regulatory fit for prevention-oriented individuals. Regulatory focus theory

(Higgins, 1997, 1998) proposes that individuals whose self-regulation is characterized by a prevention focus are primarily motivated to avoid negative outcomes. Their sense of duty and responsibility motivates them to be vigilant to avoid mistakes. For prevention-oriented individuals, organizations which rely on employees to work towards specified ends for sustainability constitute a regulatory fit (Higgins, 2000, 2005). This regulatory fit contributes to their motivation for, and performance and enjoyment of pro-environmental behavior (Förster, Higgins, & Idson, 1998; Freitas & Higgins, 2002). Their regulatory focus fits with the goal to avoid a mismatch between their behavior and what has been specified as contributing to sustainability. The case by Boiral (2002) discussed earlier suggests that employees who have undergone environmental awareness training in a moderately dynamic context were monitoring deviations from specified targets and took initiative when environmental standards were not met. For prevention-focused individuals this would have constituted a regulatory fit.

Promotion-focused individuals on the other hand are focused on advancement and growth, and motivated to achieve ideal states. They are more likely to take risky decisions (Higgins, 2002; Kark & Van Dijk, 2007), and, because they are more comfortable with the risk of failure, more likely to try out creative approaches and put them into practice (Henker, Sonnentag, & Unger, 2015). Research shows that individuals with a promotion focus are more willing to abandon their current practices and to switch to new ones (Liberman et al., 1999; Brockner, Higgins, & Low, 2004), which is likely to promote their adaptivity in the context of rapidly evolving role requirements. Highly dynamic contexts thus constitute a regulatory fit for promotion-oriented individuals (Higgins, 1997, 1998). Their focus on an eager approach of ideal outcomes means that they will be unafraid to make mistakes (Higgins, 2002), and are thus well-placed to identify new ends to be achieved. The regulatory fit between their self-regulation and the organizational environment will enhance these individuals' motivation to creatively explore

risky opportunities through trial and error (Förster et al., 1998; Freitas & Higgins, 2002). The "employee-of-the-month" page of the home cleaning products Method's shows, for example, how employees like to describe themselves as weird and as rule-benders, and how they enjoy being surrounded by people of a similar kind (Method, 2013).

Temporal orientation. Setting goals and providing incentives can help compensate for the fact that the benefits of changing one's behavior or finding new ways of achieving specified ends in response to the organization's sustainability strategy are difficult to observe, particularly in the short-term. For individuals low in future orientation who are less concerned about the distant outcomes of their current behavior (Strathman, Gleicher, Boninger, & Edwards, 1994), this is likely to be particularly critical. These individuals are generally less likely to engage in behaviors characterized by an absence of immediate benefits which are their primary concern (see Joireman, Strathman, & Balliet, 2006; Van Lange & Joireman, 2008, for reviews). Setting targets for sustainability can counterweigh the lack of immediate returns and motivate these individuals to engage in adaptivity and proactivity. For future-oriented individuals in organizations operating in moderately dynamic contexts, it is on the other hand critical to emphasize the long-term effects of such behaviors. When organizational initiatives focus primarily on short-term targets and incentives, future-oriented individuals may paradoxically be less likely to engage in behaviors which contribute to sustainability (Van Lange & Joireman, 2008).

Temporal construal theory proposes that at greater temporal distance, individuals will be more concerned about the value of an action's end state, while at closer temporal proximity the feasibility of actions, difficulty of reaching their end states, will be their primary concern (Liberman & Trope, 1998). Events in the distant future tend to be represented "in terms of a few abstract features that convey the perceived essence of the events (high-level construals) rather

than in terms of more concrete and incidental details of the events (low-level construals)" (Trope & Liberman, 2003, p. 403). In highly dynamic contexts, representations of the future guided by vague visions of sustainability thus take the form of abstract, high-level construals, and concerns about feasibility become less prominent. This in turn promotes a concern with idealistic rather than pragmatic concerns (Kivetz & Tyler, 2007), and further reinforces a promotion focus (Pennington & Roese, 2003). A focus on the long-term future can thus temporarily suspend concerns with costs and feasibility that may prevent more radical ideas for innovation in moderately dynamic contexts. The major advances in the alternative energy generation sector in Germany and Scandinavia reflect, at least in part, a longer term orientation by key sectors of the investor community, impacting on intra-organizational time frames (Enzensberger, Wietschel, & Rentz, 2002; Lehr, Nitsch, Kratzat, Lutz, & Edler, 2008).

Pro-environmental attitudes and identity. Research that has aimed to explain pro-environmental behavior at work to date has largely drawn on the theory of planned behavior (Unsworth et al., 2013), placing attitudes at the center of interest. We propose that pro-environmental attitudes are likely to play a differential role in promoting adaptivity and proactivity in moderately versus highly dynamic contexts. Where it is possible to set goals for employees and incentivize their contributions to sustainability, such as by paying out a percentage of the cost savings achieved through waste reduction, pro-environmental attitudes may be helpful in achieving compliance with behavioral change, but they are not a necessary condition. Attitude change is not required to achieve a change in sustainability-related behavior in the workplace (Young et al., 2015). However, in the absence of pro-environmental attitudes monitoring and rewards are necessary to ensure that behavior change is maintained. Changes in behavior resulting from workplace interventions are unlikely to be sustained in the long-term when they are not in line with employees' values and interests (Unsworth et al., 2013).

On the other hand, it is also possible that organizational initiatives may undermine the self-expressive nature of adaptive and proactive behavior for employees with an environmental self-identity. These individuals strongly see themselves as someone who acts environmentally-friendly (van der Werff, Steg, & Keizer, 2013). For these individuals, prescribing and rewarding such behaviors may undermine their autonomous motivation (Deci, Koestner, & Ryan, 1999). For individuals with an environmental self-identity (van der Werff et al., 2013), finding ways to complete their tasks in a more environmentally friendly way and championing sustainability issues expresses who they are, and they are likely to engage in behavior that verifies this identity (Swann, 1983). The costs and benefits of these behaviors are thus unlikely to be a primary concern for them. Individuals "may choose to raise issues in organizations as a way of expressing and manifesting those identities. They raise them not because they think they will personally benefit; and they are not deterred from raising them because they may pay some personal costs. Rather, they raise these issues because raising them is a manifestation of who they are and what they care about" (Ashford & Barton, 2012, p. 228). In the case of highly dynamic contexts this is likely to be a particular important microfoundation of sustainability capabilities as the benefits of championing ideas for sustainability are likely to be uncertain, and setbacks are frequent.

Organizational processes and practices

Rules and guidelines. In moderately dynamic contexts, it is possible to develop rules that "that precisely specify steps and subdivide activities among different individuals" (Eisenhardt & Martin, 2000, p. 1111). These rules are typically relatively complicated and are developed slowly over time (Eisenhardt & Martin, 2000). Sustainability dynamic capabilities can therefore be institutionalized through the use of technology or the implementation of formal rules (Argote, 2012). In moderately dynamic contexts organizations may thus implement procedures that

specify how employees are expected to contribute to sustainability, use technology to provide feedback on the extent to which sustainability targets are met, or develop processes through which employees contribute to continuous improvements. They can promote adaptivity by setting goals for behavior change, and specify ways in which employees can identify new means of achieving specified ends. As a result, communication flows are likely to be hierarchically structured.

For example, Boiral (2005, case 3) described how a Canadian petroleum refinery improved its wastewater management by involving employees in systematic and structured ways. The refinery operated a waste water purification station using biological treatment, but a lack of understanding of the process on the side of the operators initially prevented its efficient functioning. The company then adopted a "listening and consulting approach" (p. 354), involving systematic meetings of the environmental department with operators and supervisors and working groups in the various sectors of the refinery tasked with solving specific problems in relation to pollution prevention. In this example, employee proactivity is harnessed through an institutionalized process which specifies the pathway employees are expected to follow in order to contribute to sustainability.

In highly dynamic contexts organizations cannot draw on what has worked in the past or specify which behaviors are desirable; they therefore need to rely on broad guiding principles which clarify priorities (Eisenhardt & Martin, 2000). Having broad guidelines in place is important as they provide some structure to individuals throughout the organization as they take initiative in identifying new ends to be achieved. This allows them to focus among the many different possible courses of action that such highly dynamic contexts provide. Broad guidelines also "help provide sense making about the situation, and be confident enough to act in these

highly uncertain situations where it is easy to become paralyzed by anxiety" (Eisenhardt & Martin, 2000, p. 1112).

In highly dynamic contexts organizations need to quickly learn from mistakes, which requires an effective approach to dealing with errors and failures (van Dyck, Frese, Baer, & Sonnentag, 2005). This means that errors, incorrect actions that result from a lack of knowledge (van Dyck et al., 2005), need to be detected quickly, negative consequences need to be minimized, and learning needs to occur (Frese, 1995). Organizations with a strong error management culture rely on practices which involve communication about errors, sharing knowledge about errors, and handling errors which promotes exploration and experimentation (van Dyck et al., 2005). This will allow organizations in highly dynamic contexts to quickly detect whether a course of action is successful, and correct it if necessary. An error management culture thus facilitates a rapid recovery from setbacks on the one hand, but also diffuses and communicates lessons learned through collective tinkering in the organization, developing learning at the level of the entire organization.

Leadership. In moderately dynamic contexts, organizations are able to set goals and specify the way in which sustainability is to be achieved. In these contexts, transactional leadership is likely to be effective in promoting adaptivity and proactivity. Transactional leadership involves clarifying what employees are expected to do in order to achieve rewards, monitoring their performance, and taking action to address deviations from rules (Avolio, Bass, & Jung, 1999). In support of this idea, transactional leadership has been found to be positively associated with incremental improvements and refinements which build upon existing knowledge (Jansen, Vera, & Crossan, 2009).

Again, in highly dynamic contexts on the other hand it is not possible to set specific goals for sustainability. Instead, leaders can only sketch a vague vision of the future and state the

general direction and principles that can guide organizational search processes, as specifying how this future can be attained is impossible. This highlights the importance of transformational leadership for adaptivity and proactivity in these contexts. Transformational leadership includes the communication of an appealing vision, and stimulating others to think about problems in new ways and reframing issues (Bass, Avolio, Jung, & Berson, 2003). Previous research has highlighted the role of transformational leadership in promoting employee pro-environmental behavior (Graves et al., 2013; Kim et al., in press; Robertson & Barling, 2013) but has paid little attention to the context within which it may be most effective. In support of our argument that transformational leadership would matter most for promoting sustainability-related behaviors in highly dynamic contexts, Jansen, Vera, et al. (2009) found that transformational leadership behaviors were positively related to the extent to which organizations developed new ways of thinking which depart from existing knowledge, and pursue radical change in reaction to emerging markets. Transactional leadership had a negative effect on this type of organizational change.

In addition, leaders also play a critical role in framing the issue of sustainability in order to facilitate employees' engagement with it. If the issue of sustainability seems too overwhelming a problem, this may cause feelings of arousal, frustration, and helplessness (Weick, 1984). Under conditions of high arousal, individuals revert back to behaviors that are well-learned and have been successful in the past (Staw, Sandelands, & Dutton, 1981). However, in a highly dynamic, changing context these behaviors may no longer be effective. This means that in framing sustainability as an issue, leaders need to exert caution. In highly dynamic contexts where dominant behaviors are unlikely to be adaptive, it may be more effective to break the issue of sustainability down into "small wins" – reframing this large problem into smaller, less arousing problems so that employees "can identify a series of controllable opportunities of modest size

that produce visible results and that can be gathered into synoptic solutions" (Weick, 1984, p. 40). Quick and tangible first steps towards sustainability help to generate new knowledge, acting "like miniature experiments that test implicit theories about resistance and opportunity and uncover both resources and barriers that were invisible before the situation was stirred up" (Weick, 1984, p. 44). Focusing on small wins is thus likely to facilitate learning-by-doing and form part of effective leadership processes in highly dynamic contexts.

Organizational structures. In highly dynamic contexts, sustainability dynamic capabilities require intensive communication among members of the organization, particular across functions, as well as with customers, suppliers, and competitors. Thus, in highly dynamic contexts, cross-functional interfaces are particularly important for sustainability dynamic capabilities as they provide platforms for the generation and reorganization of knowledge sources (Jansen, Tempelaar, Van den Bosch, & Volberda, 2009). An important structural microfoundation of coordination and communication across functions and other boundaries are thus temporary and ad hoc cross-functional teams (Taylor & Helfat, 2009). While knowledge exchange also plays a role for incremental improvements in moderately dynamic contexts, it is particularly crucial in highly dynamic contexts where knowledge and experiences are situation-specific (Eisenhardt & Martin, 2000) and efforts to improve sustainability depend on generating new knowledge. The literature on cross-functional teams suggests that the relative empowerment of the team, and the ability to traverse individual variations in knowledge and understanding, are strong predictors of success (Majchrzak, More, & Faraj, 2012; McDonough, 2000). Cross-functional teams thus play an important role for sustainability, particularly in highly dynamic contexts.

In contrast, sustainability dynamic capabilities in moderately dynamic contexts develop slowly, built on existing knowledge that is often highly specialized. Effective organizational

structures thus need to ensure that suggestions for improvements are elicited and processed, such as through suggestion systems and through job design. In these contexts, widening the job roles of production workers to include sustainability-related aspects can increase their sense of responsibility and improve environmental performance (Boiral, 2002).

Discussion

Recent years have seen an increase in references to sustainability in corporate reports and on company websites (Montiel & Delgado-Ceballos, 2014). Yet it should be recognized that a feature of modern development has been a general lack of attention to environmental concerns (Singer, 2011), and that for organizations to achieve environmental sustainability, it is necessary to depart from the approaches of the past. Hence, in this paper, we argue that achieving sustainability necessarily requires change, and that sustainability dynamic capabilities are thus critical. We therefore shift the perspective from identifying factors that contribute to sustainability, such as pro-environmental leaders or a green organizational climate, to the microfoundations of sustainability dynamic capabilities. This allows us to explore how individual behaviors enable organizations to change and reconfigure their resources, and, in turn, what individual and contextual factors foster or support such behaviors. By considering how sustainability dynamic capabilities vary across different contexts, we challenge the notion that key factors universally contribute to sustainability and propose that they vary in their importance and can even have paradoxical effects. Drawing on strategic management theory on market dynamism and dynamic capabilities, our conceptual paper provides a more contextualized view of the role of employee behavior as a microfoundation of strategic dynamics in relation to sustainability. Our microfoundational approach moves beyond single levels of analysis to explore

how micro-oriented research on employee "green" behavior and the factors that enable it relates to macro-oriented theories of sustainability.

Below we outline our contributions to sustainability theory and research. Rather than structuring our discussion by disciplines, such as by discussing implications for organizational psychology or strategic approaches to sustainability in turn, we aim to take an interdisciplinary approach in outlining future research directions.

Implications for Sustainability Theory and Research

Multiple levels of analysis

While the scientific evidence indicating a necessity to act upon the environmental challenges ahead of us is less and less ambiguous (e.g., Oreskes, 2004), the scope, urgency, and distribution of actions and responsibilities to do so remain all the more so. As a phenomenon rife with complexity, the origins of these discussions are to be found at all levels of analysis, from the very macro-political, socio-cultural, and economic to neuro-cognitive and material. Yet while, as keen observers of human and organizational behavior, we are likely to be sensitive to the differences in expecting or understanding certain behaviors at each of these levels, conversations about sustainability-related behaviors often end up using monolithic decontextualized judgments, blaming absence of green behaviors on immorality at individual level or the nature of capitalism at systems level (Fischer, Peters, Vávra, Neebe, & Megyesi, 2011). Our paper aims to remind us that, if we want to make real progress towards sustainability, the diversity of challenges that exists at the level of individuals, organizations, and the environments in which they are embedded needs to be taken seriously. Moving forward in addressing environmental challenges requires us to translate these challenges into their individual and organizational implications so that we can deal with them accordingly. The implication of our analysis is then that when

organizations respond to the challenge of sustainability, the strategies they choose have implications for the dynamism of the context they operate in. Accordingly, organizations will have to rely on sustainability dynamic capabilities to reconfigure their resource base in response to resulting dynamism. Furthermore, depending on the level of dynamism, different microfoundations underlie these sustainability dynamic capabilities. As Reinhardt said nearly 20 years ago,

> "If a group of business academics wrote that all firms ought to seek differentiated niches in their marketplaces, or that all should maintain debt to capital ratios of 40%, or that all should seek maximum employee empowerment, executives would respond, correctly, that the answers depend on the nature of the business. (…) So too with the environment; the right strategy depends on the industry and the firm" (Reinhardt, 1998, p. 647).

Although research linking organizational-level sustainability with employee behavior or societal contexts does exist, acknowledging the interdependent role of context and organizational capabilities and their microfoundations opens up new questions that may push the frontier of our knowledge on sustainability. To date, research on employee pro-environmental behavior has predominantly focused on organizational-level factors as antecedents of employee behavior, or as moderators (Norton et al., 2015). For example, in retail supply chain management organizational support for the environment has been found to contribute, via employees' perceptions, to pro-environmental behavior (Cantor, Morrow, & Montabon, 2012). Also, an organization's climate towards energy saving can compensate for a lack of pro-environmental attitudes at the employee level and influence employees' intentions to save energy (Zhang, Wang, & Zhou, 2014), and organizational norms were found to play an important role for pro-environmental behaviors of office workers (Norton et al., 2014).

The majority of research spanning multiple levels of analysis thus focuses on outcomes at the individual level, while research that investigates how employee behaviors aggregate to sustainability at the organizational level is comparatively scarce. Norton et al. (2015) identified only eight studies that consider outcomes of the organizational level in their recent systematic review of the literature on employee pro-environmental or green behavior and conclude that one of the most significant shortcomings of research to date is a lack of attention to how behaviors at the employee level influence outcomes for the organization. Since the role of individuals is critical for understanding organizational routines and capabilities (Felin & Hesterly, 2007), and "examining whether and how individuals' psychological processes affect organizational routines and capabilities is important to a microfoundations inquiry" (Felin et al., 2012, p. 1360), we need to ask ourselves how different organizational actors work together to develop the capabilities that enable organizations to change towards greater sustainability.

The few studies that link employee behaviors to sustainability-related outcomes at the organizational level were mostly conducted within a single industry and consequently pay little attention to the moderating role of the context within which organizations operate. Yet, in their extensive recent review of the literature on employees' pro-environmental behaviors, Boiral et al. (2015) argue that "the nature of pro-environmental behaviors depends on the type of organization (e.g., sector of activity, production process) and the activity of individuals" (p. 16). We have argued that even within the same sector, organizations' sustainability strategies may involve more or less dynamic change, and individuals' behaviors thus play a different role. In addition, Boiral et al. (2015) focus on organizations' environmental performance, rather than on their sustainability dynamic capabilities, i.e., the processes through which organizations reconfigure or optimize the use of their resource base to achieve sustainability in changing environments.

Conversely, although there is a very wide body of literature that links societal context with the proclivity of individuals – and firms – to engage in environmentally sustainable behavior (Bansal & Roth, 2000; Sine & Lee, 2009), we also know that institutional arrangements are never perfectly aligned, and that diversity within and between contexts, albeit bounded, persists (Lane & Wood, 2012). In other words, even if some settings may encourage particular patterns of individual and group behavior, there will be much diversity. This diversity may reflect sectoral and regional dynamics, but it also reflects the choices of individuals and groups that constitute the organization (Lane & Wood, 2012). As Aoki (2010) notes, when employees interact, they develop, over time, combined cognitive capital, based on past experiences and everyday interactions. This accords an organization with dynamic capabilities which enable it to cope with unexpected challenges and operate in a manner most appropriate to, and effective in, a particular context. The choices made by individuals will, in turn, be shaped by such circumstances (Aoki, 2010).

In sum, if a limit of macro approaches is that the organization may be construed of as a transmission belt, producing near-uniform outputs in response to specific contextual circumstances, micro-approaches may underplay both internal organizational traditions and legacies, and the extent to which wider formal and informal regulation may facilitate and support, or constrain, the implementation of the choices of individuals and groups.

Beyond individual and organizational levels

Change is difficult at individual, organizational, and systemic levels, with different sources of inertia requiring different solutions. A microfoundations perspective on organizational capabilities, however, has been shown in the past to facilitate understanding of how organizations can cope with organizational change and link these different levels of analysis (Gavetti, 2005; Helfat & Peteraf, 2015; Tripsas & Gavetti, 2000). Applying such an analysis to the challenges

associated with sustainable development can therefore help to make progress in our understanding and practice of a more sustainable world.

In our exploration of sustainability dynamic capabilities, we have limited ourselves to influences at the level of individuals or the organization. While we believe there are ample opportunities to develop work on the integration of just these two sets of variables, further research could also consider the institutional and the socio-material context in which sustainability related organizational actions are developed. For example, the particular organizational location, set-up, or the availability of technologies are known to influence how organizations deal with sustainability-related change (Derksen & Gartrell, 1993; Lepoutre & Valente, 2012), and are influenced by how individuals make sense of them (Garud & Karnøe, 2003). Further research could therefore explore the implications of this socio-material context for the microfoundations of sustainability dynamic capabilities.

Sustainability as a unique challenge

Studying the microfoundations of sustainability dynamic capabilities will not only help scholars in the field of organizations and the natural environment, but also raises questions to be explored for strategy scholars more generally. For example, does the very notion of sustainability related change have a different impact than changes that are needed because of competitiveness or technological reasons? Is there a difference in speed, scope, and even nature of capability dynamisms when the changes required serve sustainability rather than avoiding relocation business activities to lower wage countries? Or conversely, can the challenges related to sustainability be indeed so daunting that they rather paralyze than build up new capabilities and resources (Weick, 1984)? Since framing has important effects on cognition and organizational change (Eggers & Kaplan, 2009; Tripsas & Gavetti, 2000), what is the impact of sustainability related framing on capability development, as compared to other types of framing? Answering

these questions will contribute to a further contextualized understanding of the aggregation processes between individual-level cognition and organizational capabilities, which remain largely a black box to date (Eggers & Kaplan, 2009; Helfat & Peteraf, 2015).

Implications for Practice

The starting point of our paper is that proactive environmental strategies represent a particular challenge to organizations. Appropriating the benefits of avoiding pollution or contributing to a cleaner environment is not self-evident, and requires organizational efforts to balance the provision of such positive externalities for the natural environment on the one hand, and achieving results on whatever financial or economic imperatives an organization is subjected to on the other. Yet, an increasing number of successful "green" firms show that these challenges are not unsurmountable. Our objective in this paper was to help organizations willing to learn from these "green firms" by making sense of the variety of lessons that can be learnt from them. In particular, we believe that organizations are helped much more by more fine-grained advice, taking into account the specific complexities an organization experiences when adjusting its existing resource base in response to more or less dynamic change resulting from different sustainability strategies.

Our paper thus has implications for organizations dealing with different forms of sustainability-related change. Different environmental strategies imply more or less disruptive change (Hart, 1995; Hart & Dowell, 2011). On one end of the continuum, pollution prevention strategies will result in moderate levels of dynamism; on the other end of the continuum, strategies such as clean technology or sustainable development generate high levels of dynamism. Organizations considering what would enable them to implement their sustainability strategy need to consider not only whether they are operating in a moderately or a highly dynamic

external environment, but also the kind of dynamism they could impose on themselves by choosing pollution prevention or more cleantech oriented strategies.

Through the examples in the text, we have shown that for organizations operating with cleantech strategies sustainability dynamic capabilities depend on dramatically different individual characteristics and organizational processes than organizations which rely more on pollution prevention strategies. This has implications for organizational practices, such as recruitment. Home cleaning products company Method, for example, recruits people that are encouraged to bend rules and also supports people that come up with novel ideas as a result. As a small and innovative company, their aim is to bring innovation to the market that shift the frontier of green possibilities (Larson & York, 2007).

When new innovations or business models have been identified by first-movers such as Method, it is possible for other organizations to follow in their footsteps and specify how they will work towards sustainability. For these organizations, the changes involved are less dynamic. The transition towards greater sustainability then requires continuous improvement, and employees who are able to optimize within a given framework. In this game of "emerging Davids and greening Goliaths" (Hockerts & Wüstenhagen, 2010), both disruptive first-movers and optimizing second-movers have a role to play in the move towards sustainability, but with different sets of resources and capabilities.

A final practical lesson, however, is that the dynamism associated with an organization's sustainability aspirations is not to be considered exclusively external. Organizations themselves are to a large extent responsible for the dynamism they inflict on themselves when choosing more radical versions of proactive environmental strategies. One lesson could be that, as a result, dynamism – and therefore uncertainty of success – can be avoided by simply toning down sustainability aspirations. However, another lesson that derives directly from our theoretical

exploration is that – when matched with the appropriate type of dynamic capabilities – such uncertainty and ambiguity is just a context like any other context that leaders have to align their organizational configuration with. While this should alleviate leaders from worries that proactive environmental strategies are "foolish" and impractical (Lepoutre & Valente, 2012), this also reinforces the notion that how organizations contribute to a more sustainable world is in the end in their own hands.

Conclusions

This theoretical paper argues that sustainability dynamic capabilities are necessary for organizations to reconfigure their resource base in response to their sustainability strategies, and that the resulting degree of dynamism will impact on the specific nature of the microfoundations of these capabilities. The paper developed a broad synthesis as to what these microfoundations might entail, focusing on employee behavior which has been a key topic in organizational behavior and organizational psychology research on sustainability. A central theme of the paper is that organizations operating in a highly or moderately dynamic context will require different patterns of microfoundations. We highlighted how employee adaptivity and proactivity are likely to play out differently in their contribution to sustainability dynamic capabilities in different contexts, and identified individual differences and organizational practices which enable these behaviors. We discussed paradoxical effects of some microfoundations, such as the possibility that future orientation may undermine behaviors that contribute to sustainability in some contexts, or that in some situations individuals with a pro-environmental identity may be less motivated to engage in such behaviors. We outlined the differential role of rules and regulations across contexts, the contribution of leadership, and the organizational structures likely to contribute to sustainability dynamic capabilities.

We hope that our paper will stimulate future research on sustainability which takes an interdisciplinary approach to explore the interplay between micro- and macro-level factors: Research which focuses on individuals and their interactions while also taking the dynamism of the context within which organizations operate into account.

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Table 1.

Employee behaviors as microfoundations of sustainability dynamic capabilities in different contexts

	Moderately dynamic contexts	Highly dynamic contexts
Adaptivity	Compliance with, and support of, behavior change guided by specific goals; low level of abstraction Learning-before-doing – skills need to be developed in response to anticipated requirements	Adapt to rapidly evolving role requirements through active exploration, guided by vague visions; high levels of abstraction Learning-by-doing – skills need to be developed without a clear link to anticipated requirements
Proactivity	Proactive behavior within existing processes, aimed at incremental improvement Proactivity in acting upon specified ends and in identifying new means of achieving them	Proactive behavior challenges existing processes, aimed at radical strategic change Proactivity in identifying new ends to be achieved

Table 2.

Enablers of adaptivity and proactivity for sustainability dynamic capabilities in different contexts

		Moderately dynamic contexts	Highly dynamic contexts
Individual characteristics	Regulatory focus	Prevention focus: vigilance, avoid deviation from specified course of action	Promotion focus: risk, achieving ideal states
	Temporal orientation	Focus on short-term targets for sustainability – future orientation can undermine compliance	Focus on long-term benefits
	Pro-environmental attitudes and identity	Pro-environmental attitudes can be helpful, but are not essential	Pro-environmental attitudes are essential
		Pro-environmental identity can be detrimental, behavior no longer self-expressive	Pro-environmental identity can fuel championing, irrespective of costs and benefits
Organizational processes and practices	Rules and guidelines	Slowly develop and implement clear and specific rules	Rely on broad guiding principles; effective error management culture
	Leadership	Transactional – Set clear goals for sustainability, specify desirable behavior change	Transformational – Provide vision for sustainability, no specification of pathways
			Focus on small wins
	Structural components	Suggestion systems and workgroups generate “best practice” and ideas for incremental improvements	Cross-functional interfaces allow for the exchange and reorganization of knowledge and the emergence of ideas for radical change