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HOW ORGANIZATIONAL COGNITIVE FRAMES AFFECT ORGANIZATIONAL CAPABILITIES: THE CONTEXT OF CORPORATE SUSTAINABILITY

ABSTRACT

We draw on the emerging literature on the micro-foundation of capability development to investigate the effects of the relative importance of corporate sustainability in a firm's organizational cognitive frame on the development of distinct organizational capabilities. Based on survey data from 124 Danish manufacturing firms and seven interviews, we find that the relative importance of corporate sustainability in a firm's organizational cognitive frame positively encourages the development of three organizational capabilities, namely, stakeholder integration, market sensing, and organizational learning. However, contrary to our expectation and reasoning, we find that the development of the strategic planning capability is negatively affected. Our findings provide novel empirical evidence and contribute to an improved understanding of the effect of a firm's organizational cognitive frame on the development of organizational capabilities.

Keywords: Organizational capabilities, corporate sustainability, organizational cognitive frame, partial-least squares structural equation modeling

Introduction

What is the link between cognition and organizational capabilities? How does cognition affect the development of organizational capabilities? Historically, research on cognition and research on organizational capabilities have developed in two distinct streams (Eggers and Kaplan, 2013; Laamanen and Wallin, 2009). More recently, however, management scholars have combined these two research streams in an effort to address the cognitive micro-foundation of organizational capabilities (Gavetti, 2005; Gilbert, 2006; Laamanen and Wallin, 2009; Tripsas and Gavetti, 2000).

The need for a cognitive micro-foundation of organizational capabilities arises from the insight that the development of organizational capabilities is highly context-specific and strongly affected by the setting in which those capabilities develop (Gavetti, 2005; Laamanen and Wallin, 2009). Managerial cognition has been identified as one important aspect of this setting. Research on managerial cognition has shown that firms' responses to the environment are driven by managers' subjective interpretation of the environment, which in turn is based on managers' cognitive frames (Barr et al., 1992; Daft and Weick, 1984; Lant et al., 1992; Ocasio, 1997). Following Goffman (1974:21), a cognitive frame can be understood as a "schemata of interpretation [...] rendering what would otherwise be a meaningless aspect of the scene into something that is meaningful." As such, a cognitive frame represents the underlying structures of beliefs, perception, and appreciation through which managers filter and interpret information (Gilbert, 2006).

Prior research has established that cognition plays a pivotal role in the development of organizational capabilities (for a recent review, see Eggers and Kaplan, 2013). What is important is that a cognitive frame exhibits both a diagnostic dimension (i.e., an assessment of the problem) *and* a prognostic dimension (i.e., an assessment of the solution) (Eggers and Kaplan, 2013; Kaplan, 2008). The development of specific organizational capabilities can thus be understood as part of the solution that follows from the prognostic dimension of the cognitive frame. The majority of

studies have focused on managerial cognition and on organizational capabilities related to technology and/or innovation (see, for example, Eggers and Kaplan, 2013; Gavetti, 2005; Kaplan, 2008; Lavie, 2006; Smith and Tushman, 2005; Tripsas and Gavetti, 2000). Far less attention has been devoted to the interpretative frame itself, the surrounding context, and the consideration of additional organizational capabilities.

Our paper complements and extends prior research by focusing on the organizational cognitive frame in the context of corporate sustainability—an issue that has its roots in a firm’s macro-environment. The key research question of this paper is, thus, to explore *how the relative importance of corporate sustainability in a firm’s organizational cognitive frame affects the development of organizational capabilities*. In particular, we hypothesize that the relative importance of corporate sustainability in a firm’s organizational cognitive frame positively encourages the development of four distinct organizational capabilities of high firm-specific strategic importance (DeSarbo et al., 2005), namely, (i) stakeholder integration, (ii) market sensing, (iii) strategic planning, and (iv) organizational learning.

To empirically investigate our arguments, we draw on survey data of 124 manufacturing firms in Denmark. Using partial least squares structural equation modeling, we find broad support for our hypotheses. We find that the relative importance of corporate sustainability in a firm’s organizational cognitive frame positively affects the development of the firm’s capabilities in terms of stakeholder integration, market sensing, and organizational learning. However, contrary to what we hypothesize, we find a significant negative effect on the strategic planning capability. To validate our findings, we also conducted seven interviews with top managers of firms included in our sample. The qualitative data support our findings and provide further insight into the link between organizational cognition and organizational capabilities.

Our paper proceeds as follows. The next section provides the theoretical background of the paper. The third section develops the hypothesis. The fourth section describes the research design. The fifth section provides the results of our analysis. Finally, the last section discusses the implications and concludes.

Theoretical background

A cognitive perspective on the development of organizational capabilities

Previous research on cognition has shown that managerial cognition is a central element in the process of organizational capability development (Eggers and Kaplan, 2013; Laamanen and Wallin, 2009). Managers, and indeed all individuals, engage in what has been called a tripartite information processing sequence, encompassing attention, interpretation, and action (Abrahamson and Hambrick, 1997; Daft and Weick, 1984; Dutton and Jackson, 1987; Hambrick and Mason, 1984). In light of this sequence of events, an organizational action—such as capability development—is directly contingent upon the information that managers allocated their attention to, and how they interpreted this information (Ocasio, 1997). It is the cognitive frame that determines how information managers allocate their scarce attentional resources and how they interpret this information (Dutton and Jackson, 1987; Hambrick and Mason, 1984; Kiesler and Sproull, 1982; Sproull, 1984).

Although the notion of a cognitive frame was originally an individual-level concept, some researchers have argued that members of a firm may share a common organizational cognitive frame (Bartunek, 1984; Prahalad and Bettis, 1986; Rerup and Feldman, 2011). These researchers reason that a cognitive frame is mainly shaped through the firm's top managers, who, researchers have argued and proven in prior research, have the most impact on the firm (Hambrick and Mason, 1984; Kaplan, 2008; Weick and Roberts, 1993). Here, we follow Rerup and Feldman (2011:578)

who define a firm's *organizational cognitive frame* as "a set of shared assumptions, values, and frames of references that give meaning to everyday activities and guide how organizational members think and act." In this sense, an organizational cognitive frame represents a dominant collective cognition about the firm's strategy and objectives, and the opportunities the firm will pursue. Therefore, we believe that, compared with the cognitive frame of any one manager, the organizational cognitive frame has more impact on how specific organizational capabilities are developed. The organizational cognitive frame is superior at guiding the understanding of both internal and external circumstances and thus facilitates and/or limits managerial attention to the accumulation and development of particular organizational capabilities.

Following Helfat and Peteraf (2003:999), an organizational capability is defined as "the ability of an organization to perform a coordinated set of tasks, utilizing organizational resources, for the purpose of achieving a particular end result." What is important in the present context is that organizational capabilities may evolve and change over time, based on actions such as the allocation of scarce resources to the respective capability (Helfat and Peteraf, 2003; Laamanen and Wallin, 2009). Thus, given that action is the last step in the tripartite information processing sequence, we argue that it is the firm's organizational cognitive frame that ultimately encourages the development of organizational capabilities (Eggers and Kaplan, 2013).

A cognitive perspective on corporate sustainability

Corporate sustainability builds on the concept of sustainable development, which is commonly defined as "meeting the needs of the present without comprising the ability of future generations" (WCED, 1987). In this sense, sustainability in general aims at securing intergenerational equity and similar opportunities for present and future generations. Applied to the business context, sustainability means that firms should be at least as profitable in the future as in

the present and the past, ideally with opportunities for growth. Corporate sustainability refers to “the ability of firms to respond to their short-term financial needs without compromising their ability to meet their future needs” (Bansal and DesJardine, 2014:71). Following the definition by the World Commission on Environment and Development (WCED), the concept of corporate sustainability has three meta-characteristics: (i) it is tridimensional, integrating economic, environmental, and social dimensions in a triple bottom line (Bansal, 2005; Gao and Bansal, 2013; Montiel, 2008); (ii) it represents intertemporal trade-offs of short-term and long-term aspects (Bansal and DesJardine, 2014; Dyllick and Hockerts, 2002); and (iii) it consumes only income while maintaining the economic, environmental, and social capital base (Dyllick and Hockerts, 2002).

From a cognitive perspective, the three meta-characteristics of corporate sustainability provide a decision-support framework (Boal and Peery, 1985) that ultimately guides action. Prior research has shown that firms in which corporate sustainability has a high relative importance in the organizational cognitive frame (Hahn et al., 2014; Van der Byl and Slawinski, 2015) assign a high priority to social, environmental, and economic issues. These firms typically perceive the issue of corporate sustainability as an opportunity rather than a threat (Bansal, 2003; Sharma, 2000; Sharma et al., 1999). Moreover, such firms recognize the financial and strategic benefits of pursuing corporate sustainability and actively search for ways to integrate corporate sustainability into their strategic agenda and decision-making process. This approach, in turn, channels resources for actions, allows a more open search for solutions, supports communication inside and outside the firm, and directs attention toward specific organizational capabilities (Sharma, 2000).

We argue that corporate sustainability provides a context that shapes a firm’s organizational cognitive frame and, as a result, channels actions aimed at the development of distinct organizational capabilities. Thus, the relative importance of corporate sustainability in a firm’s

organizational cognitive frame prognosticates the development of a firm's organizational capabilities. Here, we argue that, in particular, the relative importance of corporate sustainability in an organizational cognitive frame affects the following four organizational capabilities of high firm-specific strategic importance (DeSarbo et al., 2005): (i) stakeholder integration, (ii) market sensing, (iii) strategic planning, and (iv) organizational learning. These four organizational capabilities are consistent with the notion of corporate sustainability. We next develop our hypotheses.

Hypotheses development

Stakeholder integration capability

Firms with a high relative importance of corporate sustainability in their organizational cognitive frame are committed to triple bottom line thinking. These firms are thus confronted with multiple stakeholder issues, as they need to consider both market and non-market stakeholders (Hillman and Keim, 2001). Collecting information about the highly diverse stakeholder concerns is challenging and is further aggravated by the complex and often interdisciplinary nature of social and environmental concerns. A greater attention to the concerns of different and diverse stakeholders thus poses special requirements for the firm, such as requiring a higher demand for transparency and accountability toward industry-specific laws, regulations, and multiple sustainability standards (Waddock, 2008). Being able to integrate the various stakeholder relationships in a coherent fashion requires, first and foremost, the ability to establish durable, trust-based, and collaborative relationships (Sharma and Vredenburg, 1998). A commitment to long-term, high-quality relationships signals a reduced likelihood of short-term opportunistic behavior (Eccles et al., 2014; Slawinski and Bansal, 2012), making it easier for stakeholders to understand the firm's corporate sustainability engagement and impact. This commitment also fosters openness between the firm and its stakeholders, and facilitates legitimacy for the firm's non-economic

objectives in the eyes of its stakeholders (Suchman, 1995). Hence, to act in accordance with the high relative importance of corporate sustainability in the organizational cognitive frame, these firms develop distinct techniques, mechanisms, and principles that need to be institutionalized within the firm, and will guide the way of thinking of and working with stakeholders. Hence, we hypothesize:

H1: The relative importance of corporate sustainability in a firm's organizational cognitive frame is positively related to the development of a firm's stakeholder integration capability.

Market sensing capability

Attending to multiple and highly diverse stakeholder concerns provides firms with a wide information base. At the same time, however, firms are confronted with a constantly changing market space. It is therefore essential for firms to develop the abilities to detect changes in the market and forecast accurately associated responses (Day, 1994). For firms with a high relative importance of corporate sustainability in the organizational cognitive frame, their customers' changing needs are likely to be of particular importance. To act in accordance with their cognitive frame, these firms typically incorporate social and environmental aspects in their offerings, which then have a higher positioning that attracts new customers (Christensen, 2008) and can lead to higher customer loyalty despite typically being sold at a premium price (Hockerts, 2015). Gaining new customers and sustaining existing customer relations thus becomes crucial for firms. Consequently, firms need to sense and act on customers' emerging needs before they are fully apparent and earlier than their competitors can similarly sense and act on those emerging needs (Day, 1994; Olavarrieta and Friedmann, 2008). Firms, therefore need to develop their ability to conduct and interpret market information, and then disseminate that information to those within the firm who need to act on that knowledge (Hooley et al., 1998). As a result, these firms will build a

strong base of satisfied customers (Bhattacharya and Sen, 2003; Sen and Bhattacharya, 2001) that will help firms with a high relative importance of corporate sustainability in their organizational cognitive frame to act on their corporate sustainability objective. Hence, we hypothesize:

H2: The relative importance of corporate sustainability in a firm's organizational cognitive frame is positively related to the development of a firm's market sensing capability.

Strategic planning capability

As a prerequisite to acting on the objective of corporate sustainability, firms with a high relative importance of corporate sustainability in the organizational cognitive frame need to ensure they identify and respond to sustainability-related strategic issues (Judge and Douglas, 1998). Accordingly, they require a formal assessment of the changing conditions in both their internal and external environments. Following the three meta-characteristics of corporate sustainability, this assessment concerns both long-term and short-term horizons. Moreover, the sustainability orientation requires firms to continuously improve their processes in an attempt to avoid the over-consumption of vulnerable financial, natural, and social capital (Christmann, 2000; Paul and Siegel, 2006; Vilanova et al., 2009). Given this complexity, these firms need to rely on a structured approach of gathering information and analytical techniques to plan both their adaptation to the changing environment and the improvement of internal processes with regard to costs and resources efficiency (Hart, 1995), which firms can achieve through strategic planning (Judge and Douglas, 1998). At the same time, meeting the corporate sustainability objective requires, as elaborated on above, attending to a diverse set of stakeholder demands. Internally, different functions will possess information to address these different stakeholder demands. Therefore, functional integration is necessary to impede inefficient and ineffective decision-making regarding stakeholder demands. Only by integrating across functions is the firm able to share relevant information that is related to

stakeholders' demands and thereby allocate resources to act in a cohesive manner with regard to these demands. Similar to the monitoring of the environment and the identification of process improvements, functional integration is typically achieved in the context of strategic planning (Lenz, 1980; Mintzberg, 1994). It thus follows that strategic planning and corporate sustainability are strongly interconnected (Galbreath, 2010; Judge and Douglas, 1998). Accordingly, to ensure they meet their corporate sustainability objective, firms with a high relative importance of corporate sustainability in the organizational cognitive frame need to implement and refine formal strategic planning processes. Hence, we hypothesize:

H3: The relative importance of corporate sustainability in a firm's organizational cognitive frame is positively related to the development of a firm's strategic planning capability.

Organizational learning capability

Firms with a high relative importance of corporate sustainability in the organizational cognitive frame need to ensure organizational learning. This need is due to the complex nature of corporate sustainability, requiring these firms among others to attend to, among others, a variety of stakeholder concerns (Hillman and Keim, 2001), take a both a short-term and a long-term perspective (Slawinski and Bansal, 2012), monitor the changes in the environment (Basu and Palazzo, 2008), and integrate across functions (Lozano, 2012). Firms aiming at corporate sustainability need to handle an enormous amount of stakeholder information, due to the various stakeholder demands they face. However, this information is acquired and processed by individuals, thereby increasing knowledge on an individual level. For the firm to benefit from individual knowledge acquisition, this knowledge needs to be made available on the organizational level, to integrate it into the collective knowledge (Hedberg, 1981; Jerez-Gomez et al., 2005). Corporate

sustainability-oriented firms must strive for openness, both to learn from others and to recognize the interests of both external and internal stakeholders (Wolf, 2013), with employees being of outstanding importance in the context of organizational learning. To act on their objective of corporate sustainability, firms need to integrate relevant sustainability-related issues into the responsibilities and thinking of employees. This integration goes beyond the mere dissemination of information or a few days of training. Rather, the process requires a change in the firms' values (Cramer, 2005), new business practices and innovations (Perez-Aleman and Sandilands, 2008), and an ongoing dialogue with employees (Haugh and Talwar, 2010). To achieve this objective, firms with a high relative importance of corporate sustainability in the organizational cognitive frame need to commit to building an organizational atmosphere of openness, trust, and cultural sensitivity that will foster organizational learning and collaborative problem-solving, and will ultimately yield more motivated employees working toward the corporate sustainability objective. Therefore, we propose:

H4: The relative importance of corporate sustainability in a firm's organizational cognitive frame is positively related to the development of a firm's organizational learning capability.

A survey of the Danish manufacturing sector: Research method and findings

To investigate the relationship between a firm's organizational cognitive frame and the development of specific organizational capabilities, we applied what Harrigan (1980) referred to as a "medium-grained" approach. Specifically, we used a questionnaire to create generalizable results as a "backbone," which was further informed and interpreted by subsequent qualitative interviews (see, for example, (Angwin and Meadows, 2009)).

Data collection

A widely recognized method for assessing a firm's organizational capabilities is a survey approach using a questionnaire administered to key informants (Ethiraj et al., 2005). At the same time, scholars widely acknowledge top managers' critical influence in strategic decision-making and firm behavior (Hambrick and Mason, 1984). Thus, we conducted a survey among top managers of manufacturing firms in Denmark during the summer of 2014. We chose Denmark, as Scandinavian businesses are considered to be global leaders in terms of corporate sustainability (Strand et al., 2015). One reason for this reputation in Denmark was the 2009 introduction of the *Act on Corporate Sustainability Reporting* (§99a) for the 1,100 largest Danish firms.¹ Given the mandatory reporting on corporate sustainability activities and initiatives, most large and medium-sized Danish firms have adopted a deep-seated agenda for corporate sustainability. As a result, for many years, Denmark has been, and remains, the number-one country in the Global Sustainability Competitiveness Index (SolAbility, 2015). Thus, it seems that corporate sustainability is an important issue for Danish firms (DanWatch, 2011; Strand et al., 2015; UNEP, 2015).

Based on the Danish company register, we selected all firms with 100 or more employees, which led us to 301 firms. We chose 100 employees as the minimum size because these firms are subject to the legal requirement of corporate sustainability reporting. We then sent an online questionnaire to the top management at the 301 firms. To minimize key-informant bias (Kumar et al., 1993), we first contacted each firm by phone to identify the key contact person and, by doing so, we also ensured the qualification of the respondent, explained the purpose of the survey, and requested their permission to send the survey. We ensured confidentiality of the obtained information. After a period of two months, we received 124 valid and useable questionnaires,

¹ Section 99a of the Danish *Act on Corporate Sustainability Reporting* requires a firm to report its corporate sustainability policies, implemented actions, and results. The legislation does not address specific requirements on the content and extent of the reported information. In Denmark, corporate sustainability is still seen as voluntary for firms, but if a firm has no corporate sustainability policy, it needs to explicitly state information to that effect.

representing a response rate of 41.20%. Missing values in 10 questionnaires were replaced with mean replacement in scales (Hair et al., 2013).

The questionnaire was based on a 5-point Likert scale (Cox III, 1980; Hinkin, 1995), ranging from 1 (depending on the question, either “not at all” or “decreased a lot”) to 5 (either “to a very great extent” or “increased a lot”). To ensure the understanding, reliability, and content validity of the questionnaire, we conducted a preliminary test of the questionnaire by conducting a focus group with five local part-time MBA students familiar with the topic of corporate sustainability and by consulting with five senior fellow researchers from our university. Based on responses from both parties, we adjusted the wording of the questionnaire and, where necessary, reordered the questions.

We tested for the possibility of a non-response bias. A means comparison (2014 data) between respondents and non-respondents indicated that non-included firms did not statistically differ from included firms with regard to size (i.e., the log transformed number of employees), financial performance (i.e., the return on assets and return on equity), available slack, and leverage.

Measures

Independent variable. To the best of our knowledge, this study is the first to empirically explore in detail the relative importance of corporate sustainability in a firm’s organizational cognitive frame. Therefore, no existing quantitative measure exists. To measure the relative importance of corporate sustainability in an organizational cognitive frame and its application throughout a firm’s decision-making processes, we decided to develop a second-order reflective-formative construct (Becker et al., 2012), represented by a firm’s five main business activities—general management, marketing, human resources, production, and supply chain. Each of the five categories captures a specific aspect of functional integration and together they present a holistic

picture of corporate sustainability throughout a firm. We adopted the five business activities from Lozano's (2012) concept of generic corporate systems in corporate sustainability, which is based on Porter's value chain (1985). Each of the five business activities is a reflective construct represented by five to six items. In total, we used 28 items to measure corporate sustainability. To capture the relative importance of these measures, we used an indirect approach, by asking respondents to indicate the extent to which sustainability is considered when carrying out certain activities in their firm. We applied a confirmatory factor analysis (CFA) to confirm the reflective measurements for the business activities of general management, marketing, human resources, production, and supply chain. As part of the CFA, we also reduced the initial number of items for each reflective construct to three (Hair, Sarstedt, Ringle, et al., 2012). The individual items underlying each reflective construct are displayed in Appendix A.

Dependent variable. We measured the four organizational capabilities as reflective constructs, following DeSarbo and colleagues (2005). We posed all questions in a time-comparative approach, asking the respondents to indicate the extent to which the respective capability had been developed over the past three years. Originally, DeSarbo et al. (2005) distinguished among five main organizational capabilities. For our study context, we focused on only four main organizational capabilities—namely marketing, market-linking, technology, and management. We excluded the fifth organizational capability, information technology, because of its missing link to corporate sustainability. We initially applied a CFA to all items in our survey. The CFA could not support the four initially selected main organizational capabilities by DeSarbo et al. (2005), due to non-acceptable factor loadings. Therefore, we additionally conducted a principal component analysis (PCA) to re-estimate the relative constructs for organizational capabilities, based on only items with large loadings. The PCA led us to the four main constructs: stakeholder integration capability, market sensing capability, strategic planning capability, and organizational learning

capability. Each construct is based on three to four items. The underlying items of each construct are shown in Appendix A, and the characteristics of the variables are shown in Table 1.

*****Insert Table 1 about here*****

Control variables. Based on meta-analyses in corporate sustainability research (Dixon-Fowler et al., 2013; Orlitzky et al., 2003), we included several control variables—firm size, industry type, years of experience with corporate sustainability, and financial performance. First, we controlled for firm size because the size has a significant impact on corporate sustainability and organizational performance. (Dixon-Fowler et al., 2013; Torugsa et al., 2012). For example, larger firms may have a greater impact on the environment and society, and may thus be under more external pressure in terms of their corporate sustainability activities and initiatives (Grant et al., 2002). We measured firm size as the natural logarithm of the number of fully employed employees in 2014. Second, we controlled for the industry type, which may also be considered as an influencing factor. The industry in which the firm operates provides a context with distinct financial, environmental, and social concerns (Baird et al., 2012; Dixon-Fowler et al., 2013). To control for industry, we relied on the Danish classification for the manufacturing business sector (Statistics Denmark, 2014), which includes 12 industry types. We included the firm's industry as a dummy variable. Third, we considered a firm's years of experience working with corporate sustainability. Previous research (Torugsa et al., 2012; Wang and Bansal, 2012) has shown that corporate sustainability engagement becomes beneficial in the long run rather than in the short run. We asked the respondents to estimate the years of their firm's engagement in corporate sustainability practices. Finally, we controlled for financial performance. According to the slack resource hypothesis, better financial performance results in a surplus of resources that can be invested in corporate sustainability activities and initiatives (Surroca et al., 2010; Waddock and

Graves, 1997). Thus, better-performing firms may have a higher standard of corporate sustainability integration. We controlled for financial performance using a firm's return on assets (ROA) for 2013 and the change in ROA between 2010 and 2013.

Data analysis and findings

We used partial least squares structural equation modeling (PLS) with SmartPLS3 (Hair et al., 2013; Ringle et al., 2005) to test our hypotheses. PLS is a variance-based path-modeling technique, appropriate for exploratory research that is based on structural models that have multiple-item constructs (Hair, Sarstedt, Ringle, et al., 2012). PLS can handle large model complexity, small sample sizes with fewer than 200 observations, formative and relative constructs, and, to some extent, non-normal distributed data (Hair et al., 2013; Hair, Sarstedt, Pieper, et al., 2012; Shook et al., 2004). PLS is a commonly used approach in management research to analyze exploratory survey data.

Our PLS model had a total number of 10 latent variables and 28 items. With 124 respondents, the minimum requirement for item-to-response ratio of 1:4 (Rummel, 1970) was fulfilled. Nonetheless, we additionally applied a statistical power analysis to formally support the appropriateness of the sample size. We applied the power analysis for each structural path (Cohen, 1988). As shown in Table 6 (see further below), the analysis revealed that the power of each path is greater than 0.8, confirming the appropriateness of our sample size. Figure 1 presents the characteristics of our model. Correlation coefficients for the latent variables are provided in Table 2.

***** Insert Table 2 about here*****

***** Insert Figure 1 about here *****

We analyzed and interpreted the PLS model in two stages. In the first stage, we assessed the adequacy of the reflective and formative measurement model, and in the second stage, we tested the structural model (Hair, Sarstedt, Ringle, et al., 2012).

Reflective measurement model assessment

Standardized indicator loadings of approximately 0.70 or higher are considered to have adequate *indicator reliability* (Hulland, 1999). Table 3 shows individual variable loadings on the reflective latent variables for each of the measurement items. The reflective latent variables for the measurement of the relative importance of corporate sustainability show items with high indicator reliability, while those for the relative importance of organizational capabilities show medium to high indicator reliability. Due to theoretical reasoning, we kept all items. The *construct or internal consistency reliability* is evaluated using Cronbach's alpha or composite reliability (Fornell and Larcker, 1981). For both indicators, 0.70 represents the minimum reliability value (Nunally, 1978). We consider composite reliability as more appropriate for PLS, as it does not assume that each item contributes equally to the construct. The nine reflective latent variables in our model show good construct reliability for an explorative study. Average variance extracted (AVE) is an indicator of *convergent validity* (Fornell and Larcker, 1981), with an AVE of 0.50 or higher indicating an adequate convergent validity. All reflective latent variables are above this threshold (see Table 4). Finally, we measured discriminant validity by using the Fornell and Larcker (1981) approach, which inspects the square roots of the average variance along the diagonal of the correlation matrix. For satisfactory discriminant validity, the diagonal values need to be greater than all other values in the same row and column. As Table 2 shows the reflective constructs fulfill this requirement.

***** Insert Table 3 and 4 about here *****

Formative measurement model assessment

The relative importance of corporate sustainability in a firm's organizational cognitive frame is a second-order relative-formative construct. Given its centrality in our model, it is of high importance to assess the quality of this formative measure. A common mistake in PLS research is to evaluate formative measures by using reflective outer model assessments (Hair, Sarstedt, Ringle, et al., 2012). We avoid this error by explicitly distinguishing between these two types of latent constructs. Thus, to evaluate a formative outer model, weights instead of loadings need to be assessed for their suitability. Using bootstrapping, with 5,000 bootstrap samples, we generated t-values, p-values, and standard errors for the contribution of the first-order reflective constructs on the overall formative construct relative importance of corporate sustainability. Table 5 shows the results, which support the reliability of each reflective construct.

An important concern in the assessment of formative measures is multicollinearity among indicators, which needs to be avoided to prevent any misinterpretation of the indicators that are relevant for the formative construct (Diamantopoulos and Winklhofer, 2001). To assess multicollinearity, the variance inflation factor (VIF) needs to be less than 5 (Hair et al, 2012b). Table 5 shows the VIF values in our formative outer model to be well below this threshold, as the highest individual VIF value is 2.49.

***** Insert Table 5 about here *****

Structural model assessment

The evaluation of the structural model in PLS focuses on variance-based, non-parametric quality criteria (Hair, Sarstedt, Ringle, et al., 2012). The goodness-of-fit indicator cannot be applied. Instead, the primary evaluation criteria are R^2 , effect size f^2 , path coefficient estimates, and predictive relevance Q^2 (Hair, Sarstedt, Ringle, et al., 2012). Table 6 lists these criteria for our

structural model. R^2 is the coefficient of determination and represents the amount of explained variance of each endogenous latent variable. Although the R^2 s for our structural model are small, ranging from 0.07 to 0.13, we find significant effects for all four endogenous latent variables. The focus of our study is to explore, rather than predict, whether the relative importance of corporate sustainability in a firm's organizational cognitive frame can explain the variation in the development of organizational capabilities. With a low but significant R^2 , we can draw valuable conclusions for our context. The same can be applied to the low effect size of f^2 (Hair, Sarstedt, Ringle, et al., 2012). In our model, for the relative importance of corporate sustainability, we find a low to medium effect—from 0.04 to 0.12. Similar to f^2 , Q^2 assesses an individual construct's predictive relevance. Although the Q^2 s are low in our model, they indicate a predictive relevance of the relative importance of corporate sustainability on organizational capability development.

Of highest importance for the assessment of the inner model are the path coefficient estimates. Using bootstrapping, with 5,000 numbers of bootstrap samples, three out of four paths show high significant results at the $p < 0.01$ level. We find support that the relative importance of corporate sustainability in a firm's organizational cognitive frame encourages the development of stakeholder integration capability ($H1$), the development of market sensing capability ($H2$), and the development of organizational learning capability ($H4$). However, contrary to our prediction, our analysis also reveals a statistically significant ($p < 0.05$), though negative, effect regarding the relationship between the relative important of corporate sustainability and the strategic planning capability. Accordingly, $H3$ is not supported.

***** Insert Table 6 about here *****

Control variables

The analysis also reveals that firm size is the only control variable showing a significant effect on the dependent variables. In particular, firm size shows a positive significant effect on the stakeholder integration capability ($\gamma = 0.18$; $p < 0.05$) and on the strategic planning ($\gamma = 0.33$; $p < 0.01$) capability. Interestingly, we did not find a significant effect of duration of experience with corporate sustainability. As the average experience with corporate sustainability was 19 years, the firms in our sample exhibit a long tradition of corporate sustainability practices, which indicates a mature attitude and high valence of corporate sustainability by Danish manufacturing firms and the Danish society at large. At the same time, we interpret the insignificant results as support of the main argument of our study, namely, that researchers should focus on the thinking and integration of corporate sustainability in a firm, rather than measuring only the level of corporate sustainability in a firm based on outcome measures, such as corporate sustainability activities and initiatives.

Common method bias

Studies involving cross-sectional data, based on self-reported survey data, are vulnerable to common method bias/variance (Podsakoff et al., 2003). One main concern with common method bias is that the observed relationship between the tested variables may be artificially inflated. As a first step, and to minimize common method variance and the effects of consistency artifacts, we positioned the independent variable before the dependent variables (Salancik and Pfeffer, 1977). Second, we conducted Harman's single factor test (Harman, 1967; Podsakoff and Organ, 1986). In case of common method variance, Harman's single factor test would reveal one main factor that accounts for most of the variance. The results of the factor analysis revealed five factors, and the first factor accounted for only 31.86% of the variance. As a third step to test for common method

bias, we examined the correlation matrix (see Table 2) for very high correlations among all items (Bagozzi and Yi, 1989). The results of all three tests indicate that common method bias is not a serious problem in our study. Additionally, we conducted interviews with seven firms in our sample, in an attempt to overcome potential problems of common method bias and validity, to gain a more in-depth and nuanced understanding of the findings, and to clarify disparate results.

Interviews in the Danish manufacturing sector: Research method and findings

The findings of the survey show that a high relative importance of corporate sustainability in a firm's organizational cognitive frame encourages the development of organizational capabilities. In particular, we find positive results for stakeholder integration, market sensing, and organizational learning, supporting H1, H2, and H4. However, we find a negative impact on strategic planning, which does not support H3. To overcome the limitations inherent in the survey method, we conducted additional interviews. The aim of the interviews was to explore underlying mechanisms of corporate sustainability as a cognitive context and to provide a more nuanced, practice-oriented understanding of the survey findings (Jick, 1979).

Data collection

Following the analysis of the survey data, we conducted semi-structured interviews with seven firms from the survey sample. We applied a "random purposeful sampling" (Miles and Huberman, 1994), which aimed at a high credibility and sufficient observed variability among a large potential sample. Whenever possible, we interviewed the same individuals as the survey respondents. For four firms, the interviewed individual differed from the survey respondent. The telephone interviews lasted between 30 minutes and 42 minutes, were semi-structured around the

themes of the questionnaire, and were recorded and transcribed. Table 7 provides brief details of the firms interviewed.

***** Insert Table 7 about here*****

Thematic data analysis

We analyzed the data using deductive qualitative techniques (Boyatzis, 1998), informed by our theoretical framework on the effect of the relative importance of corporate sustainability in a firm's organizational cognitive frame on organizational capability development. Accordingly, the analysis consisted of coding the interview transcripts based on coding categories derived from our theoretical framework. Following Boyatzis (1998), such an approach enabled us to replicate, to expand, or to disprove our prior findings. In particular, we used the following coding categories: (i) organizational cognitive frame, (ii) mechanisms of corporate sustainability on organizational capabilities, (iii) causality between corporate sustainability and organizational capabilities, and (iv) reasons for findings on strategic planning.

Findings

Coding category I: Organizational cognitive frame

The aim of coding category I was to provide more content and to identify specific elements of an organizational cognitive frame within the context of corporate sustainability. We classified the main findings for this category on the bases of the three main characteristics of corporate sustainability (see Table 8).

***** Insert Table 8 about here *****

We built this paper on the premise that corporate sustainability represents a context that is sufficiently important to form a significant part of a firm's organizational cognitive frame. In line

with this premise, we find general agreement among the interviewees that corporate sustainability is—though to a varying degree—an issue that receives considerable attention. Some interviewees highlighted the importance of it by referring to corporate sustainability as being part of their firm’s “DNA or “identity,” as highlighted by the following three examples:

“The way we look at sustainability in the company is that it is an integrated part of the DNA of the company.” (Epsilon)

“I have to say, for Alpha it is extremely close to the identity, right.” (Alpha)

“I will say it is part of the firm’s corporate identity.” (Delta)

We also find that our interviewees referred to the aforementioned three meta-characteristics of corporate sustainability. For example, as stated by the interviewee from Epsilon:

“We tried to integrate it in all our decision-making, to think what we do now would that be comprehended as sustainable. Would it be a good case, in that manner, or is it not a good case if you look at the profits? We try to look at different bottom lines when we make decisions. [...] So we do it because we think it is right, but also because we think that if we look ahead, and not three or five years but 20 years ahead, the company that survives is the company that actually makes sure that they don’t cut over their own raw material source or make sure that they always act in a sustainable way. [...] So, if you make sure that you don’t take out more wood than the forest can reproduce, then you use it in a sustainable way. And you help local forest entities to maintain their opportunity to make a living on the forest, instead of cutting it down and maybe use it for crops or for animals instead. It is a good business case for them if the forest pays off to them.”

The interviews thus provide ample evidence that corporate sustainability is contained within firms’ organizational cognitive frame and, as such, is likely to ultimately shape resources allocation

and capability development. This interpretation is further supported by the frequent reference to “DNA” or “identity.” As organizational identity scholars have argued, identity provides a “perceptual lens” through which choices are made (Eggers and Kaplan, 2013). Thus, we interpret the interviewees’ references to the three meta-characteristics as indication of firms’ actual involvement in the concept of sustainability and, therefore, an indication that the answers to our survey questionnaire were not being driven by social desirability considerations.

Coding category II: Mechanisms of corporate sustainability on organizational capabilities

The aim of coding category II was to contextualize the mechanisms and drivers of corporate sustainability on the encouragement of organizational capabilities, thereby addressing the hypothesized relationships. The findings are therefore classified along the four organizational capabilities of interest (see Table 9).

***** Insert Table 9 about here *****

Interviewees referred to the key drivers of the stakeholder integration capability as *compliance with existing governmental laws and regulations, compliance with global sustainability standards, the necessity to address stakeholder expectations, and the ownership structure and heritage*. As the main interviewee from Beta emphasized, “And then we also have to look into our interested parties around us to see what they expect from us.” Regarding the market sensing capability, we find the main drivers to be the demands of primary customers and the possibility of using corporate sustainability as a branding tool to improve firm reputation. In that context, the interviewee from Delta highlighted, “I would say customers have a huge impact on how we react. No question about that.” The interviewee from Beta stated, “We want to tell around that we have a green profile. It is a positive brand.”

Consistent with our prior findings regarding the strategic planning capability, the interviewees did not clearly point to specific drivers. The only driver of the strategic planning capability in the context of corporate sustainability was the orientation on main products and main markets. The interviewees from Alpha, for example, highlighted that “what makes Alpha unique in many ways, is that it [corporate sustainability] is very close to our business model.” Finally, the interviewees provided deep insights into the drivers of the organizational learning capability. The two most emphasized drivers were the involvement of employees and the rootedness of the firm in the place, which was a reference to the Danish culture and the way of doing business in Denmark. The involvement of employees across all levels—in an effort to drive organizational learning—was highlighted as a prerequisite for the successful realization of corporate sustainability.

Coding category III: Causality between corporate sustainability and organizational capabilities

In our theoretical model, we argue that the relative importance of corporate sustainability in a firm’s organizational cognitive frame affects the development of organizational capabilities. However, one could also argue that, as a result of their excess financial resources, firms having better capabilities will turn toward corporate sustainability. Interestingly, all interviewees coherently concluded that it is the firm’s corporate sustainability thinking and orientation that direct the development of organizational capabilities. One interviewee summarized this exemplarity with regard to corporate social responsibility (CSR) reporting at Zeta:

“When we speak about our CSR reporting, it is often mentioned as non-financial reporting, but I like the notion of calling it not non-financial, because it is part of our financial performance. It is pre-financial. So all the data about employees, gender diversity, environment, and all these things are an inherent part of making money in today’s world. They are prerequisite for making money and therefore they are also pre-

financial in a sense. I think, that is just another way of looking at it instead of looking at it as to reach long-term gains. No it is actually a prerequisite of making business.”

From the interviews, it also became apparent that almost all interview partners perceived corporate sustainability as a guiding tool for how to do business. As such, corporate sustainability provides “a lot of things underneath,” such as high-quality standards and internal development. For example, the interviewee from Eta stated:

“There are a lot of things underneath. If the quality is not good enough, the environmental is not good enough, then the financial will not be good enough. So if we say that environment is okay and the quality is okay, then it will also say that the economics will be better. In that way, there is a relationship between those things. We could see that by fulfilling all those demands, we are getting better. We have better processes in our company. Actually, we can see the output of it and that is actually good. “

None of the interviewees took a view on a potential reverse-causality relationship. Accordingly, we found no evidence within the interviews that, as a result of their excess financial resources, firms having better capabilities will affect the relative importance of corporate sustainability within their organization’s cognitive frame. Rather, the interviews provide support for our assumption that it is the relative importance of corporate sustainability within an organization’s cognitive frame that affects the development of specific organizational capabilities.

Coding category IV: Reasons for findings on strategic planning capability

The aim of coding category IV was to disprove the proposed positive relationship in H3 and to instead identify the reasons for a negative relationship between the relative importance of corporate sustainability in a firm’s cognitive frame and the development of a firm’s strategic

planning capability. The interviewee from Zeta mentioned the complexity and high demand when managing corporate sustainability: “It is very demanding to plan sustainably. It is a ton of topics that you need to address and it is just a huge layer of complications.” Therefore, difficulties may arise when attempting to divide corporate sustainability tasks into realistic goals. Additionally, a certain degree of unpredictability is inherent in corporate sustainability. The Epsilon interviewee stated:

“We have normally been very case-by-case oriented. Maybe it is because it is difficult to predict which way sustainability will develop. There isn’t so much long-term planning on the strategic part in sustainability. It is more keeping your finger on the pulse and looking at what is happening now and then we go in that direction.”

Finally, the Alpha interviewee referred to the lack of communication between different departments:

“Depending on the company, these kinds of assessments tend to happen all over the place and in different ways [...] They talk about the same trends in different ways or they talk about different trends. You could almost think they talk about different companies. So it’s just a little bit about full integration, that you need, to realize all of the possible benefits at least.”

Hence, some of the interviewees confirmed that the proposed relationship in H3 might be more complex and more difficult to establish in practice than initially proposed.

Discussion

This paper set out to broaden our understanding of organizational capability development by building and empirically testing a theoretical framework grounded in recent contributions, both to the cognitive micro-foundation of capability development (Eggers and Kaplan, 2013) and to

organizational cognitive frames (Walsh, 1995). In contrast to prior studies that have predominantly focused on organizational capability development in the context of discontinuous change in firms' operating environments (Laamanen and Wallin, 2009), we focus on the context of corporate sustainability (Sharma and Vredenburg, 1998), an issue that has evolved in firms' macro-environment over several decades. In particular, our paper focuses on the extent to which corporate sustainability has been internalized in the firm and, as a consequence, encourages the development of the firm's specific organizational capabilities.

Prior research on the cognitive micro-foundation of organizational capability development has paid only limited attention to the context in which top managers assemble these organizational capabilities (Gavetti, 2005; Laamanen and Wallin, 2009). However, the development of organizational capabilities is rarely independent of their context. Rather, organizational capabilities co-evolve in part as top managers interpret a variety of environmental and organizational factors (Eggers and Kaplan, 2013; Laamanen and Wallin, 2009). The strategic issues, and thus also the organizational capabilities that decision-makers focus and act on, depend on the particular perceived context of the firm's situation (Ocasio, 1997). The so-called cognitive context is the lens through which top managers interpret strategic issues and identify existing and potential organizational capabilities (Eggers and Kaplan, 2013). Accordingly, the top manager's perception of the environment influences the firm's strategic decisions regarding organizational capability development. Moreover, such decisions are rarely made by a single top manager. Rather, strategic decisions regarding the development of organizational capabilities are likely to result from the dominant organizational cognitive frame, commonly shaped by the most influential members of the firm's top management (Snow and Hambrick, 1980). The organizational cognitive frame, and thus the cognitive context, influence the situated attention (Ocasio, 1997) of top managers toward opportunities and threats in the environment. As such, the organizational cognitive frame

substantially determines the allocation of resources to the development of organizational capabilities.

The results of our study highlight that corporate sustainability represents a cognitive context that shapes firms' organizational cognitive frame and, thus, affects how top managers assemble and develop their firms' organizational capabilities. In particular, we show that corporate sustainability positively encourages the development of specific organizational capabilities, specifically stakeholder integration, marketing sensing, and organizational learning.

Firms with a high relative importance of corporate sustainability in their organizational cognitive frame assign a high priority to social, environmental, and economic issues, labeling them as opportunities rather than threats (Bansal, 2003; Sharma, 2000; Sharma et al., 1999). These firms interpret corporate sustainability-related issues as opportunities, recognize the financial and strategic benefits of pursuing corporate sustainability initiatives, and seek ways to integrate these opportunities into their strategic agendas and decision-making processes. If corporate sustainability is perceived and understood as a present and highly important aspect in an organizational cognitive frame, then social and environmental issues become more difficult to “disown” (Weick, 1988). In fact, these issues become legitimated and justified as integral and crucial to the firm's strategy, which, in turn, channels resources for actions, allows a more open search for solutions, supports communication inside and outside the firm, and directs attention toward the prioritization of organizational capabilities (Sharma, 2000). Corporate sustainability thus becomes an overall guiding reference point for how top managers and organizational members frame their decisions and actions. Firms are more likely to achieve comfort and familiarity with social and environmental issues, thereby reducing uncertainty and ambiguity surrounding such issues. For example the interview partner from Epsilon commented:

Right now we find that we don't get the full feedback or payback that we actually should. But I guess in time it we will be a bit ahead, because we have done this for several years. When our competitors start to get their certifications, they find out it is not that easy. So I'm comfortable that it will turn out to be our advantage.

Positive emotional associations and experiences with corporate sustainability encourage top managers to dedicate more attention and resources to organizational capabilities that are aligned with addressing social and environmental issues.

Corporate sustainability also presents a cognitive context that prevents firms from falling into a capability trap (Repenning and Sterman, 2002), whereby cognitive judgmental biases impede the development of particular organizational capabilities. Our findings show that, instead of firms becoming locked in a vicious cycle of declining organizational capabilities, they employ forward-thinking and encourage the development of complex organizational capabilities. Stakeholder integration, market sensing, and organizational learning represent organizational capabilities characterized by high relational and cognitive complexity (Maguire et al., 2006). These capabilities require a firm to have a holistic view on the relationship between the organization and the environment, and to unpack related uncertainties. Our interviews revealed that this perspective is achieved through an adaptive resource management wherein decision-making is structured and iterative. For instance, the interviewee from Alpha stated:

A lot of today's megatrends have to do with sustainable issues and, of course, these can be both an opportunity and a risk, depending on how you manage for them. I would say it is done in the R&D and industry organizations. That is where the pipeline is initiated and then the sustainability lens comes on top of it to help prioritize. It's like ideally—sustainability is megatrends and megatrends should inform corporate strategy.

A high relative importance of corporate sustainability in a cognitive frame motivates a firm's top management to be open-minded and to acknowledge the relationship between the firm and the environment. Increasing the development of stakeholder integration, market sensing, and organizational learning capabilities might further encourage the development of other organizational capabilities, such as innovation capability and new product development (Hull and Rothenberg, 2008). Such resulting positive feedback loops prevent firms from stepping into the capability trap.

Limitations and future research

Finally, we acknowledge our paper's limitations. First, the paper is primarily based on a survey that reports the perception of one representative within each participating firm. A guiding assumption in our research was that top managers' attitudes toward corporate sustainability are of pivotal importance for the actual behavior of the firm (Hambrick and Mason, 1984). Self-reported survey data, however, have limitations, such as common method bias and social desirability bias (Podsakoff et al., 2003; Podsakoff and Organ, 1986). To reduce common method bias, we conducted additional tests and collected additional qualitative data in an effort to gain a more in-depth and nuanced understanding (Podsakoff et al., 2003). To reduce the social desirability bias, we ensured anonymity and confidentiality, and assessed corporate sustainability using an aggregated second-order formative construct rather than a single-item measurement (Podsakoff and Organ, 1986).

A second potential limitation of our paper is that the derived results are based on a single-country context. Denmark provides a unique European context, and it is unclear whether the results we obtained are specific to the Danish context and thus might limit their generalizability. The findings may, for example, differ in larger economies or in regions where the industry structure has

adopted another configuration and where corporate sustainability reporting is not enforced by regulation (Crane et al., 2016).

Finally, a third limitation might be the integration of social and environmental issues in our theoretical framework and empirical model. To limit complexity, we did not differentiate between specific corporate sustainability issues and activities. Rather, we focused on the relative importance of corporate sustainability, as a general notion, in a firm's organizational cognitive frame and its impact on organizational capabilities. However, other corporate sustainability issues may have different degrees of social legitimacy and therefore may be likely to evoke different firm responses and actions (Bansal, 2003). For example, human rights and labor rights are likely to be considered more socially legitimate than religious and ethnic concerns.

We encourage future research to examine the origin of the development of an organizational cognitive frame (Kaplan, 2008b, 2011) and contextual factors (Hahn et al., 2014; Kaplan, 2008), in particular with respect to how corporate sustainability becomes a significant factor in a firm's organizational cognitive frame. Previous research has shown that organizational cognitive frames are a result of the political processes involved (Kaplan, 2008; Kaplan, 2011). That is, before a predominant collective organizational frame is established, competition exists between individual actors' cognitive frames and the dominant interpretation of issues. Through such a framing contest (Kaplan, 2008), the collective construction of a predominant organizational cognitive frame opens up the prospect that organizational members act purposefully in this process in an attempt to mobilize support for a project—or, in the present context, for corporate sustainability. Furthermore, organizational cognitive frames are the product not only of politics and the competition involved in the framing contests but also of managers' demographic characteristics and contextual factors (Kaplan, 2008b). For instance, prior education, jobs, and functional experience have been shown to shape managers' accumulating knowledge, which they then apply to develop a context-specific

interpretation of a situation (Hambrick and Mason, 1984). Consequently, managers' personal and professional backgrounds may shape whether they have a corporate sustainability perspective that influences their interpretation of a situation.

We believe that research on the cognitive micro-foundation of organizational capability development with a specific focus on corporate sustainability is worthy of further exploration, and we hope that our study inspires future investigations.

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APPENDIX A

Questionnaire items

<i>Relative importance of corporate sustainability</i>	<i>Please indicate the extent to which sustainability concerns are included in carrying out the following activities in your firm over the last three years! ("not at all" to "a very great extent")</i>	
	CS Human resources (reflective construct)	
	CS_HR_I	Offering training and development of top managers
	CS_HR_II	Internal communication across different hierarchy levels
	CS_HR_III	Recruiting and hiring new employees at the top management level
	CS Management (reflective construct)	
	CS_MAN_I	Defining the firm's mission and goals
	CS_MAN_II	Setting the firms top 20 Key Performance Indicators (KPI)
	CS_MAN_III	Assigning responsibilities and announcing leaders
	CS Marketing (reflective construct)	
	CS_MAR_I	Developing and executing advertising programs
	CS_MAR_II	Customizing of products
	CS_MAR_III	Establishing and maintaining mutual steady communication with all customer groups
	CS Production (reflective construct)	
	CS_PROD_I	Discovering and developing valuable new products, services and processes
	CS_PROD_II	Assessing the product's impact at all stages of its life cycle
	CS_PROD_III	Managing the portfolio of all products and services offered
	CS Supply chain (reflective construct)	
	CS_SCM_I	Developing and executing common focus and goals, and sharing of risks and rewards with first tier suppliers
	CS_SCM_II	Communicating with first tier suppliers
	CS_SCM_III	Cooperating with first tier suppliers
<i>Organizational capabilities</i>	<i>Please indicate how the following strategic capabilities have developed over the last three years in your firm! ("decreased a lot" to "increased a lot")</i>	
	Stakeholder integration capability (reflective construct)	
	SIC_I	Creation of durable relationships with customers
	SIC_II	Creation of durable relationships with suppliers
	SIC_III	Creation of durable relationships with distributors
	Market sensing capability (reflective construct)	
	MSC_I	Ability to retain customers
	MSC_II	Knowledge of customers
	MSC_III	Effectiveness of advertising programs
	Strategic planning capability (reflective construct)	
	SPC_I	Control of costs and keeping them on a low level
	SPC_II	Raising and budgeting capital
	SPC_III	Resource efficiency and process improvements
	Organizational learning capability (reflective construct)	
	OLC_I	Facilitation of collaborative problem solving
	OLC_II	New product development
	OLC_III	Managing human resource
	OLC_IV	Long-term planning processes

FIGURES AND TABLES

Figure 1. Structural model

Table 1

Description of model variables

Latent variable	Consideration	Nature	Indicators
CS Management	Exogen, 1st order	Reflective	3 observed items
CS Marketing	Exogen, 1st order	Reflective	3 observed items
CS Production	Exogen, 1st order	Reflective	3 observed items
CS Human resources	Exogen, 1st order	Reflective	3 observed items
CS Supply chain management	Exogen, 1st order	Reflective	3 observed items
<i>Relative importance corporate sustainability</i>	Exogen, 2nd order	Formative	5 latent variables
Stakeholder integration capability	Endogen, 1st order	Reflective	3 observed items
Market sensing capability	Endogen, 1st order	Reflective	3 observed items
Strategic planning capability	Endogen, 1st order	Reflective	3 observed items
Organizational learning capability	Endogen, 1st order	Reflective	4 observed items

Table 2

Correlation latent variables, and Fornell and Larcker criteria

	1	2	3	4	5	6	7	8	9	10	11
1 Relative importance of corporate sustainability	0.68										
2 Human resources	0.71	0.82									
3 Marketing	0.86	0.53	0.84								
4 Management	0.79	0.56	0.58	0.83							
5 Production	0.86	0.38	0.73	0.57	0.86						
6 Supply chain management	0.77	0.31	0.55	0.50	0.55	0.88					
7 Stakeholder integration capability	0.31	0.04	0.29	0.24	0.30	0.30	0.78				
8 Market sensing capability	0.27	0.08	0.29	0.15	0.31	0.18	0.57	0.75			
9 Strategic planning capability	-0.13	-0.11	-0.13	-0.03	-0.09	-0.15	0.27	0.35	0.76		
10 Organizational learning capability	0.32	0.19	0.27	0.19	0.34	0.24	0.51	0.61	0.39	0.73	
11 Firm size	0.15	0.09	0.10	0.17	0.07	0.18	0.22	0.10	0.30	0.09	1.00

Table 3 Latent variable loadings

	CS Human resources	CS Management	CS Marketing	CS Production	CS Supply chain management	Organizational learning capability	Market sensing capability	Strategic planning capability	Stakeholder integration capability
CS_HR_I ^a	0.78	0.39	0.39	0.35	0.31	0.06	0.07	−0.06	0.12
CS_HR_II	0.81	0.43	0.38	0.34	0.27	0.08	0.01	−0.14	0.04
CS_HR_III	0.86	0.43	0.30	0.22	0.17	0.00	0.00	−0.12	−0.05
CS_MAN_I	0.51	0.81	0.43	0.51	0.36	0.07	0.10	−0.03	0.15
CS_MAN_II	0.50	0.86	0.53	0.47	0.43	0.13	0.05	−0.06	0.20
CS_MAN_III	0.38	0.82	0.45	0.46	0.45	0.25	0.24	0.02	0.23
CS_MAR_I	0.40	0.43	0.80	0.55	0.41	0.12	0.22	−0.04	0.18
CS_MAR_III	0.45	0.48	0.83	0.62	0.50	0.31	0.20	−0.14	0.18
CS_MAR_II	0.47	0.51	0.88	0.62	0.48	0.29	0.29	−0.13	0.32
CS_PROD_I	0.46	0.53	0.55	0.84	0.51	0.39	0.26	−0.10	0.30
CS_PROD_II	0.44	0.48	0.64	0.86	0.39	0.28	0.29	0.03	0.23
CS_PROD_III	0.45	0.48	0.66	0.88	0.48	0.20	0.27	−0.17	0.21
CS_SCM_I	0.32	0.37	0.50	0.39	0.86	0.20	0.14	−0.15	0.34
CS_SCM_II	0.38	0.48	0.45	0.51	0.89	0.21	0.16	−0.12	0.21
CS_SCM_III	0.30	0.47	0.52	0.52	0.90	0.23	0.16	−0.13	0.24
OLC_I	0.16	0.15	0.22	0.34	0.21	0.82	0.48	0.24	0.40
OLC_II	−0.03	0.11	0.31	0.28	0.20	0.65	0.42	0.23	0.38
OLC_III	−0.07	0.18	0.15	0.13	0.16	0.63	0.48	0.37	0.36
OLC_IV	0.10	0.08	0.10	0.12	0.08	0.76	0.33	0.41	0.37
MSC_I	0.10	0.21	0.28	0.33	0.20	0.50	0.65	0.26	0.50
MSC_II	−0.04	0.00	0.12	0.13	0.09	0.46	0.63	0.27	0.45
MSC_III	0.03	0.01	0.19	0.16	0.05	0.45	0.93	0.36	0.31
SPC_I	0.15	−0.02	−0.09	−0.08	−0.09	0.34	0.31	0.69	0.29
SPC_II	0.08	−0.04	−0.12	−0.10	−0.15	0.27	0.28	0.85	0.21
SPC_III	−0.02	0.00	−0.07	−0.04	−0.10	0.30	0.22	0.72	0.15
SIC_I	0.11	0.23	0.30	0.29	0.24	0.45	0.52	0.24	0.82
SIC_II	0.16	0.16	0.11	0.18	0.28	0.41	0.35	0.16	0.79

SIC_III	−0.13	0.14	0.19	0.18	0.18	0.33	0.39	0.26	0.72
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^a CS_HR: CS Human resources; CS_MAN: CS Management; CS_MAR: CS Marketing; CS_PROD: CS Production; CS_SCM: CS Supply chain management; OLC: Organizational learning capability; MSC: Market sensing capability; SPC: Strategic planning capability; SIC: Stakeholder integration capability

Table 4
Outer model parameters, reflective indicators

	Average Variance Extracted	Composite reliability	Cronbach alpha
CS Human resources	0.66	0.86	0.75
CS Marketing	0.69	0.88	0.79
CS Management	0.70	0.87	0.78
CS Production	0.74	0.89	0.82
CS Supply chain management	0.78	0.92	0.86
Stakeholder integration capability	0.61	0.82	0.68
Market sensing capability	0.56	0.79	0.66
Strategic planning capability	0.58	0.80	0.64
Organizational learning capability	0.52	0.81	0.71

Table 5

Outer model parameters, formative indicators

	Original sample	Sample mean	Standard error	t-values	VIF
CS Human resources ->					
Relative importance of corporate sustainability	0.19	0.19	0.03	7.21**	1.64
CS Marketing ->					
Relative importance of corporate sustainability	0.27	0.27	0.02	12.49**	2.49
CS Management ->					
Relative importance of corporate sustainability	0.23	0.23	0.02	11.40**	1.89
CS Production ->					
Relative importance of corporate sustainability	0.30	0.30	0.02	15.45**	2.44
CS Supply chain management ->					
Relative importance of corporate sustainability	0.27	0.27	0.03	10.18**	1.61

** p < 0.01, *p < 0.05

Table 6

Inner model parameters, hypothesis testing

Hypothesis	Path	Path coefficient	t-value	p-value	R ²	f ²	Q ²	Power
<i>H1</i>	Relative importance corporate sustainability -> Stakeholder integration capability	0.29	3.51	0.00**	0.13	0.09	0.07	0.98
<i>H2</i>	Relative importance corporate sustainability -> Market sensing capability	0.27	2.82	0.01**	0.07	0.08	0.03	0.87
<i>H3</i>	Relative importance corporate sustainability -> Strategic planning capability	-0.18	2.07	0.04*	0.12	0.04	0.01	0.96
<i>H4</i>	Relative importance corporate sustainability -> Organizational learning capability	0.32	4.66	0.00**	0.10	0.12	0.05	0.96
Control	Firm size -> Stakeholder integration capability	0.33	3.96	0.00**				
Control	Firm size -> Strategic planning capability	0.18	2.04	0.04*				

**p < 0.01, * p < 0.05

Table 7
Overview of interview partners

Firm	Industry	Duration of the interview	Number of interviewees
Alpha*	Pharmaceuticals and chemicals	30 minutes	1
Beta	Rubber and plastics	42 minutes	2
Gamma	Metal and machines	40 minutes	1
Delta*	Metal and machines	38 minutes	1
Epsilon*	Wood, cork, and furniture	31 minutes	1
Zeta	Pharmaceuticals and chemicals	40 minutes	1
Eta*	Rubber and plastics	32 minutes	1

* A new interview partner (i.e., the interviewed individual did not fill out the survey in 2014); names have been disguised

Table 8

Coding category (I): Organizational cognitive frame within the context of corporate sustainability

Main characteristic of corporate sustainability	Findings	Exemplary quote
I) Triple bottom line approach	prerequisite of doing business	<p>“We tried to integrate it in all our decision-making to think what we do now would that be comprehended as sustainable. Would it be a good case, in that manner, or is it not a good case if you look at the profits? We try to look at different bottom lines when we make decisions.” (Epsilon)</p> <p>“... but I would hope that in 10 or 20 years’ time there would be no CSR or sustainability departments, because it is just a prerequisite and an actual way of doing business.” (Zeta)</p>
	critical self-reflection on own achievements	<p>“But of course you can’t take everything into consideration because we still have to use some of the bad things. So, we are not angels, but we are trying to be. We are not even close, I would say. But still, it is part of our thinking here that we want to be the best. And part of being the best is also that you are a role model and role models can make a lot of mistakes.” (Beta)</p> <p>“Because sustainability is a touchy subject, you wanna be world champion in it, but no one is, no one are. But that is actually the truth—no company in the world is sustainable or responsible, but all are becoming.” (Zeta)</p>
II) Long-termism	integration of corporate sustainability strategy and business strategy	<p>“The way we look at sustainability in the company is that it is an integrated part of the DNA of the company.” (Epsilon)</p> <p>“We don’t actually have a separate sustainability strategy. We consider it the corporate strategy.” (Alpha)</p> <p>“We are using it as a lens to find new large opportunities in areas that we potentially may not have been gone into or we may not have prioritized in the same way.” (Alpha)</p>

	part of future orientation	<p>“So we do it because, we think it is right, but also because we think that if we look ahead, and not three or five years but 20 years ahead, the company that survives is the company that actually makes sure that they don’t cut over their own raw material source or make sure that they always act in a sustainable way.” (Epsilon)</p> <p>“A lot of today’s mega trends have to do with sustainable issues and, of course, these can be both an opportunity and a risk, depending on how you manage for them.” (Alpha)</p>
	risk-based thinking	<p>“Our approach has been to look at many of the sustainability issues as risks and as working with them as a way of medicating risks.” (Zeta)</p>
III) Consumption of income not capital	impact on society and the environment	<p>“That’s part of why our strategy is called ‘Partnering for impact’ because we are looking at how we can have impact across the value chain beyond what we, as an individual player, can do.” (Alpha)</p> <p>“So if you make sure, that you don’t take out more wood than the forest can reproduce, then you use it in a sustainable way. And you help local forest entities to maintain their opportunity to make a living on the forest, instead of cutting it down and maybe use it for crops or for animals instead. It is a good business case for them if the forest pays off to them.” (Epsilon)</p>
	high internal quality standards	<p>“We are certified according to the ISO standard 14001. But I will say that even though we have this certificate our level is much higher than this ISO standard, because our internal rules are higher.” (Gamma)</p> <p>“We have both what we call operational targets and what we call sort of inspiration or aspiration targets.” (Alpha)</p>
	assessment of economic feasibility	<p>“...because we don’t invest anything in renewable energy source. The reason for that is, that it is not feasible for us economically just yet. You could say then it is not sustainable, but it is.” (Zeta)</p> <p>“It is difficult because a company has to make some results. No doubt about that. You can wish to be as green as possible, if you know what I mean? But if you don’t make any money, you can forget it on the long term.” (Delta)</p>

Table 9

Coding category (II): Mechanisms of corporate sustainability on organizational capabilities

Organizational capability	Findings	Exemplary quotes
I) Stakeholder integration	compliance with laws, regulations, and global sustainability standards	<p>“We were looking to the Sustainable Development Goals as a guiding line when we were developing the new purpose and strategy.” (Alpha)</p> <p>“I will say it is a part of the firm’s corporate identity, because especially when you have the ISO 14001 and also the new ISO 50001 you have to integrate all you do in procedures, in instructions, etc. and you have to integrate it in the daily business.” (Delta)</p> <p>“And then we also have to look into our interested parties around us to see what do they expect from us.” (Beta)</p>
	addressing stakeholder expectations	<p>“We adjust continuous efforts to make sure that you have the right level of transparency and the right level of control because there is an ever-growing number of issues that we need to look at.” (Alpha)</p>
	ownership structure	<p>“We have been in the market since 1914 and it started as a timber-cutting plant. Back in the days when it was started, the owners had their own forest, where they went out and cut down trees. They always made sure that they planted new wood, when they took out wood.” (Epsilon)</p> <p>“...this is from 2007. Before this we were owned by a Danish company. After we were sold and became an American company we don’t use this Global Compact anymore, but I think we follow the rules anyways, just in another way.” (Gamma)</p>
II) Market sensing	listening to primary customers	<p>“If your primary customer is public health care systems, then you can’t be a bad guy either because the money you are making is basically taxpayers’ dollars in 90% of the cases. You need to spend those responsibly or in a sustainable manner.” (Zeta)</p> <p>“I would say customers have a huge impact on how we react. No question about that.” (Delta)</p>
	branding firm image	<p>“We want to tell around that we have a green profile. [...] Yeah, it is a positive brand.” (Beta)</p> <p>“It makes us stand out in the crowd that we try to think of it in different aspects.” (Epsilon)</p>

III) Strategic planning	orientation on main products and main markets	<p>“Actually, there is a very high motivation, because we are a factory that makes rubber and normally that is very dirty, but in our company it is very clean.” (Eta)</p> <p>“But furthermore, and what makes Alpha unique in many ways, is that it is very close to our business model. So, our solutions are generally better for the environment, than the conventional technology. We produce enzymes, which are biological catalysts, which usually replace chemicals and save raw materials, save chemicals, save energy, etc.” (Alpha)</p>
IV) Organizational learning	local culture	<p>“I think that is also because we are a Danish company. I think for a Danish company this is not very difficult to be and to act in an ethical manner.” (Gamma)</p> <p>“Delta worldwide, they have the same procedures, the same instructions, the same ideas for the whole world. Overall it shouldn't be different, if you are in Denmark or in China or whatever. But we also know that the culture is not the same and maybe the perspectives of the guidelines.” (Delta)</p>
	involvement of employees	<p>“I don’t feel it as top-down. I feel it is a natural way to do it.” (Gamma)</p> <p>“Because not only that the workers need to have a good environment, but also that the quality of what we are doing actually is better in a way....And just by giving the people the right information, they can have the right motivation for it.” (Eta)</p>