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Natural resource dependence theory: Impacts of extreme weather events on organizations☆

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ABSTRACT

Building on the natural resource dependence theory (NRDT), this analysis represents the first comprehensive investigation on how extreme weather events affect financial performance. The Qualitative Comparative Analysis builds on 38 expert interviews taking place predominately at small and medium-sized organizations from various industry sectors in South-East Germany, and relates those results to financial data. The analysis reveals organizational dependence on the number of affecting extreme weather events to the potential of generating positive financial performance. Hence, organizations whose business seriously suffer the impacts of extreme climatic elements cannot generate positive sales growth. By testing the NRDT, this analysis contributes to management science by examining one of the most challenging environmental risks: climate change.

1. Introduction

How does the natural environment potentially shape an organization's financial performance? Existing theories tend to focus on this question from the opposite direction, by asking how organizations affect the natural environment. Various empirical studies employ this inside-out perspective (Winn & Kirchgeorg, 2005) with different underlying theoretical groundings, such as the resource-based view, trade-off phenomenon, or managerial opportunism. The inverse perspective (outside-in), which seeks to describe how the natural environment affects organizations, is a new concept in management science. Two aspects of this approach speak to its potential for producing valuable insights and relevant results for research. Firstly, this analysis posits that a thorough consideration of the importance and impact of the natural environment on organizations is a crucial concept, because the natural environment provides organizations with necessary as well as critical resources. Secondly, this study clearly states the importance of natural resources on financial performance, an importance that the axiom of resource dependence supports.

This study focuses on extreme weather events as part of climate change (IPCC, 2012). Climate change represents one of the most challenging risks of the natural environment (European Environment Agency, 2011) and is a strategically relevant issue to organizations (Whiteman, Walker, & Perego, 2013). Organizational studies for the inside-out perspective mostly investigate how organizations could possibly avoid negatively affecting the natural environment, focusing specially on mitigating climate change (Galbreath, 2011). In contrast, a review of the literature shows that few studies actually examine adaptation to the impacts of climate change; most of the articles are case studies focusing on one specific industry sector (e.g., insurance or tourism industry). Nevertheless, the literature suggests that subsequent impacts of climate change can negatively affect organizational turnover or profit (e.g., Mills, 2009), for example, because of higher operational costs (Mills, 2009), expected damage to buildings, and altered asset values (Busch, 2011). Currently, the understanding of how climatic elements affect financial performance still lacks systematic research.

Considering that financial performance is a primary, fundamental indicator for organizational performance and long-term survival of an organization (Hamann, Schiemann, Bellora, & Guenther, 2013), an extensive body of research should exist. Within the tourism and agricultural industries, few researchers empirically show that a direct relationship exists between specific single climatic parameters and a number of performance measures, but these analyses do not use theoretical foundations (Reidsma, Ewert, Lansink, & Leemans, 2010; Shih, Nicholls, & Holecek,

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2009; Surugiu, Dinca, & Micu, 2010; Tate, Hughes, Temple, Boothby, & Wilkinson, 2010). Recent research in this area using well-known, empirically-tested management theory is still lacking. Tashman (2011) provides a profound theoretical foundation to explain how organizations' financial performance depends on climate change, extending the familiar resource dependence theory (RDT) to become the natural resource dependence theory (NRDT), which decisively integrates the natural environment.

To fill the aforementioned gaps in theoretical grounding, this study empirically analyzes the following research question building on NRDT: how does climate change, in terms of extreme weather events, affect an organization's financial performance? To answer this question, the data comes from 38 in-depth expert interviews with CEOs from mainly small and medium-sized organizations (SMEs) in the Southeastern part of Germany. Secondly, a Qualitative Comparative Analysis (QCA) investigates the relationship of five different types of extreme weather events (heat wave, cold wave, heavy precipitation, storm, and drought) to the financial performance indicator "sales growth". By using QCA, one can analyze which climatic element and, especially, which distinct combination of climatic elements lead to altered financial performance, a compelling advantage in comparison to prior studies. The analysis covers six different industry sectors, aiming to obtain both the cumulative effects and a more holistic view. The empirical analysis clearly contributes to the increasing literature on climate change (adaptation). Furthermore, this study empirically tests the new theory NRDT and, by doing so, contributes to management science by focusing on one of the most challenging threats to the natural environment: climate change. Finally, the study concurs with Starik and Kanashiro's (2013) call for the development of sustainability management theories, as well as Woodside's (2013) call for crafting theory.

2. Theory

The RDT considers an organization as an open system continuously exchanging material and information with its environment, encompassing "every event in the world which has any effect on the activities or outcomes of the organization" (Pfeffer & Salancik, 1978, p. 12). RDT further postulates that organizational survival depends on this transaction with the external environment to receive needed resources (Pfeffer & Salancik, 1978).

However, the original RDT does not actually regard the natural environment as a source of necessary organizational resources (López-Gamero, Molina-Azorín, & Claver-Cortés, 2011). Therefore, Tashman (2011) chooses to further develop the RDT-concept into natural-resource dependence, positing that the biophysical environment is also part of the environment. Not only human beings, but indeed all organizations, depend directly or indirectly on air, clean water, energy, a suitable climate, and other natural resources, because natural capital or the resulting ecosystems are the source of raw materials for all physical assets (Winn & Pogutz, 2013). Therefore, organizations and the natural environment represent the two main entities in the NRDT model (Fig. 1). Additionally, the NRDT speaks of ecosystem embeddedness, suggesting that organizational behavior is not only part of social systems, but also of the natural environment (Tashman, 2011). Therefore, in contrast to RDT, NRDT represents "a function of *organizational ecosystem dependence*, *ecological impacts on organizations*, and *organizational impacts on ecosystems* rather than organizational interdependence." (Tashman, 2011, p. 62). Finally, the extended RDT allows the investigation of a direct relationship between organizations and the natural environment.

Climate change is both an inherent part of the natural environment, as well as a phenomenon that causes changes to the natural environment. Current research lacks a theory specifically targeting the impacts of climate change on organizations (Tashman, 2011). With organizations dependent on resources the natural environment provides, however, the literature offers several clues concerning organizational dependence on climate change (Arnell & Delaney, 2006).

To test the ability of Tashman's (2011) model to capture this relationship, the analysis in this study focuses on organizational financial impacts and, thus, financial performance (Winn & Kirchgeorg, 2005). Financial indicators generally serve as reliable and valid predictors for ensuring financial performance and the long-term survival of a company (Hamann et al., 2013).

In contrast to prior studies, which focus on distinct climatic parameters, this analysis specifically asks for the most common surface variables: temperature, precipitation, and wind (i.e., storm related events) (IPCC, 2007). This research differentiates the climatic element of temperature into cold waves and heat waves (MunichRe, 2012), and precipitation into heavy precipitation, including flood events, and droughts (Heim, 2002; IPCC, 2012). Thus, this study considers extreme weather events from a more comprehensive perspective to gain a complex and deep understanding of impacts. Following prior studies and explanations of Tashman (2011), the study provides the following assumption: Extreme weather events have an impact on an organization's financial performance.

3. Materials and methods

3.1. Sample and content analysis

The sample consists of 38 organizational cases from six different industry sectors (construction industry (C) (n = 4), energy supply industry (E) (n = 4), food industry including tobacco (F) (n = 6), mechanical engineering industry (M) (n = 9), tourism industry (T) (n = 7), and water and sewage supply industry (W) (n = 8)), located in South-East Germany. The focus is on SMEs, because they comprise more than 95% of US and European businesses (Aragón-Correa & Matías-Reche, 2005). This study chooses the industry sectors building on their economic relevance to the investigated region and/or their climate sensitivity (water and energy intensity). This research expects fully productive insights from using this relevant cross-sector sample (Whiteman et al., 2013).

First, data gathering consisted of semi-structured face-to-face expert interviews with each company's CEO, or equivalent representatives, between the years 2009 and 2012. The interview guidelines followed Porter's value chain approach to discover whether extreme weather events affect the organization. Porter (1985) differentiates primary (operations & service, marketing & sales, inbound & outbound logistics) and secondary activities (procurement, technology development, human resource management (HRM), and firm infrastructure). This study adds disposal as a secondary activity to take into account the current trend toward life-cycle thinking (Hart & Milstein, 2003).

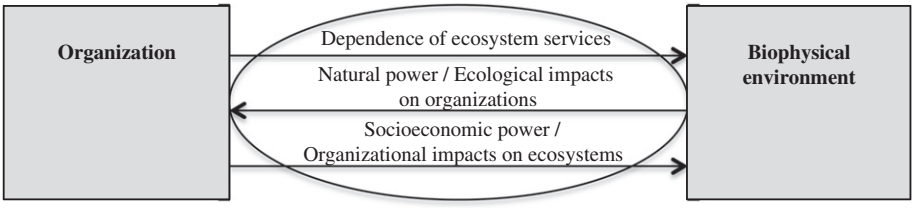

Fig. 1. The components of natural resource dependence theory (Source: Tashman, 2011).