

**Changing for the Better?**  
**Essays on the Role of Institutional Logics and Information System**  
**in Organizational Sustainability Transformations**



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## Preface

The emission of greenhouse gases, air pollution, and the overuse of freshwater let the world face serious environmental problems, which organizations are considerably aggravating with their use of natural resources, raw materials, and energy (Melville, 2010; Seidel, Recker, & Vom Brocke, 2013). If companies are forced to pay for use, loss, and damage of the environment caused by their business activities, one third of the profits of the 3,000 biggest companies worldwide would be lost (Jowitz, 2010). This accounts for an environmental damage of EUR 1.9bn and reflects up to 7 % of the companies' combined turnover (Jowitz, 2010). Since awareness for environmental damages is on the rise, many companies are urged by their stakeholders to engage in eco-sustainable initiatives and to foster eco-sustainable behavior in their organizations (Aguinis & Glavas, 2012; Corbett, Webster, & Jenkin, 2018; Schneider, 2015). Generally, *eco-sustainable behavior* is defined as actions that mitigate global warming, reduce the use of natural resources, and protect the biosphere (Stern, 2000). An increasing number of companies report that eco-sustainable initiatives have a positive impact on firms' economic performance (e.g., Albinger & Freeman, 2000; Ameer & Othman, 2012; Hahn, Pinkse, Preuss, & Figge, 2015) and concurrently allow the combination of social and commercial goals by optimizing environmental and economic decisions simultaneously (Malhotra, Melville, & Watson, 2013).

These initiatives are considered an integral part of *organizational sustainability transformations*, which are a special case of multilayered, complex organizational change efforts that relate to environmental, organizational, and individual factors (Seidel et al., 2013). Institutional logics and information systems (IS) have shown to be two important perspectives from which to explore mechanisms and processes central to organizational sustainability transformations. Institutional logics offer a unique perspective to investigate organizational change for sustainability because they provide a new approach to organizational change that

incorporates macro structures, culture, and agency to explain how actions are enabled or constrained (Thornton, Ocasio, & Lounsbury, 2012). It thus allows for insights into the complex and miscellaneous interplay of external and internal determinants that govern organizational transformation processes towards sustainability (Lülfes & Hahn, 2013). By providing insights into institutional changes of practice and behaviors, an institutional logic perspective allows for a detailed analysis of organizational transformations (Martin, Currie, Weaver, Finn, & McDonald, 2017; Meyer & Hammerschmid, 2006). Within these change processes, IS have shown to be an efficient and pervasive tool to leverage sustainability by integrating human and technological factors (Butler, 2011; Melville, 2010; Seidel, Chandra Kruse, Székely, Gau, & Stieger, 2017). Since IS have become a key resource for the encouragement of organizational sustainability transformations, adopting an IS perspective allows for an understanding of mechanisms and processes that enable IS to foster sustainability in organizations (Seidel et al., 2013). Thus, investigating an institutional logic perspective as well as an IS perspective to explore organizational sustainability transformations facilitates an in-depth understanding of organizational, human, and technological factors to encourage sustainability in organizational transformations.

*Institutional logics* represent a frame of reference that individuals and organizations employ to evaluate the world around them and everything that happens within it (Thornton et al., 2012). They are commonly defined as “the socially constructed patterns of cultural symbols and material practices, assumptions, values, beliefs, and rules by which individuals and organizations produce and reproduce their material subsistence, organize time and space, and provide meaning to their social reality” (Thornton & Ocasio, 1999, p. 804). Institutional logics thus provide guidelines for actions and individuals’ identification in social and organizational settings (Thornton, Jones, & Kurry, 2005). Even though different institutional logics might co-exist (e.g., Greenwood, Díaz, Li, & Lorente, 2010), behavior is guided by one dominant logic. Since institutional logics provide guiding principles for appropriate behavior,

actions are regarded as legitimate when they are in line with the dominant institutional logic (Fiedler & Welpel, 2010; Flickinger, Gruber-Mücke, & Fiedler, 2013).

As institutional logics link micro and macro influences on organizational behavior (Thornton et al., 2012), they are considered a mature concept to explain the complex interplay of attitudes, as well as external and internal determinants, which govern corporate eco-sustainable behaviors (Lülfes & Hahn, 2013). Research has shown that institutional logics can enable eco-sustainable behavior, as non-governmental organizations embedded in community logics can help to establish eco-sustainable behavior in societies (Lee & Lounsbury, 2015). Since eco-sustainability logics have been conceptualized and contrasted with market logics (Schneider, 2015), first theoretical work argues that corporate sustainability is shaped by an interplay of eco-sustainability and market or corporate logics (Schick, Henkel, Kranz, & Fiedler, 2016; Schneider, 2015). Furthermore, corporate sustainable initiatives can be supported by institutional logics for green information technology projects (Corbett et al., 2018).

Research has shown that institutional logics are not stable, but are subject to change (e.g., Gawer & Phillips, 2013; Reay & Hinings, 2009; Thornton & Ocasio, 2008). As logics shift, organizations must respond to this changing setting (Gawer & Phillips, 2013; Greenwood et al., 2010). To explain organizational change, existing institutional logics research has found three different explanations: competing logics, social movement initiatives and related field changes, and powerful actors. First, research on competing logics commonly describes institutional change as a transition from one dominant logic to another, characterized by conflicts between multiple competing institutional logics (e.g., Battilana & Dorado, 2010; Marquis & Lounsbury, 2007; Reay & Hinings, 2009). Second, social movement initiatives and related field changes are considered forces that disrupt existing arrangements, leading to the formation of a new dominant institutional logic (e.g., Berman, 2012; Davis, McAdam,

Richard, Scott, & Zald, 2005; Schneiberg & Lounsbury, 2008). Third, powerful actors are considered a major driver in change processes because they have the resources to modify the dominant institutional logic according to their values and beliefs (DiMaggio & Powell, 1983; Greenwood & Suddaby, 2006). Thus, since organizational change is considered to be related to a change in the dominant institutional logic, organizational sustainability transformations are likely to be connected to a transformation of the dominant institutional logic towards sustainability (Howard-Grenville, Buckle, Hoskins, & George, 2014).

Further, organizational sustainability transformations are of interest for IS research, since IS have become a key resource to support organizations' efforts in becoming more sustainable (Butler, 2011; Melville, 2010; Seidel, Chandra Kruse, et al., 2017). The field of *Green IS* particularly addresses issues related to the use of IS by individuals, groups, organizations, and society to help environmentally friendly practices to emerge and diffuse (e.g., Butler, 2011; Chan & Ma, 2017; Jenkin, Webster, & McShane, 2011; Seidel, Chandra Kruse, et al., 2017; Seidel, Fridgen, & Watson, 2017). Green IS research comprises information technologies, people, processes, and software to "support individual, organizational, or societal goals" (Kranz, Kolbe, Koo, & Boudreau, 2015, p. 8) and thus supports organizations' and individuals' sustainable behavior and decisions (e.g., Baskerville, Pries-Heje, & Recker, 2016; Butler, 2011; Jenkin et al., 2011; Seidel, Fridgen, et al., 2017; Seidel et al., 2013). Research has shown that Green IS can contribute to the creation of environmentally sustainable organizations, the management of these sustainability transformations, and the support of sensemaking for eco-sustainability in organizations (Seidel, Fridgen, et al., 2017; Seidel et al., 2013). Since IS are a central tool for improving sustainability indicators and routines (Bengtsson & Ågerfalk, 2011), they help to provide more accurate and detailed information for eco-sustainability, and allow for a transition to more sustainable business processes by enabling more seamless and efficient workflows (Hilpert, Kranz, & Schumann, 2013). Thereby, Green IS research explores how IS can contribute to the transformation of

organizations towards eco-sustainability (Schick et al., 2016; Seidel et al., 2013; Seidler, Henkel, Fiedler, & Kranz, 2018).

Green IS research has shown IS *affordances*' impact on organizational sustainability transformations (Recker, 2016; Seidel et al., 2013). Affordances relate to the potential for behaviors associated with achieving an immediate concrete outcome to arise from the relationship between an IT artifact and a goal-oriented actor (Volkoff & Strong, 2018). While affordances are ever-present potentials for action, their actualization is contingent on various characteristics of the technological and organizational context (Hedstrom & Swedberg, 1998). In organizational sustainability transformations, affordances are shown to support organizational sensemaking for sustainable practices by providing environmental data, noticing and bracketing, allowing to engage in communications, and presuming potential alternative eco-sustainable actions (Seidel, Chandra Kruse, et al., 2017). Further, research has shown that IS affordances can create an actionable context in which organizations can engage in processes to understand emerging environmental requirements and in which individuals can implement eco-sustainable work practices (Seidel et al., 2013). Thus, the affordance theory allows to investigate Green IS' contribution to organizational sustainability transformations by providing insights into IS affordances that support a shift towards environmentally friendly processes in organizations (Seidel, Chandra Kruse, et al., 2017; Seidel et al., 2013).

Since not only organizational factors allow to reduce environmental damages, but also individual behavior facilitates a change towards more eco-sustainability (e.g., Looock, Staake, & Thiesse, 2013), Green IS research addresses the pervasive potential of IS for encouraging behavioral change and more environmental practices (e.g., Seidel, Chandra Kruse, et al., 2017; Watson, Boudreau, Chen, & Sepulveda, 2011). Prior Green IS studies were successful in leveraging eco-sustainable behavior with the help of *gamification* (e.g., Gnauk, Dannecker, & Hahmann, 2012; Looock et al., 2013; Oppong-Tawiah, Webster, Staples, Cameron, & De

Guinea, 2014). By including game design elements, such as badges, leaderboards, or points, in non-game contexts (Deterding, Dixon, Khaled, & Nacke, 2011), gamification aims at activating individual motivation to influence users' attitudes and behaviors (Blohm & Leimeister, 2013; Schöbel, Janson, Leimeister, & Ernst, 2017). Thereby, Green IS literature has primarily drawn on gamified IS as well as feedback (e.g., Bellman & Murray, 2018; Tiefenbeck et al., 2018) and focuses on competition as a motivating mechanism for eco-sustainable behavior (e.g., Loock et al., 2013; Oppong-Tawiah et al., 2014).

However, rooted in environmental psychology literature, the *goal framing theory* claims that eco-sustainable behavior is not only driven by competition as motivational mechanism but by different, often conflicting, motivations or goals. The goal framing theory postulates that goals govern individual cognitive and motivational processes, such as selective attention, evaluations, or access of knowledge chunks. Eco-sustainable behavior is guided by three competing goal frames, i.e. normative, hedonic, and gain goal frame (Lindenberg & Foss, 2011; Lindenberg & Steg, 2013; Ruepert, Keizer, & Steg, 2017). A *normative goal frame* refers to behaving appropriately, furthering collective goals, and following social norms (Lindenberg, 2017). A *hedonic goal frame* relates to immediately improving personal feelings, whereas a *gain goal frame* mainly addresses the human needs of guarding and improving resources (Lindenberg, 2017). Since eco-sustainable behavior is closely related to a normative goal frame, recent literature proposes to promote eco-sustainable behavior by making it more compatible with hedonic and gain goal frames, i.e. to make eco-sustainable behavior more appealing and enjoyable (Lindenberg & Steg, 2007).

Even though institutional logic and Green IS research address different aspects of organizational sustainability transformations, both research fields unify the desire to develop a deeper understanding of eco-sustainable behavior in corporate organizations and related organizational change. Thereby, this dissertation provides needed insights into mechanisms

and processes that leverage eco-sustainable behavior in corporate organizations and reveals new ways to support organizational sustainability transformations to limit environmental damage. Since this dissertation addresses organizational factors by drawing on institutional logics, it allows for deep insights into the complex and manifold organizational mechanisms that interplay in organizational sustainability transformations. By drawing on IS, as an efficient and pervasive tool to leverage sustainability, this dissertation provides well-founded insights on human and technological factors to support eco-sustainable behavior in corporate organizations. Thus, by drawing on institutional logics and IS to investigate organizational, human, and technological factors in organizational sustainability transformations, this dissertation is one of the first to integrate research on structures and contextual dimensions of eco-sustainability as well as IS potential in influencing eco-sustainable behavior.

### **Research Questions and Dissertation Outline**

This dissertation comprises four studies that present empirical evidence on the role of institutional logics and IS in organizational sustainability transformations. The first two studies focus on an institutional logics perspective to explore eco-sustainability in corporate organizations and to develop and validate a measurement instrument of eco-sustainability and corporation logics. The third and fourth study adopt a Green IS perspective to examine Green IS affordances' contribution to a corporate sustainable strategy and gamified IS' potential in aligning competing motivations to support eco-sustainable behavior.



The first study, titled “*Opening the Black Box on Changing Institutional Logics: The Case of Organizational Sustainability Transformations*”<sup>1</sup>, adopts an institutional logics perspective to explore how a change process towards eco-sustainability in organizational sustainability transformations unfolds. Existing institutional logics research conducted first theoretical work on eco-sustainability logics (Schick et al., 2016; Schneider, 2015) and showed that institutional logics can enable eco-sustainable behavior (Lee & Lounsbury, 2015) and support corporate sustainable initiatives for green information technology projects (Corbett et al., 2018). Furthermore, research revealed that institutional logics are not stable but subject to change and can thus cause a shift in organizations’ behavior (Gawer & Phillips, 2013). To explain organizational change, existing institutional logics research has drawn on competing institutional logics (e.g., Battilana & Dorado, 2010), social movement initiatives and related field changes (e.g., Schneiberg & Lounsbury, 2008), and actors’ roles in a shift in dominant logics (e.g., Greenwood & Suddaby, 2006). However, existing research mainly addressed organizational change without exploring the underlying mechanisms and processes that transform the dominant institutional logic. Thus, existing research remains sparse on transformation processes of institutional logics, in general, and their shift towards eco-sustainability, in particular (Howard-Grenville et al., 2014). Therefore, further process-related research is needed to detect enabling conditions for organizational change, allowing for causal explanations and a better understanding of transitional states (Mair, Mayer, & Lutz, 2015).

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<sup>1</sup> This study is joint work with Prof. Dr. Marina Fiedler, Prof. Dr. Johann Kranz, and Christopher Henkel. A previous version of this paper was discussed at the European Group of Organization Studies Conference 2017 Professional Development Workshop on Institutional Logics, was presented at the British Academy of Management Conference 2017 entitled, “Greening the organization: An institutional logics approach to corporate pro-environmentalism”, and was published in the conference proceedings.

To address this gap, this study explores how the transformation process of the dominant institutional logic towards eco-sustainability unfolds by drawing on an in-depth case study based on 36 semi-structured interviews and encompassing secondary data sources, i.e. corporate and sustainability reports, press releases, newspaper articles, information from corporate homepages, and internal materials. The findings indicate that customer demand for eco-sustainable products evokes from increasing consumers' concerns for eco-sustainability. This customer demand functioned as an external impetus for organizational transformations towards eco-sustainability and caused a shift of the dominant institutional logic. Since eco-sustainability dynamically pervaded the organization, the different elements of the dominant institutional logic changed towards eco-sustainability. This change process unfolded in three phases, i.e. demand assimilation, organizational adaptation, and business model modification, and revealed two overarching transformational mechanisms, i.e. market-oriented mechanisms and intra-organizational mechanisms, which allowed for a conflict-free transformation process: (I) market-oriented mechanisms shifted the first elements of the dominant logic towards eco-sustainability (phase of demand assimilation); (II) intra-organizational mechanisms, which further incorporated eco-sustainability into the organization, led to an organizational adaptation and a further transition of the dominant institutional logic's elements towards eco-sustainability (phase of organizational adaptation); (III) market-oriented mechanisms reinforced these changes and enabled a modification of the company's business model (phase of business model modification). Overall, this process led from a corporation logic to an eco-sustainable corporation logic.

The second study, titled *“Exploring Corporate Eco-Sustainability from an Institutional Logics Perspective: The Development and Validation of a Quantitative Measurement Instrument”*, develops a scale to measure an eco-sustainability logic (ESL scale) and a scale to assess a corporation logic (COL scale). Institutional logics research is dominated by qualitative studies – which are often criticized for not being representative (Flick, 2014) –

viewing additional quantitative, secondary data at most. Thus, existing research lacks measurement instruments to explore latent factors, such as attitudes, assumptions, or beliefs, which are central to institutional logics. Quantifying the subjectivity of institutional logics allows for a needed understanding of the relationship between institutional logics and organizational responses and a more integrated and holistic analysis of institutional logics (Greenwood, Raynard, Kodeih, Micelotta, & Lounsbury, 2011). The development of a quantitative scale-based measurement instrument based on two parsimonious scales, satisfies the need to include new methodological approaches into institutional logics research's repertoire of available methods (Thornton et al., 2012) and allows the capture of manifold facets, characterizing an eco-sustainability and corporation logic.

Following the literature in measurement theory, this study reports a series of one qualitative study based on 55 semi-structured interviews and four quantitative studies (study I:  $N = 513$ ; study II:  $N = 222$ ; study III:  $N = 50$ ; study IV:  $N = 412$ ) to develop and validate the ESL scale measuring an eco-sustainability logic and the COL scale measuring a corporation logic. Since this work conceptually defines the elements of both logics and uses a rigorous scale development methodology, it is the first to demonstrate a holistic and integrative approach to measure institutional logics.

The third study, titled "*How to Become a Sustainability Leader? The Role of IS Affordances in Enabling and Triggering Sustainability Transformations*"<sup>2</sup>, explores how and why Green IS affordances contribute to a sustainable corporate strategy. Research has shown that to establish eco-sustainability in organizations, environmental concerns need to translated

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<sup>2</sup> This study is joint work with Prof. Dr. Marina Fiedler, Prof. Dr. Johann Kranz, and Christopher Henkel. This project was presented at the 38<sup>th</sup> International Conference for Information Systems 2017 in Seoul, South Korea, and published in the conference proceedings (VHB-JOURQUAL3: A).

into a corporate strategy (Banerjee, 2002). Therefore, a sustainable corporate strategy plays a pivotal role in organizational sustainability transformations (Loeser, Recker, Brocke, Molla, & Zarnekow, 2017). Organizations have started to develop and use Green IS to enable and trigger more sustainable corporate strategies (e.g., Loeser et al., 2017), which incorporate social, economic, and environmental issues (Banerjee, 2001; Elkington, 1994) to enhance business performance through low-cost or differentiation advantages (Orsato, 2006). Most of the literature focused on Green IS alignment to explore how Green IS can be used to support a corporate sustainable strategy (e.g., Ere, Loeser, Schmidt, Zarnekow, & Kolbe, 2011; Watson et al., 2011) or on conceptualizing Green IS strategies (e.g., Jenkin et al., 2011; Loeser, Ere, & Zarnekow, 2012). As existing research did not analyze Green IS' capacities for a change of organizational strategies, Green IS' contribution to organizations' corporate sustainable strategy has not experienced sufficient attention (Hedman & Henningsson, 2016).

Since Green IS literature has highlighted the importance of affordances in organizational sustainability transformations (Recker, 2016; Seidel et al., 2013), this study integrates affordance theory and organizational strategy to reveal IS affordances that support a shift towards a corporate sustainable strategy and how these affordances enable organizational sustainability processes. Therefore, the single case study draws on the qualitative analyses of 16 semi-structured interviews and qualitative and quantitative analyses of the case company's corporate and sustainability reports as well as internal documents. The results show that Green IS affordances enable individual sustainable practices to aggregate on an organizational level and thereby support the formation of a new sustainable strategy. Functional affordances can activate sensemaking processes, which stimulate cross-functional and -departmental organizational learning. Since these affordances impact the company and its suppliers and customers, this study shows that both intra- and inter-organizational affordances are important to promote the features of IS and its use for sustainability issues. Furthermore, this study provides initial evidence that functional affordances can spark an organization's strategy shift

towards sustainability. Thus, a model is developed that exhibits the relationships between material properties, Green IS affordances, and corporate sustainable strategy.

The fourth study, titled “*Promoting Eco-Sustainable Behavior with Gamification: An Experimental Study on the Alignment of Competing Goal Frames*”<sup>3</sup>, assesses the effectiveness of gamified IS in the alignment of the three goal frames, i.e. normative, hedonic, and gain goal frames, to investigate whether gamification mechanisms addressing hedonic or gain goal frames increase eco-sustainable behavior compared to normative information, and whether gamified IS addressing hedonic or gain goal frames are more effective in aligning competing motivations for normative eco-sustainable behavior. In contrast to governmental information campaigns or company policies providing information intended to raise awareness and trigger eco-sustainable behavior, which have often shown to be limited in their effectiveness (Gardner & Stern, 2002), first Green IS studies demonstrated success in leveraging eco-sustainable behavior with the help of gamification (e.g., Gnauk et al., 2012; Loock et al., 2013; Opong-Tawiah et al., 2014). Thereby, Green IS literature has primarily drawn on gamified IS and feedback (e.g., Bellman & Murray, 2018; Tiefenbeck et al., 2018) and focused on competition as a motivating mechanism for eco-sustainable behavior (e.g., Loock et al., 2013; Opong-Tawiah et al., 2014). However, the goal framing theory, rooted in environmental psychology literature, claims that eco-sustainable behavior is driven by different, often competing, motivations and is guided by three competing goal frames, i.e. normative, hedonic, and gain goal frame (Lindenberg & Foss, 2011; Lindenberg & Steg, 2013; Ruepert et al., 2017).

Since IS research mainly draws on competition and thus focuses on a gain goal frame to motivate for eco-sustainable behavior, this study is the first to build on a controlled,

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<sup>3</sup> This study is joint work with Prof. Dr. Marina Fiedler, Prof. Dr. Johann Kranz, and Christopher Henkel.

randomized laboratory experiment ( $N = 160$ ) to consider the effectiveness of gamified IS in the alignment of all three goal frames, using a four-group between-subject design ([1] normative goal frame condition, [2] hedonic and normative goal frames condition, [3] gain and normative goal frames condition, [4] control condition). The results show that when confronted with normative information that frames eco-sustainable behavior as the appropriate behavior, participants receiving additional gamified treatments to support the hedonic goal frame (via emotional feedback) and the gain goal frame (via competitive feedback), respectively, behave more eco-sustainably than participants who did not receive gamified treatments. Further, the results revealed no differences in eco-sustainable behavior between groups provided with emotion- or competition-based gamified treatments, indicating that gamified IS activating a hedonic or a gain goal frame, to support normative information, are equally effective in aligning competing motivations for normative-driven eco-sustainable behavior.

## **Conclusion**

This dissertation shows that institutional logics and IS play a major role in organizational sustainability transformations and allow for insights into organizational, human, and technological factors that shape mechanisms and processes of organizational sustainability transformations. Since organizations heavily contribute to environmental problems (Seidel et al., 2013), organizational transformations for sustainability allow the mitigation of negative environmental outcomes as well as the leverage of sustainable initiatives and behavior to protect the environment. Taking an institutional logics perspective to explore organizational factors related to a change towards eco-sustainability and drawing on an IS perspective to unveil possibilities to leverage eco-sustainability within organizations, allows for an in-depth understanding of capabilities to change for the better and to protect the environment. Thus, a change towards eco-sustainability could not only allow for an increase in organizations'

economic performance, competitive advantages, or a strengthened market position, but could also facilitate positive changes in organizations' and employees' behavior that might directly benefit the environment.

The first study applies an institutional logics perspective to explore organizational change processes towards eco-sustainability. It becomes evident that organizational sustainability transformations are characterized by complex change processes of values, assumptions, and beliefs, which are supported by underlying transformational mechanisms and can result in a conflict-free change of the dominant institutional logic towards eco-sustainability. The second study develops and validates two scales – the ESL scale to measure an eco-sustainability logic and the COL scale to measure a corporation logic. It thereby provides a methodological advancement of the field of institutional logics, since it is the first to provide robust scales to measure institutional logics that provide insights into eco-sustainable behavior of corporate organizations. The third study adopts an IS perspective and sheds light on the potential of Green IS to support a corporate sustainable strategy. Since IS affordances were actualized on an intra-organizational and inter-organizational level and are closely related to material properties, they support the formation of a new sustainable strategy. The fourth study demonstrates gamification's motivational potential to align conflicting motivations and goals. It thereby highlights the usage of gamification as an effective strategy to motivate eco-sustainable behavior. The following summaries should give a short overview of the main contributions of the four studies.

### **Study 1: Opening the Black Box on Changing Institutional Logics: The Case of Organizational Sustainability Transformations**

By applying an institutional logics perspective, the first study addresses the question of how the change process towards eco-sustainability unfolds in organizational sustainability transformations. Investigating an in-depth single case study, this study reveals that the change

process from a corporation logic to an eco-sustainable corporation logic unfolds conflict-free in the three phases of demand assimilation, organizational adaptation, and business model modification. Furthermore, market-oriented and intra-organizational mechanisms are identified as the two overarching transformational mechanisms that shifted the different elements of the dominant institutional logic towards eco-sustainability.

These results offer valuable contributions to research on the transformation of institutional logics and corporate eco-sustainability. First, by developing a process model, this work advances research on the transformation of institutional logics since it shows that market-oriented and intra-organizational mechanisms can determine the transitional states of hybrid organizations (Mair et al., 2015). Second, in contrast to existing literature which mainly draws on conflicts in managing changing institutional logics (e.g., Battilana & Dorado, 2010; Reay & Hinings, 2009), this study shows that market-oriented and intra-organizational mechanisms can enable a conflict-free change process towards a new dominant institutional logic. Third, a conflict-free change process can be facilitated, when the different institutional logics involved in this process pursue compatible goals (York, Hargrave, & Pacheco, 2016). Fourth, by developing an eco-sustainable corporation logic that serves as an explanation of eco-sustainable behavior of corporate organizations, this study contributes to research on corporate eco-sustainability embedded in organizational sustainability transformations from an institutional logics perspective (Howard-Grenville et al., 2014).

## **Study 2: Exploring Corporate Eco-Sustainability from an Institutional Logics Perspective: The Development and Validation of a Quantitative Measurement Instrument**

The second study reports a series of qualitative and quantitative studies to develop the ESL and COL scales to measure an eco-sustainability logic and a corporation logic, respectively. This study thereby conceptually defines the different elements of an eco-sustainability and a



corporation logic and uses a rigorous scale development methodology to demonstrate a holistic, integrative approach to measure institutional logics.

Thereby, this study contributes to research on institutional logics and corporate eco-sustainability. First, with the development of two parsimonious scales, the study provides institutional logics scholars with robust scales to measure an eco-sustainability and a corporation logic and adds to a methodological advancement of the field of institutional logics (Thornton et al., 2012). Second, in contrast to existing literature, which mainly focuses on institutional logics and their consequences on different behaviors, this study shows the merit of examining the effects of different elements of an institutional logic. Third, since extant institutional logics literature often fails to provide definitions of the different framework elements, the study's qualitative approach allows the closure of this gap for two institutional logics by providing definitions of the essential and necessary elements that characterize the eco-sustainability and corporation logic. Fourth, by developing these definitions, this study adds to advancements of the scale development process approach, since existing scale development studies often remain sparse on detailed construct definitions and implications of their measurement model (MacKenzie, Podsakoff, & Podsakoff, 2011). Fifth, since this study includes one qualitative and four quantitative studies, it satisfies the need for attention to methods of discovery and methods of validation (Thornton et al., 2012).

### **Study 3: How to Become a Sustainability Leader? The Role of IS Affordances in Enabling and Triggering Sustainability Transformations**

The third study addresses the questions of how and why Green IS affordances contribute to a company's sustainable strategy. Based on a single case study, the results show that Green IS affordances enable individual sustainable practices to aggregate on an organizational level and support the formation of a new sustainable strategy. Furthermore, organizational sensemaking affordances supported an organization's strategy shift towards sustainability. Since

affordances were actualized on an intra-organizational and inter-organizational level, these findings allowed for the development of a model that demonstrated the relationship between material properties, Green IS affordances, and corporate sustainable strategy.

With these findings, this study contributes to research on Green IS and sustainable strategies. First, this study extends the inter- and intra-organizational view on affordances by demonstrating that actualized inter-organizational affordances influence an organization's corporate strategy and expand to new market practices. Second, as one of the few studies that show that Green IS can have an influence on the strategic level and lead to competitive advantages, this study demonstrates that Green IS are not only a tool for resource or footprint improvement, but can also have strategic business value (Bengtsson & Ågerfalk, 2011; Butler, 2011). Third, this study complements previous work (e.g., Melville, 2010; Seidel et al., 2013) since it shows that organizational sensemaking affordances influence underlying mechanisms that lead to more sustainable actions and support a sustainable corporate strategy.

#### **Study 4: Promoting Eco-Sustainable Behavior with Gamification: An Experimental Study on the Alignment of Competing Goal Frames**

The fourth study assesses the effectiveness of gamified IS in the alignment of three competing goal frames, i.e. normative, hedonic, and gain goal frame, to investigate whether gamification mechanisms addressing hedonic or gain goal frames increase eco-sustainable behavior compared to normative information only and whether gamified IS addressing hedonic or gain goal frames are more effective in aligning competing motivations for normative eco-sustainable behavior. The results indicate that gamification mechanisms that support normative information by drawing on emotion to trigger the hedonic goal frame or on competition to promote the gain goal frame increase eco-sustainable behavior compared to normative information only. Both mechanisms demonstrate to be equally effective in aligning competing motivations for normative-driven eco-sustainable behavior.

Thereby, this study contributes to Green IS and gamification literature. First, by demonstrating that gamified IS can influence motivational states to leverage eco-sustainable behavior through aligning otherwise competing motivations, this study demonstrates gamification's persuasive potential to overcome barriers for eco-sustainable behavior and to change behavior towards more environmental practices (Benitez-Amado & Walczuch, 2012; Seidel et al., 2013; Watson et al., 2011). Second, as a first study that includes emotion-based gamification mechanisms supporting a hedonic goal frame to trigger environmental-friendly behavior and thus respond to calls in the gamification literature to address hedonic motives (Lowry, Hammer, Gaskin, Roberts, & Twyman, 2013; Santhanam, Liu, & Shen, 2016), this study extends existing Green IS research by demonstrating the potential of including emotional elements in gamified IS (Bui, Veit, & Webster, 2015; Te'eni, 2016). Third, by integrating goal framing theory, this study adds to existing research on Green IS' feedback mechanisms, since it shows that gamification mechanisms that, first, support the focal goal frames, and, second, combine normative information with competition- and emotion-based gamification design elements, are effective in transmitting direct and immediate feedback and thus allow for an increase in individuals' eco-sustainable behavior (Liu, Santhanam, & Webster, 2017).

## References

- Aguinis, H., & Glavas, A. (2012). What we know and don't know about corporate social responsibility. *Journal of Management*, 38(4), 932–968. <http://doi.org/10.1177/0149206311436079>
- Albinger, H. S., & Freeman, S. J. (2000). Corporate social performance and attractiveness as an employer to different job seeking populations. *Journal of Business Ethics*, 28(3), 243–253. <http://doi.org/10.1023/A:1006289817941>
- Ameer, R., & Othman, R. (2012). Sustainability practices and corporate financial performance: A study based on the top global corporations. *Journal of Business Ethics*, 108(1), 61–79. <http://doi.org/10.1007/s10551-011-1063-y>
- Banerjee, S. B. (2001). Managerial perceptions of corporate environmentalism: Interpretations from industry and strategic implications for organizations. *Journal of Management Studies*, 38(4), 489–513. <http://doi.org/10.1111/1467-6486.00246>
- Banerjee, S. B. (2002). Corporate environmentalism: The construct and its measurement. *Journal of Business Ethics*, 55(3), 177–191. [http://doi.org/10.1016/S0148-2963\(00\)00135-1](http://doi.org/10.1016/S0148-2963(00)00135-1)
- Baskerville, R., Pries-Heje, J., & Recker, J. (2016). Principles for re-designing information systems for environmental sustainability. In F. J. Mata & A. Pont (Eds.), *ICT for Promoting Human Development and Protecting the Environment* (pp. 14–25). San José, Costa Rica. [http://doi.org/10.1007/978-3-319-44447-5\\_2](http://doi.org/10.1007/978-3-319-44447-5_2)
- Battilana, J., & Dorado, S. (2010). Building sustainable hybrid organizations: The case of commercial microfinance organizations. *Academy of Management Journal*, 53(6), 1419–1440. <http://doi.org/10.5465/AMJ.2010.57318391>
- Bellman, S., & Murray, K. B. (2018). Feedback, task performance, and interface preferences.

*European Journal of Information Systems*, online.

<http://doi.org/10.1080/0960085X.2018.1475876>

- Bengtsson, F., & Ågerfalk, P. J. (2011). Information technology as a change actant in sustainability innovation: Insights from Uppsala. *The Journal of Strategic Information Systems*, 20(1), 96–112. <http://doi.org/10.1016/j.jsis.2010.09.007>
- Berman, E. P. (2012). Explaining the move toward the market in US academic science: How institutional logics can change without institutional entrepreneurs. *Theory and Society*, 41(3), 261–299. <http://doi.org/10.1007/s11186-012-9167-7>
- Blohm, I., & Leimeister, J. M. (2013). Gamification - Design of IT-based enhancing services for motivational support and behavioral change. *Business & Information Systems Engineering*, 5(4), 275–278. <http://doi.org/10.1007/s12599-013-0273-5>
- Bui, A., Veit, D., & Webster, J. (2015). Gamification – A novel phenomenon or a new wrapping for existing concepts? In *Proceedings of the 36th International Conference on Information Systems*. Fort Worth, USA.
- Butler, T. (2011). Compliance with institutional imperatives on environmental sustainability: Building theory on the role of Green IS. *Journal of Strategic Information Systems*, 20(1), 6–26. <http://doi.org/10.1016/j.jsis.2010.09.006>
- Chan, R. Y. K., & Ma, K. H. Y. (2017). Impact of executive compensation on the execution of IT-based environmental strategies under competition. *European Journal of Information Systems*, 26(5), 489–508. <http://doi.org/10.1057/s41303-017-0052-3>
- Corbett, J., Webster, J., & Jenkin, T. A. (2018). Unmasking corporate sustainability at the project level: Exploring the influence of institutional logics and individual agency. *Journal of Business Ethics*, 147(2), 261–286. <http://doi.org/10.1007/s10551-015-2945-1>
- Davis, G. F., McAdam, D., Richard, W., Scott, M., & Zald, N. (2005). *Social movements and*

*organizational theory*. Cambridge: Cambridge University Press.

- Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011). From game design elements to gamefulness: Defining “Gamification.” In *Proceedings of the 15th International Academic MindTrek Conference: Envisioning Future Media Environments* (pp. 9–15). Tampere, Finland. <http://doi.org/10.1145/2181037.2181040>
- DiMaggio, P., & Powell, W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review*, 48(2), 147–160.
- Elkington, J. (1994). Towards the sustainable corporation: Win-win-win business strategies for sustainable development. *California Management Review*, 36(2), 90–100. <http://doi.org/10.2307/41165746>
- Erek, K., Loeser, F., Schmidt, N.-H., Zarnekow, R., & Kolbe, L. M. (2011). Green IT strategies: A case study-based framework for aligning Green IT with competitive environmental strategies. In *Proceedings of the 15th Pacific Asia Conference on Information Systems*. Brisbane, Australia. <http://doi.org/10.1.1.232.670>
- Fiedler, M., & Welpel, I. (2010). How do organizations remember? The influence of organizational structure on organizational memory. *Organization Studies*, 31(4), 381–407. <http://doi.org/10.1177/0170840609347052>
- Flick, U. (2014). *The Sage handbook of qualitative data analysis*. London, UK: Sage.
- Flickinger, M., Gruber-Mücke, T., & Fiedler, M. (2013). The linkage between human resource practices and organizational ambidexterity: An analysis of internal labor market dynamics in a port-of-entry context. *Journal of Business Economics*, 83(8), 923–946. <http://doi.org/10.1007/s11573-013-0671-7>
- Gawer, A., & Phillips, N. (2013). Institutional work as logics shift: The case of Intel’s

- transformation to platform leader. *Organization Studies*, 34(8), 1035–1071.  
<http://doi.org/10.1177/0170840613492071>
- Gnauk, B., Dannecker, L., & Hahmann, M. (2012). Leveraging gamification in demand dispatch systems. In *Proceedings of the 2012 Joint EDBT/ICDT Workshops on EDBT-ICDT '12* (pp. 103–110). Berlin, Germany. <http://doi.org/10.1145/2320765.2320799>
- Greenwood, R., Díaz, A. M., Li, S. X., & Lorente, J. C. (2010). The multiplicity of institutional logics and the heterogeneity of organizational responses. *Organization Science*, 21(2), 521–539. <http://doi.org/10.1287/orsc.1090.0453>
- Greenwood, R., Raynard, M., Kodeih, F., Micelotta, E. R., & Lounsbury, M. (2011). Institutional complexity and organizational responses. *The Academy of Management Annals*, 5(1), 317–371. <http://doi.org/10.1080/19416520.2011.590299>
- Greenwood, R., & Suddaby, R. (2006). Institutional entrepreneurship in mature fields: The big five accounting firms. *Academy of Management Journal*, 49(1), 27–48.  
<http://doi.org/10.5465/AMJ.2006.20785498>
- Hahn, T., Pinkse, J., Preuss, L., & Figge, F. (2015). Tensions in corporate sustainability: Towards an integrative framework. *Journal of Business Ethics*, 127(2), 297–316.  
<http://doi.org/10.1007/s10551-014-2047-5>
- Hedman, J., & Henningsson, S. (2016). Developing ecological sustainability: A Green IS response model. *Information Systems Journal*, 26(2), 259–287.  
<http://doi.org/10.1111/isj.12095>
- Hedstrom, P., & Swedberg, R. (1998). *Social mechanisms: An analytical approach to social theory*. Cambridge: Cambridge Univ. Press.
- Hilpert, H., Kranz, J., & Schumann, M. (2013). Leveraging Green IS in logistics - Developing an artifact for greenhouse gas emission tracking. *Business & Information Systems*

*Engineering*, 5(5), 315–325. <http://doi.org/10.1007/s12599-013-0285-1>

Howard-Grenville, J., Buckle, S. J., Hoskins, B. J., & George, G. (2014). Climate change and management: From the editors. *Academy of Management Journal*, 57(3), 615–623.

<http://doi.org/10.5465/amj.2014.4003>

Jenkin, T. A., Webster, J., & McShane, L. (2011). An agenda for “Green” information technology and systems research. *Information and Organization*, 21(1), 17–40.

<http://doi.org/10.1016/j.infoandorg.2010.09.003>

Jowit, J. (2010). World’s top firms cause \$2.2tn of environmental damage, report estimates.

*The Guardian*.

Kranz, J., Kolbe, L. M., Koo, C., & Boudreau, M.-C. (2015). Smart energy: Where do we stand and where should we go? *Electronic Markets*, 25(1), 7–16.

<http://doi.org/10.1007/s12525-015-0180-3>

Lee, M. P., & Lounsbury, M. (2015). Filtering institutional logics: Community logic variation and differential responses to the institutional complexity of toxic waste. *Organization Science*, 26(3), 847–866.

<http://doi.org/10.1287/orsc.2014.0959>

Lindenberg, S. (2017). The dependence of human cognitive and motivational processes on institutional systems. In B. Jann & W. Przepiorka (Eds.), *Social dilemmas, institutions, and the evolution of cooperation* (pp. 85–106). Oldenburg, Germany: De Gruyter.

Lindenberg, S., & Foss, N. J. (2011). Managing joint prediction motivation: The role of goal-framing and governance mechanisms. *Academy of Management Review*, 36(3), 500–525.

<http://doi.org/10.5465/AMR.2011.61031808>

Lindenberg, S., & Steg, L. (2007). Normative, gain and hedonic goal frames guiding environmental behavior. *Journal of Social Issues*, 63(1), 117–137.

<http://doi.org/10.1111/j.1540-4560.2007.00499.x>



- Lindenberg, S., & Steg, L. (2013). Goal-framing theory and norm guided environmental behavior. In H. van Trijp (Ed.), *Encouraging sustainable behavior* (pp. 37–54). New York, USA: Psychology Press.
- Liu, D., Santhanam, R., & Webster, J. (2017). Towards meaningful engagement: A framework for design and research of gamified information systems. *MIS Quarterly*, 42(4), 1011–1034. <http://doi.org/10.1007/s13398-014-0173-7.2>
- Loeser, F., Ereik, K., & Zarnekow, R. (2012). Towards a typology of Green IS strategies: Insight from case study research. In *Proceedings of 33rd International Conference on Information Systems*. Orlando, USA.
- Loeser, F., Recker, J., Brocke, J. vom, Molla, A., & Zarnekow, R. (2017). How IT executives create organizational benefits by translating environmental strategies into Green IS initiatives. *Information Systems Journal*, 27(4), 503–553. <http://doi.org/10.1111/isj.12136>
- Loock, C.-M., Staake, T., & Thiesse, F. (2013). Motivating energy-efficient behavior with Green IS: An investigation of goal setting and the role of defaults. *MIS Quarterly*, 37(4), 1313–1332. <http://doi.org/10.1029/2012WR012398>
- Lülfes, R., & Hahn, R. (2013). Corporate greening beyond formal programs, initiatives, and systems: A conceptual model for voluntary pro-environmental behavior of employees. *European Management Review*, 10(2), 83–98. <http://doi.org/10.1111/emre.12008>
- MacKenzie, S. B., Podsakoff, P. M., & Podsakoff, N. P. (2011). Construct measurement and validation procedures in MIS and behavioral research: Integrating new and existing techniques. *MIS Quarterly*, 35(2), 293–334. <http://doi.org/10.2307/23044045>
- Mair, J., Mayer, J., & Lutz, E. (2015). Navigating institutional plurality: Organizational governance in hybrid organizations. *Organization Studies*, 36(6), 713–739.

<http://doi.org/10.1177/0170840615580007>

- Malhotra, A., Melville, N. P., & Watson, R. T. (2013). Spurring impactful research on information systems for environmental sustainability. *MIS Quarterly*, 37(4), 1265–1274. <http://doi.org/10.1002/mrdd>
- Marquis, C., & Lounsbury, M. (2007). Vive la résistance: Competing logics and the consolidation of U.S. community banking. *Academy of Management Journal*, 50(4), 799–820. <http://doi.org/10.5465/AMJ.2007.26279172>
- Martin, G., Currie, G., Weaver, S., Finn, R., & McDonald, R. (2017). Institutional complexity and individual responses: Delineating the boundaries of partial autonomy. *Organization Studies*, 38(1), 103–127. <http://doi.org/10.1177/0170840616663241>
- McDonald, F. (2014). Developing an integrated conceptual framework of pro-environmental behavior in the workplace through synthesis of the current literature. *Administrative Sciences*, 4(3), 276–303. <http://doi.org/10.3390/admsci4030276>
- Melville, N. (2010). Information systems innovation for environmental sustainability. *MIS Quarterly*, 34(1), 1–21. <http://doi.org/10.2307/20721412>
- Meyer, R. E., & Hammerschmid, G. (2006). Changing institutional logics and executive identities: A managerial challenge to public administration in Austria. *American Behavioral Scientist*, 49(7), 1000–1014. <http://doi.org/10.1177/0002764205285182>
- Oppong-Tawiah, D., Webster, J., Staples, S., Cameron, A.-F., & De Guinea, A. O. (2014). Encouraging sustainable energy use in the office with persuasive mobile information systems. In *Proceedings of the 35th International Conference on Information Systems*. Auckland, New Zealand.
- Orsato, R. J. (2006). Competitive environmental strategies: When does it pay to be green? *California Management Review*, 48(2), 127–143. [http://doi.org/10.1002/\(SICI\)1099-](http://doi.org/10.1002/(SICI)1099-)

- Reay, T., & Hinings, C. R. (2009). Managing the rivalry of competing institutional logics. *Organization Studies*, 30(6), 629–652. <http://doi.org/10.1177/0170840609104803>
- Recker, J. C. (2016). Toward a design theory for green information systems. In *Proceedings of the 49th Hawaii International Conference on System Sciences* (pp. 4474–4483). Hawaii, USA. <http://doi.org/10.1109/HICSS.2016.556>
- Ruepert, A. M., Keizer, K., & Steg, L. (2017). The relationship between corporate environmental responsibility, employees' biospheric values and pro-environmental behaviour at work. *Journal of Environmental Psychology*, 54, 65–78. <http://doi.org/10.1016/j.jenvp.2017.10.006>
- Schick, A.-R., Henkel, C., Kranz, J., & Fiedler, M. (2016). The role of motivational affordances and institutional logics in IS-enabled organizational sustainability transformations - A research agenda. In *Proceeding of the SIGGreen Pre-ICIS Workshop 2016*. Dublin, Ireland.
- Schneiberg, M., & Lounsbury, M. (2008). Social movements and institutional analysis. In K. Greenwood, R., Oliver C., Suddaby, R., Sahin (Ed.), *The Sage handbook of organizational institutionalism* (pp. 650–672). Thousand Oaks, CA: Sage.
- Schneider, A. (2015). Reflexivity in sustainability accounting and management: Transcending the economic focus of corporate sustainability. *Journal of Business Ethics*, 127(3), 525–536. <http://doi.org/10.1007/s10551-014-2058-2>
- Schöbel, S., Janson, A., Leimeister, J. M., & Ernst, S. (2017). How to gamify a mobile learning application – A modularization approach. In *Proceedings of the 38th International Conference on Information Systems*. Seoul, South Korea.
- Seidel, S., Chandra Kruse, L., Székely, N., Gau, M., & Stieger, D. (2017). Design principles

- for sensemaking support systems in environmental sustainability transformations. *European Journal of Information Systems*, 1–38. <http://doi.org/10.1057/s41303-017-0039-0>
- Seidel, S., Fridgen, G., & Watson, R. T. (2017). The sustainability imperative in information systems research. *Communications of the Association for Information Systems*, 40(1), 40–52. <http://doi.org/10.1074/cais.2017.40>
- Seidel, S., Recker, J., & Vom Brocke, J. (2013). Sensemaking and sustainable practicing: Functional affordances of information systems in green transformations. *MIS Quarterly*, 37(4), 1275–1299. <http://doi.org/10.25300/MISQ/2013/37.4.13>
- Seidler, A.-R., Henkel, C., Fiedler, M., & Kranz, J. (2018). Encouraging pro-environmental behavior: Affordances and institutional logics in IS-enabled organisational sustainability transformations. In *Proceedings of the 26th European Conference on Information Systems*. Portsmouth, UK.
- Stern, P. C. (2000). Toward a coherent theory of environmentally significant behavior. *Journal of Social Issues*, 56(3), 407–424. <http://doi.org/10.1111/0022-4537.00175>
- Thornton, P. H., Jones, C., & Kurry, K. (2005). Institutional logics and institutional change in organizations: Transformation in accounting, architecture and publishing. *Research in the Sociology of Organizations*, 23, 125–170. [http://doi.org/10.1016/S0733-558X\(05\)23009-4](http://doi.org/10.1016/S0733-558X(05)23009-4)
- Thornton, P. H., & Ocasio, W. (1999). Institutional logics and the historical contingency of power in organizations: Executive succession in the higher education publishing industry, 1958-1990. *American Journal of Sociology*, 105(3), 801–843. <http://doi.org/10.1086/210361>
- Thornton, P. H., & Ocasio, W. (2008). Institutional logics. In R. Greenwood, C. Oliver, R.

- Suddaby, & K. Sahlin-Andersson (Eds.), *Handbook of organizational institutionalism* (pp. 99–129). London: Sage.
- Thornton, P. H., Ocasio, W., & Lounsbury, M. (2012). *The institutional logics perspective: A new approach to culture, structure, and process*. Oxford, UK: Oxford University Press.
- Tiefenbeck, V., Goette, L., Degen, K., Tasic, V., Fleisch, E., & Lalive, R. (2018). Overcoming salience bias: How real-time feedback fosters resource conservation. *Management Science*, 64(3), 1458–1476. <http://doi.org/10.1287/mnsc.2016.2646>
- Volkoff, O., & Strong, D. M. (2018). Affordance theory and how to use it in IS research. In R. D. Galliers & M.-K. Stein (Eds.), *The Routledge companion to management information systems*. New York, NY: Routledge.
- Watson, R. T., Boudreau, M. C., Chen, A. J., & Sepulveda, H. H. (2011). Green projects: An information driven analysis of four cases. *Journal of Strategic Information Systems*, 20(1), 55–62. <http://doi.org/10.1016/j.jsis.2010.09.004>
- York, J. G., Hargrave, T. J., & Pacheco, D. F. (2016). Converging winds: Logic hybridization in the Colorado wind energy field. *Academy of Management Journal*, 59(2), 579–610. <http://doi.org/10.5465/amj.2013.0657>

# **1 Opening the Black Box on Changing Institutional Logics: The Case of Organizational Sustainability Transformations**

Anna-Raissa Seidler, Christopher Henkel, Marina Fiedler, and Johann Kranz

# **Opening the Black Box on Changing Institutional Logics: The Case of Organizational Sustainability Transformations**

Anna-Raissa Seidler, Christopher Henkel, Marina Fiedler, and Johann Kranz

## **Abstract**

This paper explores how the change process towards eco-sustainability unfolds in organizational sustainability transformations by applying an institutional logics perspective. Through an investigation of an in-depth single case study based on 36 qualitative interviews and secondary data from the case company and its three main competitors, we show that the change process from a corporation logic to an eco-sustainable corporation logic unfolds in the three phases of demand assimilation, organizational adaptation, and business model modification. We further identify market-oriented and intra-organizational mechanisms as the two overarching transformational mechanisms that shift the different elements of the dominant institutional logic towards eco-sustainability. Thus, by developing a process model, our study shows that market-oriented and intra-organizational mechanisms can facilitate the transition towards hybrid organizations and enable a process of conflict-free change towards a new dominant institutional logic. Moreover, a conflict-free change process can be facilitated when the different institutional logics involved in this process pursue compatible goals. Our results contribute to research on the transformation of institutional logics and corporate eco-sustainability. Our process-oriented research approach thus provides new insights into mechanisms that transform institutional logics towards eco-sustainability and allow for both causal explanations and a deeper understanding of transitional states in organizational sustainability transformations.

*Keywords:* Institutional logics, eco-sustainable behavior, corporate behavior, eco-sustainability, organizational change, organizational sustainability transformation

## Introduction

Many companies are actively integrating sustainability principles into their business (Corbett, Webster, & Jenkin, 2018) and doing so by pursuing goals that go beyond prior concerns for reputation management (Albinger & Freeman, 2000). In general, eco-sustainability is characterized by behavior that changes the availability of materials or energy from the environment or alters the structure and dynamics of ecosystems or the biosphere (Stern, 2000). Companies are increasingly engaging in eco-sustainable employee initiatives aimed at saving energy, developing green products, or limiting waste production (Corbett et al., 2018), thus fulfilling a moral and ethical obligation to protect the environment (Boiral, 2009; Nordlund & Garvill, 2002). Consequently, in 2010, almost 60 % of companies worldwide increased their investment in eco-sustainable initiatives (Haanaes et al., 2011). Consistent with this increased spending, research has revealed that engaging in eco-sustainable initiatives facilitates firms' economic performance (e.g., Albinger & Freeman, 2000; Moon, Bae, & Jeong, 2014), making these initiatives increasingly important for profit-oriented organizations (e.g., Corbett et al., 2018; Henkel, Seidler, Kranz, & Fiedler, 2017).

Since eco-sustainability is becoming increasingly important for organizations (Hahn, Pinkse, Preuss, & Figge, 2015), more and more companies refer to eco-sustainable values, beliefs, and norms as guidelines for action and individual identification in the organizational setting. These guidelines for action and individual identification are essential to institutional logics (e.g., Reay & Hinings, 2009; Thornton, Jones, & Kurry, 2005; Thornton, Ocasio, & Lounsbury, 2012), which represent a frame of reference used by individuals and organizations to evaluate the world around them and everything that happens within it (Thornton et al., 2012). Thus, examining organizational sustainability transformation in the light of institutional logics is of particular relevance, since institutional logics provide insights into changes in institutional practices and behaviors (e.g., Martin, Currie, Weaver, Finn, & McDonald, 2017; Meyer & Hammerschmid, 2006). As institutional logics link micro and



macro influences on organizational behavior (Thornton et al., 2012), they are considered an appropriate lens through which to explain the complex interplay of attitudes, external determinants (e.g., legislation or competitive environments) and internal determinants (e.g., corporate structure, culture, or formal initiatives) that govern corporate eco-sustainable behavior (Lülfs & Hahn, 2013).

Since an institutional logics perspective advances traditional approaches to eco-sustainability, which have primarily considered normative commitment to eco-sustainability to be antecedent to eco-sustainable behavior (e.g., Lo, Peters, & Kok, 2012; Steg, Dreijerink, & Abrahamse, 2005), a growing body of institutional logics research addressing eco-sustainability is emerging (e.g., Corbett et al., 2018; Schneider, 2015). Research has shown that institutional logics can enable eco-sustainable behavior, as non-governmental organizations embedded in community logics can help to establish eco-sustainable behavior in societies (Lee & Lounsbury, 2015). Since eco-sustainability logics have been conceptualized and contrasted with market logics (Schneider, 2015), recent theoretical work argues that corporate sustainability is shaped by an interplay of eco-sustainability and market or corporate logics (Schick, Henkel, Kranz, & Fiedler, 2016; Schneider, 2015). Furthermore, corporate sustainability initiatives can be supported by institutional logics for green information technology projects (Corbett et al., 2018).

However, given that research has revealed institutional logics to be subject to change rather than stable (e.g., Gawer & Phillips, 2013; Reay & Hinings, 2009; Thornton & Ocasio, 2008), insights into changes in the dominant institutional logic caused by a shift towards eco-sustainability remain sparse. Institutional logics research has revealed that logics may change over time, and that this shift can lead to changes in organizational behaviors (Gawer & Phillips, 2013). In order to explain organizational change processes, existing research has highlighted the roles of competing institutional logics (e.g., Battilana & Dorado, 2010;

Marquis & Lounsbury, 2007), social movement initiatives and related field changes (e.g., Davis, McAdam, Richard, Scott, & Zald, 2005; Lee & Lounsbury, 2015), and powerful actors in the shift in dominant logics (e.g., Greenwood & Suddaby, 2006; Hoffman, 1999). Although these studies provide insight into the reasons for changes in institutional logics and related organizational changes, there is still limited research on the transformation processes of institutional logics in general (Lok, 2010) and their shift towards eco-sustainability in particular (Howard-Grenville, Buckle, Hoskins, & George, 2014). Thus, further process-related research is required in order to detect the enabling conditions for organizational change, which will allow for the development of causal explanations and a better understanding of the transitional states (Mair, Mayer, & Lutz, 2015). To address this gap, our research aims to explore how the transformation process of the dominant institutional logic towards eco-sustainability unfolds. Therefore, our research is guided by the following research question:

*How does the change process of the dominant institutional logic supporting eco-sustainable behavior of corporate organizations unfold?*

To investigate this research question, we take a process approach and draw on the case study of a chemical company, based on semi-structured interviews with 16 employees from our case company and 20 interviews with employees from other companies operating in the same market segment. The additional interviews enable an improved understanding of contextual factors, as well as to locate the case company within the industry. Furthermore, comprehensive secondary data sources related to both the case company and their three strongest competitors are analyzed. Since this data links the external and internal determinants of organizational behavior (Bowen, 2009), it allows for an in-depth understanding of eco-sustainability in corporate organizations.

Our findings indicate that customer demand for eco-sustainable products stems from increasing consumer concerns regarding eco-sustainability. This customer demand has functioned as an external impetus for an organizational transformation towards eco-sustainability and caused a shift in the dominant institutional logic. Since eco-sustainability has come to dynamically pervade the organization, the different elements of the dominant institutional logic have shifted towards eco-sustainability, allowing for a conflict-free change in the dominant institutional logic. This change process has unfolded in three phases and revealed two overarching transformational mechanisms: (I) *market-oriented mechanisms* shifting the first elements of the dominant logic towards eco-sustainability (i.e. the phase of *demand assimilation*); (II) *intra-organizational mechanisms* acting to further incorporate eco-sustainability into the organization, leading to organizational adaptation and a further transition of the elements of the dominant institutional logic towards eco-sustainability (i.e. the phase of *organizational adaptation*); (III) *market-oriented mechanisms* reinforcing these changes and enabling a modification of the company's business model (i.e. the phase of *business model modification*). Overall, this process leads from a corporation logic to an eco-sustainable corporation logic.

Through these findings, we contribute to the body of research on the transformation of institutional logics and corporate eco-sustainability. First, by developing a process model, this work advances research on the transformation of institutional logics, since it shows that market-oriented and intra-organizational mechanisms can determine the transitional states of hybrid organizations (Mair et al., 2015). Second, in contrast to existing literature, which mainly draws on conflicts that arise when managing changing institutional logics (e.g., Battilana & Dorado, 2010; Reay & Hinings, 2009), we show that market-oriented and intra-organizational mechanisms can enable a conflict-free transition towards a new dominant institutional logic. Third, advancing research on mechanisms to respond to the incompatibility of institutional logics (York, Hargrave, & Pacheco, 2016), we highlight that a conflict-free

change process can be facilitated when the different institutional logics involved in this process pursue compatible goals. Fourth, since we develop an eco-sustainable corporation logic that serves as an explanation for the eco-sustainable behavior of corporate organizations, we contribute to research on corporate eco-sustainability embedded in organizational sustainability transformations from an institutional logics perspective (Howard-Grenville et al., 2014).

The remainder of this paper is organized as follows. In the next section, we adopt an institutional logics perspective to provide an overview of existing research on corporate organizations' eco-sustainable behavior, as well as to discuss the transformation of institutional logics in organizational change processes. Subsequently, we introduce our methods and data analysis and provide a case description. We then develop our process model by presenting our results. Finally, we discuss our findings and contributions by developing our propositions, refer to the limitations of the present study and potential avenues for further research, and end with a conclusion.

## **Theoretical Background**

### **An Institutional Logics Perspective on Corporate Eco-Sustainability**

Grounded in neo-institutional theory (Bourdieu, 1984; DiMaggio & Powell, 1983), Friedland and Alford (1991) introduced the concept of institutional logics as a link between individual actions and broader social institutions. An institutional logic is commonly defined as “the socially constructed patterns of cultural symbols and material practices, assumptions, values, beliefs, and rules by which individuals and organizations produce and reproduce their material subsistence, organize time and space, and provide meaning to their social reality” (Thornton & Ocasio, 1999, p. 804). Institutional logics are therefore central to the identity, values, and interests of individuals and organizations (Thornton et al., 2012).

These symbolically grounded organizing principles underpin individual actions consistently within a given situation (Friedland & Alford, 1991), meaning that they are important to an understanding of changing organizational behavior (Reay & Hinings, 2009). For example, institutional logics shape the organizational decision-making process in three ways: first, by regulating what issues are attended to by decision-makers; second, by providing the rules of appropriateness that make certain solutions or actions legitimate; third, by offering the schemes for interpretation that guide an organization's perceptions (Glynn & Lounsbury, 2005). Behavior is thus shaped by a dominant institutional logic, even though other logics might coexist with it (e.g., Besharov & Smith, 2014; Pache & Santos, 2013). In other words, an institutional logic describes "the way a particular world works" (Jackall, 1988, p. 112) and is therefore considered a helpful concept for understanding shifting bases of legitimacy and related changes to practices and behaviors within institutions (e.g., Martin et al., 2017; Meyer & Hammerschmid, 2006; Vurro, Dacin, & Perrini, 2010).

Although institutional theory has begun to engage in research on eco-sustainability (Jennings & Zandbergen, 1995), and despite the fact that eco-sustainability has been identified as an evolving institution (Bothello & Salles-Djelic, 2018), the eco-sustainable behavior of corporate organizations has barely been addressed in the literature. Existing research provides some insight into the role of non-governmental organizations in establishing eco-sustainable behavior in societies (Lee & Lounsbury, 2015) and the role played by project logics in green information technology projects that form part of corporate sustainability initiatives (Corbett et al., 2018). Moreover, eco-sustainability logics have been conceptualized and contrasted with market or corporation logics to support the argument that corporate sustainability is shaped by an interplay between the them (Schick et al., 2016; Schneider, 2015). However, while these studies provide initial insights into eco-sustainability from an institutional logics perspective, empirical research that uses the rich perspective of

institutional logics to explain the eco-sustainable behavior of corporate organizations remains limited.

### **Changing Institutional Logics**

Research has revealed that logics are not stable, but are rather subject to change (e.g., Gawer & Phillips, 2013; Reay & Hinings, 2009; Thornton & Ocasio, 2008). Thus, even highly legitimated institutional logics can change due to the mutability of the practices and identities that underpin them (Lok, 2010; Thornton & Ocasio, 2008). As logics shift, organizations must respond to these changes (Gawer & Phillips, 2013; Greenwood, Díaz, Li, & Lorente, 2010). Therefore, the emergence of eco-sustainability in corporate organizations is likely to be connected to a transformation of the dominant institutional logic towards eco-sustainability (Howard-Grenville et al., 2014).

Existing research has identified three different explanations for changes occurring in the dominant institutional logic: competing logics, social movement initiatives and related field changes, and the influence of powerful actors. There is a large body of research on competing logics in institutional change that describes institutional change as a transition from one dominant logic to another (e.g., Kraatz & Block, 2008; Marquis & Lounsbury, 2007; Reay & Hinings, 2009). Commonly, this process is characterized by rivalry (Scott, 1994), competition (Hoffman, 1999), or conflict (Kraatz & Block, 2008) between multiple institutional logics. If organizations are to manage this rivalry between competing logics, they will often build hybrid organizations, incorporating elements from different institutional logics (for example, by selectively coupling intact elements drawn from each logic on the organizational level; Besharov & Smith, 2014; Pache & Santos, 2013).

Other studies highlight the role of social movement initiatives and related field changes (e.g., Berman, 2012; Davis et al., 2005; Schneiberg & Lounsbury, 2008). Social movements are either seen as disrupting existing arrangements, sensemaking, and other institutional

processes by creating changes in the institutional field, or as institutional forces within fields that establish new paths leading to a change in the dominant logic (Schneiberg & Lounsbury, 2008). Since institutional theory argues that institutions in a field become increasingly isomorphic over time and adopt similar processes and structures, institutional fields are conceptualized as social spaces in which social structures allow practices to take place and which are, in turn, shaped by the enactment of these social structures (Bourdieu, 1984; DiMaggio & Powell, 1983). Social movements can be considered an “extra-institutional force for change or new path creation” (Schneiberg & Lounsbury, 2008, p. 653) and can thereby contribute to the evolution of new institutional logics that destabilize existing fields (Berman, 2012).

Moreover, powerful actors are considered a major driver in the change processes of institutional logics, since these actors’ values and beliefs are reflected by dominant institutional logics (DiMaggio & Powell, 1983). Thus, institutional change can be driven by actors within organizations, who use their knowledge of the context to develop change strategies (Battilana et al., 2006), as well as by external, field-level actors, who facilitate the replacement of dominant institutional logics (Greenwood & Suddaby, 2006; Hoffman, 1999; Tan & Wang, 2011). Additionally, institutional entrepreneurs, as agents that have access to resources that support their self-interest, can modify the dominant institutional logic (Thornton & Ocasio, 2008).

Although these studies highlight several factors contributing to changes in institutional logics (and thus related organizational change), existing research into the transformation processes of the dominant institutional logic itself remains underdeveloped (Lok, 2010). Since research into the impact of contextual factors on eco-sustainable behavior and their interaction with human determinants (such as those reflected in institutional logics) remains limited (Gifford, Kormos, & McIntyre, 2011), scholars of institutional logics have called for more

research into the shift of institutional logics towards eco-sustainability (Howard-Grenville et al., 2014). Thus, there is a clear need for process-related research that detects the conditions enabling organizational change and provides causal explanations that allow for a better understanding of transitional stages in organizational transformations (Mair et al., 2015). We aim to contribute to closing this gap by exploring how the change process of the dominant institutional logic supporting eco-sustainable behavior of corporate organizations unfolds.

### **Methods**

We use a single case study approach to investigate how the change process of the dominant institutional logic supporting eco-sustainable behavior of corporate organizations unfolds. In general, single case studies are considered an appropriate approach to the analysis of complex organizational relationships (Yin, 2013). Furthermore, single case studies have the advantage of offering a methodologically rigorous analysis of evidence on sequences, conjunctures of events, and processes (Bennett & Checkel, 2014), which are of special interest to our research. Thus, a single case study approach allows for a nuanced, holistic, and empirically rich account of the specific phenomena related to corporate eco-sustainability (Bennett & Checkel, 2014), as well as an in-depth understanding of the organizational change process towards eco-sustainability. Our decision to combine data from interviews and document analyses based on multiple methodological approaches, empirical materials, and perspectives into a single case study adds rigor, richness, breadth, and depth to our inquiry (Denzin & Lincoln, 2005).

### **Data Collection**

Our case study draws on a chemical company that operates globally in the flavors and fragrances industry and has recently undergone an organizational transformation towards sustainability by incorporating eco-sustainability into their business model. Our study relies on semi-structured interviews with 16 employees of our case company, as well as 20



employees of other chemical companies operating in the same market segment. Conducting interviews with employees from these companies allows for a profound understanding of the contextual factors that might have influenced our case company's organizational sustainability transformation, as well as an anchoring of our case company within the industry. This interview data is accompanied by secondary data about the case company and its three strongest competitors related to external (i.e. societal changes, market demand, regulatory and governance structures) and internal (i.e. corporate performance, leadership, marketing, or strategic business development) drivers for change, as these drivers are considered to fundamentally influence organizational change processes (Child, 2005). The use of multiple data sources allowed for triangulation of the data, which increases internal validity and mitigates potential biases (Yin, 2013).

Drawing on Flick (2014), we developed a semi-structured interview guide consisting of open questions, which were designed to investigate general environmental values and attitudes, as well as Thornton et al.'s (2012) framework elements; these elements specify the organizing principles that shape individual and organizational preferences, interests, and behavior within a specific institutional logic. The interviewees were employed at different organizational departments and hierarchical levels (see Table 1). The interviews were documented, tape-recorded, and subsequently transcribed. We ceased conducting interviews once we had established a comprehensive and consistent understanding (Paré, 2004).

In addition to the interviews, we analyzed the case company's as well as the three competitors' corporate and sustainability reports, press releases, and newspaper articles, along with information published on all four companies' corporate homepages over a period of eleven years (2006 to 2017). In sum, this amounted to more than 7,100 pages of written material. Finally, for the case company, this body of information was concluded with the analysis of internal documents.

**Table 1.** Overview of Interviewees

| #  | Interviewee                                    | Company      |
|----|------------------------------------------------|--------------|
| 1  | Head of HR EMEIA                               | Case Company |
| 2  | Key Account Manager                            | Case Company |
| 3  | Head of R&D                                    | Case Company |
| 4  | Chief Sustainability Officer                   | Case Company |
| 5  | Global Head of IT                              | Case Company |
| 6  | Manager Production                             | Case Company |
| 7  | Manager Site & Service                         | Case Company |
| 8  | Manager CSR                                    | Case Company |
| 9  | Head of R&D                                    | Case Company |
| 10 | Travel Manager                                 | Case Company |
| 11 | Director Process Management                    | Case Company |
| 12 | Senior Perfumer                                | Case Company |
| 13 | Manager CI / CD                                | Case Company |
| 14 | Senior Vice President Central & Eastern Europe | Case Company |
| 15 | Sales Representative                           | Case Company |
| 16 | Head of Sustainability                         | Case Company |
| 17 | Global Business Manager                        | Company A    |
| 18 | Business Manager Germany                       | Company A    |
| 19 | Sales Representative                           | Company B    |
| 20 | Manager Sales                                  | Company B    |
| 21 | Manager Sales Europe                           | Company C    |
| 22 | Manager Business Development                   | Company D    |
| 23 | Manager Business Development                   | Company D    |
| 24 | Sales Representative                           | Company E    |
| 25 | Manager Campaign Marketing Germany             | Company F    |
| 26 | Global Business Manager                        | Company G    |
| 27 | Head of Marketing & Sales EMEIA                | Company H    |
| 28 | Key Account Manager EMEIA                      | Company I    |
| 29 | Manager New Business                           | Company J    |
| 30 | Manager Customer Engagement Germany            | Company K    |
| 31 | Manager Sales                                  | Company L    |
| 32 | Marketing Manager                              | Company M    |
| 33 | Account Manager Germany                        | Company N    |
| 34 | Manager International Marketing                | Company O    |
| 35 | Marketing Manager                              | Company P    |
| 36 | Sales Representative                           | Company Q    |

## Data Analysis

*Qualitative-deductive analysis.* Our deductive analysis allows us to unveil the dominant institutional logic, along with the change process of its elements towards eco-sustainability. We transcribed the interviews according to Flick's (2014) transcription procedure. Based on Mayring's (2000) deductive analysis approach, we used Thornton et al.'s (2012) framework elements as a coding scheme (see Figure 1 for an overview of our methodological approach). We first prepared a coding guideline including definitions of all the institutional logic's elements, anchoring examples, and coding principles, which we repeatedly adjusted after coding the first interviews (Mayring, 2000). As soon as we arrived at a formative and summative consensus, we used the final coding guideline to analyze all interviews with employees from our case company, with the help of NVivo 11 (QSR International Pty Ltd, Doncaster, Australia). The final coding guideline can be found in Appendix A.

To control for inter-coder reliability, the coding was carried out by three researchers, who were not involved in the interview process, and by one interviewer, independently (Lombard, Snyder-Duch, & Bracken, 2002). Additionally, we controlled for intra-coder reliability by coding the data four times, with at least one week between each coding round (Lombard et al., 2002).

*Qualitative-inductive analysis.* Our inductive analysis enables the exploration of contextual factors (i.e. internal and external drivers) that might have an influence on our case company's organizational sustainability transformations and also assisted with locating our case company within the industry. Following Bowen (2009), for the qualitative document analysis, we first skimmed the documents (superficial examination), read through them (thorough examination), and then began to interpret them. This iterative process thus combines elements of content and thematic analysis (Bowen, 2009). Since we want to identify internal and external drivers for change that might influence organizational change processes towards eco-

sustainability (Child, 2005), we used Mayring's (2000) inductive analysis approach to analyze the documents and the interviews with employees from companies operating in the same market segment independently from the interviews with employees from our case company. Thus, we first determined the external and internal drivers for organizational eco-sustainability as selection criteria. Incrementally, we developed inductive categories and subsumed or reorganized these categories. Through continuing comparative analysis, we identified emerging patterns by triangulating the different data sources, then linked them to higher level constructs (Charmaz, 2000; Mayring, 2000). As soon as we found a formative and summative consensus, we examined mismatching codes and used the final categories to code the documents accordingly (see key nodes in Appendix B). Similar to our qualitative-deductive analysis, we controlled for inter- and intra-coder reliability.

*Quantitative analysis.* For the case company and its competitors, we assessed key performance indicators (KPIs) of eco-sustainability by calculating scores for energy, carbon, water, and waste productivity (Ameer & Othman, 2012) and including a score for the company's total eco-sustainability productivity (see Table 2 for the operationalization). To measure financial performance, we used Stanwick and Stanwick's (1998) measurement of profitability and sales growth based on annual sales figures. We further used these quantitative performance indicators to calculate growth rates related to different time periods.

In addition to these performance indicators, we built on the external and internal drivers for organizational change towards eco-sustainability, which we identified during our qualitative-inductive analysis, and quantified the four companies' reaction to these drivers in two ways: first, by identifying the year in which each of the companies began their engagement; second, by tallying the number of events we found in the documents related to the internal and external drivers (event frequency; Altmann, 1974). By calculating the event frequency, we were able to trace how prominent the different drivers were in all four companies (Altmann,

1974). These quantitative analyses increase the validity of our study, since they allow us to trace how our case company developed over time and how it performed in relation to its competitors.

**Figure 1.** Overview of Methodological Approach

| <b>Methodological Approach</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p style="text-align: center;"><b>Qualitative-Deductive Analysis</b></p> <ul style="list-style-type: none"> <li>• <b>Aim:</b><br/>Unveiling the dominant logic and the change process of its elements towards eco-sustainability</li> <li>• <b>Source:</b><br/>16 Interviews with employees from the case company<br/>Case company's corporate and sustainability reports, press releases, newspaper articles, information from the corporate homepage and internal documents (time period: 2006 to 2017)</li> <li>• <b>Coding scheme:</b><br/>Thornton et al.'s (2012) framework elements</li> </ul> | <p style="text-align: center;"><b>Qualitative-Inductive Analysis</b></p> <ul style="list-style-type: none"> <li>• <b>Aim:</b><br/>Exploring external and internal drivers for organizational eco-sustainability transformations to anchor our case company in the industry</li> <li>• <b>Source:</b><br/>20 interviews with employees from companies operating in the same market segment as the case company<br/>Case company's and their three strongest competitors' corporate and sustainability reports, newspaper articles, press releases, and information from the corporate homepages (time period: 2006 to 2017)<br/>Internal documents from the case company (time period: 2006 to 2017)</li> <li>• <b>Selection criteria:</b><br/>External and internal drivers for organization's eco-sustainability</li> </ul> | <p style="text-align: center;"><b>Quantitative Analysis</b></p> <ul style="list-style-type: none"> <li>• <b>Aim:</b><br/>Tracing of the case company's development</li> <li>• <b>Source:</b><br/>Case company's and their three strongest competitors' corporate and sustainability reports (time period: 2006 to 2017)</li> <li>• <b>Measurements:</b><br/>Eco-sustainability KPIs (Ameer &amp; Othman, 2012)<br/>Financial performance (Stanwick &amp; Stanwick, 1998)<br/>Event frequency in relation to internal and external drivers for organization's eco-sustainability (Altmann, 1974)</li> </ul> |

**Table 2.** Operationalization of Performance Indicators

| Performance indicators                | Operationalization                                                                            |
|---------------------------------------|-----------------------------------------------------------------------------------------------|
| Energy productivity                   | Annual sales (in EUR) divided by total direct and indirect energy consumption (in gigajoules) |
| Carbon productivity                   | Annual sales (in EUR) divided by total CO <sub>2</sub> emissions (in tons)                    |
| Water productivity                    | Annual sales (in EUR) divided by total water use (in cubic meters)                            |
| Waste productivity                    | Annual sales (in EUR) divided by total waste produced (in tons)                               |
| Total eco-sustainability productivity | Mean of energy productivity, carbon productivity, water productivity, and waste productivity  |
| Profitability                         | Annual profits (in EUR) divided by annual sales (in EUR)                                      |
| Sales                                 | Annual sales (in EUR)                                                                         |

*Note.* Since not all companies provide measures of CO<sub>2</sub> emission equivalents, we calculated carbon productivity only based on annual sales divided by total CO<sub>2</sub> emissions.

### Case Description

We use insights from our qualitative-inductive and quantitative approaches to develop a profound understanding of our case companies' position in the market, along with the internal and external drivers for its organizational sustainability transformation. Our case company is a German chemical company that is active in the global flavors and fragrances industry. Their products are mainly based on natural resources and their customers are producers of consumer products such as food, cosmetics, and perfume. In 2017, the company employed more than 9,000 employees, with a majority working in Germany. Compared to its three strongest competitors, in 2017, our case company performed second-best in annual sales (over EUR 4.3bn). Over a period of eleven years (2006 to 2017), the company outperformed its competitors in relation to sales (Compound Annual Growth Rate (CAGR) = 8.44 % per annum) and earnings before interest and taxes (EBIT; CAGR = 9.23 % per annum). Therefore, during the eleven-year period of observation, the case company was able to considerably increase their sales and earnings and thus leverage their financial performance.

Since the company was able to increase its sales while decreasing its consumption of energy, carbon, water, and waste, it was able to limit its impact on the environment. Comparing the case company's and its competitors' growth rates related to energy, carbon,

water, and waste, as well as the related changes in the companies' total eco-sustainability productivity, the case company is outperformed by only one competitor in relation to its water productivity (Table 3). However, the case company's total eco-sustainability performance increased the most overall. Thus, our case company showed an increase in not only financial but also eco-sustainability performance.

**Table 3.** Growth Rate in Eco-Sustainability Performance [in %]

|                           | Energy productivity | Carbon productivity | Water productivity | Waste productivity | Total eco-sustainability productivity |
|---------------------------|---------------------|---------------------|--------------------|--------------------|---------------------------------------|
| Case company <sup>a</sup> | 11.23               | 10.08               | 6.74               | 9.36               | 9.47                                  |
| Competitor 1 <sup>a</sup> | 4.02                | 6.54                | 4.83               | 8.31               | 8.01                                  |
| Competitor 2 <sup>b</sup> | 4.91                | 6.64                | 15.60              | 8.64               | 8.32                                  |
| Competitor 3 <sup>c</sup> | 3.51                | 5.24                | 6.16               | 4.73               | 4.81                                  |

*Note.* <sup>a</sup> Period: 2006 to 2017

<sup>b</sup> Period: 2010 to 2017, since the company did not measure eco-sustainability KPIs earlier.

<sup>c</sup> Period: 2011 to 2017, since the company did not measure eco-sustainability KPIs earlier.

Based on the documents from all four companies, we analyzed the event frequency in relation to the internal and external drivers for eco-sustainability. Compared to its competitors, our case company reacted strongly to external drivers and began to bolster internal drivers for eco-sustainability in early stages (see Table 4 for an overview of the companies' reactions to internal and external drivers). None of the companies were involved in any public environmental scandals. We found that our case company reacted earlier and more often to environmental crises, such as the 2011 Tohoku earthquake that led to the Fukushima disasters in Japan, or natural disasters, such as those caused by typhoon Haiyan in the Philippines in 2013, than its competitors. Furthermore, our case company was the only company eligible for government funds and tended to react earlier to new laws enforcing eco-sustainability. In comparison to its competitors, our case company showed earlier and higher engagement in inter-trade organizations such as the World Business Council for Sustainable Development (WBCSD) or the Rain Forest Alliance, and also signed more environmental

agreements, such as the Business and Biodiversity Pledge. Further, our case company realized an increasing consumer demand for eco-sustainable products at an early stage.

Early on, our case company began to adopt to internal drivers for eco-sustainability in the areas of leadership, business development, marketing and branding, production, and purchase and supply chain. Even though all four companies implemented internal and external initiatives to foster eco-sustainability in 2011, our case company was the second company to implement an internal suggestion system that allowed its employees to submit suggestions and solutions to leverage eco-sustainability within the company. Moreover, our case company was one of the first to develop new eco-sustainable products and showed the highest engagement with the use of eco-sustainability to develop their business in new markets. Even though our case company was not very active in establishing an eco-sustainable brand image, they were the earliest and most active in acquiring seals of quality. In addition, with respect to the development of new technology that enables eco-sustainable production, our case company was one of the earliest to engage with such innovations. They were also one of the first to improve the eco-sustainability of their transportation and supply chain and to develop strategies to handle limited resources, such as vanilla, vetiver, or geranium.

In summary, when compared with its three main competitors, our case company was one of the first to both sense and respond to external and internal drivers for a change towards eco-sustainability. Our case company was thereby able to increase its total eco-sustainability productivity and simultaneously increase its financial performance.



**Table 4.** Comparison of the Companies' Reaction to External and Internal Drivers for a Change towards Eco-Sustainability

|                                                 | Case company | Competitor 1 | Competitor 2 | Competitor 3 |
|-------------------------------------------------|--------------|--------------|--------------|--------------|
| Societal changes                                |              |              |              |              |
| Environmental scandals                          | -            | -            | -            | -            |
| Environmental crises                            | 2011 (1)     | -            | -            | -            |
| Natural disasters                               | 2008 (5)     | 2010 (1)     | 2016 (1)     | 2008 (4)     |
| Regulatory                                      |              |              |              |              |
| Government funding                              | 2014 (4)     | -            | -            | -            |
| Laws                                            | 2006 (4)     | 2011 (4)     | 2009 (3)     | 2011 (2)     |
| Governance                                      |              |              |              |              |
| Inter-trade organizations                       | 2006 (5)     | 2008 (6)     | 2015 (4)     | 2007 (7)     |
| Environmental agreements                        | 2014 (3)     | 2017 (1)     | 2015 (1)     | 2014 (3)     |
| Market demand                                   |              |              |              |              |
| Customer demand                                 | 2013 (2)     | 2011 (6)     | 2012 (3)     | 2011 (6)     |
| Consumer demand                                 | 2007 (7)     | 2011 (3)     | 2011 (2)     | 2012 (7)     |
| Leadership                                      |              |              |              |              |
| Internal initiatives                            | 2011 (17)    | 2011 (14)    | 2011 (13)    | 2011 (32)    |
| External initiatives                            | 2011 (26)    | 2011 (26)    | 2011 (16)    | 2011 (21)    |
| Internal suggestion system                      | 2011 (1)     | 2007 (1)     | 2016 (1)     | 2016 (1)     |
| Business development                            |              |              |              |              |
| Development of new products                     | 2007 (23)    | 2007 (32)    | 2011 (11)    | 2009 (29)    |
| Entry into new markets                          | 2008 (16)    | 2006 (14)    | 2011 (9)     | 2011 (10)    |
| Marketing and branding                          |              |              |              |              |
| Brand image                                     | 2012 (1)     | 2011 (7)     | 2012 (2)     | 2009 (8)     |
| Seals of quality                                | 2006 (20)    | 2008 (15)    | 2011 (7)     | 2008 (19)    |
| Production                                      |              |              |              |              |
| New technology for eco-sustainable production   | 2006 (7)     | 2006 (8)     | 2011 (10)    | 2008 (13)    |
| Purchase and supply chain                       |              |              |              |              |
| Improvements in transportation and supply chain | 2006 (9)     | 2006 (21)    | 2009 (9)     | 2007 (25)    |
| Handling of limited resources                   | 2006 (24)    | 2006 (58)    | 2009 (42)    | 2007 (50)    |

*Note.* The date refers to the year in which statements related to the internal and external drivers were first made. The number in brackets refers to the number of events we identified in the documents related to the internal and external drivers (i.e. event frequency).

## Results

As an organization that has recently undergone a transformation towards sustainability by incorporating eco-sustainability into their business model, our case company stands out with regard to its eco-sustainable products and initiatives. However, before eco-sustainability began to play a major role, the company was organized along a traditional corporation logic and was led by hierarchy, efficiency, and effectiveness to secure business success (see Table 5 for an overview of the corporation logic and example interviewee statements). The company's self-concept was based on its market position; particularly after its initial public offering (IPO), its top management followed a growth strategy aimed at increasing the company's size and diversification. When employees described their own identities and behavioral motivations, they referred to their bureaucratic roles and their employment at the company. Furthermore, the board of directors and the top management played a crucial role in decision-making, and employees were considered important primarily based on their position in the company's hierarchy.

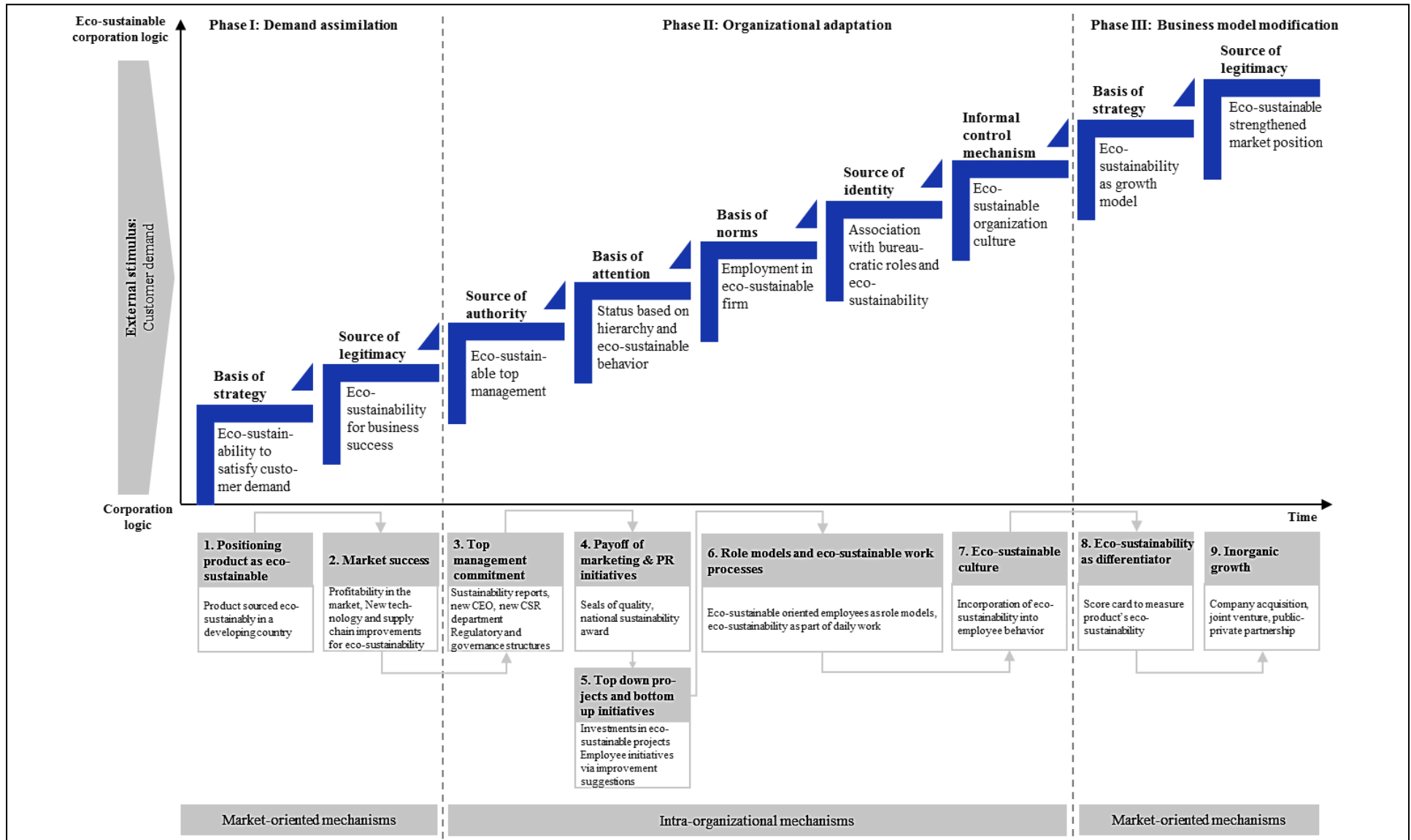
**Table 5.** Overview of the Corporation Logic and Example Interviewee Statements

| Elements<br>(Thornton et al., 2012) | Corporation logic                         | Example interviewee statements                                                                                                                                                                                                                |
|-------------------------------------|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Root metaphor                       | Corporation as hierarchy                  | <i>Our CEO drives the company. He provides the indicatory decisions, which are then enacted in the different departments and working groups.</i> [Interviewee 7]                                                                              |
| Sources of legitimacy               | Market position of firm                   | <i>The most important thing is to always support the business and to guarantee the company's success on the market.</i> [Interviewee 4]                                                                                                       |
| Sources of authority                | Board of directors, top management        | <i>If the CEO states how things should be done in the company, of course this will be implemented in an appropriate way.</i> [Interviewee 6]                                                                                                  |
| Sources of identity                 | Bureaucratic roles                        | <i>I'm responsible for the company's administration. Actually, it's called Real Estate Facility Management. Our customers are the employees, and I try to satisfy them every day. That's what I get up for every morning.</i> [Interviewee 7] |
| Basis of norms                      | Employment in firm                        | <i>The way we behave and deal with certain topics is always grounded in our norms and principles, which are prescribed by the company.</i> [Interviewee 2]                                                                                    |
| Basis of attention                  | Status in hierarchy                       | <i>Whether initiatives are implemented is often dependent on the hierarchy level of the person bringing in the idea.</i> [Interviewee 9]                                                                                                      |
| Basis of strategy                   | Increase size and diversification of firm | <i>Our business model and our strategy aim at diversifying the company into seminal markets, leading to [the company's] growth.</i> [Interviewee 4]                                                                                           |
| Informal control mechanism          | Organization culture                      | <i>Our company is based on a mixture of science and selling marketing stories. In summary, this forms our organizational culture, which provides a lot of guidance on how to behave in the company.</i> [Interviewee 1]                       |
| Economic system                     | Managerial capitalism                     | <i>Everyone has the aim of doing business, of making money. That's the rationale that drives the company.</i> [Interviewee 3]                                                                                                                 |

Our analyses revealed a transition process from this corporation logic towards an eco-sustainable corporation logic. This change process, which was initially triggered by

customers' demand for eco-sustainable products, dynamically percolated through the organization and led to a conflict-free transformation of the different elements of the dominant institutional logic towards eco-sustainability. Thereby, this change process unfolded in three phases, revealing two overarching transformational mechanisms: (I) *market-oriented mechanisms* shifted the first elements of the dominant logic towards eco-sustainability (i.e. the phase of *demand assimilation*); (II) *intra-organizational mechanisms* further incorporated eco-sustainability into the organization, leading to organizational adaptation and a further transition of the dominant institutional logic's elements towards eco-sustainability (i.e. the phase of *organizational adaptation*); (III) *market-oriented mechanisms* reinforced these changes and enabled a modification of the company's business model (i.e. the phase of *business model modification*). Overall, this process resulted in a shift from a corporation logic to an eco-sustainable corporation logic. In the following sections, we will elaborate on this change process, which is summarized in Figure 2.

**Figure 2.** Process Model of the Change Process from a Corporation Logic to an Eco-Sustainable Corporation Logic



### **Phase I: Demand Assimilation Causing Initial Changes in the Dominant Logic**

Eco-sustainability became a stronger focus for consumers as environmental crises and natural disasters, which threatened people's health and wealth, received increasing attention in Western societies. This was especially true for products that could be directly linked to consumers' health and well-being, such as food, cosmetics, or hygiene products. Since the case company and its competitors are producers of flavors and fragrances that are used to manufacture these consumer goods, their business customers increasingly opted to purchase eco-sustainable products. Thus, a global trend towards eco-sustainability emerged in the industry:

*I think everything that happened in the last decades that destroyed our planet made people more aware of ingredients and the way goods are produced. Especially for products that consumers put in their body or very close to their body – such as our home care products – sustainability plays a major role. This is nothing specific to our products, but an overarching trend with which the whole industry needs to deal.*

[Interviewee 17]

This trend also influenced the case company, since one of their main customers – a multinational company producing food and consumer goods – favored business relationships with eco-sustainably oriented companies. Thus, their customers' expectation of eco-sustainable products triggered eco-sustainability in our case company:

*We have no alternative because consumers demand [eco-sustainability] – it's already a consumer expectation, not a demand. You have two types of consumers ... You've got consumers who say: "I demand sustainable practices. I demand that stuff that is grown for me, is grown in a positive way that supports the planet, people, communities, the environment". And then you've got people who simply say: "Well, I don't demand it, I simply expect it".* [Interviewee 13]

Thus, consumer demand – and, in turn, our case company’s main customer’s demand – for eco-sustainable products was initially the main impetus for the change in the company’s corporate logic. Therefore, this shift towards eco-sustainability was triggered by an external stimulus from their customers and was oriented towards the market:

*What is forcing us is the market, customers, consumers. They want to see eco-sustainability.* [Interviewee 1]

Sensing this customer demand earlier than their competitors, our case company began to position one of their main products, which was sourced in a developing country, as eco-sustainable. The company had already started to control the entire value chain, from planting, harvesting, and extraction to industrial processing. Initially, the overarching aim was to ensure consistent quality, reliability of supplies, and stable prices. However, since they were able to successfully position this product as eco-sustainable on the market and were also the first in the industry to receive a fair-trade certificate for this product, they realized that meeting requirements for eco-sustainable production can amplify business growth and strengthen their market position. Thus, after this product proved to be successful and profitable on the market, the company realized the growth potential inherent in establishing an eco-sustainable business model:

*We realized that a sustainable business model is a very seminal business model for us.*  
[Interviewee 4]

The case company began to base their *strategy* on eco-sustainability to satisfy customer demand, increasing their share of sustainably sourced raw materials and emphasizing eco-sustainable purchasing. To bring still more eco-sustainable products to the market, the company started to invest in new technologies and improvements in their supply chain that enabled sustainable production. For example, they invented a new technology that exploits raw materials more thoroughly than had previously been possible, without any substantial

increase in energy consumption. This new technology did not only allow for an improvement of the product, but also of the case company's eco-sustainable production. Additionally, eco-sustainable production was furthered by improvements in the company's supply chain. Along with initiatives focused on reducing transport and emissions to a minimum by locally sourcing raw materials wherever possible, the company also joined the Supplier Ethical Data Exchange (SEDEX), a global non-profit membership organization that allows supply chain data to be managed with consideration given to environmental and ethical concerns. This association provides a platform that allows suppliers, such as our case company, to share their responsible sourcing information with multiple buyers, for example by providing insights into their eco-sustainability audit reports and certifications. Since these initiatives were market-oriented and directly related to business processes, these initiatives helped to facilitate an increase in the company's sales and profits. In this way, the case company began to enhance their profitability with the help of eco-sustainability initiatives. This allowed the company to *legitimize* their behavior through their eco-sustainability-related business success.

## **Phase II: Organizational Adaptation Spurring Changes in the Dominant Logic**

As the push towards eco-sustainability was triggered by external, market-oriented mechanisms, the concept began to play an increasingly important role in the company and to pervade the organization, affecting internal factors such as behaviors, rules, and assumptions. Spurred by the market success, the company's top management, as the entity exercising *authority*, began to show an increasing commitment to eco-sustainability. The company voluntarily embarked on the publication of an annual sustainability report that informed stakeholders about their eco-sustainable initiatives, performance, and goals. This was further supported by changes in the management structure and personnel: the company appointed a new CEO, who announced his eco-sustainable goals and aimed at strengthening eco-sustainability in relation to the company's business-related and internal projects. Furthermore,



a new corporate social responsibility (CSR) department was established and high-level corporate positions aimed at fostering eco-sustainable behavior were created. Thus, the top management's commitment to eco-sustainability led to some initial changes in the company's internal structures and processes. Since the top management still enacted authority, its eco-sustainable orientation reinforced eco-sustainable initiatives and behavior in the company:

*This was also triggered by eco-sustainable investments from our CEO, which were made in [company location]. He wants us to realize that something is evolving.*

[Interviewee 9]

The top management's commitment to eco-sustainability was also reflected in an increasing effort to comply with regulatory and governance structures, as well as a growing involvement in inter-trade organizations that support eco-sustainability. For example, the company was one of the first to complete the first phase of the European Union's Registration, Evaluation, Authorization, and Restriction of Chemicals (REACH) regulation. REACH aims at improving the protection of human health and the environment from risks posed by chemicals and applies to all chemical substances on the European market. The company was able to complete the first phase of this regulation two years before it became binding, showing a strong commitment to supporting eco-sustainability. This commitment was further strengthened by their engagement in inter-trade organizations that supported eco-sustainability. For example, the company became an active member of the Carbon Disclosure Project (CDP), a non-profit organization that aims to make environmental reporting and risk management a business norm and drives disclosure, insight, and action towards eco-sustainable business. Thus, the top management used its authority to foster initiatives and to comply with regulatory and governance structures that support eco-sustainability beyond industry expectations:

*There are always opportunities for improvement. We need to identify them in order to successfully manage the impact on the environment and ecosystems and to preserve the natural capital of society and the economy for future generations as well.*

[Interviewee 4]

This commitment to eco-sustainability was further encouraged as marketing and PR initiatives, such as product certifications with seals of quality, began to pay off. The company won the National German Sustainability Award, which led to increasing *attention* being paid to eco-sustainable behavior in the company. The company had already begun to certify their products with seals of quality, such as International Organization for Standardization (ISO) certifications for their plants or organic certifications for their facilities and products. However, receiving an Ecocert fair-trade certificate for one of their products, which had been sourced from a developing country, provided them with increased attention in the market and led to the company securing a nomination for the National German Sustainability Award. This award, which is annually endorsed by the German Federal Government, local and business associations, and non-governmental organizations, is granted to companies that promote the idea of a sustainable society and thereby contribute to positive impacts on the environment. Winning this award not only led to increased opportunities to receive further eco-sustainable seals of quality, but also enforced the incorporation of eco-sustainability into the company's behaviors, values, and assumptions. The award's formal acknowledgement of the product's eco-sustainability strongly supported the dispersion of eco-sustainability and the attention being paid to eco-sustainable behavior in the company:

*Winning the price was a decisive experience ... as we won first place straight away.*

*This was something very special for the company and provided a lot of updraft for eco-sustainable initiatives in our company.* [Interviewee 1]

As eco-sustainability began to play a bigger role in top management decisions, employees also became aware of this issue and realized that engagement for eco-sustainability was drawing attention. Accordingly, employees started to use eco-sustainability to gain more visibility in the company and therefore responded positively to the eco-sustainability projects initiated by top management. For instance, the company launched global sustainability workshops, in which the company's sustainability ambassadors from every division and region actively engaged in developing initiatives and ideas for increasing eco-sustainability in the company. For employees in higher corporate positions, the company formally introduced a sustainability board, which meets several times a year to ensure that sustainability-relevant topics continue to play an ever-larger role in the company's core processes. Thus, the top management set up a range of different projects to increase attention to eco-sustainability in the company via top-down approaches, which were then adopted by the employees:

*Eco-sustainable projects, which receive increasing attention in the company, were enacted from time to time by our top management. As top-down initiatives, they were managed by higher-level employees. [Interviewee 1]*

As employees were increasingly confronted with the issue of eco-sustainability, bottom-up initiatives to foster eco-sustainable behavior began to emerge; these initiatives were not only linked to employees' work environments, but also to their private life. Since the company already had a system for improvement suggestions in place, this system was increasingly used to propose eco-sustainable initiatives. Improvement suggestions ranged from ideas directly linked to the production site (such as filtering systems for special chemicals or the emission-free drainage of solvents) to improvements at offices (such as the replacement of paper calendars with sustainable stainless-steel calendars, or initiatives to reduce daily paper consumption). Moreover, employees' suggestions for improvements increasingly included initiatives related to aspects of employees' private life. For example, employees asked for

more bicycle racks, implemented an initiative to motivate their colleagues to bike to work instead of taking the car, and organized the first ‘Sustainability Day’ as an event to encourage the whole company to support eco-sustainable behavior.

At this point, eco-sustainability was no longer solely driven by top-down approaches designed by top management; rather, it was also increased through bottom-up initiatives that emerged from the employees’ engagement with eco-sustainability. Thus, although hierarchy still played a major role, engagement with eco-sustainability and eco-sustainable behavior was attracting attention within the company:

*People began to listen attentively. [Eco-sustainable behavior] is realized by our CEO at least as much as by other colleagues in other regions. [Interviewee 2]*

This attention to eco-sustainability in the case company enabled employees who supported the concept to come to the fore and establish themselves as role models, such as ‘Mrs. NABU’, a woman who is very active in the German Nature and Biodiversity Conservation Union (NABU). These role models were able to deepen the anchoring of eco-sustainability in the company’s and employees’ *norms*:

*There are colleagues with very strong eco-sustainable norms, and they enable the whole company to become more eco-sustainable. [Interviewee 3]*

Being increasingly confronted with the concept of eco-sustainability in the course of their daily work, the employees began to realize a shift towards eco-sustainability in the company’s norms. Since the employees have a strong commitment to the company as their employer, they began to incorporate eco-sustainability into their own norms, which guide their behavior at work:

*When the company upholds eco-sustainability as the guiding principle for behavior, for me, this is a sign that the company is contemplating specific initiatives that may*

*improve the planet. Since I am employed at [company name], where eco-sustainability has become important, eco-sustainability has somehow started to guide my personal behavior at work as well. [Interviewee 2]*

Eco-sustainability subverted employees' norms; in turn, employees' *identities* became influenced by eco-sustainability. Even though employees still strongly identified with their bureaucratic roles, such as their assigned job in a department or unit, eco-sustainability also became part of their identity. Employees started to draw a connection between their corporate role in the company and their association with eco-sustainability. For example, employees in facility management roles realized that they could support eco-sustainability by transforming lawn into green areas sown with local flowers in order to counter bee mortality. Employees in the research and development department experienced eco-sustainability as part of their job, since they engaged in solutions that reduced waste by using up to 99 % of raw materials for different products. Thus, eco-sustainability became connected to bureaucratic roles, and employees drew their identity from this connection:

*Everyone is responsible [for eco-sustainability]; one person has greater responsibility, while another might have less responsibility, based on the nature of their work and tasks. [Interviewee 1]*

Given that eco-sustainability was receiving increasing attention in the company and had become incorporated in employees' behavior, identity, and norms, the organizational culture was in turn affected by eco-sustainable values and beliefs. Thus, this eco-sustainable culture began to informally influence the company's decision-making in a subtle way and thereby acted as an *informal control mechanism*:

*[Eco-sustainability] became incorporated in a lot of projects in such a way that we didn't need to use special, eco-sustainable wording; everyone was aware of the positive eco-sustainable effects. [Interviewee 4]*

### **Phase III: Business Model Modifications Enforcing Changes in the Dominant Logic**

As eco-sustainability pervaded the organization and became a core element of the case company's values, beliefs, and rules, the company also strengthened its market position through its focus on eco-sustainability. Even though eco-sustainability affected the whole industry, the company was able to effectively use eco-sustainability as a differentiator. First, they developed tools that provided their customers with information on their eco-sustainable impact. For instance, after the introduction of a scorecard to measure products' eco-sustainability, the company was able to provide their customers with insights on each product's environmental impact in relation to the United Nation's Sustainability Development Goals, which include traceability, land use, water intensity, biodiversity, toxicity, ecotoxicity, CO<sub>2</sub> emissions, scrap, renewability, and biodegradability. Although used for sales and marketing purposes, these tools accommodated eco-sustainability as a differentiator and allowed the company to base their *strategy* on eco-sustainability as a growth model:

*These are the things [referring to the scorecard] that have hugely advanced our market differentiation.* [Interviewee 4]

This potential for differentiation and market success was further strengthened by the company's inorganic growth activities, which took the form of building a public-private partnership and acquiring smaller companies. For example, the company entered a public-private partnership with the German Agency for International Development (GIZ) and develoPPP, an initiative of the German Federal Ministry for Economic Cooperation and Development. This public-private partnership aimed to establish the company as a role model for responsible sourcing in developing countries that went beyond fair-trade certifications. Moreover, the company also acquired parts of a US-based fragrance company that produced natural fragrances in Brazil, allowing them to further strengthen their market position. In addition, they acquired a European company that solely produces natural products, which

enabled an expansion of their eco-sustainable product portfolio. Since this acquisition led to remarkable financial growth, it fostered the company's *legitimacy* at the same time as eco-sustainability strengthened their market position:

*In particular, with the acquisition of [target name], as an eco-sustainable player in the market, we tried another path and considered ... customers' demand for natural, eco-sustainable products.* [Interviewee 3]

Since eco-sustainability had been shown to be effective in advancing the company's market position, led to remarkable financial growth, and allowed them to differentiate themselves from their competitors, eco-sustainability emerged as a business model that allowed for competitive advantages and continuous growth:

*A company that doesn't think about eco-sustainability simply will not survive.*  
[Interviewee 1]

## **Discussion**

Taking an institutional logics approach, we explored how the change process of the dominant institutional logic supporting eco-sustainable behavior of corporate organizations unfolds. Based on our in-depth case study, we show that customer demand for eco-sustainable products, as an external stimulus, initiated a shift in the prevailing corporate logic towards eco-sustainability. Since this external stimulus caused a change in behaviors, values, rules, and assumptions, the dominant institutional logic shifted towards an eco-sustainable corporation logic. By developing a model that opens the black box of the processes that change institutional logics, this study advances research on the transformation of institutional logics and corporate eco-sustainability.

### **Advancing Research on the Transformation of Institutional Logics**

Our case study showed that, as eco-sustainability percolated through the organization, the different elements of the dominant institutional logic changed to favor eco-sustainability.

Ingrained in Thornton et al.'s (2012) framework elements, this change process unfolds in three phases. First, since eco-sustainability is perceived as promising for business success, *market-oriented demand assimilation* shifted the basis of strategy and source of legitimacy towards eco-sustainability. Since eco-sustainability was at first primarily adopted to satisfy customer demand, in this phase, organizational behavior was mainly aimed at market success and dominated by *corporate goals*. Second, positioning the company as eco-sustainable in the market led to *intra-organizational* changes, leading to the further incorporation of eco-sustainability into the organization. This phase of *organizational adaptation* was characterized by a change in the source of authority, basis of attention, basis of norms, source of identity, and informal control mechanisms. Thus, in this phase, organizational behavior was mainly guided by *eco-sustainable goals*. Third, owing to the organization's stronger eco-sustainable orientation, a *market-oriented business model modification* reinforced the changes in the basis of strategy and source of legitimacy that angled towards eco-sustainability. Thus, in this phase, *corporate goals* associated with financial growth and market success through eco-sustainability dominated organizational behavior. As this process has been shown to be dynamic, we assume an ongoing percolation of eco-sustainable values, beliefs, and assumptions throughout the organization, leading to a consistent reinforcement of eco-sustainability.

By taking a process approach, our work provides a novel explanation of how the transformation of institutional logics unfolds. It thereby provides vital insights into the transformational processes of institutional logics (Lok, 2010) and the transitional states of institutional logics in organizational change processes (Reay & Hinings, 2009). Through highlighting the three phases of (I) *demand assimilation*, (II) *organizational adaptation*, and (III) *business model modification*, we provide the initial seeds for a causal understanding of the transitional nature of hybrid organizations (Mair et al., 2015). In the demand assimilation



phase, eco-sustainability was mainly triggered by *market-oriented mechanisms*. In the organizational adaptation phase, incremental changes – supported by *intra-organizational mechanisms* such as top management commitment, bottom-up approaches, and role modelling – facilitated the dominance of eco-sustainable values and norms in organizational behavior. Furthermore, spurred by *market-oriented mechanisms*, eco-sustainability became the main driver for business model modification. This change process thus highlights the fact that market-oriented and intra-organizational mechanisms can determine the transitional states of hybrid organizations during organizational sustainability transformations (Mair et al., 2015; Reay & Hinings, 2009). Thus, we propose:

***PI:** Market-oriented and intra-organizational mechanisms can determine the transitional states of institutional logics in organizational change processes towards eco-sustainability.*

Furthermore, our study shows that the change process towards a new dominant logic can unfold conflict-free. Over the past decades, a remarkable amount of literature describing institutional change as a transition from one dominant logic to another has emerged. This process is mainly described in terms of the rivalry or conflict between different logics (e.g., Marquis & Lounsbury, 2007; Reay & Hinings, 2009). In contrast to this avenue of research, which considers management of this conflict to be a prerequisite for hybrid organizations (e.g., Hoffman, 1999), our study has shown that a transition process from one dominant logic to another can also unfold without competition between multiple logics. Since the change process included the different elements of the dominant institutional logic over time, the operation of market-oriented mechanisms and intra-organizational mechanisms allowed for an eco-sustainable pervasion of the organization and a conflict-free change in the dominant institutional logic.

*P2: Market-oriented and intra-organizational mechanisms can allow for a conflict-free change process towards eco-sustainability and the formation of a new dominant institutional logic.*

Furthermore, even though the dominant logic changed towards eco-sustainability, the leading principles guiding organizational behavior differed throughout the three observed phases. The phase of demand assimilation (as the first phase) and the phase of business model modification (as the third phase) were dominated by corporate goals; however, the phase of organizational adaptation was bestridden by eco-sustainable goals. Thus, both corporate and eco-sustainable goals prevailed at different times during the underlying change process of the organizational transformation towards sustainability; however, since these two sets of goals did not stand in conflict during this process, but rather spurred each other, the dominant institutional logic was continuously transformed towards eco-sustainability. It can therefore be deduced that, since the corporate and eco-sustainable goals were compatible during the organizational sustainability transformation, this change process allowed for a conflict-free transformation of the dominant institutional logic towards eco-sustainability. Thus, in line with York et al.'s (2016) work on mechanisms to respond to the incompatibility of institutional logics, we argue that compatible goals of different institutional logics facilitate a conflict-free change process in institutional logics. Therefore, we suggest:

*P3: When different institutional logics pursue compatible goals, they can facilitate a conflict-free change process towards eco-sustainability and the formation of a new dominant institutional logic.*

### **Advancing Research on Corporate Eco-Sustainability**

The change process illustrated above led to a shift in the company's dominant institutional logic from a corporation logic to an eco-sustainable corporation logic (Table 6). This institutional logic is rooted in eco-sustainability as a business model, since eco-sustainability

can be used to leverage business potential. Thus, eco-sustainability can be seen as a model for strategic growth. As the organization legitimizes itself based on its market position, any eco-sustainable behavior that enhances business success contributes to this organizational purpose. As a decision-making body, an eco-sustainably committed top management exercises authority and can thus further spur eco-sustainability in the organization. Moreover, since employees feel strongly connected to their employer, they are likely to base their norms on their employment in an eco-sustainable firm. As the company is still organized according to a corporate structure, attention received is based on individual status, which is influenced by both the individual's position in the hierarchy as well as eco-sustainable behavior. Since employees identify with their bureaucratic roles and simultaneously feel connected to eco-sustainability, they draw their identity from this connection. In turn, eco-sustainability plays an important role in the dominant values, rules, and assumptions of the organization, thus enabling an eco-sustainable culture to informally control behavior within the company. Accordingly, even though eco-sustainability influences the principles that guide action, the organization still functions as a corporation that aims at managing trade for profit.

**Table 6.** Eco-Sustainable Corporation Logic

| Elements<br>(Thornton et al., 2012) | Eco-sustainable corporation logic                          |
|-------------------------------------|------------------------------------------------------------|
| Root metaphor                       | Eco-sustainability as business model                       |
| Sources of legitimacy               | Market position strengthened through eco-sustainability    |
| Sources of authority                | Eco-sustainable top management                             |
| Sources of identity                 | Association with bureaucratic roles and eco-sustainability |
| Basis of norms                      | Employment in eco-sustainable firm                         |
| Basis of attention                  | Status based on hierarchy and eco-sustainable behavior     |
| Basis of strategy                   | Eco-sustainability as growth model                         |
| Informal control mechanism          | Eco-sustainable organization culture                       |
| Economic system                     | Managerial capitalism                                      |

This eco-sustainable corporation logic provides an explanation of the eco-sustainable behavior of corporate, profit-oriented organizations that shapes organizational sustainability

transformations. Although institutional theory has begun to focus on eco-sustainability (Jennings & Zandbergen, 1995), which has been identified as an evolving institution (Bothello & Salles-Djelic, 2018), market and corporation logics continue to dominate the research domain (Schneider, 2015). Thus, scholars of institutional logics have called for more research into eco-sustainability in organizational settings (Howard-Grenville et al., 2014). In the present research, we close this gap by illustrating the key elements of an eco-sustainability logic that allows for insights into corporate eco-sustainability and guides the eco-sustainable behavior of corporate organizations. Thus, we propose:

*P4: An eco-sustainable corporation logic guides the eco-sustainable behavior of corporate organizations.*

### **Practical Implications, Limitations, and Future Research**

Our results are also of interest for practitioners, since they demonstrate that companies can combine eco-sustainable behavior with corporate growth. Shifting to an eco-sustainable strategy can be a beneficial way of satisfying increasing customer expectations regarding eco-sustainable products and investments in eco-sustainability. Meeting this customer demand can reveal a new, profitable niche market. Since eco-sustainability can attract attention in the market, an eco-sustainable position offers the company potential for substantial advancement, both on the market as well as internally. Thus, corporate eco-sustainable initiatives may lead not only to an improvement of a company's reputation in the market, but also to positive changes in employee behavior that might directly benefit the environment.

Since a company's movement towards eco-sustainability can evolve without conflicts that endanger business success, eco-sustainability can add to a robust and innovative business model, supporting competitive advantages and strengthening market position. Incorporating eco-sustainability into corporate endeavors can lead to a change in the business model, allowing for innovative products as well as seminal organic and inorganic growth; in this way,

it can enable companies to extend their market position using eco-sustainability as a competitive advantage.

While there are significant theoretical and practical implications to our research, we must also acknowledge its limitations. We conducted a single case study drawing on one German company from a particular industry. Even though this research design is especially helpful in analyzing complex, collective relationships and offers the advantage of a methodologically rigorous analysis of evidence regarding sequences, conjunctures of events, and processes (Bennett & Checkel, 2014), it permits only limited generalizability. However, since we were able to draw on different data sources and use qualitative and quantitative research methods as means of triangulation (Denzin, 1970), we can correlate findings across data sets and thus reduce the impact of potential biases that might otherwise impair a single study (Eisner, 1991). To increase the generalizability of our results, further research is needed to replicate our findings and test our propositions in other organizational contexts (Eisenhardt, 1989; Eisenhardt & Graebner, 2007). Thus, further studies linking institutional logics and corporate eco-sustainability should include multiple research sites, incorporating variance in industries, size, and territories of operation.

Moreover, even though the concept of institutional logics has been shown to be a helpful framework through which to analyze organizational sustainability transformations, our study is limited to a retroactive approach. Although this approach allows us to provide an in-depth understanding of the stimuli and mechanisms that leverage eco-sustainability in corporate organizations, future research should build on our work and include approaches to fostering eco-sustainable behavior. For example, experimental designs that investigate the interplay between different institutional logics and potential motivational triggers for eco-sustainable behavior could provide interesting insights on how to actively support eco-sustainable behavior in work settings.

## **Conclusion**

Our study elucidates the processes underpinning organizational sustainability transformations from an institutional logics perspective and provides in-depth insights into the change process by which the dominant institutional logic can come to support eco-sustainable behavior of corporate organizations. Through the development of a process model, the present study advances research into the transformation of institutional logics by showing that market-oriented and intra-organizational mechanisms can determine the transitional states of hybrid organizations and allow for a conflict-free process of change towards a new dominant institutional logic. Furthermore, a conflict-free change process can be facilitated when the different institutional logics involved in said process are pursuing compatible goals.

Through developing an eco-sustainable corporation logic that serves as an explanation of the eco-sustainable behavior of corporate organizations, we contribute to research on corporate eco-sustainability from an institutional logics perspective. Thus, we are convinced that bringing together research on eco-sustainability and institutional logics is a helpful way to establish a thorough understanding of the eco-sustainable behavior of corporate organizations, since institutional logics provide an adjuvant framework for the analysis of the values, assumptions, and beliefs that provoke particular organizational behaviors. In summary, our work can potentially give rise to new ways of looking at profit-oriented organizations' eco-sustainable behavior, and also provides an in-depth understanding of the mechanisms supporting organizational sustainability transformations.

## References

- Albinger, H. S., & Freeman, S. J. (2000). Corporate social performance and attractiveness as an employer to different job seeking populations. *Journal of Business Ethics*, 28(3), 243–253. <http://doi.org/10.1023/A:1006289817941>
- Altmann, J. (1974). Observational study of behavior: Sampling methods. *Behaviour*, 49(3), 227–267. <http://doi.org/10.1163/156853974X00534>
- Ameer, R., & Othman, R. (2012). Sustainability practices and corporate financial performance: A study based on the top global corporations. *Journal of Business Ethics*, 108(1), 61–79. <http://doi.org/10.1007/s10551-011-1063-y>
- Battilana, J., De Constance, B., Greenwood, R., Ibarra, H., Leca, B., Simon, A., & Thoenig, J.-C. (2006). Agency and institutions: The enabling role of individual's social position. *Organization*, 13(5), 653–676. <http://doi.org/10.1177/1350508406067008>
- Battilana, J., & Dorado, S. (2010). Building sustainable hybrid organizations: The case of commercial microfinance organizations. *Academy of Management Journal*, 53(6), 1419–1440. <http://doi.org/10.5465/AMJ.2010.57318391>
- Bennett, A., & Checkel, J. (2014). Process tracing: From methodological roots to best practices. In A. Bennett & J. Checkel (Eds.), *Process tracing in the social sciences: From metaphor to analytic tool* (pp. 3–38). Cambridge: Cambridge University Press.
- Berman, E. P. (2012). Explaining the move toward the market in US academic science: How institutional logics can change without institutional entrepreneurs. *Theory and Society*, 41(3), 261–299. <http://doi.org/10.1007/s11186-012-9167-7>
- Besharov, M. L., & Smith, W. K. (2014). Multiple institutional logics in organizations: Explaining their varied nature and implications. *Academy of Management Review*, 39(3), 364–381. <http://doi.org/10.5465/amr.2011.0431>
- Boiral, O. (2009). Greening the corporation through organizational citizenship behaviors. *Journal of Business Ethics*, 87(2), 221–236. <http://doi.org/10.1007/s10551-008-9881-2>
- Bothello, J., & Salles-Djelic, M.-L. (2018). Evolving conceptualizations of organizational environmentalism: A path generation account. *Organization Studies*, 39(1), 93–119. <http://doi.org/10.1177/0170840617693272>
- Bourdieu, P. (1984). *Distinction: A social critique of the judgement of taste*. London, UK:

Harvard University Press.

- Bowen, G. A. (2009). Document analysis as a qualitative research method. *Qualitative Research Journal*, 9(2), 27–40. <http://doi.org/10.3316/qrj0902027>
- Charmaz, K. (2000). Grounded theory: Objectivist and constructivist methods. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 508–535). London: Sage.
- Child, J. (2005). *Organization. Contemporary principles and practice*. Oxford, UK: Blackwell Publishing.
- Corbett, J., Webster, J., & Jenkin, T. A. (2018). Unmasking corporate sustainability at the project level: Exploring the influence of institutional logics and individual agency. *Journal of Business Ethics*, 147(2), 261–286. <http://doi.org/10.1007/s10551-015-2945-1>
- Davis, G. F., McAdam, D., Richard, W., Scott, M., & Zald, N. (2005). *Social movements and organizational theory*. Cambridge: Cambridge University Press.
- Denzin, N. K. (1970). *The research act: A theoretical introduction to sociological methods*. Chicago, MI: Aldine.
- Denzin, N. K., & Lincoln, Y. S. (2005). *The Sage handbook of qualitative research* (3rd ed.). Thousand Oaks, CA: Sage.
- DiMaggio, P., & Powell, W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review*, 48(2), 147–160.
- Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of Management Review*, 14(4), 532–550. <http://doi.org/10.5465/amr.1989.4308385>
- Eisenhardt, K. M., & Graebner, M. E. (2007). Theory building from cases: Opportunities and challenges. *Academy of Management Journal*, 50(1), 25–32. <http://doi.org/10.2307/20159839>
- Eisner, E. W. (1991). *The enlightened eye: Qualitative enquiry and the enhancement of educational practice*. Toronto: Collier Macmillan Canada.
- Flick, U. (2014). *The Sage handbook of qualitative data analysis*. London, UK: Sage.
- Friedland, R., & Alford, R. (1991). Bringing society back in: Symbols, practices, and



- institutional contradictions. In W. Powell & P. DiMaggio (Eds.), *The new institutionalism in organizational analysis* (pp. 232–266). Chicago, MI: University of Chicago Press.
- Gawer, A., & Phillips, N. (2013). Institutional work as logics shift: The case of Intel's transformation to platform leader. *Organization Studies*, 34(8), 1035–1071. <http://doi.org/10.1177/0170840613492071>
- Gifford, R., Kormos, C., & McIntyre, A. (2011). Behavioral dimensions of climate change: Drivers, responses, barriers, and interventions. *Wiley Interdisciplinary Reviews: Climate Change*, 2(6), 801–827. <http://doi.org/10.1002/wcc.143>
- Glynn, M. A., & Lounsbury, M. (2005). From the critics' corner: Logic blending, discursive change and authenticity in a cultural production system. *Journal of Management Studies*, 42(5), 1031–1055. <http://doi.org/10.1111/j.1467-6486.2005.00531.x>
- Greenwood, R., Díaz, A. M., Li, S. X., & Lorente, J. C. (2010). The multiplicity of institutional logics and the heterogeneity of organizational responses. *Organization Science*, 21(2), 521–539. <http://doi.org/10.1287/orsc.1090.0453>
- Greenwood, R., & Suddaby, R. (2006). Institutional entrepreneurship in mature fields: The big five accounting firms. *Academy of Management Journal*, 49(1), 27–48. <http://doi.org/10.5465/AMJ.2006.20785498>
- Haanaes, K., Kong, M. T., Hopkins, M. S., Arthur, D., Reeves, M., Kruschwitz, N., ... Velken, I. (2011). Sustainability: The 'embracers' seize advantage. Findings from the 2010 sustainability & innovation global executive study and research project. *MIT Sloan Management Review*, 53(2), 69–74.
- Hahn, T., Pinkse, J., Preuss, L., & Figge, F. (2015). Tensions in corporate sustainability: Towards an integrative framework. *Journal of Business Ethics*, 127(2), 297–316. <http://doi.org/10.1007/s10551-014-2047-5>
- Henkel, C., Seidler, A.-R., Kranz, J., & Fiedler, M. (2017). How to become a sustainability leader? The role of IS affordances in enabling and triggering sustainability transformations. In *Proceedings of the 38th International Conference on Information Systems*. Seoul, South Korea.
- Hoffman, A. J. (1999). Institutional evolution and change: Environmentalism and the U.S. chemical industry. *Academy of Management Journal*, 42(4), 351–371.

<http://doi.org/10.5465/257008>

- Howard-Grenville, J., Buckle, S. J., Hoskins, B. J., & George, G. (2014). Climate change and management: From the editors. *Academy of Management Journal*, *57*(3), 615–623. <http://doi.org/10.5465/amj.2014.4003>
- Jackall, R. (1988). *Moral mazes: The world of corporate managers*. New York, Oxford: Oxford University Press.
- Jennings, P. D., & Zandbergen, P. A. (1995). Ecologically sustainable organizations: An institutional approach. *Academy of Management Review*, *20*(4), 1015–1052. <http://doi.org/10.5465/AMR.1995.9512280034>
- Kraatz, M., & Block, E. (2008). Organizational implications of institutional pluralism. In R. Greenwood, C. Oliver, R. Suddaby, & K. Sahlin (Eds.), *The Sage handbook of organizational institutionalism* (pp. 243–275). Thousand Oaks, CA: Sage.
- Lee, M. P., & Lounsbury, M. (2015). Filtering institutional logics: Community logic variation and differential responses to the institutional complexity of toxic waste. *Organization Science*, *26*(3), 847–866. <http://doi.org/10.1287/orsc.2014.0959>
- Lo, S. H., Peters, G.-J. Y., & Kok, G. (2012). A review of determinants of and interventions for proenvironmental behaviors in organizations. *Journal of Applied Social Psychology*, *42*(12), 2933–2967. <http://doi.org/10.1111/j.1559-1816.2012.00969.x>
- Lok, J. (2010). Institutional logics as identity projects. *Academy of Management Journal*, *53*(6), 1305–1335. <http://doi.org/10.5465/AMJ.2010.57317866>
- Lombard, M., Snyder-Duch, J., & Bracken, C. C. (2002). Content analysis in mass communication. *Human Communication Research*, *28*(4), 587–604. <http://doi.org/10.1111/j.1468-2958.2002.tb00826.x>
- Lülfes, R., & Hahn, R. (2013). Corporate greening beyond formal programs, initiatives, and systems: A conceptual model for voluntary pro-environmental behavior of employees. *European Management Review*, *10*(2), 83–98. <http://doi.org/10.1111/emre.12008>
- Mair, J., Mayer, J., & Lutz, E. (2015). Navigating institutional plurality: Organizational governance in hybrid organizations. *Organization Studies*, *36*(6), 713–739. <http://doi.org/10.1177/0170840615580007>
- Marquis, C., & Lounsbury, M. (2007). Vive la résistance: Competing logics and the

- consolidation of U.S. community banking. *Academy of Management Journal*, 50(4), 799–820. <http://doi.org/10.5465/AMJ.2007.26279172>
- Martin, G., Currie, G., Weaver, S., Finn, R., & McDonald, R. (2017). Institutional complexity and individual responses: Delineating the boundaries of partial autonomy. *Organization Studies*, 38(1), 103–127. <http://doi.org/10.1177/0170840616663241>
- Mayring, P. (2000). *Qualitative Inhaltsanalyse. Grundlagen und Techniken*. (7th ed.). Weinheim: Deutscher Studien Verlag.
- Meyer, R. E., & Hammerschmid, G. (2006). Changing institutional logics and executive identities: A managerial challenge to public administration in Austria. *American Behavioral Scientist*, 49(7), 1000–1014. <http://doi.org/10.1177/0002764205285182>
- Moon, S. G., Bae, S., & Jeong, M. G. (2014). Corporate sustainability and economic performance: An empirical analysis of a voluntary environmental program in the USA. *Business Strategy and the Environment*, 23(8), 534–546. <http://doi.org/10.1002/bse.1800>
- Nordlund, A. M., & Garvill, J. (2002). Value structures behind proenvironmental behavior. *Environment and Behavior*, 34(6), 740–756. <http://doi.org/10.1177/001391602237244>
- Pache, A.-C., & Santos, F. (2013). Inside the hybrid organization: Selective coupling as a response to competing institutional logics. *Academy of Management Journal*, 56(4), 972–1001. <http://doi.org/10.5465/amj.2011.0405>
- Paré, G. (2004). Investigating information systems with positivist case research. *Communications of the Association for Information Systems*, 13(18), 233–264. <http://doi.org/10.1178/cais.2004.13>
- Reay, T., & Hinings, C. R. (2009). Managing the rivalry of competing institutional logics. *Organization Studies*, 30(6), 629–652. <http://doi.org/10.1177/0170840609104803>
- Schick, A.-R., Henkel, C., Kranz, J., & Fiedler, M. (2016). The role of motivational affordances and institutional logics in IS-enabled organizational sustainability transformations - A research agenda. In *Proceeding of the SIGGreen Pre-ICIS Workshop 2016*. Dublin, Ireland.
- Schneiberg, M., & Lounsbury, M. (2008). Social movements and institutional analysis. In K. Greenwood, R., Oliver C., Suddaby, R., Sahin (Ed.), *The Sage handbook of organizational institutionalism* (pp. 650–672). Thousand Oaks, CA: Sage.

- Schneider, A. (2015). Reflexivity in sustainability accounting and management: Transcending the economic focus of corporate sustainability. *Journal of Business Ethics*, 127(3), 525–536. <http://doi.org/10.1007/s10551-014-2058-2>
- Scott, W. R. (1994). Conceptualizing organizational fields: Linking organizations and societal systems. In H. Derlien, U. Gerhardt, & F. Scharpf (Eds.), *Systemrationalität und Partialinteresse* (pp. 203–221). Baden-Baden: Nomos.
- Stanwick, P. A., & Stanwick, S. D. (1998). The relationship between corporate social performance, and organizational size, financial performance, and environmental performance: An empirical examination. *Journal of Business Ethics*, 17(2), 195–204. <http://doi.org/10.1023/A:1005784421547>
- Steg, L., Dreijerink, L., & Abrahamse, W. (2005). Factors influencing the acceptability of energy policies: A test of VBN theory. *Journal of Environmental Psychology*, 25(4), 415–425. <http://doi.org/10.1016/j.jenvp.2005.08.003>
- Stern, P. C. (2000). Toward a coherent theory of environmentally significant behavior. *Journal of Social Issues*, 56(3), 407–424. <http://doi.org/10.1111/0022-4537.00175>
- Tan, J., & Wang, L. (2011). MNC strategic responses to ethical pressure: An institutional logic perspective. *Journal of Business Ethics*, 98(3), 373–390. <http://doi.org/10.1007/s10551-010-0553-7>
- Thornton, P. H., Jones, C., & Kurry, K. (2005). Institutional logics and institutional change in organizations: Transformation in accounting, architecture and publishing. *Research in the Sociology of Organizations*, 23, 125–170. [http://doi.org/10.1016/S0733-558X\(05\)23009-4](http://doi.org/10.1016/S0733-558X(05)23009-4)
- Thornton, P. H., & Ocasio, W. (1999). Institutional logics and the historical contingency of power in organizations: Executive succession in the higher education publishing industry, 1958-1990. *American Journal of Sociology*, 105(3), 801–843. <http://doi.org/10.1086/210361>
- Thornton, P. H., & Ocasio, W. (2008). Institutional logics. In R. Greenwood, C. Oliver, R. Suddaby, & K. Sahlin-Andersson (Eds.), *Handbook of organizational institutionalism* (pp. 99–129). London: Sage.
- Thornton, P. H., Ocasio, W., & Lounsbury, M. (2012). *The institutional logics perspective: A new approach to culture, structure, and process*. Oxford, UK: Oxford University Press.

- Vurro, C., Dacin, M. T., & Perrini, F. (2010). Institutional antecedents of partnering for social change: How institutional logics shape cross-sector social partnerships. *Journal of Business Ethics*, 94(1), 39–53. <http://doi.org/10.1007/s10551-011-0778-0>
- Yin, R. K. (2013). *Case study research: Design and methods* (5th ed.). Thousand Oaks, CA: Sage.
- York, J. G., Hargrave, T. J., & Pacheco, D. F. (2016). Converging winds: Logic hybridization in the Colorado wind energy field. *Academy of Management Journal*, 59(2), 579–610. <http://doi.org/10.5465/amj.2013.0657>

### Appendix A: Coding Guideline (following Mayring, 2000)

| Category<br>(Thornton<br>et al., 2012) | Definition                                                        | Anchoring example                                                                                                                                                                                                                             | Coding Principles<br>Relevant aspects should<br>...                                                               |
|----------------------------------------|-------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| Root metaphor                          | Overarching principle that guides organizational decision-making  | <i>Always have an eye on your business model to ensure the company's success!</i> [Interviewee 4]                                                                                                                                             | ... consider the organizational principles with reference to which behavioral decisions are made                  |
| Sources of legitimacy                  | Purpose of the organization or department                         | <i>The aim of my department is, first of all, to support the business and to guarantee success.</i> [Interviewee 4]                                                                                                                           | ... provide insights into entities' (i.e. organizations or departments) rights to exist and their overarching aim |
| Sources of authority                   | Individuals or groups that wield authority in the organization    | <i>If the CEO decides that one thing or the other should be implemented, this will always be realized.</i> [Interviewee 6]                                                                                                                    | ... outline who wields authority and why authority is ascribed to this group or individual                        |
| Sources of identity                    | Entities that allow individuals to identify with the organization | <i>I'm responsible for the company's administration. Actually, it's called Real Estate Facility Management. Our customers are the employees, and I try to satisfy them every day. That's what I get up for every morning.</i> [Interviewee 7] | ... include an individual's or a group's self-conception in relation to the organization                          |

### Appendix A: Continued

|                            |                                                                              |                                                                                                                                                                                                                          |                                                                                                                                                       |
|----------------------------|------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| Basis of norms             | Reasons to stick to behavioral norms and principles                          | <i>For me, there are no monetary incentives, but I ride my bike to work since I am strongly convinced by eco-sustainable values and want to be a role model for my kids.</i> [Interviewee 6]                             | ... provide insights on which entity individuals draw on when identifying behavioral norms and principles considered appropriate in the organization  |
| Basis of attention         | Reasons for attention in the organization                                    | <i>For sure, there is attention for eco-sustainable behavior in the company. Sustainable behavior is appreciated by our top management and by my colleagues alike.</i> [Interviewee 2]                                   | ... provide insights regarding why individuals in the organization receive attention                                                                  |
| Basis of strategy          | Ways of attaining organizational goals                                       | <i>Sustainability is becoming especially interesting, when it strengthens our market position.</i> [Interviewee 3]                                                                                                       | ... consider how an overarching goal can be reached by a certain behavior                                                                             |
| Informal control mechanism | Entities that affect behavior informally                                     | <i>[Eco-sustainability] became incorporated in a lot of projects in such a way that we don't need to use the wording of eco-sustainability; everyone is aware of its positive environmental effects.</i> [Interviewee 4] | ... consider reasons why an individual might stick to behavior that is considered appropriate in the organization even though formal rules are absent |
| Economic system            | A systematic rationale that guides behavior and shapes the dominant entities | <i>[Eco-sustainability] does pay off. You know, to be in on the long run, you've got to be able to get in on the short run.</i> [Interviewee 13]                                                                         | ... provide insights into the systematic rationale that guides behavior, as well as the entities that are shaped by this rationale                    |

## Appendix B: Key Nodes

| External drivers          |                                                                                                                                                                                                   |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Societal changes          | <ul style="list-style-type: none"> <li>- Environmental scandals</li> <li>- Environmental crises</li> <li>- Natural disasters</li> </ul>                                                           |
| Regulatory                | <ul style="list-style-type: none"> <li>- Government funding</li> <li>- Laws enforcing or preventing eco-sustainability</li> </ul>                                                                 |
| Governance                | <ul style="list-style-type: none"> <li>- Engagement in inter-trade organizations</li> <li>- Commitment to environmental agreements</li> </ul>                                                     |
| Market demand             | <ul style="list-style-type: none"> <li>- Customer demand</li> <li>- Consumer demand</li> </ul>                                                                                                    |
| Internal drivers          |                                                                                                                                                                                                   |
| Performance               | <ul style="list-style-type: none"> <li>- Economic performance</li> <li>- Eco-sustainable performance</li> </ul>                                                                                   |
| Leadership                | <ul style="list-style-type: none"> <li>- Changes in the top management and board of directors</li> <li>- Development of internal and external initiatives fostering eco-sustainability</li> </ul> |
| Business development      | <ul style="list-style-type: none"> <li>- Development of new eco-sustainable products</li> <li>- Entry into new markets with eco-sustainable products</li> </ul>                                   |
| Pricing                   | <ul style="list-style-type: none"> <li>- Pricing development for eco-sustainable products</li> </ul>                                                                                              |
| Marketing/Branding        | <ul style="list-style-type: none"> <li>- Brand image</li> <li>- Eco-sustainable seals of quality</li> </ul>                                                                                       |
| Production                | <ul style="list-style-type: none"> <li>- Deployment of new technologies that enable eco-sustainable production</li> </ul>                                                                         |
| Purchase and supply chain | <ul style="list-style-type: none"> <li>- Purchase criteria</li> <li>- Improvements in transportation and supply chain</li> <li>- Handling of limited resources</li> </ul>                         |



## **2 Exploring Corporate Eco-Sustainability from an Institutional Logics Perspective: The Development and Validation of a Quantitative Measurement Instrument**

Anna-Raissa Seidler

## **Exploring Corporate Eco-Sustainability from an Institutional Logics Perspective: The Development and Validation of a Quantitative Measurement Instrument**

Anna-Raissa Seidler

### **Abstract**

Since corporate organizations have become increasingly engaged in eco-sustainable initiatives, more companies refer to eco-sustainable values, beliefs, and norms as guidelines for actions and an individual's identification within the organizational setting. These guidelines for action are essential to institutional logics which are assumed to guide behavior, such as an eco-sustainability logic encourages eco-sustainable behavior and a corporation logic guides corporate behavior. However, as institutional logics research is dominated by qualitative studies viewing additional quantitative, secondary data at the most, existing institutional logics research lacks measurement instruments to explore latent factors such as attitudes, assumptions, or beliefs, which are central to institutional logics. To address this omission, this study follows literature in measurement theory and reports on a series of one qualitative and four quantitative studies, to develop an eco-sustainability logic (ESL) scale and a corporation logic (COL) scale. Thereby, this study conceptually defines the different elements of eco-sustainability and corporation logics and demonstrates a holistic, integrative approach to measuring institutional logics. This study contributes to research on institutional logics and corporate eco-sustainability, since it adds to a methodological advancement of the field of institutional logics, discusses directions for further research and managerial implications.

*Keywords:* Institutional logics, scale development, eco-sustainability logic, corporation logic, ESL scale, COL scale, environmental, sustainability, corporation

## Introduction

As evidence of climate change and worldwide environmental degradation manifesting in ocean acidification, melting glaciers, deforestation, and resource scarcity (Hoffman, 2001; Walls & Hoffman, 2013), eco-sustainability increasingly spikes interest in corporate organizations leading to gradient engagement in eco-sustainable initiatives (Hahn, Pinkse, Preuss, & Figge, 2015). Eco-sustainability is characterized by behavior that changes the availability of environmental resources or alters the structure and dynamics of ecosystems or the biosphere (Stern, 2000). Since eco-sustainability allows for an increase in organizations' environmental and financial performance (Lubin & Esty, 2010), eco-sustainability is increasingly important for corporate organizations (Corbett, Webster, & Jenkin, 2018). Thus, more companies refer to eco-sustainable values, beliefs, and norms as guidelines for action and the individual's identification in the organizational setting. These guidelines are essential to institutional logics, which provide individuals and organizations with a frame of reference for evaluating the world around them (Martin, Currie, Weaver, Finn, & McDonald, 2017; Thornton, Ocasio, & Lounsbury, 2012). Although different institutional logics might co-exist (Greenwood, Díaz, Li, & Lorente, 2010), behavior is guided by a dominant logic. Accordingly, corporate behavior is led by a corporation logic (Thornton et al., 2012), whereas eco-sustainable behavior is guided by an eco-sustainability logic (Schick, Henkel, Kranz, & Fiedler, 2016).

As institutional logics research is mainly dominated by qualitative studies, existing institutional logics research lacks measurement instruments to explore latent factors such as attitudes, assumptions, or beliefs, which are central to institutional logics. Thus, quantifying the subjectivity of institutional logics advances qualitative approaches, which are often criticized for not being representative (Flick, 2014) as they allow for a necessary understanding of the relationship between institutional logics and organizational responses

(Greenwood, Raynard, Kodeih, Micelotta, & Lounsbury, 2011). To follow the call by Thornton et al. (2012) to include new methodological approaches into institutional logics researchers' repertoire of available methods, this paper addresses the need for a more integrated and holistic analysis of institutional logics. Thus, the development of a quantitative scale-based measurement instrument allows the capture of manifold facets that characterize eco-sustainability and corporation logics.

Based on the comprehensive scale development approach by MacKenzie, Podsakoff, and Podsakoff (2011), I originated scales to measure an eco-sustainability logic (*ESL scale*) and a corporation logic (*COL scale*). To develop conceptual definitions for elements of both institutional logics, I undertook a thorough literature review and enhanced the accuracy and comprehensiveness of the construct definitions with a qualitative pre-study based on 55 in-depth interviews. After an initial item generation, the establishment of content and face validity, and the specification of the formal measurement model, I conducted two quantitative studies with distinct student samples ( $N = 513$ ,  $N = 222$ ), and a third study with working professionals ( $N = 50$ ) to validate the items with a fourth and final study with employees of a large automotive company ( $N = 412$ ). During this process, the scales were purified, refined, and assessed for reliability and validity.

This allowed for five main contributions to research on institutional logics and corporate eco-sustainability. First, since I have developed two parsimonious scales, I have provided institutional logics scholars with robust scales, which allocate a holistic concept for the measurement of eco-sustainability and corporation logics, and contribute to a methodological advancement of the field of institutional logics (Thornton et al., 2012). Second, whereas existing research mainly focuses on the institutional logic and its consequences on different behaviors, my analysis shows the merit of examining the effects of different elements of an institutional logic. Third, since extant institutional logics literature often fails to provide

definitions of the various framework elements, the qualitative pre-study allows the closing of this gap for two institutional logics by providing definitions of the essential and necessary elements that characterize an eco-sustainability logic and a corporation logic. Fourth, by developing these definitions, I add to advancements of the scale-development-process approach, since existing scale-development studies often fail to provide detailed construct definitions and implications for their measurement models (MacKenzie et al., 2011). Fifth, by applying a comprehensive scale-development approach that includes one qualitative and four quantitative studies, my study satisfies the need for attention to methods of discovery and methods of validation (Thornton et al., 2012).

The remainder of this paper is organized as follows. In the following section, I provide an overview of existing research on institutional logics and eco-sustainability in corporate organizations and existing measurement approaches. Next, I present my pre-study for construct definition and content domain, before providing insights into item generation and content validity assessments. Following this, I draw on four quantitative studies to reveal the construct development and validation process. The fourth study highlights the final ESL and COL scales, including all final items, and the assessment of the measurement model. I discuss my results and provide theoretical, methodological, and managerial contributions. Finally, I refer to limitations, the potential for further research, and a concluding summary.

## **Theoretical Background**

### **An Introduction to Institutional Logics**

Grounded in neo-institutional theory (Bourdieu, 1984; DiMaggio & Powell, 1983), Friedland and Alford (1991) introduced the concept of institutional logics as a link between individual practices and broader social institutions. An institutional logic is defined as “the socially constructed patterns of cultural symbols and material practices, assumptions, values, beliefs, and rules by which individuals and organizations produce and reproduce their material

subsistence, organize time and space, and provide meaning to their social reality” (Thornton & Ocasio, 1999, p. 804). Institutional logics are therefore central to individuals’ and organizations’ identity, values, and interests (Thornton et al., 2012) and represent a frame of reference that individuals and organizations use to evaluate the world around them and everything that happens within it (Martin et al., 2017). Thus, institutional logics provide actors with a set of cohesive assumptions, rules, and beliefs to help them make sense of the world, orient themselves towards others, and account for their behavior (Currie & Spyridonidis, 2016; Ocasio, Mauskopf, & Steele, 2016).

Institutional logics are important for understanding behavior in organizations (Reay & Hinings, 2009) as they underpin individual practices consistently within a given situation (Berente & Yoo, 2012; Friedland & Alford, 1991). Since institutional logics provide guiding principles for appropriate behavior, actions are regarded as legitimate when they are in line with the dominant institutional logic (Fiedler & Welp, 2010; Flickinger, Gruber-Mücke, & Fiedler, 2013). Thus behavior in organizations could be guided by one institutional logic, such as an eco-sustainability logic or a corporation logic, or through a hybrid logic, which combines elements from, for example, an eco-sustainability logic and a corporation logic (Seidler, Henkel, Fiedler, & Kranz, 2017, 2018).

### **Eco-Sustainability and Corporation Logics in Organizations**

For the characterization of institutional logic elements, the framework by Thornton et al. (2012) has become a well-acknowledged and comprehensive tool (Johansen & Waldorff, 2015). Since the elements specify the organizing principles that frame organizational behavior, interests, and preferences, the elements should not be understood as distinct, but rather *complementary* (Thornton et al., 2012). With this assumption in mind, two institutional logics have been developed to understand eco-sustainable behavior (Schick et al., 2016) and corporate behavior (Thornton et al., 2012).

Building on the work of Lee and Lounsbury (2015) and Corbett et al. (2018) as well as the well-established framework of Thornton et al. (2012), Schick et al. (2016) developed an *eco-sustainability logic* to explain eco-sustainable behavior (Table 7). This eco-sustainability logic assumes that behavior is legitimized by associated environmental impacts. As commitment to eco-sustainable values provides others with the opportunity to sanction environmentally unfriendly behavior, authority is related to strong eco-sustainable attitudes and values. Identity is connected to attempts to enhance positive environmental impacts, i.e. environmental championship (Andersson & Bateman, 2000). Furthermore, norms are predicated on the participation in environmentally friendly actions based on a conviction to protect the environment (Schick et al., 2016). In a dominant eco-sustainability logic, a strong investment in eco-sustainable behaviors results in an increase in attention. The overall behavioral goal is to leverage eco-sustainable behavior, since this is assumed to be the appropriate behavior to protect the environment. As eco-sustainable behavior is based on the normative concern to protect the environment, the visibility of environmental impacts serves as an informal control mechanism. Thus, as the overarching goal is to protect the environment, an eco-sustainability logic is rooted in the ideal notion of eco-sustainability and allows for ecological capitalism.

To elaborate on corporate behavior in organizations, I draw on Thornton et al.'s (2012) *corporation logic* (Table 7), which is “realized through managerial techniques for controlling professionals’ activity” (Martin et al., 2017, p. 6). Following this logic, employee behavior is mainly oriented towards hierarchy, with an aim to increase the size and diversification of the company (Thornton et al., 2012). A good market position of the company legitimizes this behavior. Authority is enacted by the company’s top management, whereas employees identify with their formal, bureaucratic roles and relate to the company’s norms. As corporate organizations are characterized by hierarchy, employees receive more attention with an

increasing status in this hierarchical order. An organization culture that reflects these relationships serves as informal control mechanism and enables managerial capitalism.

**Table 7.** Overview of the Eco-Sustainability Logic and the Corporation Logic

| Elements<br>(Thornton et al., 2012) | Eco-Sustainability Logic<br>(Schick et al., 2016)              | Corporation Logic<br>(Thornton et al., 2012) |
|-------------------------------------|----------------------------------------------------------------|----------------------------------------------|
| Root metaphor                       | Eco-sustainability as an ideal                                 | Corporation as hierarchy                     |
| Sources of legitimacy               | Environmental impacts                                          | Market position of the firm                  |
| Sources of authority                | Commitment to eco-sustainable values                           | Board of directors, top management           |
| Sources of identity                 | Environmental championship                                     | Bureaucratic roles                           |
| Basis of norms                      | Participation based on a conviction to protect the environment | Employment in firm                           |
| Basis of attention                  | Investment in eco-sustainable behavior                         | Status in hierarchy                          |
| Basis of strategy                   | Increase eco-sustainable behavior                              | Increase size and diversification of firm    |
| Informal control mechanism          | Visibility of eco-sustainable impacts                          | Organization culture                         |
| Economic system                     | Ecological capitalism                                          | Managerial capitalism                        |

### **Institutional Logics and their Measurement**

To gain an in-depth understanding of measurement approaches for institutional logics in organizations, I conducted a thorough literature review<sup>4</sup>. While institutional logics have been

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<sup>4</sup> The literature review included international peer-reviewed journals in the field of organizational behavior and human resource management, business and international management including business ethics, strategy and management, management information systems, and organizational sociology with an impact factor of 1.0 or above (Guerrero-Bote & Moya-Anegón, 2012; SCImago, 2007). Since the focus laid on methodological approaches towards institutional logics in organizational contexts, I diminished the literature to be reviewed by excluding theoretical work in non-organizational contexts.



applied in a large number of qualitative studies – investigating institutional logics based on interviews and observational data (e.g., Battilana & Dorado, 2010; Berente & Yoo, 2012; Currie & Spyridonidis, 2016; Ioannou & Serafeim, 2015), very few studies attempt quantitative measurements of institutional logics (see the overview in Table 8). Some authors, including Sonpar, Handelman, and Dastmalchian (2009), Thornton (2001, 2002), and Thornton and Ocasio (1999), use a mixed-methods approach to research institutional logics in organizations, utilizing qualitative data such as interviews or document analyses to retrieve dominant institutional logic(s) and additionally measure their effects using quantitative approaches such as hazard-rate models (e.g., Thornton, 2001, 2002) or event history designs (e.g., Thornton & Ocasio, 1999). Even though these studies provide interesting insights, the mixed-methods approach is criticized for its lack of descriptive accuracy, validity, and exhaustiveness (Symonds & Gorard, 2003). The few studies measuring logics quantitatively mostly use secondary data sources to operationalize institutional logics by applying event history designs (Joseph, Ocasio, & McDonnell, 2014; Lee & Lounsbury, 2015; Lounsbury, 2002; Marquis & Lounsbury, 2007), textual analyses (Johnson, Safadi, & Faraj, 2015), or regression analyses (Lounsbury, 2007; Miller, Le Breton-Miller, & Lester, 2011). However, secondary data can hardly illustrate latent factors, such as attitudes, values, or beliefs, which are central to institutional logics (Martin et al., 2017).

Against this backdrop, only the study by Ollier-Malaterre, McNamara, Matz-Costa, Pitt-Catsouphes, and Valcour (2013) draws on a quantitative survey-based measurement of strategic, benchmarking, and compliance logics and thus serves as a first important step towards a survey-based measurement of institutional logics. However, the authors acknowledge that it lacks more sophisticated data “that would allow for causal interpretations of the findings” (Ollier-Malaterre et al., 2013, p. 1390). Since institutional logics frame individuals’ and organizations’ identity, values, and interests and therefore exceed secondary

data measurements by latent factors such as attitudes, assumptions, or beliefs (Martin et al., 2017), I aim to develop a survey measurement to quantify an eco-sustainability logic (Schick et al., 2016) and a corporation logic (Thornton et al., 2012).

**Table 8.** Overview of Quantitative Studies measuring Institutional Logics

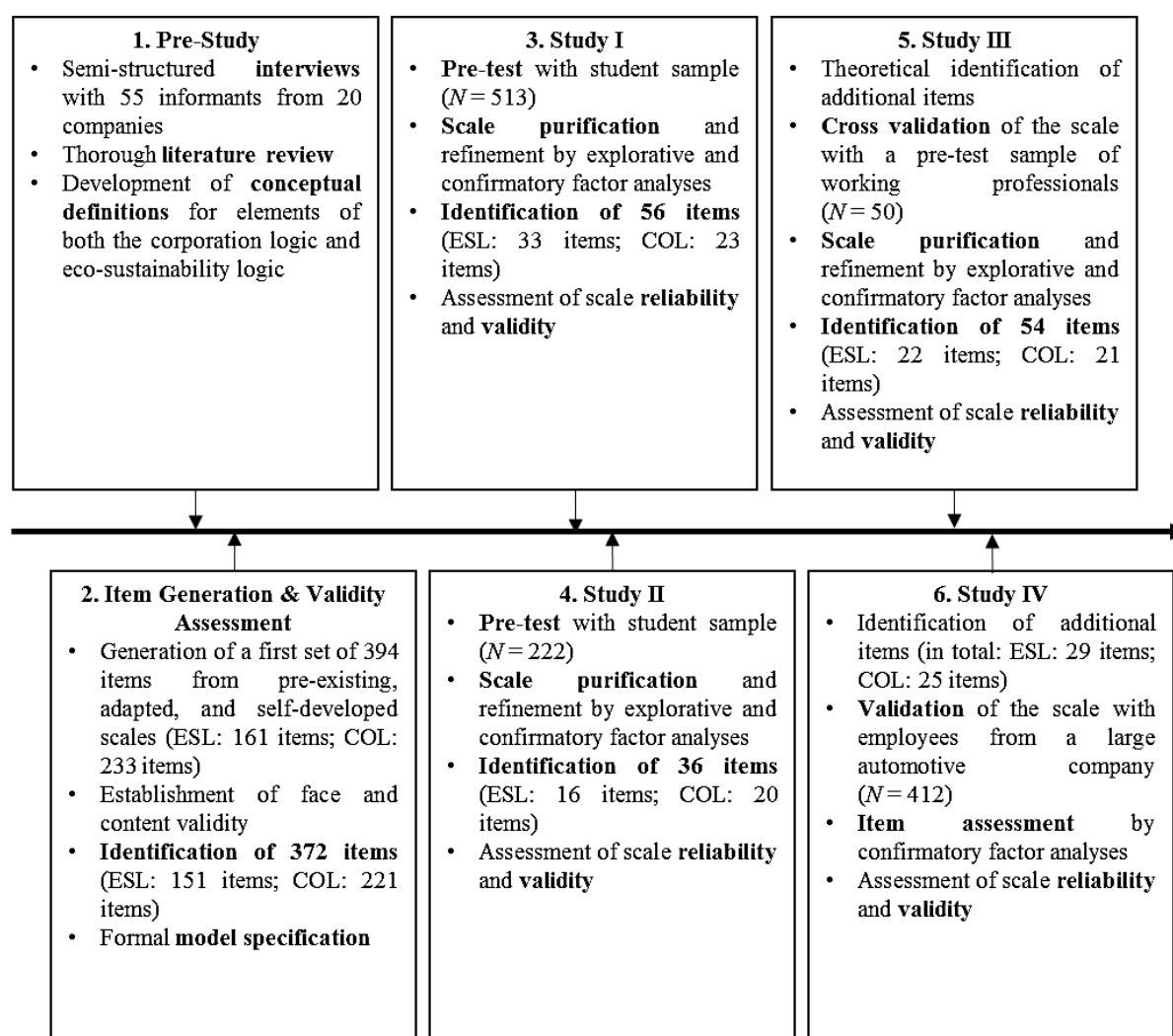
| Authors, year                  | Institutional logic(s)                                                              | Method                 | Measurement                                                                                                                                       |
|--------------------------------|-------------------------------------------------------------------------------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Johnson et al. (2015)          | Logics of online communities                                                        | Textual analysis       | Proxies based on online community usage data                                                                                                      |
| Joseph et al. (2014)           | Logics of shareholder value                                                         | Event history analysis | Proxies based on financial data from Fortune 500 companies                                                                                        |
| Lee and Lounsbury (2015)       | Proenvironmental logic, market logic, political conservative logic, and state logic | Event history analysis | Proxies based on industrial facilities and community panel data                                                                                   |
| Lounsbury (2002)               | Regulatory logic and market logic                                                   | Event history analysis | Proxies based on financial data from professional and business finance associations                                                               |
| Lounsbury (2007)               | Trustee logic and performance logic                                                 | Regression analysis    | Proxies based on yearly data from mutual funds                                                                                                    |
| Marquis and Lounsbury (2007)   | Logic of community banking and national logic of economic efficiency                | Event history analysis | Proxies based on annual branch insurance data                                                                                                     |
| Miller et al. (2011)           | Logic of family nurturers and logics of entrepreneurs                               | Regression analysis    | Proxies based on data from family and lone funder companies of the Fortune 1000 companies                                                         |
| Ollier-Malaterre et al. (2013) | Strategic logic, benchmark logic, and compliance logic                              | Survey                 | Survey with ratings on the perceived importance of various strategies, benchmarking against other organizations, and the importance of compliance |

### Construct Measurement and Scale Development

The construct measurement and scale development followed the approach by MacKenzie et al. (2011). Therefore, I conducted a qualitative pre-study, generated an initial set of items, assessed their validity, and specified a formal measurement model. To purify and refine the

scales, I conducted two quantitative studies with student samples ( $N = 513$ ;  $N = 222$ ), cross validated the scales with a sample of working professionals ( $N = 50$ ), and finally validated the scales with employees from a large automotive company ( $N = 412$ ). Figure 3 provides an overview of the scale-development process and the steps undertaken, which I will evaluate in detail in the following.

**Figure 3.** Scale Development Process following MacKenzie et al. (2011)



### Pre-Study for Construct Definition and Content Domain

This study builds on a thorough literature review in institutional logics providing insights of eco-sustainable behavior in corporate organizations (Netemeyer, Bearden, & Sharma, 2003). Furthermore, 55 in-depth interviews were conducted with subject matter experts from

20 different companies, highlighting eco-sustainability in their corporate strategy (see Appendix C for an overview of the interviewees) to enhance the accuracy and comprehensiveness of construct definitions and to generate items that reflect these constructs from both a theoretical and empirical perspective (MacKenzie et al., 2011).

Drawing on Flick (2014), I designed a semi-structured interview guide on environmental values, attitudes, Thornton et al.'s (2012) framework elements, and leading institutions and principles, as recommended by Berente and Yoo (2012). The interviews were tape-recorded and I terminated conducting further interviews once I had established a comprehensive and consistent understanding (Paré, 2004). I used the framework elements by Thornton et al. (2012) as a coding scheme and coded the interviews in a three-step approach, including single-case analysis, in-depth analysis, and group comparison, to provide generalizations regarding the characteristics of the dominant logic (Flick, 2014). These interviews were supported by observational data, internal sources (internal policies), and external documents (financial, corporate, and sustainability reports) to verify the consistency of interviewees' statements on past developments and dominant assumptions, values, and beliefs.

This qualitative study acknowledged the eco-sustainability logic (Schick et al., 2016) and the corporation logic (Thornton et al., 2012; see Appendix D for indicative quotes from the interviewees). Synthesizing the extant literature and data from the in-depth interviews, I specified both institutional logics based on the framework elements by Thornton et al. (2012) by elaborating on the conceptual domain and theme of the institutional logics (MacKenzie et al., 2011). These specifications allow the characterization of the elements of both institutional logics as well as the related institution and principles in unambiguous terms. Concerning the framework elements by Thornton et al. (2012), these elements should not be understood as distinct but rather related to each other, as they represent "predictions for symbols and practices in theory likely to be observed within [an institutional order's] sphere of influence"

(Thornton et al., 2012, p. 70). I concentrated on six out of nine elements, as the interviews revealed those elements as essential and necessary for characterizing institutional logics. I further included institutions and principles in the analysis (Berente & Yoo, 2012). Following the qualitative analysis, the results were reconciled, and operational definitions were developed, as shown in Table 9.

**Table 9.** Characteristics and Definitions of the Eco-Sustainability Logic and the Corporation Logic

|                | Source of legitimacy                                                                    | Source of authority                                                            | Source of identity                                                                                                     | Basis of norms                                                                                         | Basis of attention                                                                            | Basis of strategy                                                                       | Institution & principles                                                                                         |
|----------------|-----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
|                | Eco-Sustainability Logic                                                                |                                                                                |                                                                                                                        |                                                                                                        |                                                                                               |                                                                                         |                                                                                                                  |
| Characteristic | Environmental impacts                                                                   | Commitment to eco-sustainable values                                           | Environmental championship                                                                                             | Participation based on a conviction to protect the environment                                         | Investment in eco-sustainable behavior                                                        | Increase eco-sustainable behavior                                                       | Effectiveness for eco-sustainability                                                                             |
| Definition     | The extent to which eco-sustainable behavior has a measurable impact on the environment | The extent to which a commitment to eco-sustainable values increases authority | The extent to which identity is related to activities undertaken as attempts to enhance positive environmental impacts | The extent to which active participation is based on a normative conviction to protect the environment | The extent to which actions for eco-sustainability increases attention within an organization | The extent to which the overarching goal is an increasement in eco-sustainable behavior | The extent to which effective behavior for eco-sustainability is seen as established behavior in an organization |

**Table 9.** Continued

| Corporation Logic   |                                                                                             |                                                                                                                   |                                                                                                                                          |                                                                                                                                                         |                                                                                            |                                                                                                                       |                                                                                                                                        |
|---------------------|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Charac-<br>teristic | Market position<br>of the firm                                                              | Board of<br>directors, top<br>management                                                                          | Bureaucratic roles                                                                                                                       | Employment in<br>firm                                                                                                                                   | Status in<br>hierarchy                                                                     | Increase size and<br>diversification of<br>firm                                                                       | Efficiency for<br>market success                                                                                                       |
| Definit-<br>ion     | The extent to<br>which a<br>company's<br>behavior is<br>reflected in its<br>market position | The extent to<br>which formal,<br>leading<br>authorities that<br>are defined by the<br>company enact<br>authority | The extent to<br>which employees<br>identify with<br>bureaucratic roles<br>as formal<br>structures<br>established by the<br>organization | The extent to<br>which employees<br>base their<br>normative<br>conviction on a<br>binding contract<br>between the<br>individual and the<br>organization | The extent to<br>which status-<br>based structures<br>increase attention<br>in the company | The extent to<br>which the<br>overarching goal<br>is to increase the<br>size and<br>diversification of<br>the company | The extent to<br>which efficient<br>behavior is seen<br>as an established<br>procedure to<br>increase a<br>company's<br>market success |

## Construct Development and Validation

### Item Generation and Content Validity Assessment

**Item generation.** Accurately defining the eco-sustainability and corporation logic, their elements, and related institution and principles allows for the development of scale items for the ESL scale and the COL scale that can measure the strength with which each dimension exists in an organization. To generate a pool of items, the literature was thoroughly reviewed and the interview narratives were analyzed (Papadas, Avlonitis, & Carrigan, 2017). Due to institutional complexity, institutional logics operate on a macro-level, i.e. referring to the organization or department, and a micro-level, i.e. referring to the individual (Martin et al., 2017). Thus, items referring to both levels for each element of the logics were included. In total, a set of 394 items from pre-existing, adapted, and self-developed scales (ESL: 161 items; COL: 233 items) were initially generated with thorough consideration of wording clarity, redundancy, response format, and obvious social desirability (MacKenzie et al., 2011).

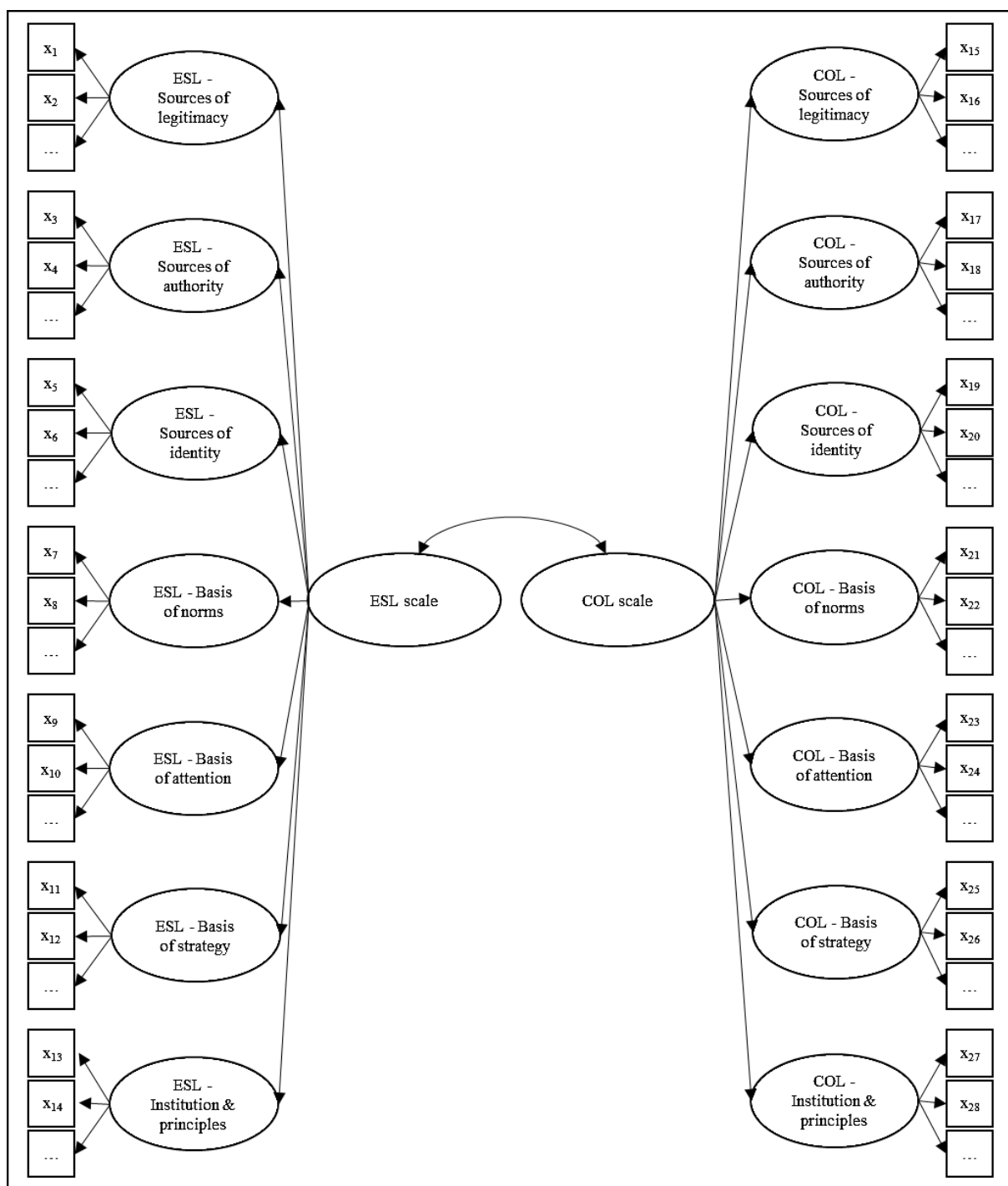
**Content validity assessment.** Following the initial item generation, content and face validity was assessed. For face validity, ten judges (seven organization researchers and three management practitioners) were invited to provide feedback on representativeness, clarity, and specificity (MacKenzie et al., 2011; Netemeyer et al., 2003). Content validity was established using six raters that categorized each item on a three-point scale ([1] item is essential; [0] item is useful, but not necessary; [-1] item is not necessary; Lawshe, 1975; MacKenzie et al., 2011). I calculated the content validity ratio (CVR) for each item and refined or removed items that did not adequately represent the constructs. I thereby identified 372 items (ESL: 151 items; COL: 221 items), building sub-categories with a sufficiently high content validity index ( $CVI \geq 0.654$ ; Lawshe, 1975).

**Measurement model and assumptions.** Figure 4 exhibits the measurement model and inhibits several assumptions based on the nature of institutional logics. As each of the



elements adds to the institutional logics and reflects characteristics of those logics, these elements are *reflectively* measured. Furthermore, as different institutional logics can exist at the same time and form hybrid organizations (e.g., Bévort & Suddaby, 2016; Ocasio & Radoynovska, 2016), I assume that the ESL scale and the COL scale are *correlated*. Since the elemental categories by Thornton et al. (2012) specify the organizing principles that shape individual and organizational preferences, interests, and behavior within a specific institutional logic, these elemental categories are considered *complementary*. Thus, I assume that the items measure the different elements, but, in turn, I do not assume these elements to be distinct.

**Figure 4.** Formal Measurement Model



### Quantitative Study I for Explorative Item Assessment

Once the item pool was thoroughly judged, modified, and trimmed by practitioners and organization scholars, pilot testing took place on a larger sample of undergraduate and graduate management students ( $N = 513$ ; Netemeyer et al., 2003). The participants were

mostly female (74.80 %;  $M_{age} = 21.990$ ,  $SD_{age} = 1.728$ ), had an average work experience at the referring company of six months, and indicated a good knowledge of the company ( $M = 4.910$ ;  $SD = 0.058$ ). To ensure that all participants had first working experience, the students were asked to relate the questions to work experience of more than three months. I controlled the type and duration of employment, company division, and the company's number of employees and branch. I further assessed how well the participants know the company, and the participants' age, sex, student status, study program, and duration of study. Participants knowledge of the company was measured on a seven-point Likert scale (anchored between [1] strongly disagree and [7] strongly agree), and age was continually measured. All other items were measured as single-choice questions.

To ensure an appropriate item-respondent ratio, I split the questions according to the framework elements by Thornton et al. (2012) and institutions and principles. To prevent any bias due to the questionnaire split, the students always had to answer questions from two elements of the eco-sustainability and the corporation logic. I ensured that each element of both logics was displayed together with each individual element. For example, if one group of participants received items measuring eco-sustainability logic's basis of legitimacy and sources of identity, these participants also received items measuring corporation logic's basis of legitimacy and sources of identity. This resulted in 28 different questionnaires. I then matched questionnaires based on sociodemographic variables (Hulley, Cummings, Browner, Grady, & Newman, 2013), which resulted in a final sample of 103 completed questionnaires.

Explorative factor analyses (EFAs) using direct oblimin rotation<sup>5</sup> were performed for the ESL scale and COL scale to reduce the number of items and test the underlying dimensions of

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<sup>5</sup> Varimax rotation was performed as, based on the theoretical framework of institutional logics; it is assumed that the factors displaying Thornton et al.'s (2012) framework categories, institutions, and principles are correlated.

the constructs. To avoid non-hypothesized cross loadings and to ensure factor loadings above 0.300 (Stevens, 2002), I deleted 96 items for the ESL scale and 157 items for the COL scale. An EFA with the remaining items (ESL: 33 items,  $KMO = 0.641$ ,  $p < .001$ ; COL: 23 items,  $KMO = 0.646$ ,  $p < .001$ ) reveals, consistent to theory, a seven-factor solution for each logic with eigenvalues above one (ESL: variance explained = 78.31 %; COL: variance explained = 79.03 %). As the squared multiple correlation of each indicator of both scales is sufficiently high and suggests that the majority of the variance in the indicator is due to the latent construct (MacKenzie et al., 2011), the individual indicators are considered valid and reliable.

Next, I conducted a structural equation model (SEM)-based confirmatory factor analysis (CFA), using a covariance-based approach, independently for both scales, to ensure the factor structure. As the elements of each institutional logic are considered latent constructs based on underlying assumptions, values, and norms, it is likely that not all factors in the model are distinct. Thus, I allowed the error terms of the items within one element to correlate. The CFA reveals that all items loaded on the intended factor, but not all items exceeded the recommended level of .300, indicating that the identified factors are not distinct (Gorsuch, 1983). However, since the items loaded the highest on the intended factors, this supports the underlying theoretical assumptions that the elemental categories of the institutional logics – represented by the factors – are complementary.

Due to the relatively small sample size, I used R (R Development Core Team, 2008) to calculate the model fit with Swain correction to better approximate the Chi-square distribution (Swain correction factor: ESL: 0.746; COL: 0.733; Antonakis & Bastardo, 2013; Herzog & Boomsma, 2009). This CFA revealed a mediocre model fit for both scales (ESL:  $X^2 = 579.461$ ,  $p = 0.004$ ,  $RMSEA = 0.041$ ,  $CFI = 0.944$ ;  $TLI = 0.825$ , average variance extracted ( $AVE$ )  $\geq .669$ ; COL:  $X^2 = 288.027$ ,  $p = 0.005$ ,  $RMSEA = 0.050$ ,  $CFI = 0.640$ ;  $TLI = 1.346$ ,  $AVE \geq 0.351$ ). However, both scales fulfill the Fornell Larcker criteria (Fornell & Larcker,

1981), and all sub-scales based on the framework elements by Thornton et al. (2012) and institutions and principles are considered reliable (ESL:  $\alpha \geq .876$ ; COL:  $\alpha \geq .744$ ). Models with many variables often do not provide sufficiently high model fit values and especially the Comparative Fit Index (CFI) and the Tucker-Lewis Index (TLI) tend to worsen with an increase of variables (Kenny & McCoach, 2003). As the Chi-square test is also found to be related to sample size and model complexity (Hu & Bentler, 1999; MacKenzie et al., 2011) and is often criticized for conceptual reasons as the null of perfect fit is unreasonable (Brown, 2015; Little, 2013), I conducted a second study with the remaining 56 items. Table 10 provides an overview of the discussed assessment.

**Table 10.** Overview of Explorative Item Assessment

| # items   | Reliability | Validity     |                    |         | Model fit |       |       |       |
|-----------|-------------|--------------|--------------------|---------|-----------|-------|-------|-------|
|           | $\alpha$    | AVE          | Fornell<br>Larcker | $X^2$   | p         | RMSEA | CFI   | TLI   |
| ESL scale |             |              |                    |         |           |       |       |       |
| 33        | $\geq .876$ | $\geq .669$  | *                  | 579.461 | 0.004     | 0.041 | 0.944 | 0.825 |
| COL scale |             |              |                    |         |           |       |       |       |
| 23        | $\geq .744$ | $\geq 0.351$ | *                  | 288.027 | 0.005     | 0.050 | 0.640 | 1.346 |

*Note.* \* Fulfillment of Fornell Larcker criteria (Fornell & Larcker, 1981).

### Quantitative Study II for the Refinement of Former Results

To assess the 56 items derived in study I (ESL: 33 items; COL: 23 items), I conducted a second pre-test with university students ( $N = 222$ ). Participants were mainly female (64.90 %;  $M_{age} = 22.790$ ;  $SD_{age} = 2.818$ ), had an average work experience at the referring company of six months, and indicated a good knowledge of the company ( $M = 5.350$ ,  $SD = 1.127$ ). This second study used the same instructions and control variables as study I.

Similar to the first study, I conducted EFAs using direct oblimin rotation and eliminated items with non-sufficient factor loadings or non-hypothesized cross loadings. I conducted an EFA with the remaining items for the ESL scale (16 items) and the COL scale (20 items) independently. For the COL scale, the EFA revealed a seven-factor solution with eigenvalues

above one ( $KMO = 0.759$ ,  $p < .001$ ; variance explained = 78.05 %), as theoretically indicated. As the squared multiple correlation of each indicator of both scales is sufficiently high, the individual indicators are considered valid and reliable. However, for the ESL scale, the EFA reveals a five-factor solution ( $KMO = 0.934$ ,  $p < .001$ , variance extracted = 75.25 %), indicating that items intended to measure the sources of identity and the basis of norms, and basis of attention and basis of strategy load on the same factor. As these elements are characterized as related categories (Thornton et al., 2012), this is only slightly surprising. In an eco-sustainability logic, identity is based on environmental championship, which might be connected to a conviction to protect the environment (basis of norms; Schick et al., 2016). Also, aiming at an increase in eco-sustainable behavior (basis of strategy) relates to receiving attention based on investment in eco-sustainable behavior (basis of attention).

Similar to the first study, I conducted CFAs for both scales independently using Swain correction due to a small sample size (Swain correction factor: ESL: 0.920; COL: 0.922) and allowed error terms to correlate. I used a seven-factor solution to model the ESL scale, as this is based on the framework by Thornton et al. (2012), which is well-evaluated by qualitative studies (Martin et al., 2017). As in study I, the CFA reveals that all items loaded on the intended factors, but not all items exceeded the recommended level of .300 (Gorsuch, 1983). Since the items loaded the highest on the intended factor, this is in line with the underlying theoretical assumptions that elemental categories complementarily frame an institutional logic.

The SEM-based CFA revealed a mediocre model fit for both scales (ESL:  $X^2 = 109.801$ ,  $p = 0.015$ ,  $RMSEA = 0.041$ ,  $CFI = 0.982$ ;  $TLI = 0.864$ ; COL:  $X^2 = 175.676$ ,  $p = 0.029$ ,  $RMSEA = 0.033$ ,  $CFI = 0.973$ ;  $TLI = 0.917$ ). The Root Mean Square Error of Approximation (RMSEA), as an absolute fit index that compares the fit of the model to a perfectly fitting model, and CFI, as a relative fit index that compares the fit of the model to the fit of the null

model, demonstrate a good model fit. Furthermore, both scales indicate a sufficient AVE (ESL: all  $AVE \geq 0.636$ ; COL: all  $AVE \geq 0.602$ ), fulfill the Fornell Larcker criteria (Fornell & Larcker, 1981), and all sub-scales based on the framework elements by Thornton et al. (2012) and institutions and principles are considered reliable (ESL:  $\alpha \geq .831$ ; COL:  $\alpha \geq .721$ ). However, the Chi-square test and related TLI do not support the model. This is not surprising, as the Chi-square test looks at whether the variables are independent and has no interest in the combined effect of the variables. As the framework elements by Thornton et al. (2012) are not considered distinct categories but related to each other and to the overarching institution and principles (Thornton et al., 2012), it is very likely that the variables are not independent. Thus, even though the Chi-square test and the related TLI, which are often criticized for conceptual reasons (Brown, 2015; Little, 2013), provide limited support for the model, I conducted a third study to cross-validate the scales and test the remaining items. Table 11 provides an overview of the discussed item assessment.

**Table 11.** Overview of Item Assessment for Refinement

| # items   | Reliability |              | Validity           |         | Model fit |       |       |       |
|-----------|-------------|--------------|--------------------|---------|-----------|-------|-------|-------|
|           | $\alpha$    | AVE          | Fornell<br>Larcker | $X^2$   | p         | RMSEA | CFI   | TLI   |
| ESL scale |             |              |                    |         |           |       |       |       |
| 16        | $\geq .831$ | $\geq 0.636$ | *                  | 109.801 | 0.015     | 0.041 | 0.982 | 0.864 |
| COL scale |             |              |                    |         |           |       |       |       |
| 20        | $\geq .721$ | $\geq 0.602$ | *                  | 175.676 | 0.029     | 0.033 | 0.973 | 0.917 |

*Note.* \* Fulfillment of Fornell Larcker criteria (Fornell & Larcker, 1981).

### Quantitative Study III for Cross Validation

I conducted a third study to cross validate the 36 remaining items (ESL: 16 items; COL: 20 items). To ensure that all framework elements are at least measured with three items that are unidimensional for the same construct (MacKenzie et al., 2011), I theoretically identified 19 additional items (ESL: twelve items; COL: seven items), which I assessed for content validity using a card-sorting procedure with ten raters (six academics, four practitioners; hit ration  $\geq$

54.00 %; Benlian, Koufaris, & Hess, 2011). All items were then assessed with a sample of working professionals ( $N = 50$ ). Participants' sex was almost evenly distributed (52.00 % male, 48.00 % female) and participants mean age was 37.960 years ( $SD = 14.956$ ). Participants had an average work experience of five to ten years and indicated that, on average, they worked for companies with more than 1,000 employees for three to four years. Participants indicated a good knowledge of the company ( $M = 5.560$ ,  $SD = 1.110$ ). As in prior studies, I controlled for type and duration of employment, company division, the company's number of employees and branch. I further assessed how well the participants know the company, and participants' age, sex, and work experience. Age was measured as a continuous variable and participants' knowledge was measured on a seven-point Likert scale (anchored between [1] strongly disagree and [7] strongly agree). All other items were measured as single-choice questions.

Similar to studies I and II, I conducted EFAs using direct oblimin rotation and eliminated items with non-sufficient factor loadings or non-hypothesized cross loadings. I conducted an EFA with the remaining items for ESL scale (22 items) and the COL scale (23 items), independently. For the ESL scale, this analysis reveals a seven-factor solution with eigenvalues above one ( $KMO = 0.859$ ,  $p < .001$ , variance explained = 89.72 %). However, for the COL scale, the EFA reveals a six-factor solution ( $KMO = 0.767$ ,  $p < .001$ , variance extracted = 81.97 %), indicating that items intended to measure the sources of authority and basis of strategy load on the same factor. As these elements are characterized as related categories, this is slightly astonishing. In a corporation logic, authority is enacted by top management, which also shapes the corporate strategy aiming to increase the company's size and diversification (basis of strategy).

I conducted CFAs for both scales independently using Swain correction due to a small sample size (Swain correction factor: eco-sustainability: 0.820; corporation: 0.841) and did



allow error terms to correlate. I used a seven-factor solution to model both institutional logics, as this is based on the well-evaluated framework by Thornton et al. (2012) (Martin et al., 2017). Like studies I and II, even though all items loaded the highest on the intended factor, not all items exceeded the recommended level of .300 (Gorsuch, 1983). This supports the theoretical assumption that elemental categories are complementarily representing institutional logics. Since the overall model fit increased when two items of the COL scale were removed, I deleted these items. Thus, the scales consisted of 22 items (ESL scale) and 21 items (COL scale), respectively.

Using R, the SEM-based CFA revealed a good model fit for both scales (ESL:  $X^2 = 236.482$ ,  $p = 0.007$ ,  $RMSEA = 0.074$ ,  $CFI = 0.962$ ;  $TLI = 0.952$ ; COL:  $X^2 = 175.788$ ,  $p = 0.005$ ,  $RMSEA = 0.084$ ,  $CFI = 0.937$ ;  $TLI = 0.918$ ). Thus, the RMSEA, CFI, and TLI show a good model fit. However, the Chi-square test does not support the model, which is likely due to the fact that the elements, underlying institution, and principles together form the logics and they are consequently not considered as fully distinct constructs. Furthermore, both scales indicate a sufficient AVE (ESL: all  $AVE \geq 0.663$ ; COL: all  $AVE \geq 0.546$ ), fulfill the Fornell Larcker criteria (Fornell & Larcker, 1981), and all sub-scales based on the framework elements by Thornton et al. (2012) and institutions and principles are considered reliable (ESL:  $\alpha \geq .821$ ; COL:  $\alpha \geq .652$ ). Table 12 provides an overview of the discussed item assessment.

**Table 12.** Overview of Item Assessment for Cross Validation

| # items   | Reliability |              | Validity           |         |       | Model fit |       |       |
|-----------|-------------|--------------|--------------------|---------|-------|-----------|-------|-------|
|           | $\alpha$    | AVE          | Fornell<br>Larcker | $X^2$   | p     | RMSEA     | CFI   | TLI   |
| ESL scale |             |              |                    |         |       |           |       |       |
| 22        | $\geq .821$ | $\geq 0.663$ | *                  | 236.482 | 0.007 | 0.074     | 0.962 | 0.952 |
| COL scale |             |              |                    |         |       |           |       |       |
| 21        | $\geq .652$ | $\geq 0.546$ | *                  | 175.788 | 0.005 | 0.084     | 0.937 | 0.918 |

*Note.* \* Fulfillment of Fornell Larcker criteria (Fornell & Larcker, 1981).

### **Quantitative Study IV for Scale Validation**

I conducted a fourth study with employees of a German automotive company to assess the 43 items identified in study III (ESL: 22 items; COL: 21 items). To ensure that all elements of the institutional logics are measured on the macro-level (i.e. organization or department) and the micro-level (i.e. individual; Martin et al., 2017), I identified eleven additional items (ESL: seven items; COL: four items), which were similar in their wording to existing items in both scales but were adapted to either the micro- or macro-level following MacKenzie et al.'s (2011) recommendations. These items were assessed for face validity by nine judges (seven organization researchers and two management practitioners), who provided feedback on representativeness, clarity, and specificity (MacKenzie et al., 2011; Netemeyer et al., 2003). The resulting final 54 items (ESL: 29 items; COL: 25 items) were either self-developed or adapted from prior studies (see Appendix E for the source of the scale items).

I identified 1,500 representative employees, from which  $N = 412$  fully completed the survey (response rate: 27.50 %). Participants were mainly male (74.50 %) and their mean age was 41.230 years ( $SD = 11.170$ ). Participants had an average work experience of six to ten years and 11.90 % of all participants were directly responsible for personnel. I controlled for participants' education, work experience, company division, and direct personnel responsibility. I further assessed the participants' age and sex. Age was measured continually, whereas all other items were measured as single-choice questions.

I conducted a CFA for both scales independently and allowed error terms to correlate. Even though not all items exceeded the recommended level of .300 (Gorsuch, 1983), all items loaded the highest on the intended factors. Thus, the identified factors are not distinct, which supports the underlying theoretical assumptions because the factors are intended to represent different framework elements that complementarily build the institutional logic. Using R, the SEM-based approach revealed a good model fit for both scales (ESL:  $X^2 = 971.138$ ,

$p < 0.001$ ,  $RMSEA = 0.067$ ,  $CFI = 0.934$ ;  $TLI = 0.921$ ; COL:  $X^2 = 728.699$ ,  $p < 0.001$ ,  $RMSEA = 0.066$ ,  $CFI = 0.908$ ;  $TLI = 0.900$ ). Thus, the RMSEA, CFI, and TLI show a good model fit. However, the Chi-square test does not support the model, which is likely since the elements, underlying institution, and principles together form the institutional logics and are thus not considered as fully distinct constructs.

Since composite reliability (CR) exceeds the level of .600 for most of the sub-categories, as recommended by Fornell and Larcker (1981) (all  $CR \geq .717$ ), the scales indicate a sufficient AVE ( $AVE \geq .397$ ; Fornell & Larcker, 1981; see Table 13). Both scales mostly fulfill the Fornell Larcker criteria since the AVE for most constructs was higher than the squared correlation between that construct and any other construct (Fornell & Larcker, 1981). The only sub-scale that was problematic with respect to discriminant validity was the ESL scale's sub-scale for sources of identity. For this sub-scale, even though the composite reliability was sufficiently high ( $CR = .751$ ), AVE did not exceed the recommended level of 0.400 ( $AVE = .340$ ). Furthermore, the square root of the AVE was less than the absolute value of the correlations with another factor, and maximum shared variance (MSV) did not exceed AVE (see Table 13). All sub-scales based on the framework elements by Thornton et al. (2012) and institutions and principles are considered reliable (ESL:  $\alpha \geq .804$ ; COL:  $\alpha \geq .705$ ). Table 14 provides an overview of the discussed item assessment. All items, their means, and standard deviations, as well as the reliability of sub-scales can be found in Tables 15 and 16.

**Table 13.** Discriminant Validity Test

| Construct                    | CR   | AVE  | MSV  | Correlations |      |      |      |      |      |      |
|------------------------------|------|------|------|--------------|------|------|------|------|------|------|
|                              |      |      |      | 1            | 2    | 3    | 4    | 5    | 6    | 7    |
| ESL scale                    |      |      |      |              |      |      |      |      |      |      |
| 1 Sources of Legitimacy      | .953 | .839 | .130 | .916         |      |      |      |      |      |      |
| 2 Sources of Authority       | .832 | .832 | .563 | .264         | .790 |      |      |      |      |      |
| 3 Sources of Identity        | .751 | .340 | .401 | .336         | .479 | .583 |      |      |      |      |
| 4 Basis of Norms             | .923 | .800 | .331 | .254         | .191 | .575 | .895 |      |      |      |
| 5 Basis of Attention         | .846 | .581 | .563 | .284         | .750 | .574 | .275 | .762 |      |      |
| 6 Basis of Strategy          | .878 | .707 | .504 | .306         | .444 | .633 | .299 | .528 | .841 |      |
| 7 Institution and Principles | .891 | .504 | .504 | .360         | .572 | .594 | .276 | .284 | .710 | .760 |
| COL scale                    |      |      |      |              |      |      |      |      |      |      |
| 1 Sources of Legitimacy      | .832 | .626 | .306 | .791         |      |      |      |      |      |      |
| 2 Sources of Authority       | .857 | .669 | .241 | .380         | .818 |      |      |      |      |      |
| 3 Sources of Identity        | .876 | .704 | .180 | .424         | .305 | .839 |      |      |      |      |
| 4 Basis of Norms             | .717 | .465 | .349 | .305         | .425 | .207 | .682 |      |      |      |
| 5 Basis of Attention         | .833 | .626 | .135 | .234         | .368 | .194 | .266 | .791 |      |      |
| 6 Basis of Strategy          | .723 | .397 | .306 | .553         | .491 | .391 | .388 | .293 | .630 |      |
| 7 Institution and Principles | .856 | .498 | .349 | .426         | .442 | .294 | .591 | .243 | .495 | .706 |

**Table 14.** Overview of Item Assessment for Scale Validation

| # items   | Relia-<br>bility | Validity     |                    |         | Model fit |       |       |       |
|-----------|------------------|--------------|--------------------|---------|-----------|-------|-------|-------|
|           | $\alpha$         | AVE          | Fornell<br>Larcker | $X^2$   | p         | RMSEA | CFI   | TLI   |
| ESL scale |                  |              |                    |         |           |       |       |       |
| 29        | $\geq .804$      | $\geq 0.340$ | *                  | 971.138 | $< 0.001$ | 0.067 | 0.934 | 0.921 |
| COL scale |                  |              |                    |         |           |       |       |       |
| 25        | $\geq .705$      | $\geq 0.397$ | *                  | 728.699 | $< 0.001$ | 0.066 | 0.908 | 0.900 |

*Note.* \* Fulfillment of Fornell Larcker criteria (Fornell & Larcker, 1981).

**Table 15.** ESL Scale: Scale Items, Reliability, Means, and Descriptives

| Item                                      |                                                                                                                                                                    | M     | SD    |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------|
| Sources of legitimacy ( $\alpha = .833$ ) |                                                                                                                                                                    |       |       |
| LegESL1                                   | Because of my work, I feel partly responsible for the ecological footprint of my company.                                                                          | 4.430 | 1.702 |
| LegESL2                                   | In my company, the measurement of the following indicators is important with respect to eco-sustainability: inputs of energy.                                      | 5.301 | 1.644 |
| LegESL3                                   | In my company, the measurement of the following indicators is important with respect to eco-sustainability: inputs of water and outputs of waste water.            | 5.289 | 1.576 |
| LegESL4                                   | In my company, the measurement of the following indicators is important with respect to eco-sustainability: implementation of environmental policies and programs. | 4.988 | 1.565 |
| Sources of authority ( $\alpha = .881$ )  |                                                                                                                                                                    |       |       |
| AutESL1                                   | Colleagues who are particularly committed to sustainability can influence decisions in my company.                                                                 | 3.779 | 1.418 |
| AutESL2                                   | Colleagues who are particularly committed to sustainability can strengthen sustainable values in my company.                                                       | 4.413 | 1.460 |
| AutESL3                                   | Colleagues who are particularly committed to sustainability can make a difference in my company.                                                                   | 3.709 | 1.452 |

**Table 15.** Continued

| Sources of identity ( $\alpha = .804$ ) |                                                                                                                                                                         |       |       |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------|
| IdeESL1                                 | Acting environmentally-friendly is an important part of who I am.                                                                                                       | 5.913 | 1.108 |
| IdeESL2                                 | I see myself as a person who improves the sustainability of my company.                                                                                                 | 5.117 | 1.335 |
| IdeESL3                                 | I identify with colleagues who support sustainability in my company.                                                                                                    | 5.595 | 1.231 |
| IdeESL4                                 | In my company, there are departments that act as environmentally conscious role models in the company.                                                                  | 4.578 | 1.444 |
| IdeESL5                                 | My department serves as an environmentally friendly role model for my company.                                                                                          | 3.981 | 1.421 |
| IdeESL6                                 | It is important for my department to be perceived as an environmentally friendly role model for my company.                                                             | 3.954 | 1.509 |
| Basis of norms ( $\alpha = .935$ )      |                                                                                                                                                                         |       |       |
| NorESL1                                 | It is important to me to take an active part in sustainability initiatives in my company, as it enables me to contribute to environmental protection.                   | 5.410 | 1.305 |
| NorESL2                                 | It is important to me to actively participate in sustainability initiatives in the company, as everyone is responsible for environmental protection with their actions. | 5.583 | 1.244 |
| NorESL3                                 | It is a matter of course for me to take an active part in sustainability initiatives at my company as environmental protection concerns everyone.                       | 5.604 | 1.270 |
| Basis of attention ( $\alpha = .875$ )  |                                                                                                                                                                         |       |       |
| AttESL1                                 | Special commitment to sustainable behavior is valued by my employer.                                                                                                    | 3.718 | 1.505 |
| AttESL2                                 | My employer wants me to commit to sustainability on a personal level.                                                                                                   | 4.359 | 1.599 |
| AttESL3                                 | Committing to sustainability is a great way to attract attention in my company.                                                                                         | 3.631 | 1.589 |
| AttESL4                                 | In my company, the commitment to sustainability is honored.                                                                                                             | 3.490 | 1.425 |
| Sources of strategy ( $\alpha = .938$ ) |                                                                                                                                                                         |       |       |
| StrESL1                                 | Environmental issues have a strong impact on the values and philosophy of my team.                                                                                      | 3.473 | 1.497 |
| StrESL2                                 | Environmental issues have a strong impact on my team's planning and information systems (type of information used, etc.).                                               | 3.376 | 1.493 |
| StrESL3                                 | When important decisions are made in my department, environmental issues play an important role.                                                                        | 3.199 | 1.589 |

**Table 15.** Continued

| Institution and principles ( $\alpha = .926$ ) |                                                                                                                                               |       |       |
|------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-------|-------|
| IPEL1                                          | Sustainability has become institutionalized as a proven behavior in my company.                                                               | 3.672 | 1.445 |
| IPEL2                                          | In my work, sustainability is an integral part of my actions.                                                                                 | 3.939 | 1.599 |
| IPEL3                                          | In my company, sustainable behavior has been established.                                                                                     | 3.774 | 1.491 |
| IPEL4                                          | In my department, sustainability has become the guiding principle.                                                                            | 3.318 | 1.512 |
| IPEL5                                          | In my department, we not only avoid negative environmental impacts, but also actively promote the protection of resources.                    | 3.660 | 1.555 |
| IPEL6                                          | In my company, we not only avoid negative environmental impacts, but also design our processes so that as few resources as possible are used. | 3.779 | 1.587 |

*Note.* All items were measured on a seven-point Likert scale from (1) strongly disagree to (7) strongly agree.

**Table 16.** COL Scale: Scale Items, Reliability, and Descriptives

| Item                                      |                                                                                                   | M     | SD    |
|-------------------------------------------|---------------------------------------------------------------------------------------------------|-------|-------|
| Sources of legitimacy ( $\alpha = .834$ ) |                                                                                                   |       |       |
| LegCOL1                                   | My department contributes significantly to the company's success.                                 | 5.600 | 1.384 |
| LegCOL2                                   | If my department did not exist, my business would not as profitable.                              | 5.226 | 1.629 |
| LegCOL3                                   | My department helps strengthen the company's market position.                                     | 5.439 | 1.479 |
| Sources of authority ( $\alpha = .880$ )  |                                                                                                   |       |       |
| AutCOL1                                   | The top management of my company actively articulates their vision for the organization.          | 4.624 | 1.487 |
| AutCOL2                                   | The top management of my company actively formulated a strategy for the organization.             | 4.709 | 1.454 |
| AutCOL3                                   | The top management of my company actively established goals and standards to monitor the company. | 4.243 | 1.563 |
| Sources of identity ( $\alpha = .848$ )   |                                                                                                   |       |       |
| IdeCOL1                                   | My colleagues adequately complete assigned duties.                                                | 5.612 | 1.198 |
| IdeCOL2                                   | My colleagues fulfill responsibilities specified in their job description.                        | 5.500 | 1.255 |
| IdeCOL3                                   | My colleagues meet the formal performance required of their job.                                  | 5.262 | 1.342 |

**Table 16.** Continued

| Basis of norms ( $\alpha = .705$ )             |                                                                                                                                     |       |       |
|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|-------|-------|
| NorCOL1                                        | I talk up this organization to my friends as a good organization to work for.                                                       | 5.883 | 1.178 |
| NorCOL2                                        | I care about the fate of the organization.                                                                                          | 6.687 | 0.762 |
| NorCOL3                                        | The values this company stands for are similar to my own values.                                                                    | 5.143 | 1.317 |
| Basis of attention ( $\alpha = .838$ )         |                                                                                                                                     |       |       |
| AttCOL1                                        | A good position in the company gives weight to my decisions.                                                                        | 5.510 | 1.297 |
| AttCOL2                                        | People who achieved something in the company are heard.                                                                             | 5.197 | 1.384 |
| AttCOL3                                        | As I progress in the company, my status within the company also improves.                                                           | 5.444 | 1.255 |
| Sources of strategy ( $\alpha = .752$ )        |                                                                                                                                     |       |       |
| StrCOL1                                        | In order to grow, over the last three years, this company has established or sponsored several new ventures.                        | 4.854 | 1.357 |
| StrCOL2                                        | In order to grow, over the last three years, this company has aimed to differentiate from its direct competitors.                   | 4.092 | 1.629 |
| StrCOL3                                        | The company's growth ambitions have a strong impact on the values and philosophy of my team.                                        | 4.422 | 1.532 |
| StrCOL4                                        | The company's growth ambitions have a strong impact on my team's planning and information systems (type of information used, etc.). | 4.442 | 1.624 |
| Institution and principles ( $\alpha = .871$ ) |                                                                                                                                     |       |       |
| IPCOL1                                         | In my company, efficient action is a proven approach.                                                                               | 3.854 | 1.479 |
| IPCOL2                                         | In my company, efficient processes have become institutionalized over time.                                                         | 3.888 | 1.505 |
| IPCOL3                                         | In my company, I learned how to act efficiently.                                                                                    | 4.063 | 1.626 |
| IPCOL4                                         | In my department, efficiency has become institutionalized as a mission.                                                             | 4.303 | 1.507 |
| IPCOL5                                         | In my department, efficiency is important.                                                                                          | 5.029 | 1.475 |
| IPCOL6                                         | Efficient action contributes significantly to the success of my department.                                                         | 4.966 | 1.544 |

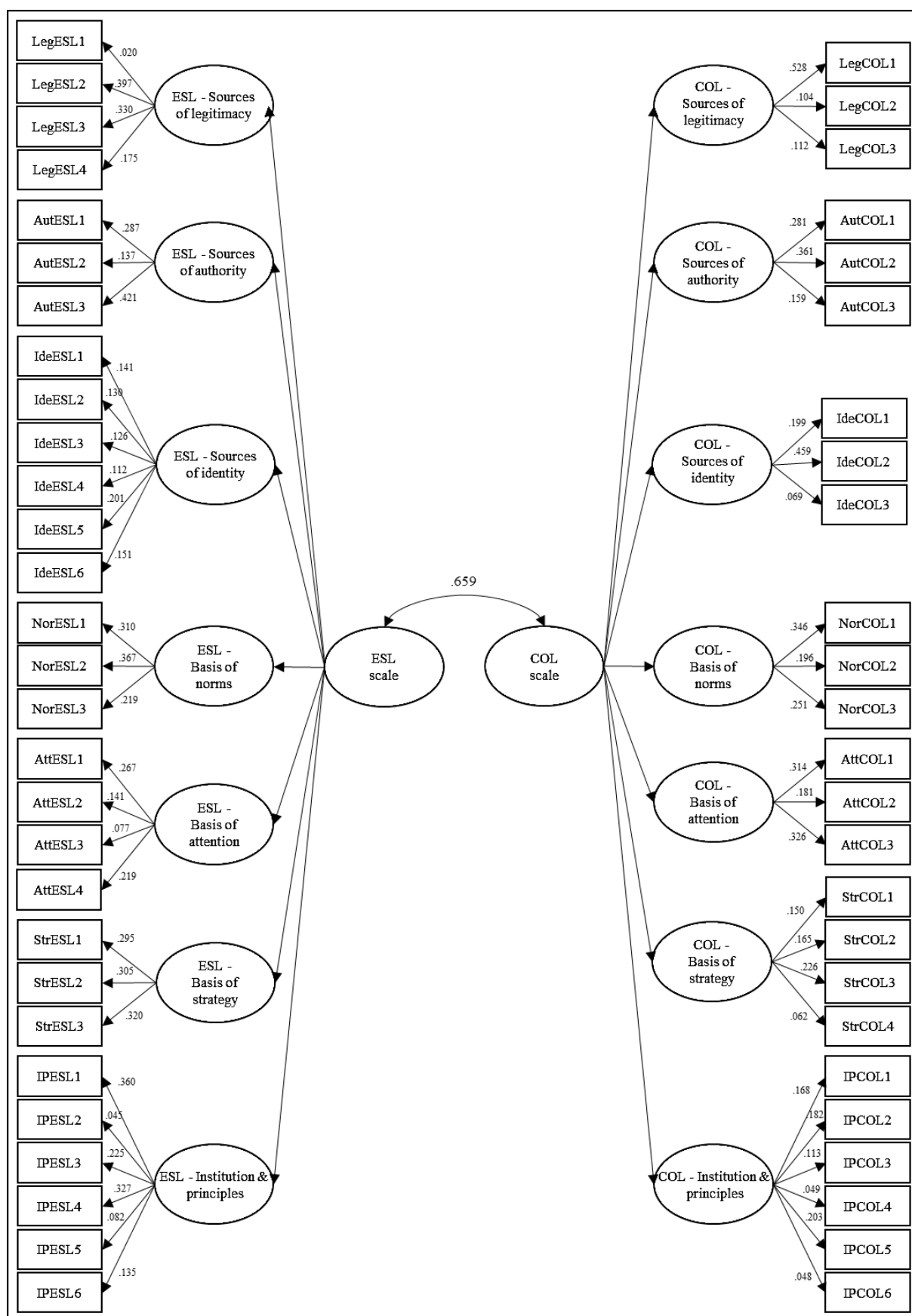
*Note.* All items were measured on a seven-point Likert scale from (1) strongly disagree to (7) strongly agree.

As theoretically assumed, there was a positive correlation between the ESL scale and the COL scale ( $r = .659, p < .001$ ; see Figure 5), supporting the notion that multiple logics might coexist at the same time. The model explains 71.35 % of variance ( $KMO = .927, p < .001$ ) and



reveals a good fit ( $RMSEA = 0.050$ ,  $CFI = 0.911$ ;  $TLI = 0.904$ ). However, the chi-square test does not support the model ( $X^2 = 2676.568$ ,  $p < 0.001$ ), which is likely, since the elements, underlying institution, and principles together form institutional logics and are thus not considered as fully distinct constructs. Further, I theoretically assumed the elements of the institutional logics to be complementary. Thus, since all items loaded the highest on the intended factor, but did not exceed the recommended level of .300 (Gorsuch, 1983), the analysis of the model supports this assumption.

Figure 5. Model Assessment



## Discussion

Given the increasing importance of eco-sustainability for corporate organizations (e.g., Corbett et al., 2018; Seidler et al., 2017), this study is the first attempt to conceptualize and operationalize the broad meaning of institutional logics and construct a comprehensive and empirically tested framework for this notion. Thus, this work is a significant contribution to the further development of the field of institutional logics and eco-sustainability in corporate organizations.

Overall, this work offers five main theoretical and methodological contributions. A first notable contribution of this work is the development of two parsimonious institutional logic scales – the ESL scale and the COL scale. From a methodological perspective, institutional theory scholars now have, at their disposal, robust scales that provide a holistic concept to measure an eco-sustainability and corporation logic. Five studies, including qualitative insights from interviews and documents, and four quantitative assessments, confirm the reliability and validity of the scales and offer confidence for any future scholarly research design, such as experiments or longitudinal studies. This allows for advancements in the field of institutional logics, because institutional logics research solicits to include new methodological approaches, such as experiments or simulations in its repertoire of available methods (Thornton et al., 2012).

Second, this study highlights the value of examining the different elements of both institutional logics. Whereas the research in this domain is limited to the focus of the institutional logic as a whole and its consequences on different behaviors (e.g., Berente & Yoo, 2012; Ocasio, Loewenstein, & Nigam, 2015), my analysis shows the merit of examining different elements of an institutional logic. Since hybrid logics appear to be a frequent outcome of organizational change processes, the approach developed in this study allows the measurement of the strength of each element of different institutional logics. The developed

measurement thus accounts for institutional logics' complexity and provides insights into the nature of potential hybrid logics. This perspective also advances the understanding of coupling mechanisms, which combine elements from different logics within hybrid institutional logics (Greenwood et al., 2011).

Third, my results extend earlier institutional logic studies of eco-sustainable behavior in corporate organizations (Corbett et al., 2018) by providing characteristics and definitions of two institutional logics that guide this behavior, i.e. eco-sustainability logic and corporation logic. In broader institutional logics literature, most studies focus on the institutional framework by Thornton et al. (2012) (Gavetti, Greve, Levinthal, & Ocasio, 2012; Lee & Lounsbury, 2015), but fail to provide detailed definitions of the different framework elements when developing institutional logics. Considering that these elements represent predictions for symbols and practices that are central to institutional logics (Thornton et al., 2012), my qualitative pre-study allowed for definitions of the essential and necessary elements that characterized the eco-sustainability and corporation logics. Thus, by qualitatively exploring definitions for the elements, I provide a deeper and more nuanced understanding of the framework elements by Thornton et al. (2012).

Fourth, and related to the third contribution, by developing definitions for the institutional logics' elements, I add to advancements in the scale-development process approach, since existing scale-development studies often fail to provide detailed construct definitions and implications for their measurement models (MacKenzie et al., 2011). I followed MacKenzie et al. (2011) to adequately define the conceptual domain of the constructs and elaborate on details of the measurement model specifications. I thereby (1) provide guidance about what the construct does and does not refer to; (2) provide indicators that are sufficient and unalloyed, since I fleshed out the definitions with care to prevent overlaps with other constructs already existing in the field; (3) avoid invalid conclusions about relationships with

other constructs that have to be rejected because the indicators of the focal construct do not capture what they intended (MacKenzie et al., 2011).

Fifth, I advance institutional logics literature, which is mainly swayed by qualitative studies, by bringing together qualitative and quantitative research approaches to provide a well-grounded, quantitative measurement model (Thornton et al., 2012). Thus, as I base the scale development on a qualitative pre-study, this study links qualitative methods of discovery and quantitative methods of validation (Thornton et al., 2012). Furthermore, the developed scales broaden institutional logics research as they allow the measurement of latent factors, such as attitudes, assumptions, or beliefs, which are central to institutional logics. A quantitative assessment further allows to understand and compare institutional logics in various contexts.

This study also offers useful insights for practitioners. The ESL scale and the COL scale provide some potential benefits by supporting human resources and strategic managers in assessing individual and organizational identities, values, and interests, framed by institutional logics. This becomes especially important in periods of organizational change, which can be caused by for example company acquisitions or changes in the corporate strategy (Henkel, Seidler, Kranz, & Fiedler, 2017). Thus, my measurement of both institutional logics allows for insights into employees' tradeoffs between corporate behavior and eco-sustainable values and drivers for a corporate and/or eco-sustainable organization culture. Further, the scales are a useful tool to measure the success of organizational sustainability transformations that aim at furthering eco-sustainable behavior in corporate organizations. When applied before and after behavioral change initiatives in organizations, the scales allow for a longitudinal measurement of the success of these initiatives, since the scales provide insights into the dominant institutional logic, shaping behavior of employees.

Even though I designed the research with special care, I must acknowledge limitations. Since the ESL scale's sub-scale for sources of identity appeared problematic with respect to discriminant validity, further research should emphasize testing this sub-scale with new samples. Even though fit indices indicate a good model fit regarding absolute fit and relative fit (fit of the model to the fit of the null model), the Chi-square test does not support the measurement model. This is likely due to the assumptions that the elements, underlying institution, and principles together form institutional logics and are thus not considered as fully distinct constructs. Thus, even though the Chi-square test is often criticized for conceptual reasons as the null of perfect fit is unreasonable (Brown, 2015; Little, 2013), future research should assess the developed scales' model fit. Since the Chi-square test is found to be related to sample size and model complexity (Hu & Bentler, 1999; MacKenzie et al., 2011), another large-scale survey should test the validity of the developed scales in further studies.

Studies I and II were conducted with students, since student samples have shown to be sufficient for pretesting scales (Netemeyer et al., 2003). Since study II draws on a sample of working professionals of different companies, only study IV is based on a sample, of which all participants were actively working in the same company. As institutional logics are recognized as context specific, I suggest investigating how the proposed framework operates in different cultural, social, economic, and political environments. Since existing research lacks insight into the complex relationships between institutional logics and organizational responses (Greenwood et al., 2011) and thus theoretical relationships between institutional logics and organizational responses can only hardly be postulated based on existing research (Diamantopoulos & Winklhofer, 2001), nomological validity could not be assessed. Even though nomological validity testing has been criticized as a non-rational approach (Rossiter, 2002), future research should start developing nomological networks and identify established,

validated scales measuring potential organizational responses to then test the scales developed in this study for nomological validity. Furthermore, since evidence of nomological validity is provided by a construct's possession of distinct consequences and by investigating theoretical relationships between different constructs (Iacobucci, Ostrom, & Grayson, 1995), future studies should investigate prerequisites and consequences. Therefore, studies should link the developed scales to agreed objective measures of environmental (e.g., detailed lifecycles analysis or CO<sub>2</sub> emissions) and corporate (e.g., sales or earnings) performance as well as other subjectively measured constructs.

Finally, a major outcome of the study is the development of comprehensive scales to measure eco-sustainability and corporation logics with encouraging, satisfactory results in terms of reliability and validity. Although four quantitative studies provide evidence of the measurement's applicability, multiple tests and applications are required to infer the construct's validity more confidentially. Some of these tests could lead to a refinement of the constructs itself. Building on the present research framework, further research should explore the relevance of external and internal factors to the dominance of both institutional logics.

### **Conclusion**

This work develops and validates two scales to assess institutional logics – the ESL scale to measure an eco-sustainability logic and the COL scale to measure a corporation logic – by drawing on one qualitative pre-study for construct definition and content domain and four quantitative studies for construct development and validation. This allows for a meaningful contribution to research on institutional logics and corporate eco-sustainability. Using a rigorous scale development methodology, this is the first study to develop and validate a comprehensive, integrative approach to measure institutional logics. This allows for methodological advancements in the field of institutional logics and solicits the need to include new methodological approaches in its repertoire of available methods. Further, I

develop conceptual definitions for the different elements of both institutional logics, which allow for a deep dive into eco-sustainability and corporation logics. Thus, I uncover a new way of measuring the dominance of institutional logics and provide a new avenue to assess the hybridity of institutional logics. Based on these contributions, I am convinced that the developed ESL and COL scales broaden institutional logics research since they allow to measure latent factors, such as attitudes, assumptions, or beliefs, which are central to institutional logics, and, similarly, enable the understanding, comparison, and quantification of institutional logics in various contexts. In summary, the developed quantitative measurement of an eco-sustainability and a corporation logic holds the potential to provide a thorough understanding of eco-sustainable behavior in corporate organizations and allows for new methodological approaches and designs.



## References

- Andersson, L. M., & Bateman, T. S. (2000). Individual environmental initiative: Championing natural environmental issues in U.S. business organizations. *Academy of Management Journal*, 43(4), 548–570. <http://doi.org/https://doi.org/10.5465/1556355>
- Antonakis, J., & Bastardo, N. (2013). SWAIN: Stata module to correct the SEM chi-square overidentification test in small sample sizes or complex models. *Statistical Software Components S457617*, Boston College Department of Economics.
- Battilana, J., & Dorado, S. (2010). Building sustainable hybrid organizations: The case of commercial microfinance organizations. *Academy of Management Journal*, 53(6), 1419–1440. <http://doi.org/10.5465/AMJ.2010.57318391>
- Benlian, A., Koufaris, M., & Hess, T. (2011). Service quality in software-as-a-service: Developing the SaaS-Qual Measure and examining its role in usage continuance. *Journal of Management Information Systems*, 28(3), 85–126. <http://doi.org/10.2753/MIS0742-1222280303>
- Berente, N., & Yoo, Y. (2012). Institutional contradictions and loose coupling: Postimplementation of NASA's enterprise information system. *Information Systems Research*, 23(2), 376–396. <http://doi.org/10.1287/isre.1110.0373>
- Bévort, F., & Suddaby, R. (2016). Scripting professional identities: How individuals make sense of contradictory institutional logics. *Journal of Professions and Organization*, 3(1), 17–38. <http://doi.org/10.1093/jpo/jov007>
- Bourdieu, P. (1984). *Distinction: A social critique of the judgement of taste*. London, UK: Harvard University Press.
- Brown, T. A. (2015). *Confirmatory factor analysis for applied research* (2nd ed.). New York, NY: Guilford Press.

- Chatterjee, D., Grewal, R., & Sambamurthy, V. (2002). Shaping up for e-commerce: Institutional enablers of the organizational assimilation of web technologies. *MIS Quarterly*, *26*(2), 65–89. <http://doi.org/10.2307/4132321>
- Corbett, J., Webster, J., & Jenkin, T. A. (2018). Unmasking corporate sustainability at the project level: Exploring the influence of institutional logics and individual agency. *Journal of Business Ethics*, *147*(2), 261–286. <http://doi.org/10.1007/s10551-015-2945-1>
- Currie, G., & Spyridonidis, D. (2016). Interpretation of multiple institutional logics on the ground: Actors position, their agency and situational constraints in professionalized contexts. *Organization Studies*, *37*(1), 1–41. <http://doi.org/10.1177/0170840615604503>
- Diamantopoulos, A., & Winklhofer, H. M. (2001). Index construction with formative indicators: An alternative to scale development. *Journal of Marketing Research*, *38*(2), 269–277. <http://doi.org/10.1509/jmkr.38.2.269.18845>
- DiMaggio, P., & Powell, W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review*, *48*(2), 147–160.
- Fiedler, M., & Welpe, I. (2010). How do organizations remember? The influence of organizational structure on organizational memory. *Organization Studies*, *31*(4), 381–407. <http://doi.org/10.1177/0170840609347052>
- Flick, U. (2014). *The Sage handbook of qualitative data analysis*. London, UK: Sage.
- Flickinger, M., Gruber-Mücke, T., & Fiedler, M. (2013). The linkage between human resource practices and organizational ambidexterity: An analysis of internal labor market dynamics in a port-of-entry context. *Journal of Business Economics*, *83*(8), 923–946. <http://doi.org/10.1007/s11573-013-0671-7>

- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39–50.  
<http://doi.org/10.2307/3151312>
- Friedland, R., & Alford, R. (1991). Bringing society back in: Symbols, practices, and institutional contradictions. In W. Powell & P. DiMaggio (Eds.), *The new institutionalism in organizational analysis* (pp. 232–266). Chicago, MI: University of Chicago Press.
- Gavetti, G., Greve, H. R., Levinthal, D. A., & Ocasio, W. (2012). The behavioral theory of the firm: Assessment and prospects. *The Academy of Management Annals*, 6(1), 1–40.  
<http://doi.org/10.1080/19416520.2012.656841>
- Gorsuch, R. L. (1983). *Factor analysis*. Hillsdale, New Jersey: Erlbaum.
- Greenwood, R., Díaz, A. M., Li, S. X., & Lorente, J. C. (2010). The multiplicity of institutional logics and the heterogeneity of organizational responses. *Organization Science*, 21(2), 521–539. <http://doi.org/10.1287/orsc.1090.0453>
- Greenwood, R., Raynard, M., Kodeih, F., Micelotta, E. R., & Lounsbury, M. (2011). Institutional complexity and organizational responses. *The Academy of Management Annals*, 5(1), 317–371. <http://doi.org/10.1080/19416520.2011.590299>
- Guerrero-Bote, V. P., & Moya-Anegón, F. (2012). A further step forward in measuring journals' scientific prestige: The SJR2 indicator. *Journal of Informetrics*, 6(4), 674–688.  
<http://doi.org/10.1016/j.joi.2012.07.001>
- Hahn, T., Pinkse, J., Preuss, L., & Figge, F. (2015). Tensions in corporate sustainability: Towards an integrative framework. *Journal of Business Ethics*, 127(2), 297–316.  
<http://doi.org/10.1007/s10551-014-2047-5>

- Henkel, C., Seidler, A.-R., Kranz, J., & Fiedler, M. (2017). How to become a sustainability leader? The role of IS affordances in enabling and triggering sustainability transformations. In *Proceedings of the 38th International Conference on Information Systems*. Seoul, South Korea.
- Henri, J.-F., & Journeault, M. (2008). Environmental performance indicators: An empirical study of canadian manufacturing firms. *Journal of Environmental Management*, 87(1), 165–76. <http://doi.org/10.1016/j.jenvman.2007.01.009>
- Herzog, W., & Boomsma, A. (2009). Small-sample robust estimators of noncentrality-based and incremental model fit. *Structural Equation Modeling*, 16(1), 1–27. <http://doi.org/10.1080/10705510802561279>
- Hoffman, A. J. (2001). Linking organizational and field-level analyses: The diffusion of corporate environmental practice. *Organization & Environment*, 14(2), 133–156. <http://doi.org/10.1177/1086026601142001>
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6(1), 1–55. <http://doi.org/10.1080/10705519909540118>
- Hulley, S. B., Cummings, S. R., Browner, W. S., Grady, D. G., & Newman, T. B. (2013). *Designing clinical research* (4th ed.). Philadelphia, PA: Wolters Kluwer.
- Iacobucci, D., Ostrom, A., & Grayson, K. (1995). Distinguishing service quality and customer satisfaction: The voice of the consumer. *Journal of Consumer Psychology*, 4(3), 277–303. [http://doi.org/10.1207/s15327663jcp0403\\_04](http://doi.org/10.1207/s15327663jcp0403_04)
- Ioannou, I., & Serafeim, G. (2015). The impact of corporate social responsibility on investment recommendations: Analysts' perceptions and shifting institutional logics. *Strategic Management Journal*, 36(7), 1053–1081. <http://doi.org/10.1002/smj.2268>

- Johansen, C. B., & Waldorff, S. B. (2015). What are institutional logics - and where is the perspective taking us? In G. Krücken, C. Mazza, R. E. Meyer, & P. Walgenbach (Eds.), *New themes in institutional analysis: Topics and issues from european research* (pp. 51–76). Cheltenham, UK: Edward Elgar Publishing.
- Johnson, S. L., Safadi, H., & Faraj, S. (2015). The emergence of online community leadership. *Information Systems Research*, 26(1), 165–187. <http://doi.org/10.1287/isre.2014.0562>
- Joseph, J., Ocasio, W., & McDonnell, M.-H. (2014). The structural elaboration of board independence: Executive power, institutional logics, and the adoption of CEO-only board structures in U.S. corporate governance. *Academy of Management Journal*, 57(6), 1834–1858. <http://doi.org/10.5465/amj.2012.0253>
- Kärnä, J., Hansen, E., & Juslin, H. (2003). Social responsibility in environmental marketing planning. *European Journal of Marketing*, 37(5/6), 848–871. <http://doi.org/10.1108/03090560310465170>
- Kenny, D. A., & McCoach, D. B. (2003). Effect of the number of variables on measures of fit in structural equation modeling. *Structural Equation Modeling*, 10(1), 333–351. [http://doi.org/doi.org/10.1207/S15328007SEM1003\\_1](http://doi.org/doi.org/10.1207/S15328007SEM1003_1)
- Lawshe, C. (1975). A quantitative approach to content validity. *Personnel Psychology*, 28(1), 563–575. <http://doi.org/10.1111/j.1744-6570.1975.tb01393.x>
- Lee, M. P., & Lounsbury, M. (2015). Filtering institutional logics: Community logic variation and differential responses to the institutional complexity of toxic waste. *Organization Science*, 26(3), 847–866. <http://doi.org/10.1287/orsc.2014.0959>
- Little, T. D. (2013). *Longitudinal structural equation modeling*. New York, NY: Guilford Press.

- Lounsbury, M. (2002). Institutional transformation and status mobility: The professionalization of the field of finance. *Academy of Management Journal*, 45(1), 255–266. <http://doi.org/10.2307/3069295>
- Lounsbury, M. (2007). A tale of two cities: Competing logics and practice variation in the professionalizing of mutual funds. *Academy of Management Journal*, 50(2), 289–307. <http://doi.org/10.5465/AMJ.2007.24634436>
- Lubin, D. A., & Esty, D. C. (2010). The sustainability imperative. *Harvard Business Review*, 88(5), 2–9. <http://doi.org/10.1057/palgrave.crr.1540128>
- MacKenzie, S. B., Podsakoff, P. M., & Podsakoff, N. P. (2011). Construct measurement and validation procedures in MIS and behavioral research: Integrating new and existing techniques. *MIS Quarterly*, 35(2), 293–334.
- Marquis, C., & Lounsbury, M. (2007). Vive la résistance: Competing logics and the consolidation of U.S. community banking. *Academy of Management Journal*, 50(4), 799–820. <http://doi.org/10.5465/AMJ.2007.26279172>
- Martin, G., Currie, G., Weaver, S., Finn, R., & McDonald, R. (2017). Institutional complexity and individual responses: Delineating the boundaries of partial autonomy. *Organization Studies*, 38(1), 103–127. <http://doi.org/10.1177/0170840616663241>
- Mayer, R. C., & Schoorman, F. D. (1992). Predicting participation and production outcomes through a two-dimensional model of organizational commitment. *Academy of Management Journal*, 35(3), 671–684. <http://doi.org/10.2307/256492>
- Miller, D., Le Breton-Miller, I., & Lester, R. H. (2011). Family and lone founder ownership and strategic behaviour: Social context, identity, and institutional logics. *Journal of Management Studies*, 48(1), 1–25. <http://doi.org/10.1111/j.1467-6486.2009.00896.x>

- Netemeyer, R. G., Bearden, W. O., & Sharma, S. (2003). *Scaling procedures: Issues and applications*. Thousand Oaks, CA: Sage.
- Ocasio, W., Loewenstein, J., & Nigam, A. (2015). How streams of communication reproduce and change insitutional logics: The role of categories. *Academy of Management Review*, *40*(1), 28–48. <http://doi.org/10.5465/amr.2013.0274>
- Ocasio, W., Mauskapf, M., & Steele, C. W. J. (2016). History, society, and institutions: The role of collective memory in the emergence and evolution of societal logics. *Academy of Management Review*, *41*(4), 676–699. <http://doi.org/10.5465/amr.2014.0183>
- Ocasio, W., & Radoynovska, N. (2016). Strategy and commitments to institutional logics: Organizational heterogeneity in business models and governance. *Strategic Organization*, *14*(4), 287–309. <http://doi.org/10.1177/1476127015625040>
- Ollier-Malaterre, A., McNamara, T., Matz-Costa, C., Pitt-Catsouphes, M., & Valcour, M. (2013). Looking up to regulations, out at peers or down at the bottom line: How institutional logics affect the prevalence of age-related HR practices. *Human Relations*, *66*(10), 1373–1395. <http://doi.org/10.1177/0018726713478244>
- Papadas, K., Avlonitis, G. J., & Carrigan, M. (2017). Green marketing orientation: Conceptualization, scale development and validation. *Journal of Business Research*, *80*(2), 236–246. <http://doi.org/10.1016/j.jbusres.2017.05.024>
- Paré, G. (2004). Investigating information systems with positivist case research. *Communications of the Association for Information Systems*, *13*(18), 233–264. <http://doi.org/10.1178/cais.2004.13>
- R Development Core Team. (2008). R: A language and environment for statistical computing. Vienna, Austria: R Foundation for Statistical Computing. <http://doi.org/3-900051-07-0>

- Reay, T., & Hinings, C. R. (2009). Managing the rivalry of competing institutional logics. *Organization Studies*, 30(6), 629–652. <http://doi.org/10.1177/0170840609104803>
- Rossiter, J. R. (2002). The C-OAR-SE procedure for scale development in marketing. *International Journal of Research in Marketing*, 19(4), 305–335. [http://doi.org/10.1016/S0167-8116\(02\)00097-6](http://doi.org/10.1016/S0167-8116(02)00097-6)
- Schick, A.-R., Henkel, C., Kranz, J., & Fiedler, M. (2016). The role of motivational affordances and institutional logics in IS-enabled organizational sustainability transformations - A research agenda. In *Proceeding of the SIGGreen Pre-ICIS Workshop 2016*. Dublin, Ireland.
- SCImago. (2007). SJR — SCImago journal and country rank. Retrieved July 25, 2018, from <http://www.scimagojr.com>
- Seidler, A.-R., Henkel, C., Fiedler, M., & Kranz, J. (2017). Greening the organisation: An institutional logics approach to corporate pro-environmentalism. In *Proceedings of the British Academy of Management Conference 2017*. Warwick, UK.
- Seidler, A.-R., Henkel, C., Fiedler, M., & Kranz, J. (2018). Encouraging pro-environmental behavior: Affordances and institutional logics in IS-enabled organisational sustainability transformations. In *Proceedings of the 26th European Conference on Information Systems*. Portsmouth, UK.
- Sonpar, K., Handelman, J. M., & Dastmalchian, A. (2009). Implementing new institutional logics in pioneering organizations: The burden of justifying ethical appropriateness and trustworthiness. *Journal of Business Ethics*, 90(3), 345–359. <http://doi.org/10.1007/s10551-009-0045-9>
- Stern, P. C. (2000). Toward a coherent theory of environmentally significant behavior. *Journal of Social Issues*, 56(3), 407–424. <http://doi.org/10.1111/0022-4537.00175>



- Stevens, J. (2002). Confirmatory and exploratory factor analysis. In J. Stevens (Ed.), *Applied multivariate statistics for the social sciences* (pp. 385–454). Mahwah, NJ: Erlbaum.
- Symonds, J. E., & Gorard, S. (2003). The death of mixed methods: Research labels and their casualties. In *The British Educational Research Association Annual Conference*. Edinburgh, UK.
- Thornton, P. H. (2001). Personal versus market logics of control: A historically contingent theory of the risk of acquisition. *Organization Science*, *12*(3), 294–311. <http://doi.org/10.1287/orsc.12.3.294.10100>
- Thornton, P. H. (2002). The rise of the corporation in a craft industry: Conflict and conformity in institutional logics. *Academy of Management Journal*, *45*(1), 81–101. <http://doi.org/10.2307/3069286>
- Thornton, P. H., & Ocasio, W. (1999). Institutional logics and the historical contingency of power in organizations: Executive succession in the higher education publishing industry, 1958-1990. *American Journal of Sociology*, *105*(3), 801–843. <http://doi.org/10.1086/210361>
- Thornton, P. H., Ocasio, W., & Lounsbury, M. (2012). *The institutional logics perspective: A new approach to culture, structure, and process*. Oxford, UK: Oxford University Press.
- Van der Werff, E., Steg, L., & Keizer, K. (2013). The value of environmental self-identity: The relationship between biospheric values, environmental self-identity and environmental preferences, intentions and behaviour. *Journal of Environmental Psychology*, *34*, 55–63. <http://doi.org/10.1016/j.jenvp.2012.12.006>
- Walls, J. L., & Hoffman, A. J. (2013). Exceptional boards: Environmental experience and positive deviance from institutional norms. *Journal of Organizational Behavior*, *34*(2), 253–271. <http://doi.org/10.1002/job.1813>

- Williams, L., & Anderson, S. (1991). Job satisfaction and organizational commitment as predictors of organizational citizenship and in-role behavior. *Journal of Management*, *17*(3), 601–617. <http://doi.org/10.1177/014920639101700305>
- Zahra, S. A. (1996). Governance, ownership, and corporate entrepreneurship: The moderating impact of industry technological opportunities. *Academy of Management Journal*, *39*(6), 1713–1735. <http://doi.org/10.5465/257076>

### Appendix C: Overview of Interviewees

| #  | Interviewee                                     | Company   | Branch     |
|----|-------------------------------------------------|-----------|------------|
| 1  | Head of HR EMEIA                                | Company A | Chemistry  |
| 2  | Key Account Manager                             | Company A | Chemistry  |
| 3  | Head of R&D                                     | Company A | Chemistry  |
| 4  | Chief Sustainability Officer                    | Company A | Chemistry  |
| 5  | Global Head of IT                               | Company A | Chemistry  |
| 6  | Manager Production                              | Company A | Chemistry  |
| 7  | Manager Site & Service                          | Company A | Chemistry  |
| 8  | Manager CSR                                     | Company A | Chemistry  |
| 9  | Head of R&D                                     | Company A | Chemistry  |
| 10 | Travel Manager                                  | Company A | Chemistry  |
| 11 | Director Process Management                     | Company A | Chemistry  |
| 12 | Senior Perfumer                                 | Company A | Chemistry  |
| 13 | Manager CI / CD                                 | Company A | Chemistry  |
| 14 | Senior Vice President Central- & Eastern Europe | Company A | Chemistry  |
| 15 | Sales Representative                            | Company A | Chemistry  |
| 16 | Head of Sustainability                          | Company A | Chemistry  |
| 17 | Manager Employee Mobility                       | Company B | Automotive |
| 18 | Division Manager Travel Management              | Company B | Automotive |
| 19 | Research Analyst                                | Company B | Automotive |
| 20 | Assistant Sustainability                        | Company B | Automotive |
| 21 | Assistant Automated Driving                     | Company B | Automotive |
| 22 | Assistant Command Functions Production          | Company B | Automotive |
| 23 | Employee R&D                                    | Company B | Automotive |
| 24 | Senior CSR Manager                              | Company B | Automotive |
| 25 | Employee CSR                                    | Company B | Automotive |
| 26 | Manager Facility Services                       | Company B | Automotive |
| 27 | Supply Chain Manager                            | Company B | Automotive |
| 28 | Manager Corporate Citizenship                   | Company B | Automotive |
| 29 | HR Business Partner                             | Company B | Automotive |
| 30 | Manager Operations                              | Company B | Automotive |
| 31 | Team Lead Production                            | Company B | Automotive |
| 32 | Employee IT                                     | Company B | Automotive |
| 33 | Employee CSR                                    | Company B | Automotive |

### Appendix C: Continued

|    |                                            |           |                        |
|----|--------------------------------------------|-----------|------------------------|
| 34 | Head of Sustainability Management          | Company C | Electrical engineering |
| 35 | Division Manager Business Model Innovation | Company C | Electrical engineering |
| 36 | Global Business Manager                    | Company D | Chemistry              |
| 37 | Business Manager Germany                   | Company D | Chemistry              |
| 38 | Sales Representative                       | Company E | Cosmetics              |
| 39 | Manager Sales                              | Company E | Cosmetics              |
| 40 | Manager Sales Europe                       | Company F | Chemistry              |
| 41 | Manager Business Development               | Company G | Food                   |
| 42 | Manager Business Development               | Company G | Food                   |
| 43 | Sales Representative                       | Company H | Chemistry              |
| 44 | Manager Campaign Marketing Germany         | Company I | Cosmetics              |
| 45 | Global Business Manager                    | Company J | Chemistry              |
| 46 | Head of Marketing & Sales EMEIA            | Company K | Food                   |
| 47 | Key Account Manager EMEIA                  | Company L | Chemistry              |
| 48 | Manager New Business                       | Company M | Chemistry              |
| 49 | Manager Customer Engagement Germany        | Company N | Chemistry              |
| 50 | Manager Sales                              | Company O | Food                   |
| 51 | Marketing Manager                          | Company P | Chemistry              |
| 52 | Account Manager Germany                    | Company Q | Chemistry              |
| 53 | Manager International Marketing            | Company R | Chemistry              |
| 54 | Marketing Manager                          | Company S | Chemistry              |
| 55 | Sales Representative                       | Company T | Chemistry              |

### Appendix D: Qualitative Assessment of the Eco-Sustainability and Corporation Logic

| Elements<br>(Thornton et al., 2012) | Eco-sustainability logic (Schick et al., 2016) | Interviewee statements                                                                                                                                                                | Corporation logic<br>(Thornton et al., 2012) | Interviewee statements                                                                                                                                                                                                              |
|-------------------------------------|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Root metaphor                       | Eco-sustainability as ideal                    | <i>I always remained an idealist and protecting the environment is what I am striving for.</i> [Interviewee 7]                                                                        | Corporation as hierarchy                     | <i>Our CEO drives the company. He provides the indicatory decisions, which are then enacted in the different departments and working groups.</i> [Interviewee 7]                                                                    |
| Sources of legitimacy               | Environmental impact                           | <i>You have that energy to do something meaningful for the environment – and I think, this is what we are here for.</i> [Interviewee 23]                                              | Market position of the firm                  | <i>It is always very important to support the business and to guarantee the company's success in the market.</i> [Interviewee 4]                                                                                                    |
| Sources of authority                | Commitment to eco-sustainable values           | <i>Being a big player with eco-sustainable values, we need to, and can set an example in the industry that sustainability is important.</i> [Interviewee 12]                          | Board of directors, top management           | <i>If the CEO states how things shall be done in the company, of course it will be implemented in an appropriate way.</i> [Interviewee 6]                                                                                           |
| Sources of identity                 | Environmental championship                     | <i>I believe that it needs people like me in a company that at least try to act as a role model and try to convince other people of eco-sustainable initiatives.</i> [Interviewee 23] | Bureaucratic roles                           | <i>I'm responsible for the company's administration. It's called Real Estate Facility Management. Our customers are the employees, and I try to satisfy them every day. That's what I get up for every morning.</i> [Interviewee 7] |

**Appendix D: Continued**

|                            |                                                                |                                                                                                                                                                                                                                                                          |                                           |                                                                                                                                                                                                                         |
|----------------------------|----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Basis of norms             | Participation based on a conviction to protect the environment | <i>There are many people in this country who think that sustainability is an extremely important asset and participate in sustainable initiatives with passion. [Interviewee 1]</i>                                                                                      | Employment in firm                        | <i>The way we behave and deal with certain topics is always grounded in the norms and principles, which are prescribed by the company. [Interviewee 2]</i>                                                              |
| Basis of attention         | Investment in eco-sustainable behavior                         | <i>People are complaining [about eco-unfriendly behavior] – if you start an eco-sustainable initiative, this is honored in the company. [Interviewee 28]</i>                                                                                                             | Status in hierarchy                       | <i>Whether initiatives are implemented is often dependent on the hierarchy level of the person bringing in the idea. [Interviewee 9]</i>                                                                                |
| Basis of strategy          | Increase eco-sustainable behavior                              | <i>Everyone must start with themselves, because a lot of small things help to increase sustainability. The behavior of each and every one has an influence – I think that's one of the most important basics here. [Interviewee 3]</i>                                   | Increase size and diversification of firm | <i>Our business model and our strategy aim at diversifying the company into seminal markets, leading to [the company's] growth. [Interviewee 4]</i>                                                                     |
| Informal control mechanism | Visibility of eco-sustainable impacts                          | <i>We don't only have sustainability written down in our corporate strategy, but it is also stored in people, actions, programs and certainly in the last five or six years, there have been a lot of resources invested to make our impact visible. [Interviewee 2]</i> | Organization culture                      | <i>Our company is based on a mixture of science and selling marketing stories. In summary, this forms our organizational culture, which provides a lot of guidance on how to behave in the company. [Interviewee 1]</i> |

**Appendix D: Continued**

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|                          |                                      |                                                                                                                                                                                                                                                                         |                               |                                                                                                                          |
|--------------------------|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| Economic system          | Ecological capitalism                | <i>If I want my children to live happily, then I must change my life. [Interviewee 1]</i>                                                                                                                                                                               | Managerial capitalism         | <i>Everyone has the aim to do business, to make money. That's the rationale that drives the company. [Interviewee 3]</i> |
| Institution & principles | Effectiveness for eco-sustainability | <i>Eco-sustainability is not something we recently started; we have engaged in this topic for quite some time. People in the company can really experience eco-sustainable behavior – this is what the people out there should experience as well. [Interviewee 33]</i> | Efficiency for market success | <i>Our overarching principle is to satisfy our customer – this is crucial to survive in the market. [Interviewee 29]</i> |

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### Appendix E: Source of Scale Items

| Item                  | Source                                   | Item      | Source                                    |
|-----------------------|------------------------------------------|-----------|-------------------------------------------|
| ESL scale             |                                          | COL scale |                                           |
| Sources of legitimacy |                                          |           |                                           |
| LegESL1               | Own development                          | LegCOL1   | Own development                           |
| LegESL2               | Adapted from Henri and Journeault (2008) | LegCOL2   | Own development                           |
| LegESL3               | Adapted from Henri and Journeault (2008) | LegCOL3   | Own development                           |
| LegESL4               | Adapted from Henri and Journeault (2008) |           |                                           |
| Sources of authority  |                                          |           |                                           |
| AutESL1               | Own development                          | AutCOL1   | Adapted from Chatterjee et al. (2002)     |
| AutESL2               | Own development                          | AutCOL2   | Adapted from Chatterjee et al. (2002)     |
| AutESL3               | Own development                          | AutCOL3   | Adapted from Chatterjee et al. (2002)     |
| Sources of identity   |                                          |           |                                           |
| IdeESL1               | Van der Werff et al. (2013)              | IdeCOL1   | Adapted from Williams and Anderson (1991) |
| IdeESL2               | Own development                          | IdeCOL2   | Adapted from Williams and Anderson (1991) |
| IdeESL3               | Own development                          | IdeCOL3   | Adapted from Williams and Anderson (1991) |
| IdeESL4               | Own development                          |           |                                           |
| IdeESL5               | Own development                          |           |                                           |
| IdeESL6               | Own development                          |           |                                           |
| Basis of norms        |                                          |           |                                           |
| NorESL1               | Own development                          | NorCOL1   | Adapted from Mayer and Schoorman (1992)   |
| NorESL2               | Own development                          | NorCOL2   | Adapted from Mayer and Schoorman (1992)   |
| NorESL3               | Own development                          | NorCOL3   | Own development                           |



### Appendix E: Continued

| Basis of attention       |                                  |         |                                  |
|--------------------------|----------------------------------|---------|----------------------------------|
| AttESL1                  | Own development                  | AttCOL1 | Own development                  |
| AttESL2                  | Own development                  | AttCOL2 | Own development                  |
| AttESL3                  | Own development                  | AttCOL3 | Own development                  |
| AttESL4                  | Own development                  |         |                                  |
| Sources of strategy      |                                  |         |                                  |
| StrESL1                  | Adapted from Kärnä et al. (2003) | StrCOL1 | Adapted from Zahra (1996)        |
| StrESL2                  | Adapted from Kärnä et al. (2003) | StrCOL2 | Adapted from Zahra (1996)        |
| StrESL3                  | Own development                  | StrCOL3 | Adapted from Kärnä et al. (2003) |
|                          |                                  | StrCOL4 | Adapted from Kärnä et al. (2003) |
| Institution & principles |                                  |         |                                  |
| IPESL1                   | Own development                  | IPCOL1  | Own development                  |
| IPESL2                   | Own development                  | IPCOL2  | Own development                  |
| IPESL3                   | Own development                  | IPCOL3  | Own development                  |
| IPESL4                   | Own development                  | IPCOL4  | Own development                  |
| IPESL5                   | Own development                  | IPCOL5  | Own development                  |
| IPESL6                   | Own development                  | IPCOL6  | Own development                  |

*Note.* All items were measured on a seven-point Likert scale from (1) strongly disagree to (7) strongly agree.

### **3 How to become a Sustainability Leader? The Role of IS Affordances in Enabling and Triggering Sustainability Transformations**

Christopher Henkel, Anna-Raissa Seidler, Johann Kranz, and Marina Fiedler

## **How to Become a Sustainability Leader?**

### **The Role of IS Affordances in Enabling and Triggering Sustainability Transformations**

Christopher Henkel, Anna-Raissa Seidler, Johann Kranz, and Marina Fiedler

#### **Abstract**

In response to growing concerns about environmental degradation, firms are increasingly aiming to reduce their environmental footprint. On an operational level, Green Information Systems (IS) are recognized as an important driver of more sustainable practices. However, the impact of Green IS on a strategic level is less understood. Our study seeks to fill this void by investigating the role of Green IS on organizations' sustainability strategies. Using a single case study design, we aim to identify if and how affordances of Green IS contribute to firms' sustainable strategy. Our results indicate that Green IS affordances supported the strategic shift of our case-study company towards more sustainability. Moreover, we found that these affordances existed on an intra- and inter-organizational level, thus impacting eco-sustainability processes beyond the focal organization's boundaries. Our study contributes to research on Green IS by extending our understanding of how and why affordances can trigger and enable an organizational sustainability strategy.

*Keywords:* Green Information Systems (IS), affordance theory, sensemaking affordances, environmental management system (EMS), corporate sustainable strategy

## Introduction

Climate change is one of the world's most important grand challenges of our time (Gholami, Watson, Hassan, Bjørn-Andersen, & Molla, 2016). As a result, organizations have started to develop and use *Green Information Systems (IS)* to enable and trigger more sustainable organizational processes and corporate strategies (Loeser, Recker, Brocke, Molla, & Zarnekow, 2017; Seidel, Recker, & Vom Brocke, 2013). Corporate sustainable strategies include social, economic, and environmental issues (Banerjee, 2001; Elkington, 1994) to enhance business performance through low-cost or differentiation advantages (Orsato, 2006).

Much of the literature on Green IS and strategy has focused on alignment, i.e. how Green IS can be used to support a firm's sustainable business strategy (e.g., Ereik, Loeser, Schmidt, Zarnekow, & Kolbe, 2011; Loeser, Ereik, Schmidt, Zarnekow, & Kolbe, 2011; Wati & Koo, 2011; Watson, Boudreau, Chen, & Sepulveda, 2011), neglecting IS as an enabler or trigger of organizational sustainability transformations (Seidel et al., 2013). Others have focused on conceptualizing Green IS strategies (e.g., Jenkin, Webster, & McShane, 2011; Loeser, Ereik, & Zarnekow, 2012) without analyzing in detail how using Green IS enables changes in organizational strategies. Hedman and Henningsson (2016) correspondingly observe that previous research on Green IS has put an emphasis on specific projects that are rather detached from firms' overall strategy and organizational sustainability processes. They contend that Green IS' contribution to organizations' corporate sustainable strategy have found too little attention (Hedman & Henningsson, 2016).

Research has demonstrated that environmental management systems (EMS), which allow for monitoring, presenting, and analyzing economic performance indicators, such as cost efficiency, or growth, and environmental performance indicators, such as reductions of resource usage, waste, and emissions, are enabled for the implementation and correction of sustainable strategies (Butler, Daly, & Hackney, 2015; Lubin & Esty, 2010; Moon, Bae, &

Jeong, 2014). This is supported by EMS's functional affordances, which provide processes for monitoring, summarizing, and reporting of environmental performance information to internal and external stakeholders of the organization (Melnik, Sroufe, & Calantone, 2003). Functional affordances are potential uses of IS originating from a system's material properties that specify how users may be able to use the system given users' capabilities and goals (Markus & Silver, 2008). However, even though literature prior to Green IS has highlighted the importance of affordances in organizational sustainability transformations (Recker, 2016; Seidel et al., 2013), their impact on firms' sustainable strategies has not yet been examined. Thus, our study seeks to identify how functional affordances of EMS can trigger and help organizations to shift to a corporate sustainable strategy and is guided by the following research question:

*How and why do Green IS affordances contribute to a company's corporate sustainable strategy?*

To answer this question, we conducted a single case study at a chemical company and examined how individuals in an organization understand, frame, and interpret multifaceted complex matters with respect to sustainability-related organizational processes and if, and how, actualized affordances trigger changes on an organizational and strategic level. Our single-case study draws on the qualitative analyses of semi-structured interviews and quantitative and qualitative analyses of the case company's corporate and sustainability reports as well as internal documents. Since single-case studies are widely accepted in IS research (Klein & Myers, 1999; Orlikowski & Iacono, 2001), in our context, they allow for a nuanced, holistic, and empirically-rich account of the relationship between Green IS affordances and the emergence of sustainable strategy.

We found that Green IS affordances enable individual sustainable practices to aggregate on an organizational level and thereby support the formation of a new corporate sustainable

strategy. Based on the EMS material properties, functional affordances can activate sensemaking processes, which stimulate cross-functional and cross-departmental organizational learning. Since these affordances impact the company and its suppliers and customers, we show that both intra- and inter-organizational affordances are important to promote the EMS's features and its use for sustainability issues. Further, we provide initial evidence that functional affordances can spark an organization's strategy shift towards sustainability. Thus, we develop a model that shows the relationships between material properties, Green IS affordances, and corporate sustainable strategy.

We thereby contribute to research on Green IS and sustainable strategy. First, we expand the inter- and intra-organizational view on affordances by demonstrating that actualized inter-organizational affordances influence the organizations' corporate strategy and expand to new market practices. Second, we demonstrate that Green IS are not only a tool for resource or footprint improvement, but can also have strategic business value (Bengtsson & Ågerfalk, 2011; Butler, 2011). Third, this study complements previous work by Melville (2010) and Seidel et al. (2013), since it shows that organizational sensemaking affordances influence underlying mechanisms that lead to more sustainable actions and support a corporate sustainable strategy.

The remainder of this paper is organized as follows. In the next section, we provide the theoretical background of Green IS, and elaborate on the theory of affordances and their grounding in Green IS research. Next, we present our case study, research methods, and data analyses. We then outline our results on how Green IS affordances support an organization's corporate sustainable strategy. In the concluding sections, we highlight our contributions, point out the study's limitations and potential for further research, and finish with a conclusion.

## Theoretical Background

### Green IS and Corporate Sustainable Strategy

Green IS are an emerging strand in IS research that addresses issues related to IS usage by individuals, groups, organizations, and society to help eco-sustainable practices to emerge and diffuse (e.g., Dedrick, 2010; Kranz & Picot, 2011; Watson, Boudreau, & Chen, 2010). Thus, Green IS integrate information technologies (IT), people, processes, and software to “support individual, organizational, or societal goals” (Kranz, Kolbe, Koo, & Boudreau, 2015, p. 8). In an organizational context, Green IS can help mitigating negative environmental impacts by enabling organizations to change practices, sensemaking processes, and business processes, which have an impact on the environment (Seidel et al., 2013).

Several studies have examined the success factors of Green IS initiatives (Kuo & Dick, 2009; Molla, Cooper, & Pittayachawan, 2009) and demonstrated Green IS’ potential to influence organizational practices (e.g., Bengtsson & Ågerfalk, 2011; Butler, 2011; Hilpert, Kranz, & Schumann, 2013; Marett, Otondo, & Taylor, 2013; Seidel et al., 2013). Success factors for Green IS that enable and trigger changes in sustainable strategies were identified as, for example, awareness and monetary use (Sarkar & Young, 2009), corporate management and environmental engagement (Schmidt, Ereik, Kolbe, & Zarnekow, 2010), or institutional pressures and personal benefits (Marett et al., 2013). Bengtsson and Ågerfalk (2011) illustrated that the introduction of IS can change the environmental sustainability performance of the overall municipality. The results imply that IS served as an essential “change actant in sustainability innovations” (Bengtsson & Ågerfalk, 2011, p. 96). These studies demonstrate the transformational power of Green IS by changing people’s mindset from eco-efficiency towards eco-effectiveness (Hedman, Henningson, & Selander, 2012). In such cases, the IS are not only an operational tool to save resources and to improve the

ecological footprint but also and foremost implemented to strategically influence, change, and move the organization towards sustainability (Bengtsson & Ågerfalk, 2011; Butler, 2011).

In a previous literature review on Green IS (Jenkin et al., 2011), it was found that only seven studies addressed issues related to firms' corporate sustainability strategies. Thus, our understanding of the benefits of Green IS on a strategic level is limited (Thambusamy & Salam, 2010). Some previously covered topics, such as the mediating role of Green IS strategies on Green IS practices (Loeser et al., 2017) or the strategic alignment of Green IS with the corporate strategy (Erek et al., 2011; Loeser et al., 2011; Wati & Koo, 2011), have not viewed Green IS as having an active part in triggering a corporate sustainable strategy. Others define strategies for Green IS solely from a technical point of view (Loeser et al., 2012; Watson et al., 2011) and omit the socio-cultural context. Hedman and Henningsson (2016) and Henfridsson and Lind (2014) are among the few who describe the role of Green IS initiatives in shaping a new sustainable strategy at an abstract level without scrutinizing the vital role of Green IS affordances. Table 17 provides an overview of the research that highlights an interplay between Green IS and corporate strategy.



**Table 17.** Literature Review on Green IS and Corporate Strategy

| Study                        | Context of study                                                                                                                                                                                                | Key Findings and Results                                                                                                                                                                                                                                                                                                                                  | Theory                                                                                  | Method              |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|---------------------|
| Erek et al. (2011)           | Explaining the strategic relevance of Green IT on the basis of a literature review and a multiple case study of four companies and emphasize the necessity of aligning business, sustainability, and IT domain. | The authors conceptualize a Strategic Green IT Alignment Framework and identify four distinct Green IT strategies to achieve corporate sustainability targets and leverage competitiveness                                                                                                                                                                | Strategic alignment model (Henderson & Venkatraman, 1993)                               | Multiple case study |
| Hedman and Henningson (2016) | Investigating how Green IS initiatives become part of a firm's overall strategy and part of the organizational sustainability process.                                                                          | The paper presents an explanatory model of how Green IS has become part of the sustainability process and what role IS plays in this process. In a bottom-up process, Green IS champions use their authority and edification skills to promote it within the organizational agenda. Feedback from successful Green IS reinforces its role in the process. | Organizational response (Daft & Weick, 1984)                                            | Single case study   |
| Henfridsson and Lind (2014)  | Examining the process by which the micro-strategizing of actors from a variety of organizational sub-communities contribute to realize strategy contents as they use IS to implement a sustainable strategy.    | Developed a new process model to describe organizational sub-communities' production of strategy contents regarding its contextual conditions, activity-based production of strategy contents, and IS strategy outcome.                                                                                                                                   | Activity-Based Approach (Jarzabkowski, 2003, 2008), Strategy Patterns (Mintzberg, 1978) | Single case study   |

Table 17. Continued

|                             |                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                      |                                                                                                |                                          |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|------------------------------------------|
| Loeser et al. (2012)        | Developing a typology of Green IS strategies and address two research questions: 1) What types of Green IS strategies can be identified in a real-life context? 2) How do firms with distinct Green IS strategies conceive the role of Green IS within their organization? | Four distinct Green IS strategies are identified: Green IS for efficiency, innovation, transformation, and credibility. The emerging patterns are defined using a cross-case analysis and consolidated in five propositions that outline characteristics of Green IS strategies.     | -                                                                                              | Exploratory multiple-case study analysis |
| Loeser et al. (2017)        | Examining how an organization's environmental orientation and strategy influences Green IS initiatives and its organizational benefits.                                                                                                                                    | Green IS strategies mediate the relationship between environmental orientation and the implementation of Green IT practices and Green IS practices. This leads to cost reductions, corporate reputation enhancement and Green innovation capabilities, thus organizational benefits. | Belief-action-outcome framework (Melville, 2010)                                               | Cross-sectional survey                   |
| Thambusamy and Salam (2010) | A review of extant IS literature on environmental sustainability reveals that the strategic role of IT in enabling environmental sustainable strategies has not been explored in depth.                                                                                    | Firms that use IT to enable their environmental sustainability strategies and demonstrate environmental ambidexterity can achieve competitive advantage, legitimacy, and reputation from their corporate ecological responsiveness initiatives.                                      | Ecological responsiveness (Bansal & Roth, 2000) and organizational ambidexterity (March, 1991) | Single case study                        |

**Table 17.** Continued

|                      |                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                          |                                                                                     |                     |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------|
| Wati and Koo (2011)  | Introducing a Green IT Balanced Scorecard by combining environmental aspects of technology into the scorecard measurement method.                                                                                  | A management tool to systematically align IT strategy with business strategy from an environmental sustainability perspective to achieve competitive advantage.                                                                                                                          | Strategic Balanced Scorecard (Kaplan & Norton, 1996)                                | Conceptual study    |
| Watson et al. (2011) | Analysis of the strategic alignment between transport systems and information systems of four green transport projects using the lens of the information drivers to report the key characteristics of each system. | Four fundamental desires explain the success and failure of Green IS. In particular, those that minimized the limitations of the physical systems and met citizens' fundamental information needs were successful. The findings explain how to strategically design innovative Green IS. | Information drives (Junglas & Watson, 2006; Watson, Pitt, Berthon, & Zinkhan, 2002) | Multiple case study |

## Green IS Affordances

To help explain the influence of Green IS on a company's corporate strategy towards eco-sustainability, we utilize the concept of affordances (Gibson, 1986), which has the capacity to answer the question of how Green IS provide its users with the functionality to acquire information and reflect on sustainable work practices (Baskerville, Pries-Heje, & Recker, 2016). Generally, affordances relate to "the potential for behaviors associated with achieving an immediate concrete outcome and arising from the relation between an object (e.g., an information technology artifact) and a goal-oriented actor or actors" (Volkoff & Strong, 2013, p. 823). Investigating how IS can promote environmentally sustainable work practices in organizations, the study by Seidel et al. (2013) focused on functional affordances of Green IS. Functional affordances are potential uses of IS that originate from a system's material properties, specifying how users may be able to use the system, given users' capabilities and goals (Markus & Silver, 2008).

In the field of Green IS, Seidel et al. (2013) proposed a set of affordances for organizational sustainability transformations. The theoretical lens of affordances allows them to identify *organizational sensemaking* as one central category of Green IS affordances. Organizational sensemaking affordances relate to the ability of Green IS to enable *reflective disclosure*, defined as the reconsideration of beliefs, action, and outcomes by individual and organizational actors. As a second sensemaking affordance of Green IS, *information democratization* relates to the ability of Green IS to allow the distribution and interaction of sustainability-related information from internal and external sources. The case study conducted by Seidel et al. (2013) demonstrates how to design IS for organizational sustainability transformations. The identified affordances serve as the core for explaining how beliefs (through information democratization) and actions (sustainable practices) are formed and how outcomes are assessed (through reflective disclosure). Seidel et al. (2013)

examine these Green IS affordances as facilitating the implementation of sustainable work practices in organizations. This supports existing research, which has shown that organizational strategies and sustainability practices are intertwined (e.g., Henfridsson & Lind, 2014; Jarzabkowski, 2003, 2008).

Since affordances are only potential for action, several studies highlight that affordances first need to be triggered (Volkoff & Strong, 2013) and then actualized (Strong et al., 2014) by a goal-oriented individual to be activated. Therefore, existing research suggest a multi-affordance lens, as this allows the investigation of how affordances act together, rather than the individual analysis of each one (Volkoff & Strong, 2013). This view is particularly important regarding organizational sustainability transformations since these initiatives involve a complex interplay of intra-organizational factors, such as organizational values and institutionalized behavior, and inter-organizational factors, such as dependence, power relations, and competitive pressure (Gifford, Kormos, & McIntyre, 2011; Premkumar & Ramamurthy, 1995).

### **Methods**

We used a single-case-study approach to investigate how and why Green IS affordances support a company's sustainable strategy. We chose a single-case-study design, as this is especially helpful in analyzing complex organizational relationships (Yin, 2013). Furthermore, single case studies allow a methodologically rigorous analysis of sequences and processes (Bennett & Checkel, 2014). For our case study, we selected a chemical company as our research setting as this firm won the most prestigious national sustainability award. The firm also recently introduced an EMS, which provides information on the sustainability of their products along the entire supply chain.

Using multiple data sources allowed for a triangulation of the data to increase internal validity and mitigate potential biases (Yin, 2013). Our study relies on data from semi-

structured interviews and qualitative and quantitative document analysis. According to Breton (2009), quantitative document analyses can provide helpful indicators for underlying topics and their contexts. Combining the findings from the interviews and document analyses based on multiple methodological approaches, empirical materials, and perspectives in a single study adds rigor, breadth, richness, and depth to our inquiry (Denzin & Lincoln, 2005).

### **Data collection**

We relied on semi-structured interviews with 16 informants, internal documents on the EMS, and the company's corporate and sustainability reports. We used a snowball sampling strategy to identify key informants within the organization and designed a semi-structured interview guide (Flick, 2014) on strategic decision making, the use of Green IS in general, and the company's EMS in particular. The interviewees came from different organizational departments and hierarchical levels (Table 18). We terminated conducting further interviews once we had established a comprehensive and consistent understanding (Paré, 2004).

The interview data were iteratively triangulated across interviewees and compared with internal and external documents. We thus conducted a qualitative and quantitative document analysis of the case company's corporate and sustainability reports from 2006 to 2017 as well as internal documentations of the firm's EMS. The qualitative analysis allows for an in-depth understanding of the case company's strategic focus, their structuration processes, and provides evidence on how Green IS affordances support the case company's corporate strategy. Furthermore, we used data from the company's reports to measure financial and environmental performance indicators.

**Table 18.** Case Description

| Case                 | Details                                                                                                                                                                                                   |                                        |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| Company profile      | The company globally operates in the chemical industry. Their products are mainly based on natural resources and their customers are producers of consumer products, such as cosmetics, food, or perfume. |                                        |
| Headquarters         | Germany                                                                                                                                                                                                   |                                        |
| Employees (2017)     | 9,000                                                                                                                                                                                                     |                                        |
| Total sales (2017)   | EUR 4.3bn                                                                                                                                                                                                 |                                        |
| Number of interviews | 16                                                                                                                                                                                                        |                                        |
| Interviewee position | 1: Head of HR EMEIA                                                                                                                                                                                       | 9: Head of R & D                       |
|                      | 2: Key Account Manager                                                                                                                                                                                    | 10: Travel Manager                     |
|                      | 3: Head of R & D                                                                                                                                                                                          | 11: Director Process Management        |
|                      | 4: Chief Sustainability Officer                                                                                                                                                                           | 12: Senior Perfumer                    |
|                      | 5: Global Head of IT                                                                                                                                                                                      | 13: Manager CI/CD                      |
|                      | 6: Manager Production                                                                                                                                                                                     | 14: Senior VP Central & Eastern Europe |
|                      | 7: Manager Site & Service                                                                                                                                                                                 | 15: Sales Representative               |
|                      | 8: Manager CSR                                                                                                                                                                                            | 16: Head of Sustainability             |

### Data analysis

Since the interviews were tape-recorded, we transcribed them according to Flick's (2014) transcription procedure and coded the interviews using the software NVivo 11 (QSR International Pty Ltd, Doncaster, Victoria, Australia). We developed a short description of each interview (single case analysis), searched for meaningful correlation between the different statements (in-depth analysis), and aimed for commonalities and differences between the interviews (group comparison) to build categories and provide generalizations regarding the company's corporate strategy and the Green IS affordances by Seidel et al. (2013) (Flick, 2014).

For coding the interviews, we built upon the framework by Seidel et al. (2013). In particular, we carried out open and axial coding. We started by engaging in open coding,

which involved coding different incidents in many different categories. With a pre-understanding of the categories of the framework by Seidel et al. (2013), we focused on the analysis of the categories in the axial coding process. After combining related categories into core categories, we compared the emerging ones to the prior theorized categories. The identified categories and subcategories were *material properties of IS*, the *emergence of functional affordances*, the *realization of functional affordances* and *organizational consequences*. We started to link indicators to identified concepts – for example reflective disclosure affordances – within each of the tentative categories from the open coding stage, for example intra- and inter-organizational sensemaking.

Following Bowen (2009) for the qualitative document analysis, we first skimmed the documents (superficial examination), read through them (thorough examination), and then started our interpretation. This iterative process combines content and thematic analysis (Bowen, 2009). We then coded the documents independently from the interviews, using the same coding procedure described above.

To control for inter-coder reliability, the coding was done by one researcher, who was not involved in the interview process and by two interviewers (Lombard, Snyder-Duch, & Bracken, 2002). Additionally, we controlled for intra-coder reliability by coding the data four times with at least one week between each coding process (Lombard et al., 2002). We examined mismatching codes and reached an agreement on a final coding matrix before analyzing the data.

We used NVivo 11 to analyze word frequencies in the company's corporate reports from 2006 to 2017. This quantitative analysis was used for a further grounding of the qualitative analysis and the developed coding scheme. We conducted a word-frequency analysis to gain a profound understanding of the topics. As we were aware that no meaningful words are



excluded, we limited our analysis on the 100 most important words with at least four characters to exclude fillers.

For an in-depth understanding of our case company's performance, we investigated eco-sustainability and financial indicators. To measure financial performance, we used Stanwick and Stanwick's (1998) measurement of profitability, as well as growth in sales based on annual sales figures. Furthermore, we calculated scores for energy, carbon, water, and waste productivity (Ameer & Othman, 2012), as well as a total eco-sustainability productivity score (Table 19). Since the case company does not measure CO<sub>2</sub> emissions equivalents, we calculated carbon productivity only based on annual sales divided by CO<sub>2</sub> emissions. The quantitative analysis of key performance indicators allows us to trace how the firm developed over time increasing our study's validity.

**Table 19.** Operationalization of Performance Indicators

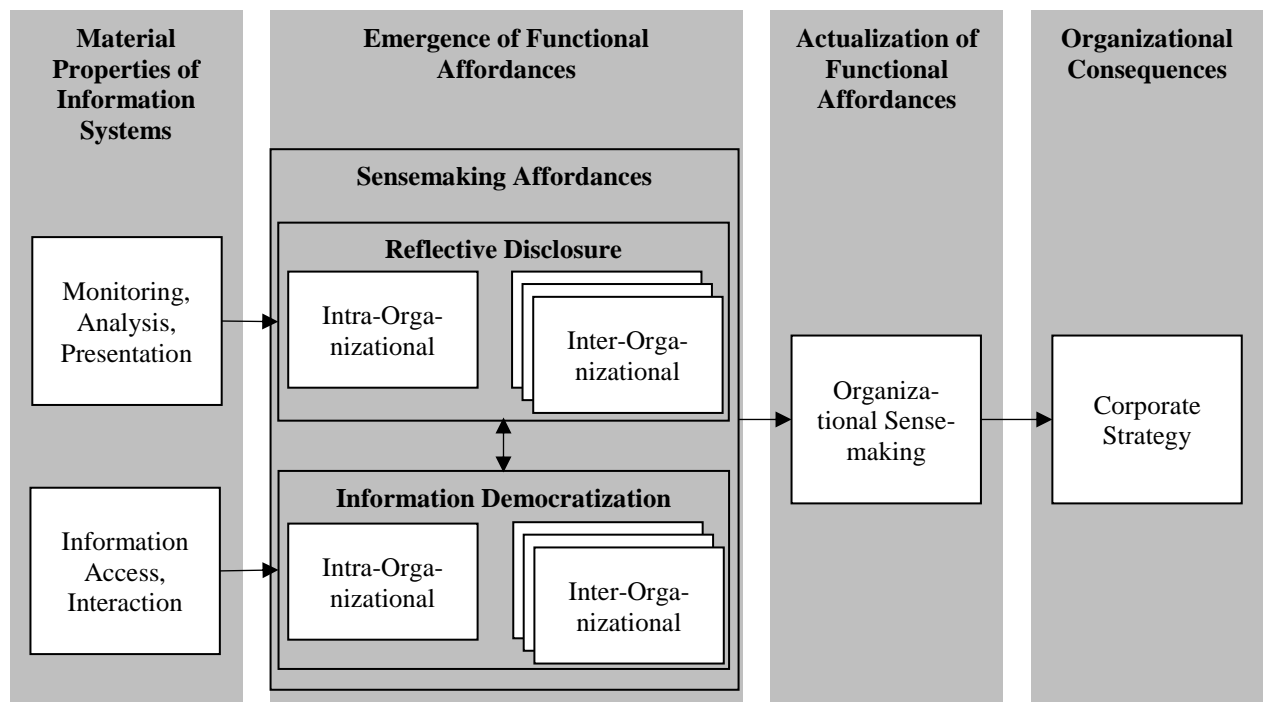
| Performance Indicators                | Operationalization                                                                            |
|---------------------------------------|-----------------------------------------------------------------------------------------------|
| Energy productivity                   | Annual sales (in EUR) divided by total direct and indirect energy consumption (in gigajoules) |
| Carbon productivity                   | Annual sales (in EUR) divided by total CO <sub>2</sub> emissions (in tons)                    |
| Water productivity                    | Annual sales (in EUR) divided by total water use (in cubic meters)                            |
| Waste productivity                    | Annual sales (in EUR) divided by total waste produced (in tons)                               |
| Total eco-sustainability productivity | Mean of energy productivity, carbon productivity, water productivity, waste productivity      |
| Profitability                         | Annual profits (in EUR) divided by annual sales (in EUR)                                      |
| Growth in Sales                       | Annual sales (in EUR)                                                                         |

## Results

Our data analysis revealed that the firm's EMS supported a more sustainable strategy by affording sensemaking, which led to a change in the company's corporate strategy. The material properties of the EMS allowed the emergence of sensemaking affordances

(reflective disclosure and information democratization) both on the intra- and inter-organizational level (see Figure 6). The EMS provided reflective disclosure and information democratization affordances, which were actualized on the individual and organizational level for sensemaking. We further observed that the availability of sustainability-related information increased awareness regarding environmental and social issues throughout the organization, which eventually affected the case company's overall business strategy. We will elaborate on the underlying mechanisms in the following.

**Figure 6.** Extension of the Model by Seidel et al. (2013): Green IS Affordances supporting Corporate Strategy



### Material Properties of the Environmental Management System

In the concept of functional affordances, material properties provide potential uses for IS, given the user's means and goals (Markus & Silver, 2008). In our case study, we discovered five material properties of the EMS supporting sensemaking affordances: monitoring, analysis, presentation, information access, and interaction.

The EMS allows the *monitoring* of environmental impacts in relation to the United Nation's Sustainable Development Goals, including traceability, land use, water intensity, bio diversity, toxicity, ecotoxicity, CO<sub>2</sub> emissions, scrap (e-factor), renewability, and biodegradability. With more than 1,200 chemicals maintained in the system, most of the product codes are covered. This allows for an eco-sustainability measurement of more than 90 % of all products. Thereby, the entire supply chain is monitored:

*Based on the United Nation's Sustainability Development Goals, we developed these indicators to measure the eco-sustainability of our products. As we try to cover eco-sustainability extensively, we included the whole supply chain, including all sourcing processes, in our analyses. [Interviewee 8]*

Further, the EMS provides advanced *analysis* possibilities for different user groups. All substances, products, and characteristics of interest can be chosen independently. For example, the eco-sustainability of different products or product categories can be compared with each other. The EMS also facilitates the *presentation* of each substance's and final product's eco-sustainability via spider diagrams, which also enables a comparison of the product's eco-sustainability (see Figure 7). Additional visualization techniques (e.g., tables and diagrams) support users in understanding the complex effects and interactions of different substances. For instance, the EMS facilitates a comparison of the environmental impacts of naturally-produced substances with the same product produced synthetically:

*The tool [referring to the EMS] provides you with a great overview: You can see the available data for the product displayed as a ratio, the eco-sustainability index displayed in a table, and a spider diagram in which you can see exactly how well the product performs in relation to each eco-sustainable category. [Interviewee 8]*

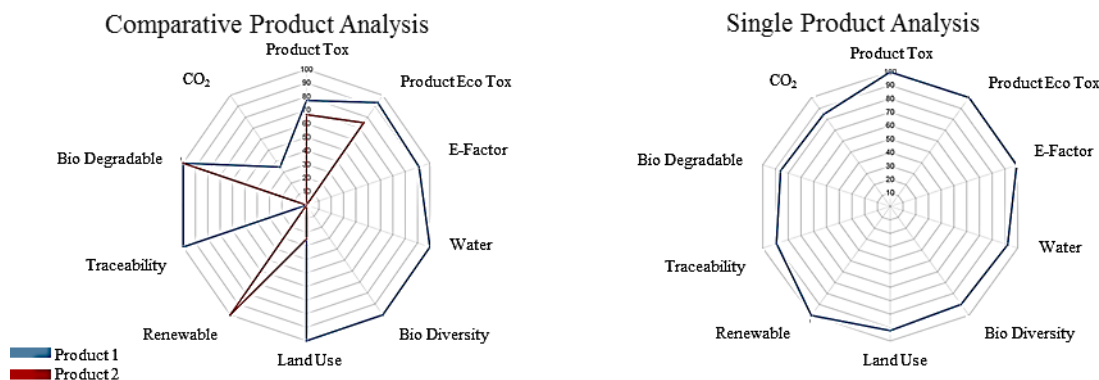
The EMS was developed as a standard component for an enterprise resource planning (ERP) system and therefore *information access* barriers for employees are low. As the firm's IT infrastructure is based on an ERP system, the EMS is universally available:

*The information provided is accessible by everyone in the company and especially relevant for our personnel in sales, research and development, and production.*

[Interviewee 11]

Due to the EMS's ubiquity, information can be accessed easily and quickly by simply selecting a product of interest and the required eco-sustainability characteristics. *Interaction* is enabled by features that provide the possibility of sharing the analyses with others via e-mail and internal communication platforms.

**Figure 7.** EMS - Presentation of Product's Eco-Sustainability



### Emergence and Actualization of Functional Affordances

The introduction of the EMS was initiated by a single employee at the beginning of 2009. It started with a basic Microsoft Excel version to test the idea, which was then reviewed and further developed with the help of other employees. The Excel prototype delivered a proof of concept so that several departments actively supported the EMS' development by allocating funding and contributing feedback about raw materials and products. In the development

process, new environmental key performance indicators based on the United Nation's Sustainable Development Goals were included and examined by an external auditor:

*We needed a tool [referring to the EMS] like this. A lot of colleagues were looking for information about sustainability but did not know where and how to find it. This information is now available due to the implementation of the EMS. [Interviewee 9]*

In the case company, the development of the EMS initiated a company-wide knowledge exchange, as knowledge of the various raw materials is then globally dispersed among the organizational departments. With the help of the EMS, the employees could understand, interpret, and frame the complex and multifaceted information about eco-sustainability.

### **Intra- and Inter-Organizational Information Democratization**

After the EMS was integrated into the existing ERP solution, all employees could use the EMS for accessing information on the sustainability of different substances, compositions, and products. The EMS enabled the sustainability-related information – which was new and surprising at times – to assimilate quickly throughout the organization allowing *for intra-organizational information democratization*:

*All information regarding the environmental impact of raw materials is globally accessible through the EMS. [Interviewee 8]*

As customers and suppliers became increasingly interested in the EMS, the case company selectively granted access to the information stored within it. Based on feedback and discussions with customers and suppliers, the case company could further refine and improve the EMS. As a result of sharing and discussing the information with these related organizations, the EMS initiated spill-over effects in the customers' and suppliers' decision-making processes, resulting in an increased awareness in the inter-organizational network for

sustainability issues. Thereby, the EMS afforded the inter-organizational dissemination of knowledge and afforded *intra-organizational information democratization*:

*Our customers started to ask for eco-sustainability measures as a selection criterion for our products. When we presented the output of the system and highlighted eco-sustainability aspects, our customers were willing to pay even more. [Interviewee 4]*

### **Intra- and Inter-Organizational Reflective Disclosure**

In the case company, we found that employees used the EMS to reconsider established practices and to test new ideas on more sustainable compositions and products. The material properties of the EMS afforded employees to assess and visualize related information quickly and thus allowed for *intra-organizational reflective disclosure*. The features of the EMS afforded the comparison of different compositions of raw materials for final products. This was especially useful for new product development:

*Employees in product development use the EMS actively [...] They already prefer sustainable raw materials and formulas based on the insights of the system. [Interviewee 4]*

Furthermore, the EMS afforded portfolio analyses to identify products with a large negative environmental and social impact. The discussion features of the EMS enabled employees to share their findings with other colleagues. The results were discussed regularly with internal and external co-workers and experts to find solutions that were less environmentally harmful:

*We found out that a so-called green molecule was not green at all. The EMS showed very bad results for this molecule. So, we asked our colleagues in Asia about this problem [...] Now we cooperate with local universities and work together with scientists and farmers on a solution. [Interviewee 11]*

Customers with a strong environmental agenda were especially intrigued by the information provided by the EMS, as they could assess and compare the social and environmental impact of their products and specific materials for the first time. At times the information altered their beliefs about the impact of certain products on the environment and societies and with the help of the EMS, the case company could even reveal counterintuitive information on particular products. As a consequence, some customers reconsidered the products they procured from the case company and the raw materials that are used to produce them, allowing for *inter-organizational reflective disclosure*:

*The customers asked for eco-sustainable solutions and products. When they saw the EMS's results, they were surprised that from a sustainability point of view, some natural products should be better replaced by synthetic products. As a consequence, they ordered the synthetic product and changed their established beliefs about the eco-sustainability of some products. [Interviewee 3]*

### **Corporate Sustainable Strategy**

As the case company went public in 2006, its corporate strategy intended to ensure profitable growth by smart products and superior customer service. For the first time, sustainability issues were included in the annual report in 2009. In the case company's strategy statement, eco-sustainability was described as an effective way to manage resources and to develop environmentally-friendly products. Winning the most prestigious national sustainability award in 2012, for a sustainable sourcing initiative in a developing country, led to a major change in the case company's corporate strategy:

*Winning the prize was a decisive experience, because it was very media-effective, as we were immediately given first place. This was something very special for the company. [Interviewee 1]*

From 2012 onwards, the case company's strategy was still based on growth, effectiveness, and customer-centricity, but sustainability became an essential building block of corporate strategy. The case company thus highlighted sustainability as an integral part of their corporate strategy. To facilitate their strategy, the firm defined the following economic and sustainable goals: (1) above-average growth in sales; (2) continuous improvement in performance; (3) ongoing optimization of the product portfolio; (4) strong engagement for sustainability in footprint (reduction of environmental pollution in the complete value chain), innovation (eco-sustainable product development), sourcing (eco-sustainable supplier relationships), and care (local and global care for eco-sustainable production conditions).

These goals were supported by the actualized affordances of their EMS. First, the EMS helped to increase sales, as the case company was the only firm on the market that could provide sustainability performance indicators to customers. This information was increasingly important for the case company's customers as they were faced with a rising demand for sustainable products and information on their products' sustainability. Regarding the second goal for performance improvement, the EMS allowed for sharing and discussing information in relation to eco-sustainability. Furthermore, customers' awareness of sustainable products increased, leading to an improvement in the overall performance of the company. Supporting the third goal, the EMS provided detailed information on the product's sustainability characteristics and enabled a constant optimization of the product portfolio. Regarding the fourth goal, the EMS incorporated the United Nation's Sustainable Development Goals in the measurement of the product's sustainability; it directly supported the company's goal to strongly engage for sustainability in footprint, innovation, sourcing, and care. Thus, as explicitly stated in the annual reports of 2014 to 2017, sustainability has become a competitive advantage and a key component of the company's differentiation strategy. This change towards a corporate sustainable strategy is also supported by the results



of our quantitative analysis of the company's annual reports. In the 2017 annual report, the term 'sustainability' occurred 232 times, which ranked it fourth among the 100 most frequently used terms, well above 'market' (ninth place), 'sales' (15<sup>th</sup> place), or 'financial' (25<sup>th</sup> place).

As the importance of sustainability increased for the entire food and fragrance industry, the EMS increased the case company's credibility and reputation as the industry's sustainability leader. For a considerable time, the case company was the only supplier in the market, which could provide detailed information about its sustainability efforts. Thus, the EMS has become an essential sales and marketing tool that helped the company to position itself as a sustainability leader on the market:

*These are the things [referring to the EMS] that have hugely advanced our market differentiation. [Interviewee 4]*

Also, managers used the EMS to support strategic decision making. Based on the novel information provided by the EMS, environmental and social impacts related to sourcing and producing goods became an ever more important decision criterion. Incorporating sustainability-related information in strategic decision making also had a tremendous impact on the company's organizational culture. Awareness and knowledge about sustainable effects and issues increased across the workforce. The alignment of strategic and sustainability objectives additionally embedded sustainability in the case company's culture. Thus, the EMS enabled and triggered changes in corporate strategy and organizational culture, which mutually reinforced each other. However, an organization-wide rollout of the EMS was only possible as eco-sustainability started to play an ever more important role in the case company's culture. As a result, an internal project was funded to further develop the EMS as a component for the company-wide ERP system. External IT providers supported the integration and rolled out the EMS in the whole company.

The introduction of the EMS did not only contribute to an improved sustainability performance, but it also had a positive impact on the firm's financial performance. The company realized an increase in annual sales of 5.09 % per annum from 2012 to 2017, which is remarkable in comparison to an annual growth of 2.33 % per annum from 2006 to 2011. This supported an overall increase in earnings by 71.60 % from 2012 to 2017. Also, in comparison to its main competitors, the increase in sales from 2012 to 2017 lowered the competitors' lead on the market. From 2006 to 2017, the case company reached an annual growth rate in sales of more than two-thirds more than one of their strongest competitors (case company: 8.44 % growth per annum; competitor 1: 9.14 % growth per annum; competitor 2: 5.42 % growth per annum) This is also related to a strong increase in the company's eco-sustainable productivity. Based on Ameer and Othman's (2012) measurements, Table 20 shows the case company's increase in eco-sustainable productivity in relation to its annual use of energy, water, carbon, and waste. The productivity level of all four environmental categories (energy, carbon, water, and waste) increased and led to a strong overall increase of eco-sustainable productivity over time. Thus, besides other factors which might have had an impact on the company's strategy, the EMS successfully supported the case company's sustainability strategy:

*Thanks to the tool [referring to the EMS] we realized how eco-sustainable our product portfolio is and are constantly improving for sustainability. [Interviewee 11]*

**Table 20.** Annual Increase in Sustainability Productivity [in %]

| Year | Increase in productivity |        |       |        | Total eco-sustainability |
|------|--------------------------|--------|-------|--------|--------------------------|
|      | Energy                   | Carbon | Water | Waste  |                          |
| 2007 | 3.06                     | 2.67   | 3.66  | -6.69  | -5.22                    |
| 2008 | 6.31                     | 5.85   | 11.93 | 4.55   | 4.82                     |
| 2009 | 3.88                     | 11.11  | 6.90  | 27.22  | 24.35                    |
| 2010 | 7.18                     | -13.34 | 12.91 | -15.16 | -14.51                   |
| 2011 | 1.94                     | 1.03   | 0.53  | 0.62   | 0.69                     |
| 2012 | 7.61                     | 9.80   | 6.98  | 16.74  | 15.58                    |
| 2013 | 21.71                    | 19.21  | 18.08 | 19.20  | 19.30                    |
| 2014 | 26.40                    | 26.52  | 9.50  | 36.10  | 34.51                    |
| 2015 | 34.70                    | 34.70  | 16.36 | 25.95  | 27.06                    |
| 2016 | 15.94                    | 17.96  | -5.85 | 14.61  | 14.94                    |
| 2017 | 15.25                    | 15.61  | 1.81  | 1.75   | 3.76                     |

### Discussion

Our study aimed to investigate how and why Green IS affordances can contribute to an organization's shift towards a more sustainable corporate strategy. Our study thereby draws on two key findings. First, we demonstrate that, based on the material properties of the EMS, the functional affordances of reflective disclosure and information democratization activated sensemaking processes. The availability of sustainability-related information for all employees enabled organizational sensemaking with regard to how raw materials are procured and which materials have a lower ecological and social footprint. The newly available information resulted in the reconsideration of established beliefs about ecological and social impacts of particular substances and chemical compounds, increasing employees' awareness regarding sustainability issues. Chemists in research and development, for instance, could assess for the first time the sustainability of different combinations leading to the same product and select the one with the best sustainability performance. Information

democratization affordances supported employees to share and discuss information and their analyses. As the company procures a multitude of very specific raw materials and maintains production sites worldwide, knowledge about these raw materials is widely dispersed. The EMS' features demonstrated to be extremely helpful to request, discuss, and share information on raw materials and products. Hence, the EMS stimulated cross-functional and cross-departmental organizational learning. Moreover, we found that the functional affordances of reflective disclosure and information democratization of the EMS did not only impact the case company, but also their suppliers and customers, which were given access to certain analyses. Sharing and discussing this information with partners created a learning network in which information spilled over. Hence, the EMS offered affordances on the intra- and inter-organizational level. This multi-level view further elucidates the mechanisms behind an IS-supported sustainable strategy shift. Our results thus indicate that both intra-organizational and inter-organizational affordances were important to broadly and successfully promote the EMS' features and its use for sustainability issues.

Second, our study provides initial evidence that organizational sensemaking affordances sparked an organization strategy shift. From an internal perspective, the EMS triggered an organizational culture in which sustainability was ever more deeply embedded. For the first time, employees had the opportunity to explore information on the ecological and social impact of raw materials and products, which was often surprising and counter-intuitive. These analyses frequently triggered initiatives for more sustainable practices that spread quickly through the use of the EMS-interaction features. The initiatives and their positive business impacts (new business, reputation, credibility) were a key driver for the firm's top management to manifest a more sustainable corporate strategy. From an external perspective, the EMS enabled the case company to provide much more detailed information on the sustainability of its products than its competitors. In times of increasing consumer awareness

of sustainability issues, providing exhaustive quantitative evidence on their products' ecological and social footprints to customers was a competitive advantage leading to a growing number of customers purchasing more sustainable products. Differentiating itself as an industry leader for sustainability, the case company could outperform competitors, both in terms of financial and sustainability performance. Furthermore, the organization initiated a shift in dominant market behavior. As further companies reacted to the new strategy, their demand for sustainable products also grew. This spillover effect enabled the company to directly react to customer needs and serve a more differentiated market.

With these findings, this paper contributes to the extant literature on Green IS and sustainable strategies in three ways. First, we found that affordances can emerge not only on an intra-, but also on an inter-organizational level. Our case elucidates that sensemaking affordances affect the motivation, attitude, and awareness of individuals to reconsider work practices in an organization. These changed beliefs about the environment result in new sustainable practices. Similar to Seidel et al. (2013), our study shows that information democratization affords individuals to monitor environmental performance indicators related to their daily work and to globally access this information. Reflective disclosure enabled individuals to exchange their knowledge with others and help reinterpret, realign, and raise awareness for sustainability issues. Extending work by Seidel et al. (2013), we found evidence for actualized organizational sensemaking affordances to act as a driver for strategy shifts. The inter- and intra-organizational view on affordances has presented its use in studies on collaboration (Gal, Jensen, & Lyytinen, 2014) and innovation (Rehm & Goel, 2015), but is unique in the field of Green IS. Zammuto, Griffith, Majchrzak, Dougherty, and Faraj (2007) argued that new organizational practices are afforded by increased IT capabilities and changes in inter-organizational contexts. Our findings extend this argument by demonstrating

that actualized inter-organizational affordances influence the organizations' strategy and expand to new market practices.

Second, this study is one of few that shows that Green IS can have an influence on strategic level and lead to competitive advantage. The presented case study provides an example of how Green IS enable and trigger a sustainable strategy and delineates the role of Green IS in organizational sustainability transformations by highlighting underlying mechanisms (Seidel et al., 2013). Thus, in line with Bengtsson and Ågerfalk (2011) and Butler (2011), our case study demonstrates that Green IS are not only a tool to save resources or improve the ecological footprint, but can also have strategic business value.

Third, our findings complement previous work by Melville (2010) and Seidel et al. (2013), as we find organizational sensemaking affordances to play a crucial role in changing individual's motivation, attitude, and awareness that support the reconsideration of beliefs and practices and lead to more sustainable actions. We show how those mechanisms can improve an organization's strategic position for example through enhanced reputation, credibility, and market differentiation. We thus provide an explanation of underlying mechanisms that support a corporate sustainable strategy.

Our study also has meaningful implications for practitioners. By designing and implementing Green IS to afford information democratization and reflective disclosure, companies can encourage organizational learning about sustainability issues. Thereby, organizations should not only include a technical perspective, but also take strategic and organizational aspects into consideration. As our case study shows, Green IS can be leveraged to gain a competitive advantage, especially in industries in which sustainability is important. In our case, the EMS provided information on the sustainability of the case company's products, which proved to be extremely helpful to generate new and foster existing customer relationships, since this allows customers to satisfy consumers' demand for eco-sustainable

products. Thus, the EMS constituted a competitive advantage and helped the company pursue a credible differentiation strategy. Thereby Green IS cannot only support a company's sustainable strategy in organizational sustainability transformations, but can even support an industry-wide shift towards sustainability. As we demonstrate, with the help of Green IS, a company can positively contribute to the United Nation's Sustainable Development Goals by implementing a corporate sustainable strategy. Thus, the use of Green IS cannot only support companies' success, but also contributes to a company's ethical responsibility towards the environment and society, increasing its legitimacy.

Although we designed this study with care, our study is not without limitations. Even though a single case study design allows us to generalize a theory (Lee & Baskerville, 2003), it is limited in its generalizability. Thus, further research is needed to replicate our findings in other organizational contexts and in relation to other Green IS (Eisenhardt, 1989; Eisenhardt & Graebner, 2007). Further studies linking Green IS affordances and sustainable strategies should include multiple research sites, incorporating variance in industries, size, and territories of operation.

Our study focuses on the organizational sensemaking affordances by Seidel et al. (2013) (reflective disclosure and information democratization), as an important part of Green IS affordances. However, this study does not explicitly involve sustainable practicing affordances, as another set of important Green IS affordances that directly contribute to the establishment of sustainable work practices (Seidel et al., 2013), and is thus limited in its investigation on specific work practices. Against this limitation, further research should include sustainable practicing affordances and scrutinize their impact on a firm's sustainable strategy. Furthermore, research should explore other Green IS affordances and examine how these Green IS affordances support organizations' sustainable strategies. An additional direction for further research is to evaluate how Green IS affordances interact with

organizational values, assumptions, and beliefs in fostering a corporate sustainable strategy or even sustainable behavior in organizations.

Furthermore, even though analyzing Green IS affordances' role in supporting a company's corporate sustainable strategy allowed for meaningful insights into mechanisms supporting a strategic shift in organizational sustainability transformations, our study is limited to a retroactive approach. Thus, future research should build on our findings and include active approaches to trigger mechanisms and dynamics of Green IS affordances in supporting sustainable strategy initiatives. By engaging in action research or ethnographic studies, future research can delve more deeply into the dynamics of Green IS affordances and organizational factors.

### **Conclusion**

Our study elucidates the role of Green IS affordances in facilitating an organization's sustainable strategy. We thereby address shortcomings of existing research, namely the potential of Green IS, to address broader environmental issues in organizations (Jenkin et al., 2011). By drawing on the affordance theory in general and Seidel et al.'s (2013) sensemaking affordances of reflective disclosure and information democratization in particular, we are able to analyze the role of Green IS in a corporate sustainable strategy. We thereby broaden the concept of Seidel et al. (2013), as we demonstrate that sensemaking affordances do not only influence organizational sensemaking but also organizational strategy. This allows for an explanation of the underlying mechanisms that support a sustainable strategy and related organizational sustainability transformations. Further, we found that Green IS affordances can exist on an intra- and inter-organizational level and thus extend the inter- and intra-organizational view on affordances by demonstrating that actualized inter-organizational affordances influence organizations' strategies. As one of the view studies that demonstrate that Green IS can have an influence on firm's strategy and can have strategic business value,



our study provides a new way of looking at Green IS affordances with regard to corporate sustainable strategy and provides a first step to understand this complex relationship.

## References

- Ameer, R., & Othman, R. (2012). Sustainability practices and corporate financial performance: A study based on the top global corporations. *Journal of Business Ethics*, *108*(1), 61–79. <http://doi.org/10.1007/s10551-011-1063-y>
- Banerjee, S. B. (2001). Managerial perceptions of corporate environmentalism: Interpretations from industry and strategic implications for organizations. *Journal of Management Studies*, *38*(4), 489–513. <http://doi.org/10.1111/1467-6486.00246>
- Bansal, P., & Roth, K. (2000). Why companies go green: A model of ecological responsiveness. *The Academy of Management Journal*, *43*(4), 717–736. <http://doi.org/10.5465/1556363>
- Baskerville, R., Pries-Heje, J., & Recker, J. (2016). Principles for re-designing information systems for environmental sustainability. In F. J. Mata & A. Pont (Eds.), *ICT for Promoting Human Development and Protecting the Environment* (pp. 14–25). San José, Costa Rica. [http://doi.org/10.1007/978-3-319-44447-5\\_2](http://doi.org/10.1007/978-3-319-44447-5_2)
- Bengtsson, F., & Ågerfalk, P. J. (2011). Information technology as a change actant in sustainability innovation: Insights from Uppsala. *Journal of Strategic Information Systems*, *20*(1), 96–112. <http://doi.org/10.1016/j.jsis.2010.09.007>
- Bennett, A., & Checkel, J. (2014). Process tracing: From methodological roots to best practices. In A. Bennett & J. Checkel (Eds.), *Process tracing in the social sciences: From metaphor to analytic tool* (pp. 3–38). Cambridge: Cambridge University Press.
- Bowen, G. A. (2009). Document analysis as a qualitative research method. *Qualitative Research Journal*, *9*(2), 27–40. <http://doi.org/10.3316/qrj0902027>
- Breton, G. (2009). From folk-tales to shareholder-tales: semiotics analysis of the annual report. *Society and Business Review*, *4*(3), 187–201. <http://doi.org/10.1108/17465680910994191>

- Butler, T. (2011). Compliance with institutional imperatives on environmental sustainability: Building theory on the role of Green IS. *Journal of Strategic Information Systems*, 20(1), 6–26. <http://doi.org/10.1016/j.jsis.2010.09.006>
- Butler, T., Daly, M., & Hackney, R. (2015). Socio-technical transitions towards environmental sustainability through Green ICT. In *SIGGreen Pre-ICIS 2015 Workshop* (pp. 1–12). Ft. Worth, USA.
- Daft, R. L., & Weick, K. E. (1984). Toward a model of organizations as interpretation systems. *Academy of Management Review*, 9(2), 284–295. <http://doi.org/10.5465/AMR.1984.4277657>
- Dedrick, J. (2010). Green IS: Concepts and issues for information systems research. *Communications of the Association for Information Systems*, 27(1), 173–184. <http://doi.org/10.1057/cais.2010.27>
- Denzin, N. K., & Lincoln, Y. S. (2005). *The Sage handbook of qualitative research* (3rd ed.). Thousand Oaks, CA: Sage.
- Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of Management Review*, 14(4), 532–550. <http://doi.org/10.5465/amr.1989.4308385>
- Eisenhardt, K. M., & Graebner, M. E. (2007). Theory building from cases: Opportunities and challenges. *Academy of Management Journal*, 50(1), 25–32. <http://doi.org/10.2307/20159839>
- Elkington, J. (1994). Towards the sustainable corporation: Win-win-win business strategies for sustainable development. *California Management Review*, 36(2), 90–100. <http://doi.org/10.2307/41165746>
- Erek, K., Loeser, F., Schmidt, N.-H., Zarnekow, R., & Kolbe, L. M. (2011). Green IT strategies: A case study-based framework for aligning Green IT with competitive environmental strategies. In *Proceedings of the 15th Pacific Asia Conference on*

*Information Systems*. Brisbane, Australia. <http://doi.org/10.1.1.232.670>

- Flick, U. (2014). *The Sage handbook of qualitative data analysis*. London, UK: Sage.
- Gal, U., Jensen, T. B., & Lyytinen, K. (2014). Identity orientation, social exchange, and information technology use in interorganizational collaborations. *Organization Science*, 25(5), 1372–1390. <http://doi.org/10.1287/orsc.2014.0924>
- Gholami, R., Watson, R. T., Hassan, H., Bjørn-Andersen, N., & Molla, A. (2016). Information systems solutions for environmental sustainability: How can we do more? *Journal of the Association for Information Systems*, 17(8), 521–536. <http://doi.org/10.1016/j.ais.2016.17.08>
- Gibson, J. J. (1986). *The ecological approach to visual perception*. London: Psychology Press.
- Gifford, R., Kormos, C., & McIntyre, A. (2011). Behavioral dimensions of climate change: Drivers, responses, barriers, and interventions. *Wiley Interdisciplinary Reviews: Climate Change*, 2(6), 801–827. <http://doi.org/10.1002/wcc.143>
- Hedman, J., & Henningsson, S. (2016). Developing ecological sustainability: A Green IS response model. *Information Systems Journal*, 26(2), 259–287. <http://doi.org/10.1111/isj.12095>
- Hedman, J., Henningsson, S., & Selander, L. (2012). Organizational self-renewal: The role of Green IS in developing eco-effectiveness. In *Proceedings of the 33rd International Conference on Information Systems*. Orlando, USA.
- Henderson, J. C., & Venkatraman, N. (1993). Strategic alignment leveraging information technology for transforming organizations. *IBM Systems Journal*, 32(1), 4–16. <http://doi.org/10.1147/sj.382.0472>
- Henfridsson, O., & Lind, M. (2014). Information systems strategizing, organizational sub-communities, and the emergence of a sustainability strategy. *Journal of Strategic*

- Information Systems*, 23(1), 11–28. <http://doi.org/10.1016/j.jsis.2013.11.001>
- Hilpert, H., Kranz, J., & Schumann, M. (2013). Leveraging Green IS in logistics - Developing an artifact for greenhouse gas emission tracking. *Business & Information Systems Engineering*, 5(5), 315–325. <http://doi.org/10.1007/s12599-013-0285-1>
- Jarzabkowski, P. (2003). Strategic practices: An activity theory perspective on continuity and change. *Journal of Management Studies*, 40(1), 23–55. <http://doi.org/10.1111/1467-6486.t01-1-00003>
- Jarzabkowski, P. (2008). Shaping strategy as a structuration process. *Academy of Management Journal*, 51(4), 621–650. <http://doi.org/10.2307/20159532>
- Jenkin, T. A., Webster, J., & McShane, L. (2011). An agenda for “Green” information technology and systems research. *Information and Organization*, 21(1), 17–40. <http://doi.org/10.1016/j.infoandorg.2010.09.003>
- Junglas, I., & Watson, R. T. (2006). The U-constructs: Four information drives. *Communications of the Association for Information Systems*, 17(1), 569–592. <http://doi.org/http://doi.org/10.1068/cais.2006.17>
- Kaplan, R. S., & Norton, D. P. (1996). Strategic learning and the balanced scorecard. *Strategy & Leadership*, 24(5), 18–24. <http://doi.org/10.1108/eb054566>
- Klein, H. H. K., & Myers, M. (1999). A set of principles for conducting and evaluating interpretive field studies in information systems. *MIS Quarterly*, 23(1), 67–93. <http://doi.org/10.2307/249410>
- Kranz, J., Kolbe, L. M., Koo, C., & Boudreau, M.-C. (2015). Smart energy: Where do we stand and where should we go? *Electronic Markets*, 25(1), 7–16. <http://doi.org/10.1007/s12525-015-0180-3>
- Kranz, J., & Picot, A. (2011). Why are consumers going green? The role of environmental concerns in private Green-IS adoption. In *Proceedings of the 19th European Conference*

on *Information Systems*. Helsinki, Finland.

- Kuo, B. N., & Dick, G. N. (2009). The greening of organisational IT: What makes a difference? *Australasian Journal of Information Systems*, 16(2), 81–92. <http://doi.org/10.3127/ajis.v16i2.592>
- Lee, A. S., & Baskerville, R. L. (2003). Generalizing generalizability in information systems research. *Information Systems Research*, 14(3), 221–243. <http://doi.org/10.1287/isre.14.3.221.16560>
- Loeser, F., Ereik, K., Schmidt, N.-H., Zarnekow, R., & Kolbe, L. M. (2011). Aligning Green IT with environmental strategies: Development of a conceptual framework that leverages sustainability and firm competitiveness. In *Proceeding of the 17th Americas Conference on Information Systems*. Detroit, USA.
- Loeser, F., Ereik, K., & Zarnekow, R. (2012). Towards a typology of Green IS strategies: Insight from case study research. In *Proceedings of 33rd International Conference on Information Systems*. Orlando, USA.
- Loeser, F., Recker, J., Brocke, J. vom, Molla, A., & Zarnekow, R. (2017). How IT executives create organizational benefits by translating environmental strategies into Green IS initiatives. *Information Systems Journal*, 27(4), 503–553. <http://doi.org/10.1111/isj.12136>
- Lombard, M., Snyder-Duch, J., & Bracken, C. C. (2002). Content analysis in mass communication. *Human Communication Research*, 28(4), 587–604. <http://doi.org/10.1111/j.1468-2958.2002.tb00826.x>
- Lubin, D. A., & Esty, D. C. (2010). The sustainability imperative. *Harvard Business Review*, 88(5), 2–9. <http://doi.org/10.1057/palgrave.crr.1540128>
- March, J. G. (1991). Exploration and exploitation in organizational learning. *Organization Science*, 2(1), 71–87. <http://doi.org/10.1287/orsc.2.1.71>

- Marett, K., Otondo, R., & Taylor, G. (2013). Assessing the effects of benefits and institutional influences on the continued use of environmentally munificent bypass systems in long-haul trucking. *MIS Quarterly*, 37(4), 1301–1312. <http://doi.org/10.25300/MISQ/2013/37.4.14>
- Markus, M. L., & Silver, M. S. (2008). A foundation for the study of IT effects: A new look at DeSanctis and Poole's concepts of structural features and spirit. *Journal of the Association for Information Systems*, 9(10), 609–632. <http://doi.org/10.1.1.183.3995>
- Melnyk, S., Sroufe, R. ., & Calantone, R. (2003). Assessing the impact of environmental management systems on corporate and environmental performance. *Journal of Operations Management*, 21(3), 329–351. [http://doi.org/10.1016/S0272-6963\(02\)00109-2](http://doi.org/10.1016/S0272-6963(02)00109-2)
- Melville, N. (2010). Information systems innovation for environmental sustainability. *MIS Quarterly*, 34(1), 1–21. <http://doi.org/10.2307/20721412>
- Mintzberg, H. (1978). Patterns in strategy formation. *Management Science*, 24(9), 934–948. <http://doi.org/10.1287/mnsc.24.9.934>
- Molla, A., Cooper, V. A., & Pittayachawan, S. (2009). IT and eco-sustainability: Developing and validating a Green IT readiness model. In *Proceedings of the 30th International Conference on Information Systems*. Phoenix, USA.
- Moon, S. G., Bae, S., & Jeong, M. G. (2014). Corporate sustainability and economic performance: An empirical analysis of a voluntary environmental program in the USA. *Business Strategy and the Environment*, 23(8), 534–546. <http://doi.org/10.1002/bse.1800>
- Orlikowski, W. J., & Iacono, C. S. (2001). Desperately seeking the “IT” in IT research. A call to theorzing the IT artifact. *Information Systems Research*, 12(2), 121–134. <http://doi.org/10.1287/isre.12.2.121.9700>
- Orsato, R. J. (2006). Competitive environmental strategies: When does it pay to be green?

- California Management Review*, 48(2), 127–143. [http://doi.org/10.1002/\(SICI\)1099-0836](http://doi.org/10.1002/(SICI)1099-0836)
- Paré, G. (2004). Investigating information systems with positivist case research. *Communications of the Association for Information Systems*, 13(18), 233–264. <http://doi.org/10.1178/cais.2004.13>
- Premkumar, G., & Ramamurthy, K. (1995). The role of interorganizational and organizational factors on the decision mode for adoption of interorganizational systems. *Decision Sciences*, 26(3), 303–336. <http://doi.org/10.1111/j.1540-5915.1995.tb01431.x>
- Recker, J. C. (2016). Toward a design theory for green information systems. In *Proceedings of the 49th Hawaii International Conference on System Sciences* (pp. 4474–4483). Hawaii, USA. <http://doi.org/10.1109/HICSS.2016.556>
- Rehm, S.-V., & Goel, L. (2015). The emergence of boundary clusters in inter-organizational innovation. *Information and Organization*, 25(1), 27–51. <http://doi.org/10.1016/j.infoandorg.2014.12.001>
- Sarkar, P., & Young, L. (2009). Managerial attitudes towards Green IT: An explorative study of policy drivers. In *Proceedings of the 13th Pacific Asia Conference on Information Systems*. Hyderabad, India.
- Schmidt, N.-H., Erek, K., Kolbe, L. M., & Zarnekow, R. (2010). Predictors of Green IT adoption: Implications from an empirical investigation. In *Proceedings of the 16th Americas Conference on Information Systems*. Lima, Peru.
- Seidel, S., Recker, J., & Vom Brocke, J. (2013). Sensemaking and sustainable practicing: Functional affordances of information systems in green transformations. *MIS Quarterly*, 37(4), 1275–1299. <http://doi.org/10.25300/MISQ/2013/37.4.13>
- Stanwick, P. A., & Stanwick, S. D. (1998). The relationship between corporate social performance, and organizational size, financial performance, and environmental



- performance: An empirical examination. *Journal of Business Ethics*, 17(2), 195–204.  
<http://doi.org/10.1023/A:1005784421547>
- Strong, D. M., Volkoff, O., Johnson, S. A., Pelletier, L. R., Tulu, B., Bar-on, I., ... Garber, L. (2014). A theory of organization-EHR affordance actualization. *Journal of the Association for Information Systems*, 15(2), 53–85. <http://doi.org/10.17705/1jais.00353>
- Thambusamy, R., & Salam, A. F. (2010). Corporate ecological responsiveness, environmental ambidexterity and IT-enabled environmental sustainability strategy. In *Proceedings of the 31st International Conference on Information Systems*. St. Louis, USA.
- Volkoff, O., & Strong, D. M. (2013). Critical realism and affordances: Theorizing IT-associated organizational change processes. *MIS Quarterly*, 37(3), 819–834.  
<http://doi.org/10.25300/MISQ/2013/37.3.07>
- Wati, Y., & Koo, C. (2011). An introduction to the Green IT balanced scorecard as a strategic IT management system. In *Proceedings of the 44th Hawaii International International Conference on Systems Science*. Hawaii, USA. <http://doi.org/10.1109/HICSS.2011.59>
- Watson, R. T., Boudreau, M. C., & Chen, A. J. (2010). Information systems and environmentally sustainable development: Energy informatics and new directions for the IS community. *MIS Quarterly*, 34(1), 23–38. <http://doi.org/10.2307/20721413>
- Watson, R. T., Boudreau, M. C., Chen, A. J., & Sepulveda, H. H. (2011). Green projects: An information driven analysis of four cases. *Journal of Strategic Information Systems*, 20(1), 55–62. <http://doi.org/10.1016/j.jsis.2010.09.004>
- Watson, R. T., Pitt, L. F., Berthon, P., & Zinkhan, G. M. (2002). U-commerce: Expanding the universe of marketing. *Journal of the Academy of Marketing Science*, 30(4), 333–347.  
<http://doi.org/10.1177/009207002236909>
- Yin, R. K. (2013). *Case study research: Design and methods* (5th ed.). Thousand Oaks, CA:

Sage.

Zammuto, R. F., Griffith, T. L., Majchrzak, A., Dougherty, D. J., & Faraj, S. (2007). Information technology and the changing fabric of organization. *Organization Science*, *18*(5), 749–762. <http://doi.org/10.1287/orsc.1070.0307>

## **4 Promoting Eco-Sustainable Behavior with Gamification: An Experimental Study on the Alignment of Competing Goal Frames**

Anna-Raissa Seidler, Christopher Henkel, Marina Fiedler, and Johann Kranz

**Promoting Eco-Sustainable Behavior with Gamification:  
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**Abstract**

To address serious environmental problems, behavioral changes of individuals, organizations, and societies are required to establish and foster eco-sustainability. However, information campaigns that provide information intended to raise awareness and trigger eco-sustainable behavior have shown to be limited in their effectiveness. In information systems (IS) research, first Green IS studies demonstrated to be successful in leveraging eco-sustainable behavior with the help of gamification, by primarily drawing on feedback and competition as motivating mechanisms. However, the goal framing theory claims that eco-sustainable behavior is driven by different, often competing motivations, which are reflected in three goal frames (i.e. normative, hedonic, and gain). To assess the effectiveness of gamified Green IS in the alignment of competing goal frames to motivate eco-sustainable behavior, this study draws on a randomized laboratory experiment with a four-group between-subjects design ( $N = 160$ ). The results indicate that gamification mechanisms that support normative information by drawing on emotions or competition to trigger either the hedonic or the gain goal frame increase eco-sustainable behavior, compared to normative information only. Both mechanisms are equally effective in aligning competing motivations for normative-driven eco-sustainable behavior. Overall, our results extend existing research on gamified Green IS by showing gamification's persuasive potential to solve tensions between competing goal frames and overcome individual barriers for eco-sustainable behavior.

*Keywords:* Gamification, Green Information Systems (Green IS), goal framing theory (GFT), eco-sustainable behavior, competition, emotion, experimental research

## Introduction

Climate change and environmental pollution are grand challenges of our time (Melville, 2010; Seidel, Chandra Kruse, Székely, Gau, & Stieger, 2017). The United Nations Framework Convention on Climate Change (2018) states that “climate change presents the single biggest threat to sustainable development everywhere and its widespread, unprecedented impacts disproportionately burden the poorest and most vulnerable.” Thus, to achieve the United Nation’s Sustainable Development Goals, such as responsible consumption and production and sustainable cities and communities, urgent action to curb carbon emissions is crucial. To address these challenges, individuals, organizations, and societies need to adapt to more eco-sustainable behavior (Elliot, 2011). Eco-sustainable behavior comprises all behaviors that reduce the use of collective and limited natural resources, halt global warming, and protect the biosphere (Stern, 2000). Individual eco-sustainable behavior is strongly related to the awareness of environmental consequences (McDonald, 2014). Hence, to motivate individual eco-sustainable behavior, it is commonplace to provide information conveying norms about a specific behavior and its environmental outcomes (Unsworth, Dmitrieva, & Adriasola, 2013). Although environmental awareness is important for fostering environmentally friendly behavior (Tiefenbeck et al., 2018), normative information provided by governments, non-governmental organizations, or companies have shown to be only limited in their effectiveness in triggering eco-sustainable behavior (Gardner & Stern, 2002).

Research on *Green Information Systems (IS)* has addressed how to leverage IS’ pervasive potential for encouraging behavioral change for eco-sustainability (Seidel et al., 2017; R. T. Watson, Boudreau, & Chen, 2010). Thereby, initial Green IS studies demonstrated success in leveraging eco-sustainable behavior with the help of *gamification* (e.g., Gnauk, Dannecker, & Hahmann, 2012; Loock, Staake, & Thiesse, 2013; Oppong-Tawiah, Webster, Staples,

Cameron, & De Guinea, 2014). By including game-design elements, such as badges, leaderboards, or points, in non-game contexts (Deterding, Dixon, Khaled, & Nacke, 2011), gamification aims at activating individual motivations to influence users' attitudes and behaviors (Blohm & Leimeister, 2013; Schöbel, Janson, Leimeister, & Ernst, 2017).

To date, Green IS literature has primarily drawn on gamified IS and feedback (e.g., Bellman & Murray, 2018; Tiefenbeck et al., 2018) and has focused on competition as a motivating mechanism for eco-sustainable behavior (e.g., Looock et al., 2013; Oppong-Tawiah et al., 2014). However, environmental psychology literature indicates that eco-sustainable behavior is driven by three competing motivations and goals (i.e. normative, hedonic, and gain goals; Lindenberg & Foss, 2011; Lindenberg & Steg, 2013; Ruerpert, Keizer, & Steg, 2017), which are reflected in the *goal framing theory (GFT)* (Lindenberg & Foss, 2011; Lindenberg & Steg, 2007, 2013). The GFT postulates that goals govern individual cognitive and motivational processes, such as selective attention, evaluations, or access of knowledge chunks. Based on this assumption, eco-sustainable behavior is strongly related to the normative goal frame, which refers to behaving appropriately, furthering collective goals, and following social norms (Lindenberg, 2017). This goal frame can be supported by normative information, which allows individuals to anchor their behavior in normative expectations (Koo & Chung, 2014; Unsworth et al., 2013). A hedonic goal frame refers to the goal of immediately improving personal feelings (Lindenberg, 2017). Since personal feelings, as simply feeling good or bad, energized or enervated, are at the center of emotions (Russell, 2003), the hedonic goal frame is closely related to positive emotions. A gain goal frame addresses the individual need of guarding and improving one's resources (Lindenberg, 2017). Thus, the gain goal frame is associated with competition (Lindenberg & Foss, 2011), which can be addressed by comparing individuals' performance (Matallaoui, Koivisto, Hamari, & Zarnekow, 2017). To make normative-driven eco-sustainable behavior more appealing and

enjoyable, Lindenberg and Steg (2007, 2013) proposed to increase the compatibility of hedonic and gain goal frames with the normative goal frame.

Meanwhile, Green IS research addresses the potential of IS as a high-scale, low-cost means of influencing human actions and has successfully applied psychological theories to foster individuals' eco-sustainable attitudes and behaviors (Flüchter & Wortmann, 2014). Since traditional methods of encouraging positive environmental behaviors have had limited success (Abrahamse, Steg, Vlek, & Rothengatter, 2005), the application of gamified IS has been identified as a natural fit to foster environmental concern as the general desirability to protect the environment makes individuals more receptive to persuasion approaches (Corbett, 2013; King & Tester, 1999). Our study builds upon this proposition, seeking to extend research by investigating the potential of gamified IS to align competing goal frames regarding eco-sustainable behavior. Thereby, we address an important void in Green IS literature as we consider the complex interactions of competing goal frames, while past research has chiefly focused on competitions addressing a gain goal frame to motivate for eco-sustainability. Our experimental study is therefore guided by the following research questions:

*RQ1: Do gamification mechanisms addressing hedonic or gain goal frames increase eco-sustainable behavior compared to normative information only?*

*RQ2: Is addressing hedonic or gain goal frames more effective in aligning competing goal frames for normative-driven eco-sustainable behavior?*

To elicit the effects of gamified IS in aligning otherwise competing goal frames to trigger eco-sustainable behavior, we conducted a controlled, randomized laboratory experiment with  $N = 160$  participants, using a four-group between-subject design ([1] normative goal frame condition, [2] hedonic and normative goal frames condition, [3] gain and normative goal

frames condition, [4] control condition). Our results show that when provided with normative information that frames eco-sustainability as an appropriate behavior, participants receiving additional gamified treatments that support the hedonic goal frame (via emotional feedback) and the gain goal frame (via competitive feedback), respectively, behave more eco-sustainably than participants who did not receive gamified treatments (RQ1). Further, we found no differences in eco-sustainable behavior between the groups that were provided with gamified IS treatments supporting hedonic or gain goal frames, indicating that both gamified treatments are equally effective stimuli for eco-sustainable behavior (RQ2).

To the best of our knowledge, our study is the first to jointly investigate how competing goal frames regarding eco-sustainable behavior can be aligned using gamified IS based on GFT (Lowry, Hammer, Gaskin, Roberts, & Twyman, 2013). Following recent calls in gamified Green IS literature (Seidel, Recker, & Vom Brocke, 2013; R. T. Watson et al., 2010), we highlight that normative behavior – such as eco-sustainable behavior – is best achieved when a gamified Green IS is added to normative information and demonstrate gamified Green IS' potential to address hedonic motives via emotion. Specifically, we extend existing research on gamified Green IS in three ways: first, by demonstrating that gamified IS can influence motivational states to leverage eco-sustainable behavior through aligning otherwise competing motivations, we demonstrate gamification's persuasive potential to overcome barriers for eco-sustainable behavior and to change behavior towards more environmental practices (Benitez-Amado & Walczuch, 2012; Seidel et al., 2013; R. T. Watson, Boudreau, Chen, & Sepulveda, 2011). Second, as a first study that includes emotion-based gamification mechanisms to trigger environmental-friendly behavior and thus responds to calls in gamification literature to address hedonic motives (Lowry et al., 2013; Santhanam, Liu, & Shen, 2016), we extend existing Green IS research by demonstrating the potential of including emotional elements in gamified IS (Bui, Veit, & Webster, 2015; Te'eni, 2016).



Third, by integrating GFT, we extend existing research on Green IS' feedback mechanisms, since we show gamification mechanisms that, first, support the focal goal frames, and, second, combine normative information with competition- and emotion-based gamification design elements, are effective in transmitting direct and immediate feedback, thus allowing for an increase in individuals' eco-sustainable behavior (D. Liu, Santhanam, & Webster, 2017).

The remainder of this paper is organized as follows. In the next section, we elaborate on the theoretical background by providing insights into gamification's and goal frames' influence on eco-sustainable behavior. This allows us to develop our hypotheses. Next, we present our experimental design and data analyses. We then discuss our results and contributions, the study's limitations, and potential avenues for further research.

### **Theoretical Background**

Recently, IS research has drawn on the concept of *gamification* to activate individuals' motivation and influence users' attitudes and behaviors by incorporating gamification design elements, such as images, animations, or visual assets and mechanics, into software design (Blohm & Leimeister, 2013; D. Liu et al., 2017). Gamification is broadly defined as the "use of game design elements in non-game contexts" (Deterding et al., 2011, p. 10). Research into gamified IS has demonstrated the efficacy of using gamification design elements in diverse contexts such as e-learning (Franceschi, Lee, Zanakis, & Hinds, 2009), collaboration (Jung, Schneider, & Valacich, 2010), idea generation (Leimeister, Huber, Bretschneider, & Krcmar, 2009), cooperation (Morschheuser, Riar, Hamari, & Maedche, 2017), customer engagement (Zicherman & Cunningham, 2011), or resource conservation (Loock et al., 2013).

Although *Green IS* research covers different streams of research, one of the core goals is to further our knowledge on how IS can be used by individuals, groups, organizations, and society to help ecologically responsible behaviors to emerge and diffuse (Chan & Ma, 2017;

Seidel et al., 2017). Existing Green IS studies have mainly focused on gamified IS, using competition as a motivating mechanism to leverage eco-sustainable behavior (see Table 21). Competitions are characterized by rival parties that attempt to achieve a goal (Weiser, Bucher, Cellina, & De Luca, 2015) and are thus closely connected to IS designs, allowing for challenges and the provision of timely and positive feedback (P. Zhang, 2008). Existing Green IS studies indicate that gamification design elements, such as point systems, goal setting, or performance feedback, promote individuals' environmental awareness and intentions to behave eco-sustainably (Y. Liu, Alexandrova, & Nakajima, 2011; Lounis, Neratzouli, & Pramadari, 2013), which is considered a prerequisite for eco-sustainable behavior. Further, Green IS research has demonstrated the effectiveness of realistic, yet challenging default goals (Loock et al., 2013), goal setting (Loock et al., 2013; Oppong-Tawiah et al., 2014), scores (Brewer, Lee, & Johnson, 2011; Gnauk et al., 2012), and social comparisons (Foster, Lawson, Blythe, Cairns, & Pool, 2010; Mankoff et al., 2010) to strengthen individuals' motivation and trigger users' behavioral change towards eco-sustainability.

**Table 21.** Literature Review on Gamified IS that motivate Eco-Sustainable Behavior

| Authors, year               | Key findings                                                                                                                                                                     | Mechanism   | Game design elements                              | Method                  | Context            |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|---------------------------------------------------|-------------------------|--------------------|
| Brewer et al. (2011)        | Individual and group-level competitive feedback on eco-sustainable behavior increases energy literacy and related, actual eco-sustainable behavior.                              | Competition | Goal setting, scores, real-time feedback          | Field experiment        | University dorms   |
| Foster et al. (2010)        | Competitive elements allowing for social comparison lead to a decrease in energy consumption.                                                                                    | Competition | Public scores                                     | Field experiment        | Private households |
| Gnauk et al. (2012)         | By evoking social competition, gamification can engage customers to proactively change their energy usage patterns.                                                              | Competition | Competitive scores                                | Laboratory experiment   | Firms              |
| Y. Liu et al. (2011)        | Gamified, virtual platforms that resemble real-world behavior can promote environmental awareness.                                                                               | Competition | Point systems, goal setting, performance feedback | Field experiment        | Private households |
| Loock et al. (2013)         | Default goals and competitive performance feedback increase energy conservation behavior.                                                                                        | Competition | Goal setting, defaults                            | Field experiment        | Private households |
| Lounis et al. (2013)        | Gamified interventions increase consumers' intention to purchase eco-sustainable products.                                                                                       | Competition | Points, badges, avatars, quests                   | Qualitative study       | Consumer behavior  |
| Mankoff et al. (2010)       | Public commitment and gamified competition, supported by comparative visualizations, increase energy saving behavior.                                                            | Competition | Leaderboards, goal setting, performance feedback  | Field experiment        | Private households |
| Oppong-Tawiah et al. (2014) | Gamified interventions based on social psychological processes (goal setting, social modeling, consistency, and commitment) have potential to leverage eco-sustainable behavior. | Competition | Goal setting, performance feedback                | Design science approach | Firms              |

However, rooted in environmental psychology literature, the *GFT* claims that eco-sustainable behavior is not only driven by motivations related to competition, but by different, often competing motivations and goals. In general, the *GFT* postulates that “goals govern or ‘frame’ to what people attend, what knowledge and attitudes become cognitively most accessible, how people evaluate various aspects of the situation, and what alternatives are being considered” (Lindenberg & Steg, 2007, p. 119). A *goal frame* comprises the focal goal (i.e. an activated goal) and the goal’s framing effects on individual cognitive and motivational processes. Focal goals influence which information is absorbed and how this information is processed (Lindenberg & Steg, 2013). Although one goal is likely to dominate the framing process, multiple goals are simultaneously present (Lindenberg & Steg, 2007).

In particular, three overarching goal frames drive eco-sustainable behavior, i.e. normative, gain, and hedonic goal frames (Lindenberg & Foss, 2011; Lindenberg & Steg, 2013; Ruepert et al., 2017). First, a *normative goal frame* considers appropriate behavior, following social norms, and furthering collective goals (Lindenberg, 2017). Thus, in a normative goal frame, individuals are more willing to act eco-sustainably, even if doing so is unpleasant or burdensome, since environmental friendly behavior is framed as appropriate (Steg, Bolderdijk, Keizer, & Perlaviciute, 2014). The normative goal frame is stronger when people are aware of environmental problems and behavioral consequences, as individuals are particularly sensitive to information about what is expected from influential others (Lindenberg & Steg, 2007, 2013). For example, in a normative goal frame, employees are more willing to take the train for business trips instead of taking the car, when they are provided with information that illustrates how train rides support the collective goal to protect the environment, and frames taking the train as appropriate behavior with respect to business trips.

Second, a *hedonic goal frame* draws on intrinsic motivation and is related to improving the way one feels at present. In a hedonic goal frame, individuals are more likely to engage in eco-sustainability when they gain instant gratification, such as satisfaction or pleasure, from their actions (Lindenberg & Steg, 2007). Hence, a hedonic goal frame refers to immediately improving personal feelings (Lindenberg, 2017). Since personal feelings are focal for emotional states (Russell, 2003), this goal frame is closely related to positive emotions. Emotions crucially influence one's beliefs about what is good or bad, right or wrong (McGrath, 2006) and thus energize and guide behavior (Csikszentmihalyi, 1975; McGrath, 2006; Ryan & Deci, 2000). For example, in a hedonic goal frame, people are more willing to take the train for their business trips, when train rides are connected to positive emotions leading to satisfaction or pleasure.

Third, a *gain goal frame* draws on extrinsic motivation and is related to guarding and improving one's resources. When a gain goal frame is dominant, individuals will behave eco-sustainably only if this behavior increases resources, such as money, status, or time (Steg et al., 2014). Since individuals in a gain goal frame are highly sensitive to opportunities for, and threats to, the improvement of their resources, individual rewards and competitions support the goal frame (Lindenberg & Foss, 2011). Individuals in a gain goal frame feel appealed to competitions in which increasing eco-sustainable behavior is the objective and which allow for a comparison against others (Lindenberg & Foss, 2011; Matallaoui et al., 2017). For example, in a gain goal frame, employees are more likely to take the train for business trips instead of a car, when they gain redeemable points for each trip taken by train.

To date, research on gamified Green IS has not adequately considered the interplay of competing goals' framing effects and how they can be aligned to motivate eco-sustainability. However, gamified IS provides great potential to address the shortcomings of rather ineffective,

but common, approaches of promoting individual eco-sustainable behavior in private and organizational contexts (Abrahamse, Steg, Vlek, & Rothengatter, 2005). Environmental campaigns, for example, have not proved to be effective in changing environment-related behaviors (Dobson, 2007; McDonald, 2014). The same applies to economic-based approaches (e.g., financial rewards or penalties), which only have a transient positive effect (Abrahamse et al., 2005; Dobson, 2007). However, Gamified IS can incorporate multiple tactics and techniques that are instrumental in persuading individuals to act eco-sustainably (Corbett, 2013). Similarly, a meta-review of feedback on energy conservation suggests that IS-mediated feedback is more effective than traditional mediums (Karlin, Zinger, & Ford, 2015). Another advantage of gamified IS lies in the ubiquity and penetration of IS in people's daily lives, which provides abundant potential in IS as a high-scale, low-cost means to influencing human behavior (Flüchter & Wortmann, 2014).

However, by chiefly focusing on competition as a motivational mechanism that supports a gain goal frame, Green IS research has not entirely exploited the potential of gamified IS for promoting eco-sustainable behavior. First, people's hedonic goals have been largely overlooked by an overemphasis on gain-oriented goals. Second, the relationships of different, competing goal frames have not been studied, although gamified IS are a natural fit to do so compared to traditional approaches of promoting eco-sustainable behavior. Third, the potential of gamified IS for aligning competing goals has not yet been addressed. Fourth, there is a void of larger-scale, rigorous experimental studies that differentiate between different gamification designs (Hamari, Koivisto, & Pakkanen, 2014). We seek to address these issues to increase our understanding of ways gamified IS can be used to promote normatively-driven eco-sustainable behavior through aligning competing goal frames.

## **Hypotheses Development**

Since the GFT postulates that eco-sustainable behavior – a normatively driven behavior – is influenced by three overarching, often competing, goal frames (i.e. normative, hedonic, and gain goal frames; Ruepert et al., 2017), our study aims to test the effectiveness of gamified IS in aligning these goal frames to support eco-sustainable behavior. To elaborate on the potential effects of gamified IS, we build on existing research and relate a normative goal frame to normative information (Koo & Chung, 2014; Unsworth et al., 2013), a hedonic goal frame to emotions (Russell, 2003), and a gain goal frame to competition (Lindenberg & Foss, 2011).

### **Normative Information Supporting a Normative Goal Frame for Eco-Sustainable Behavior**

As a normative goal frame refers to behaving appropriately, supporting collective goals, and following social norms (Lindenberg, 2017), eco-sustainable behavior is strongly related to individuals' awareness of environmental consequences (McDonald, 2014). To increase problem awareness, normative information, that is linked to specific behavior (Unsworth et al., 2013) and is readily available when decisions about behavior are made (DeYoung, 2000), is highly supportive in triggering eco-sustainable behavior. Normative information includes expectations about the appropriateness and desirability of behaviors (Cooke & Rousseau, 1988). As people in a normative goal frame feel connected to a collective, these expectations about appropriate behavior are incorporated into their mental model (Lindenberg, 2017). Individuals with high normative concerns react negatively to violations of these normative expectations and tend to feel obliged to follow the expectations of others (Lindenberg, 2017; Ruepert & Steg, 2018). Thus, normative information addresses people's normative obligation to act in line with expectations regarding desired behavior, such as eco-sustainable behavior. Providing individuals with normative information on appropriate behavior should therefore strengthen the normative

goal frame, since it increases problem awareness and one's normative obligation to act according to social expectations (Lindenberg & Steg, 2007). We therefore hypothesize:

***H1:** Strengthening the normative goal frame through normative information regarding eco-sustainability will be more effective in triggering eco-sustainable behavior than providing no information.*

### **Gamified Green IS Aligning Hedonic and Normative Goal Frames for Eco-Sustainable Behavior**

A hedonic goal frame refers to immediately improving personal feelings, which are central to emotions (Russell, 2003). Emotions strongly impact behavioral motivation, since they energize and guide behavior (Csikszentmihalyi, 1975; McGrath, 2006; Ryan & Deci, 2000). Emotions are mainly understood as affective states directed at a specific object (Russell, 2003; Sun & Zhang, 2006) and are considered “a critical factor in human decisions and behaviors within many social contexts” (P. Zhang, 2013, p. 247). Providing people with visually induced positive emotions increases their willingness to donate to environmental organizations, compared to people who experience negative or no emotion (Ibanez, Moureau, & Roussel, 2016). Furthermore, positive emotions are found to positively affect personal norms' influence on eco-sustainable behavior (Elgaaied, 2012; Onwezen, Antonides, & Bartels, 2013). Thus, existing research has indicated that emotions influence intended normative behaviors (McGrath, 2006), such as eco-sustainable behavior. However, existing research has mainly focused on emotions' effect on the *intention* to change behavior. Thus, we lack insight in the effects of positive emotions on actual behavior. This is of particular importance, as people's concern for the environment is not necessarily reflected in their *de facto* behavior, a phenomenon known as the attitude-behavior gap (Blake, 1999).



Gamification research has proposed visual cues to make using IS more enjoyable and fun (Hamari, 2013; Scheiner, Haas, Bretschneider, Blohm, & Leimeister, 2017). Using gamified IS to promote enjoyment when acting eco-sustainably may increase eco-sustainable behavior, even if the behavior itself is not enjoyable. Thus, using emotions to bring individual hedonic motives in line with a normative goal frame should increase individuals' inclination to act eco-sustainably. Hence, we argue that compared to providing no information, gamified IS that provide emotional feedback and normative information align hedonic and normative goal frames, such as the likelihood of eco-sustainable behavior increases. Furthermore, we expect that combining normative information with emotional feedback is more effective in triggering eco-sustainable behavior compared to providing only normative information. Thus, we propose:

***H2a:** Aligning hedonic and normative goal frames through both gamified emotional feedback and normative information will be more effective in triggering eco-sustainable behavior than providing no information.*

***H2b:** Aligning hedonic and normative goal frames through both gamified emotional feedback and normative information will be more effective in triggering eco-sustainable behavior than providing only normative information.*

### **Gamified Green IS Aligning Gain and Normative Goal Frames for Eco-Sustainable Behavior**

Individuals in a gain goal frame are highly sensitive to opportunities that increase their resources, such as money, time, or status (Lindenberg & Foss, 2011). This need can be satisfied by competitions that allow for comparing performance with others (Matallaoui et al., 2017). Thus, for example a contest during which participants strive for victory or superiority to increase personal resources (e.g., prizes or enhanced status) appeals to the gain goal frame (D. Liu, Li, &

Santhanam, 2013). A key mechanism to activate the gain goal frame is to set clear performance goals to provide “the user with an idea of how the service is meant to be used and what is expected of the user” (Hamari, 2017, p. 470). To satisfy users’ motivational needs related to the competition, IS that allow comparisons of individual and group performance, setting individual goals, and assigning default goals have shown to be successful in triggering behavioral changes in diverse contexts (Jung et al., 2010; Loock et al., 2013). Comparative performance feedback reduces the gap between self-selected goals and actual behavior, since comparative feedback enables individuals to check the appropriateness of their behavior and adjust it towards the set goal (Karlin et al., 2015; Loock et al., 2013). Studies have also shown that challenging competitions lead to higher cognitive levels of attention (Novak, Hoffman, & Yung, 2000), concentration (Keller & Blomann, 2008; Koufaris, 2002), learning (Skadberg & Kimmel, 2004), and information processing (Sicilia, Ruiz, & Munuera, 2005).

Thus, gamified IS that afford competition among individuals should make eco-sustainable behavior more appealing and increase individuals’ cognitive efforts (Santhanam et al., 2016; Schöbel, Söllner, & Leimeister, 2016). Accordingly, we argue that combining gamified competitive feedback with normative information, making gain and normative goal frames more compatible, will increase eco-sustainable behavior, compared to receiving only normative information or receiving no information. Thus, we hypothesize:

***H3a: Aligning gain and normative goal frames through both gamified competitive feedback and normative information will be more effective in triggering eco-sustainable behavior than providing no information.***

*H3b: Aligning gain and normative goal frames through both gamified competitive feedback and normative information will be more effective in triggering eco-sustainable behavior than providing only normative information.*

### **Comparing Gamified Green IS Aligning Hedonic or Gain Goal Frames with a Normative Goal Frame for Eco-Sustainable Behavior**

GFT postulates that the prevalent goal frame guides behavioral decision making, while other goals are pushed into the cognitive background, from which they stabilize (if they are congruent with the focal goal frame) or destabilize (if they are incongruent with the focal goal frame) the dominant motivation (Lindenberg & Steg, 2007). *A priori*, the hedonic goal frame is considered the strongest, since from an evolutionary perspective, hedonic goals satisfy the most fundamental human needs (Lindenberg, 2017). The normative goal frame is considered to be the weakest, because collective goods for individual adaptive advantages are involved. The gain goal frame is considered to be somewhere in between (Lindenberg, 2017).

When a hedonic goal frame guides behavior, people seek positive emotions and an improvement in their well-being. However, showing participants an emotional image before placing a bid in an internet auction resulted in inferior financial performance, because individuals did not only concentrate on their bidding performance but also on regulating their emotions (Adam, Astor, & Krämer, 2016). Therefore, performance goals were less highly valued when hedonic goals dominated cognitive and motivational processes. Similarly, highly stimulating game environments were found to distract students from learning (Young et al., 2012). Thus, an overly high emotional involvement level in gamification may even weaken performance.

In contrast, using gamified IS that induce competition often leveraged users' motivation for greater performance (Mekler, Brühlmann, Tuch, & Opwis, 2017; Song, Kim, Tenzek, & Min,

2013). Moreover, gamified IS that allow the comparison of performance via comparative scores satisfy individuals' innate need for performance feedback (Deci & Ryan, 2000; D. Liu et al., 2017). Comparative feedback motivates members of a group to adapt their behavior to perform better than the group, which can self-reinforce overall group performance (D. Liu et al., 2017; Santhanam et al., 2016). Regarding norm-guided behavior, such as eco-sustainable behavior, comparative feedback may also result in individuals experiencing group pressure to act according to normative expectations (Lindenberg & Steg, 2013).

Further, the presence and behaviors of other people fosters eco-sustainable behavior, since individuals tend to compare their own behavior with the behavior of others (Lo, Peters, & Kok, 2012). The likelihood of people acting eco-sustainably significantly increases when people think their behavior is being observed (Keizer, Lindenberg, & Steg, 2008). Also, observing norm-guided behavior of others activates norms, because acting against these norms shows a lack of moral integrity (Aquino, Freeman, Reed, Lim, & Felps, 2009). Thus, people tend to behave more eco-sustainably when choices for associated behaviors are made in public (Griskevicius, Tybur, & Van den Bergh, 2010). Therefore, we assume that gamified IS that allow for competition among individuals are more effective in activating social norms as a guiding behavioral principle than gamified IS that provide emotional stimuli. Thus, we contend:

***H4:*** *Aligning gain and normative goal frames through both gamified competitive feedback and normative information will be more effective in triggering eco-sustainable behavior than aligning hedonic and normative goal frames through both gamified emotional feedback and normative information.*

## Experimental Design and Data Collection

### Participants and Design

To test our hypotheses, we conducted a laboratory study with management students at a German university. In total,  $N = 160$  undergraduate and graduate students (117 female and 43 male participants) voluntarily participated in our study for a monetary compensation of EUR 8.00. Their mean age was 22.810 years ( $SD = 3.079$ ). The study followed a randomized four-group between-subjects design ([1] normative goal frame, [2] hedonic and normative goal frames, [3] gain and normative goal frames, [4] control). We randomly assigned participants to one of the four conditions.

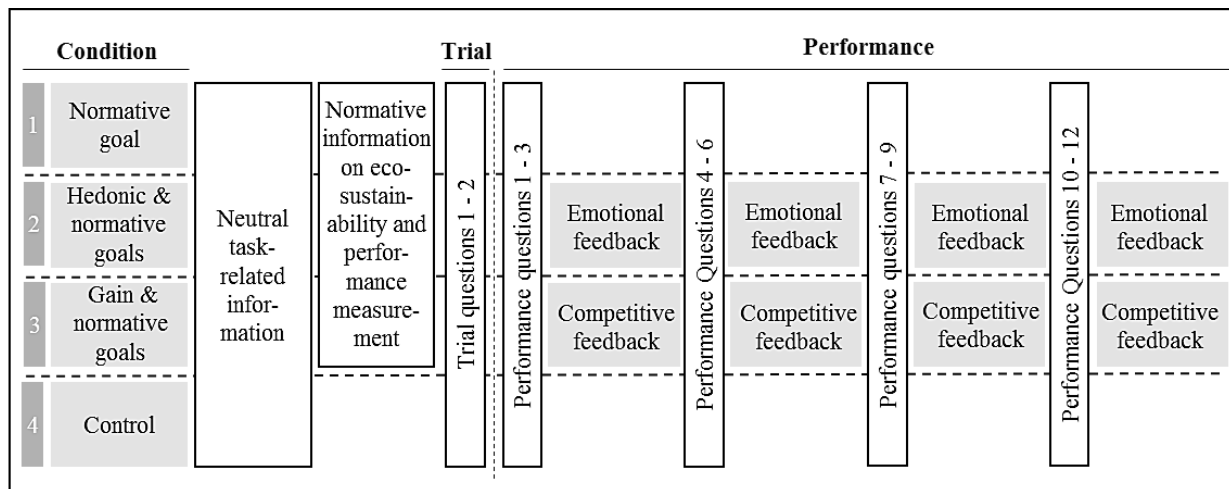
### Procedure

The participants were randomly assigned to an individual cubicle with a computer and we explained that, during the experiment, all necessary information would be provided on the screen. Following this, all participants completed a survey on eco-sustainable values, beliefs, and their willingness to act eco-sustainably, which served as control variables. Following the survey, the participants were forwarded to the introduction screen on which the task was explained.

The participants' task was to find correct answers to validated multiple-choice questions, adopted from Sparrow, Liu, and Wegner (2011; Appendix F). These questions are considered difficult and cannot be answered by common knowledge (Sparrow et al., 2011). To avoid any bias, none of the questions were related to eco-sustainability. To answer these questions, the participants had to choose between a non-eco-friendly, but user-friendly search engine (Google, [www.google.com](http://www.google.com)) and an eco-friendly, but non-user-friendly search engine (Blackle, [www.blackle.com](http://www.blackle.com)). Blackle is a search engine that works the same way as Google but has a black background to reduce energy consumption of screens by approximately 35 %. Blackle is

harder to use than Google due to the reduced brightness and the lower contrast ratio that increases response times. Participants' decision between both search engines reflects eco-sustainable behavior in real-life settings, because eco-sustainability is most often associated with a higher investment in resources, such as time and effort, thus, incurring personal costs to benefit the environment (Andersson & von Borgstede, 2010).

After receiving an introduction to the task and information about both search engines' functionalities, all participants had five minutes to get used to the experimental setting and the search engines by answering two trial questions (trial session; see Figure 8). Before starting the performance session of the experiment, the participants had the opportunity to clarify any open questions. These questions were answered by the authors, who ensured that all participants received exactly the same information across all sessions. During the performance session, we asked the participants to answer three multiple-choice questions over four rounds (twelve questions in total) with the help of the search engines. After each round of the performance session, the participants in all groups, besides the control group, received a type of treatment. After the performance session, we asked the participants to complete a survey that included manipulation checks and control variables. All participants were then formally debriefed.

**Figure 8.** Course of the Experiment

### Conditions

Participants in the *normative goal frame* condition received information regarding the energy consumption of both search engines, including details on the amount of energy conserved if Blackle was used on a global scale (see Appendix G for details). They were further informed that their performance was measured based on the screen's electricity consumption of the search engine they used, the correctness of their answers, and their response time. This normative information appeals to eco-sustainable values, framing eco-sustainable behavior as the appropriate behavior (Steg & Vlek, 2009), and was provided in the form of normatively-framed facts, following the work of Seidel et al. (2017).

Participants in the combined *hedonic and normative goal frames* condition received the same information as the participants in the normative goal frame condition at the beginning of the experiment. The information was also available during the performance session by hovering over an information button at the top of the page. To support this information and to activate the hedonic goal frame, emotions were evoked by showing the participants an apple tree along with a supportive message after each round (see Figure 9). For every question correctly answered via

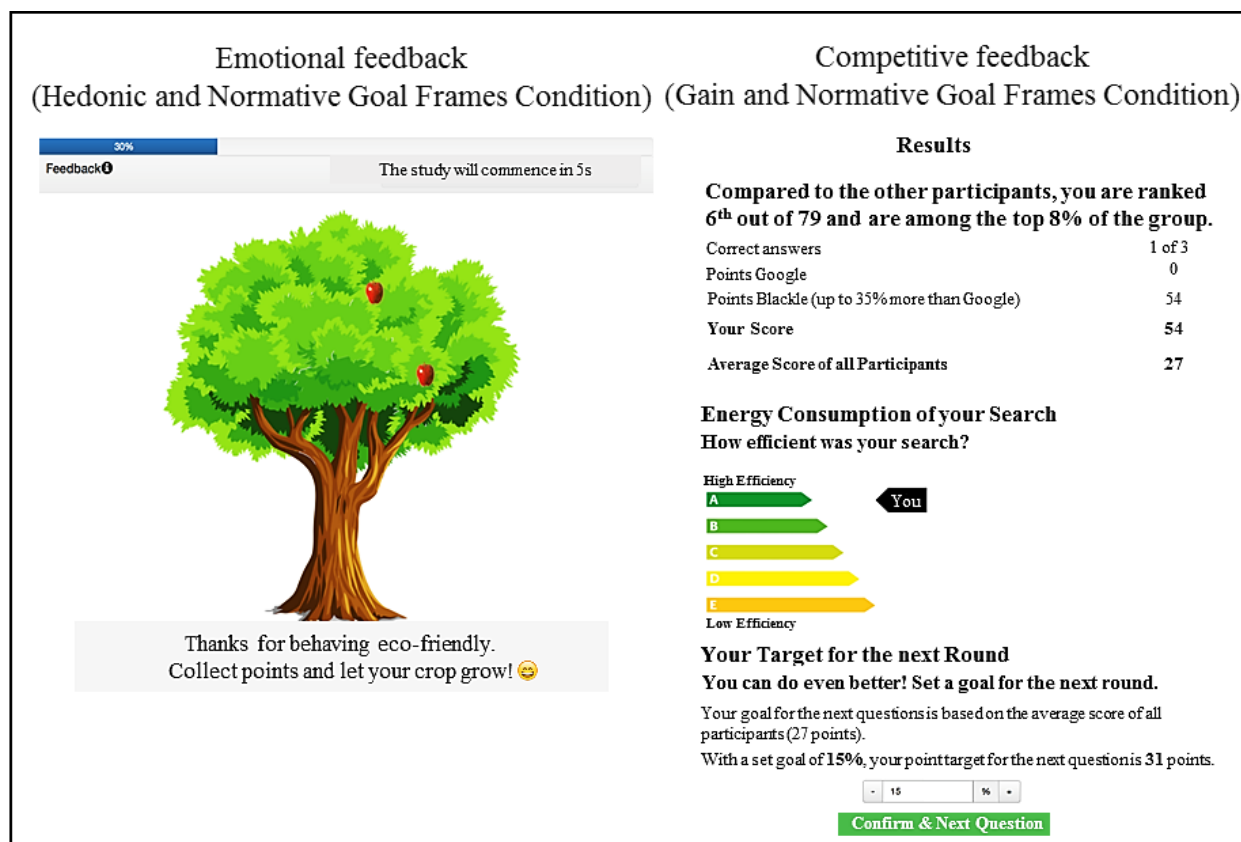
Blackle, a red apple was added to the tree. We designed this manipulation with special care, as prior research has shown that aesthetic impressions are important in triggering emotions (Lounis, Pramatar, & Theotokis, 2014; Zicherman & Cunningham, 2011) and that positive emotional states influence the desire to perform a given behavior (Loock et al., 2013).

In the combined *gain and normative goal frames* condition, participants received the same normative information as the normative goal frame condition at the beginning of the experiment and could access this information via an information button during the treatments. To activate the gain goal frame, this information was supported by a functionality that allowed for comparing one's own performance with the average performance of others (see Figure 9). To design this stimulus, we built on Loock et al.'s (2013) manipulation by including the following functionalities that allowed for the intended behavior: (1) a display of their own score and the score of all other participants in the same group allowed social comparison; (2) a scale-based efficiency rating that provided individual feedback; and (3) a goal setting functionality that allowed participants to set a goal for collecting points by using Blackle during the next search. After each round, participants received positive and timely feedback as well as functionalities that allowed for goal setting and social comparison.

Participants in the *control* condition only received neutral task-related instructions, but no additional information on appropriate behavior, performance, or any gamified treatments. This allowed us to carry out isolated evaluation of possible treatment effects.



**Figure 9.** Treatments in the Hedonic and Normative Goal Frames Condition and the Gain and Normative Goal Frames Condition



## Measurements

We developed a cumulative score to measure *eco-sustainable behavior (ESB) performance* as our dependent variable. The development of this score was based on a thorough literature review and included an assessment of the final score through five experienced scholars in the field of experimental research. We calculated the ESB performance for each question based on the following formula (see Table 22 for the measurement of each factor):

$$ESB \text{ performance} = \text{correctness} * \frac{\text{energy efficiency}}{\text{time}}$$

**Table 22.** Factors to calculate ESB Performance

| Factor            | Measurement                            | Points                                                     |
|-------------------|----------------------------------------|------------------------------------------------------------|
| Correctness       | Correctness of the answer              | false: 0 points<br>correct: 1 point                        |
| Energy efficiency | Energy efficiency of the search engine | Google: 1,000 points<br>Blackle: 1,350 points <sup>6</sup> |
| Time              | Response time                          | One point per second needed                                |

Calculating the score to measure ESB performance based on these three factors reflects eco-sustainable behavior in real-life settings, as it (1) includes the attainment of a certain goal (i.e. answering questions correctly), and (2) reflects the direct environmental outcome of the behavior by taking the energy efficiency and the duration of the behavior into consideration. Thus, the score reflects the need to answer the questions correctly and considers that the usage of Google indicates a 35 % higher energy consumption compared to Blackle but finding answers in Blackle is more difficult than finding answers in Google. To ensure that all participants understood the measurement for eco-sustainable behavior, each participant had to calculate three scores of fictional examples and then list each person in the correct order based on the scores. After each of the four rounds (each comprising three questions), the score for each question was added up to show participants in the gain and normative goals conditions a cumulative round-based score.

### **Manipulation Checks and Controls**

As a manipulation check for the emotional treatment in the hedonic and normative goal frames condition we used the positive and negative affect schedule (PANAS; D. Watson, Clark, & Tellegen, 1988;  $\alpha = .862$ ), as a widely used indicator for an individual's prevailing emotional state. As a manipulation check for the competitive treatment in the gain and normative goal

<sup>6</sup> The points reflected that Blackle reduces the electricity consumption of the screens by 35 %.

frames condition, we adapted Landers, Bauer, and Callan's (2017) manipulation check by asking whether and to what extent a performance goal was determined by the experimental setting. Participants had to make a single choice from a list of three options with option three ("The goal could be set and adapted by myself") indicating the correct answer. Thus, this manipulation check was designed to detect those participants paying attention to the competitive treatment (Landers et al., 2017). All manipulation checks proved their reliability in prior studies (e.g., Blay, Kadous, & Sawers, 2012; Landers et al., 2017; X. Zhang, Zuo, Erskine, & Hu, 2016; see Appendix H for all manipulation checks).

As control variables for ESB performance, we built on established scales on environmental beliefs and attitudes (EBA; Gatersleben, Steg, & Vlek, 2002;  $\alpha = .850$ ), personal norms (PN; Steg, Dreijerink, & Abrahamse, 2005;  $\alpha = .848$ ), and personal ecological norms (PEN; Hunecke, Blobaum, Matthies, & Hoger, 2001;  $\alpha = .897$ ) to control for inclination to eco-sustainable behavior before starting the experiment (see Appendix H for all control variables). We further included scales on personal innovativeness regarding information technology (PIIT; Agarwal & Prasad, 1998;  $\alpha = .877$ ), computer playfulness (CP; Agarwal & Prasad, 1998;  $\alpha = .842$ ), and attitudes to using technology (ATUT; Venkatesh, Morris, Davis, & Davis, 2003;  $\alpha = .868$ ) to control for participants' affinity for dealing with technology and new technical features, such as Blackle. For all scales, the items were measured on a seven-point Likert scale (anchored between strongly disagree [1] and strongly agree [7]). We further controlled for participants' sex, age, student status (undergraduate or graduate student), and prior experience with similar experiments and included dummy variables controlling for learning effects and treatment effects in our regression analysis.

## Analysis and Results

### Descriptive Statistics

Table 23 shows the means, standard deviations, and correlations of all study variables. The demographics and participants' values and experiences were equally distributed among the participants in the four conditions. We checked for homogeneity of variances between all conditions and conducted a t-test for equal and unequal variances accordingly (Mertens, Pugliese, & Recker, 2017). To check for multicollinearity issues and uncover relationships between variables, we conducted a correlation analyses of ESB performance and all independent variables. Since we found no high correlations between variables (all  $|r| < .708$ ) and no high variance inflation factors (all  $VIF \leq 2.920$ ), multicollinearity was not problematic (Diamantopoulos, Riefler, & Roth, 2008; Diamantopoulos & Winklhofer, 2001). We conducted a random-effects panel regression, since we accumulated the round-based scores and observed participants' behavior at four points in time. A random-effects model allowed for the estimation of time invariant variables' effects. Before conducting this regression analysis, we carried out a Mann-Whitney U test to assess differences in ESB performance between the four conditions.

**Table 23.** Mean, Standard Deviation, and Correlation Matrix

| Variables | Normative |        | Hedonic and normative |        | Gain and normative |        | Control |        | 1      | 2       | 3       | 4      | 5      | 6       | 7       | 8       | 9      | 10     | 11 |  |
|-----------|-----------|--------|-----------------------|--------|--------------------|--------|---------|--------|--------|---------|---------|--------|--------|---------|---------|---------|--------|--------|----|--|
|           | M         | SD     | M                     | SD     | M                  | SD     | M       | SD     |        |         |         |        |        |         |         |         |        |        |    |  |
| 1 ESB     | 51.820    | 27.722 | 74.850                | 43.773 | 83.440             | 47.013 | 49.448  | 33.488 | 1      |         |         |        |        |         |         |         |        |        |    |  |
| 2 Exp     | 3.400     | 0.626  | 3.425                 | 0.589  | 3.400              | 0.665  | 3.400   | 0.737  | -0.013 | 1       |         |        |        |         |         |         |        |        |    |  |
| 3 Sex     | 1.800     | 0.401  | 1.700                 | 0.460  | 1.600              | 0.491  | 1.825   | 0.381  | -0.089 | 0.032   | 1       |        |        |         |         |         |        |        |    |  |
| 4 Age     | 22.975    | 2.678  | 23.125                | 3.236  | 22.525             | 3.740  | 22.600  | 2.455  | -0.094 | -0.045* | -0.190* | 1      |        |         |         |         |        |        |    |  |
| 5 Status  | 1.825     | 1.631  | 1.575                 | 1.325  | 2.000              | 1.780  | 1.800   | 1.474  | 0.009  | -0.134* | -0.105* | 0.129* | 1      |         |         |         |        |        |    |  |
| 6 EBA     | 5.829     | 0.698  | 5.738                 | 0.699  | 5.756              | 0.800  | 5.900   | 0.712  | -0.051 | 0.014   | 0.246*  | 0.035  | -0.073 | 1       |         |         |        |        |    |  |
| 7 PN      | 4.967     | 0.872  | 4.864                 | 0.901  | 4.867              | 1.000  | 4.881   | 0.967  | -0.026 | 0.059   | 0.238*  | -0.030 | -0.062 | 0.708*  | 1       |         |        |        |    |  |
| 8 PEN     | 4.908     | 1.033  | 4.958                 | 1.035  | 4.817              | 1.521  | 5.038   | 1.074  | -0.016 | 0.038   | 0.242*  | 0.033  | -0.064 | 0.531*  | 0.694*  | 1       |        |        |    |  |
| 9 PIIT    | 3.906     | 0.784  | 3.856                 | 0.752  | 4.181              | 0.698  | 3.794   | 0.916  | 0.085  | -0.131* | -0.146* | 0.010  | 0.037  | -0.072  | -0.083  | -0.032  | 1      |        |    |  |
| 10 CP     | 4.761     | 1.066  | 4.843                 | 0.890  | 4.982              | 0.820  | 4.832   | 0.884  | 0.069  | -0.111* | -0.157* | -0.016 | 0.173* | -0.149* | -0.138* | -0.194* | 0.353* | 1      |    |  |
| 11 ATUT   | 5.381     | 1.002  | 5.250                 | 0.793  | 5.756              | 0.886  | 5.575   | 0.905  | 0.049  | -0.048  | -0.045  | 0.113* | 0.126* | -0.090* | -0.031  | -0.059  | 0.402* | 0.433* | 1  |  |

Note. \*  $p < .01$

ESB ESB performance

Exp Prior experimental experience (5 times or more = 1, 3-4 times = 2, 1-2 times = 3, never = 4)

Sex Gender (male = 1, female = 2)

Age Age in years (Numeric text box allowing for numbers from 16 to 99)

Status Student status (undergraduate student = 1, graduate student = 2)

EBA Environmental beliefs and attitudes (Gatersleben et al., 2002)

PN Personal norms (Steg et al., 2005)

PEN Personal ecological norms (Hunecke et al., 2001)

PIIT Personal innovativeness regarding information technology (Agarwal & Prasad, 1998)

CP Computer playfulness (Agarwal & Prasad, 1998)

ATUT Attitudes toward using technology (Venkatesh et al., 2003)

All manipulation checks were effective. In comparison to the control group ( $M = 4.950$ ,  $SD = 0.111$ ), participants in the hedonic and normative goal frames condition receiving emotional feedback reported a higher positive emotional state ( $M = 4.910$ ,  $SD = 0.099$ ,  $t(78) = 2.212$ ,  $p = .030$ ), measured by the PANAS scale (D. Watson et al., 1988). Participants in the gain and normative goal frames condition, receiving competitive feedback, indicated that they could set a goal and were able to adapt it themselves, and thus paid attention to the competitive treatment; 75 % of the participants provided the correct answer ( $M = 2.730$ ;  $SD = 0.506$ ).

### **Mann-Whitney U Test**

As the dependent variable was not normally distributed<sup>7</sup>, we applied a non-parametric Mann-Whitney U test to compare the four conditions after receiving the treatments (see Table 24). The results indicated that there was no difference in ESB performance between participants in the normative goal frame condition and participants in the control condition ( $p = 0.257$ ). However, we found significant differences in ESB performance between the non-gamified and the gamified conditions: Participants in the hedonic and normative goal frames condition receiving emotional feedback indicated significantly more eco-sustainable behavior than participants who received only normative information (normative goal frame condition;  $p < 0.001$ ) or participants who neither received a gamified treatment nor normative information (control condition;  $p < 0.001$ ). Participants in the gain and normative goal frames condition also showed significantly more eco-sustainable behavior than participants who

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<sup>7</sup> A Skewness/Kurtosis test for normality ( $p < 0.001$ ), the Shapiro-Wilk test ( $p < 0.001$ ), the Shapiro-Francia test ( $p < 0.001$ ), and the visual inspection with Q-Q plots reveal a non-normal distribution of our data. Thus, parametric tests could not be used (Mertens et al., 2017).

received only normative information (normative goal frame condition;  $p < 0.001$ ) or participants who neither received a gamified treatment nor normative information (control condition;  $p < 0.001$ ). Thus, participants in the two gamified conditions had a significantly higher *de facto* ESB performance compared to participants in the non-gamified conditions. The results from the Mann-Whitney U test indicated that competitive feedback that strengthens the gain goal frame and emotional feedback that strengthens the hedonic goal frame were equally effective in triggering eco-sustainable behavior ( $p = 0.124$ ).

**Table 24.** Mann-Whitney U-Test after Treatments

| Condition                         | Normative goal frame | Hedonic and normative goal frames | Gain and normative goal frames |
|-----------------------------------|----------------------|-----------------------------------|--------------------------------|
| Hedonic and normative goal frames | 4.733 (***)          |                                   |                                |
| Gain and normative goal frames    | 6.105 (***)          | -1.540                            |                                |
| Control                           | 1.134                | 5.413 (***)                       | 6.689 (***)                    |

*Note.* \*\*\*  $p < 0.001$ , with z-values.

### Regression Analysis

Additionally, we conducted a random-effects GLS panel regression analysis to gain a more thorough understanding of the treatments' and control variables' effects. We used a GLS panel regression as we aimed to include learning effects in the analysis through dummy variables for each round. Treatment effects were included as dummy variables for each of the four experimental groups. Control variables were added to the model as confounding factors (see Table 25). The results demonstrate that, even with considering multiple confounding factors, the gamified treatments maintain their significance on ESB performance.

**Table 25.** Random-effects GLS Regression on ESB Performance

| Variable                          | Coefficient | SE    | z      | P> z  | VIF   | Tolerance |
|-----------------------------------|-------------|-------|--------|-------|-------|-----------|
| Normative goal frame              | 0.080       | 0.069 | 1.150  | 0.250 | 1.640 | 0.610     |
| Hedonic and normative goal frames | 0.634 ***   | 0.087 | 7.300  | 0.000 | 1.600 | 0.627     |
| Gain and normative goal frames    | 0.789 ***   | 0.092 | 8.540  | 0.000 | 1.640 | 0.608     |
| Round 2                           | 0.763 ***   | 0.057 | 13.350 | 0.000 | 1.500 | 0.667     |
| Round 3                           | 1.830 ***   | 0.074 | 24.890 | 0.000 | 1.500 | 0.667     |
| Round 4                           | 1.199 ***   | 0.071 | 16.840 | 0.000 | 1.500 | 0.667     |
| Exp                               | -0.013      | 0.030 | -0.430 | 0.667 | 1.060 | 0.945     |
| Sex                               | -0.081      | 0.079 | -1.020 | 0.308 | 1.210 | 0.824     |
| Age                               | -0.105 ***  | 0.030 | -3.500 | 0.000 | 1.270 | 0.786     |
| Status                            | 0.006       | 0.033 | -0.190 | 0.851 | 1.090 | 0.915     |
| EBA                               | -0.003      | 0.043 | -0.060 | 0.951 | 2.150 | 0.464     |
| PN                                | -0.024      | 0.054 | -0.450 | 0.652 | 2.920 | 0.342     |
| PEN                               | 0.030       | 0.043 | 0.720  | 0.474 | 2.040 | 0.491     |
| PIIT                              | 0.129       | 0.037 | 0.350  | 0.728 | 1.370 | 0.728     |
| CP                                | 0.019       | 0.031 | 0.620  | 0.535 | 1.430 | 0.697     |
| ATUT                              | 0.032       | 0.036 | 0.900  | 0.367 | 1.480 | 0.676     |
| Intercept                         | -1.184      | 0.155 | -7.630 | 0.000 | -     | -         |

Note. \*\*  $p < 0.05$ , \*\*\*  $p < 0.001$ .

The regression results indicated no difference in ESB performance between the normative goal frame condition and the control condition ( $\beta = 0.080$ ,  $p = 0.250$ ). Thus, we found no support for H1. Similar to the results obtained by the Mann-Whitney U test, treatment effects for normative information and emotional (hedonic and normative goal frames condition;  $\beta = 0.634$ ,  $p < 0.001$ ) and competitive (gain and normative goal frames condition;  $\beta = 0.789$ ,  $p < 0.001$ ) feedback on ESB performance were significant, supporting H2a and H3a. To test for differences between the groups, we conducted a Wald test. The results indicate that combining normative information with emotional (hedonic and normative goal frames condition;  $W = 46.450$ ,  $p < 0.001$ ) and competitive (gain and normative goal frames condition;  $W = 65.030$ ,  $p < 0.001$ ) feedback results in higher ESB performance compared to



providing normative information only (normative goal frame condition), indicating support for H2b and H3b.

Even though we controlled for individual effects in the regression model, the comparison between the conditions receiving normative information and emotional (hedonic and normative goal frames condition) or competitive feedback (gain and normative goal frames condition) did not differ from the Mann-Whitney U test's results. Thus, we could not confirm differences in the treatment effects of the gamified conditions ( $W = 2.380$ ,  $p = 0.123$ ), leading to a rejection of H4.

To delve more deeply into this finding, we conducted an additional analysis to investigate participants' round-based scores. We found that participants receiving competitive feedback (gain and normative goal frames condition) behaved significantly more eco-sustainably than participants receiving emotional feedback (hedonic and normative goal frames condition) in round two (gain:  $M = 76.055$ ,  $SD = 28.214$ ; hedonic:  $M = 60.587$ ,  $SD = 25.253$ ,  $p = 0.012$ ). However, in round three (gain:  $M = 129.561$ ,  $SD = 39.270$ ; hedonic:  $M = 117.337$ ,  $SD = 38.104$ ,  $p = 0.162$ ), and four (gain:  $M = 95.486$ ,  $SD = 31.795$ ; hedonic:  $M = 91.356$ ,  $SD = 29.953$ ,  $p = 0.552$ ) the two groups' performance no longer differed. This also holds with respect to the overall performance (gain:  $M = 83.440$ ,  $SD = 47.014$ ; hedonic:  $M = 74.833$ ,  $SD = 43.773$ ,  $p = 0.091$ ). Thus, these results indicate that the effect of competitive and emotional treatments differ over time but show no difference with respect to the overall performance.

## Discussion

We investigated and compared the effectiveness of gamified IS, affording competition and emotion to align competing goal frames and motivate for eco-sustainable behavior. In particular, we examined whether gamification mechanisms, addressing hedonic or gain goal frames, can increase eco-sustainable behavior compared to normative information only, and whether addressing a hedonic or a gain goal frame is more effective in aligning competing

motivations for normative eco-sustainable behavior. We therefore conducted a controlled, randomized laboratory experiment with  $N = 160$  participants to test our hypotheses. Thereby, our results indicate that, in comparison to providing only normative information, gamified IS that support the hedonic goal frame (via emotional feedback) and the gain goal frame (via competitive feedback), respectively, allow for an increase in eco-sustainable behavior. Further, our results demonstrate that gamified IS supporting hedonic or gain goal frames are equally effective in stimulating eco-sustainable behavior.

Since the application of gamified IS has been identified as a natural fit to foster environmental concerns (Corbett, 2013; King & Tester, 1999), as a first study that jointly investigate how competing goal frames regarding eco-sustainable behavior can be aligned using gamified IS based on GFT, our study offers vital implications for research on gamified Green IS: First, we contribute to Green IS research's aim for insights into how IS can influence motivational states to leverage eco-sustainable behavior and thus change behavior towards more environmental practices (Benitez-Amado & Walczuch, 2012; Seidel et al., 2013; R. T. Watson et al., 2011), as we show that gamified IS that afford emotional or competitive stimuli can influence motivational states to leverage eco-sustainable behavior by aligning otherwise competing motivations and goal frames. Thus, by integrating findings from environmental psychology, we not only support existing Green IS literature that indicates that gamified IS are effective in affording competition (e.g., D. Liu et al., 2013; Loock et al., 2013), but also provide insights into gamification's potential to influence individual motivation for eco-sustainability. Even though motivation is a key requirement for behavioral change, existing Green IS research did not sufficiently take users' motivational needs – as one of the most crucial aspects in designing Green IS – into account (Weiser et al., 2015). Thus, as our results indicate, designing gamified IS that do not only support a single goal frame but enable the activation of a normative goal frame simultaneously with hedonic

or gain goal frames, allow to overcome otherwise existing motivational barriers for eco-sustainable behavior. Thus, since individual motivation is considered a key enabler for sustainability programs (Seidel, Recker, & Pimmer, 2010), aligning otherwise competing goal frames that influence individuals' motivation for eco-sustainable behavior with gamified IS can actively support behavioral changes towards more environmentally friendly practices.

Second, as an early example of including gamification mechanisms that draw on a hedonic goal frame by elucidating emotions to trigger eco-sustainable behavior, we extend existing Green IS research, which primarily focuses on a gain goal frame using competition as motivating mechanism (e.g., D. Liu et al., 2013; Loock et al., 2013). Since we found that gamified IS stimulating emotions are as effective in enhancing individuals' eco-sustainable behavior over the four rounds as gamified IS affording competition, we demonstrate the potential of including emotional elements in gamified IS (Bui et al., 2015; Corbett, 2013; Te'eni, 2016) and thus address hedonic motives (Lowry et al., 2013; Santhanam et al., 2016). However, significant differences between both conditions in round two, after receiving either emotional or competitive feedback, imply a transient effect of competition-inducing IS and provide hints that in short periods of time, gamified IS providing competitive feedback are more effective than gamified IS providing emotional feedback. Yet, we found no evidence for differences between both stimuli during the course of the experiment. Thus, even though gamified IS, stimulating a gain goal frame via competition, might have a stronger short-term effect, gamified IS allowing for an activation of both a gain or a hedonic goal frame provide great potential in supporting eco-sustainable behavior when they are repeatedly applied.

Third, by integrating GFT, this study allows for insights into how gamification design elements could be used to improve task feedback (D. Liu et al., 2017). As the focal goal frame influences which information is absorbed and processed, what knowledge and attitudes become cognitively accessible, and how people evaluate aspects and alternatives of different

situations, information and feedback in line with the dominant goal frame is more effectively processed (Lindenberg & Steg, 2007, 2013). As our results show, gamification mechanisms, building on competition or emotion, can support normative information by transferring behavioral feedback in a way that is congruent with the focal goal frames. Thus, we extend existing research that demonstrates the effectiveness of direct and immediate feedback to support eco-sustainable behavior (e.g., Fischer, 2008; Loock et al., 2013) by showing that gamification mechanisms that, first, support the focal goal frames, and, second, combine normative information with competition- and emotion-based gamification design elements, are effective in transmitting direct and immediate feedback and thus allow for an increase in individuals' eco-sustainable behavior.

Beyond theoretical implications, our study also provides insights for business practitioners. We have shown that gamification is effective in triggering eco-sustainable behavior – a category of employee behavior, which is becoming increasingly important for companies. As organizations are suffering from non-leveraged potential, since people's concern for the environment is not necessarily reflected in their *de facto* behavior (attitude-behavior-gap; Blake, 1999), cost-efficient and user-friendly gamification mechanisms are suited stimuli to bridge this gap in an organizational context and advance employees' environmentally friendly behavior. More broadly, our results are also useful in creating behavioral change regarding other norm-guided behaviors, such as complying with information security policies or participating in corporate health programs. Thus, gamified IS can serve as an easy and cost-effective way to promote changes for norm-guided behavior in organizations.

Furthermore, our study has practical implications on how to raise employees' awareness regarding normative behaviors in organizations. Our results imply that the traditional way of guiding employees' behaviors by providing normative information, is less effective in

creating behavioral change than combining normative information with gamification. Thus, organizations should consider providing normative guidance, as included in policies or guidelines, and support these guidelines with gamified IS that harness employees' hedonic and gain motives, to make normative behaviors more appealing. As our study indicates that gamified IS providing emotional and competitive stimuli, show great leverage potential in supporting normative behavior, organizations should, for example, complement normative policies or guidelines with gamification.

Even though we designed our study with care, our study has limitations. First, involving student participants in a laboratory experiment limits generalizability and realism. However, as laboratory experiments allow for greater precision than field experiments, Dennis and Valacich (2001, p. 5) note that "no one method is better or worse than any other; they are simply better at some aspects and worse at others." Moreover, experimental research has shown that there is no significant difference between business students and business managers (Remus, 1986), which holds especially true for their behavioral responses to goals, feedback, and incentives (Locke, 1986). Using student participants allowed us to precisely test our hypotheses, while controlling for organizational influences that can impair the results of field experiments (Jung et al., 2010; Ruchala, 1999). As we could vary one factor at a time, our experimental setting's internal validity can be considered as high. However, as with any laboratory study, participants were aware about the artificial setting, leading to a decrease in external validity. Furthermore, since our study took place in an online context, our study might remain limited in their transferability to eco-sustainable behavior in an offline context. As there is a gap between intended and de facto eco-sustainable behavior (Blake, 1999) and keeping a motivation stimulus constant when switching from an online stimulus to offline behavior can be challenging (Yee, Bailenson, & Ducheneaut, 2009), this gap could lead to a mitigation of the effect of gamified IS on eco-sustainability. Thus, conducting controlled,

randomized field experiments could help to establish external validity and test our findings on the intersection of online and offline contexts.

Also, we only measured behavior over a short period of time, neglecting longitudinal effects. Thus, future research should apply longitudinal experimental designs to better understand the interventions' short-term and long-term effects, as well as the interplay of multiple gamified interventions that were sequentially introduced. This may provide further insights into how to design gamified IS to encourage eco-sustainable behavior in the long term. Furthermore, since tensions between a normative goal frame and hedonic or gain goal frames, respectively, prevent eco-sustainable behavior (Lindenberg & Steg, 2007), we investigated how gamified IS can align a normative goal frame with either a hedonic or a gain goal frame. Since we did not consider an alignment of all three goal frames, future research should explore whether gamified IS activating hedonic and gain goal frames simultaneously to support normative eco-sustainable behavior, are more effective than gamified IS aligning competing hedonic or gain goal frames for eco-sustainability. As we only considered motivational stimuli related to competition and emotion regarding eco-sustainable behavior, further studies should examine other motivational needs and gamification design elements (D. Liu et al., 2017; P. Zhang, 2008). Comparing their effectiveness and their interactions in other contexts would increase our understanding of how gamified IS should be designed for specific behaviors and tasks.

### **Conclusion**

Building on a randomized laboratory experiment, we investigated whether gamification mechanisms addressing hedonic or gain goal frames increased eco-sustainable behavior compared to normative information only and whether addressing a hedonic or a gain goal frame is more effective in aligning competing motivations for normative eco-sustainable behavior. By investigating and comparing the effectiveness of gamified IS providing

competitive and emotional feedback, our research showed gamified IS that support the hedonic goal frame and the gain goal frame to increase eco-sustainable behavior and demonstrated that gamified IS activating a hedonic or a gain goal frame to support normative information are equally effective in aligning competing motivations for normative-driven eco-sustainable behavior.

In conclusion, this study addresses an important void in Green IS literature by considering gamification's potential in the complex interactions of competing goal frames, while past research has chiefly focused on a single goal frame to motivate eco-sustainable behavior. Thus, building on the GFT, this study, first, demonstrates that gamification can influence motivational states to leverage eco-sustainable behavior by aligning otherwise competing motivations; second, it extends existing Green IS research by demonstrating the potential of including emotional elements in gamified IS to address hedonic goals; and third, it highlights that gamification mechanisms that support the focal goal frames, and combine normative information with competition- and emotion-based gamification design elements, are effective in transmitting direct and immediate feedback, thus allowing for an increase in individuals' eco-sustainable behavior. Thus, by showing gamification's persuasive potential to solve tensions between competing motivations for eco-sustainability, and to overcome individual barriers for eco-sustainable behavior, we contribute to Green IS' overarching aim to change behavior for eco-sustainability, and, thus, help environmental-friendly practices emerge and diffuse.

## References

- Abrahamse, W., Steg, L., Vlek, C., & Rothengatter, T. (2005). A review of intervention studies aimed at household energy conservation. *Journal of Environmental Psychology*, 25(3), 273–291. <http://doi.org/10.1016/j.jenvp.2005.08.002>
- Adam, M. T. P., Astor, P. J., & Krämer, J. (2016). Affective images, emotion regulation and bidding behavior: An experiment on the influence of competition and community. *Journal of Interactive Marketing*, 35, 56–69. <http://doi.org/10.1016/j.intmar.2015.12.002>
- Agarwal, R., & Prasad, J. (1998). A conceptual and operational definition of personal innovativeness in the domain of information technology. *Information Systems Research*, 9(2), 204–215. <http://doi.org/10.1287/isre.9.2.204>
- Andersson, M., & von Borgstede, C. (2010). Differentiation of determinants of low-cost and high-cost recycling. *Journal of Environmental Psychology*, 30(4), 402–408. <http://doi.org/10.1016/j.jenvp.2010.02.003>
- Aquino, K., Freeman, D., Reed, A., Lim, V. K. G., & Felps, W. (2009). Testing a social-cognitive model of moral behavior: The interactive influence of situations and moral identity centrality. *Journal of Personality and Social Psychology*, 97(1), 123–141. <http://doi.org/10.1037/a0015406>
- Bellman, S., & Murray, K. B. (2018). Feedback, task performance, and interface preferences. *European Journal of Information Systems*, online. <http://doi.org/10.1080/0960085X.2018.1475876>
- Benitez-Amado, J., & Walczuch, R. M. (2012). Information technology, the organizational capability of proactive corporate environmental strategy and firm performance: A resource-based analysis. *European Journal of Information Systems*, 21(1), 664–679. <http://doi.org/10.1057/ejis.2012.14>
- Blake, J. (1999). Overcoming the ‘value-action gap’ in environmental policy: Tensions



- between national policy and local experience. *Local Environment*, 4(3), 257–278.  
<http://doi.org/10.1080/13549839908725599>
- Blay, A. D., Kadous, K., & Sawers, K. (2012). The impact of risk and affect on information search efficiency. *Organizational Behavior and Human Decision Processes*, 117(1), 80–87. <http://doi.org/10.1016/j.obhdp.2011.09.003>
- Blohm, I., & Leimeister, J. M. (2013). Gamification - Design of IT-based enhancing services for motivational support and behavioral change. *Business & Information Systems Engineering*, 5(4), 275–278. <http://doi.org/10.1007/s12599-013-0273-5>
- Brewer, R. S., Lee, G. E., & Johnson, P. M. (2011). The Kukui Cup: A dorm energy competition focused on sustainable behavior change and energy literacy. In *Proceedings of the Annual Hawaii International Conference on System Sciences*. Hawaii, USA.  
<http://doi.org/10.1109/HICSS.2011.422>
- Bui, A., Veit, D., & Webster, J. (2015). Gamification – A novel phenomenon or a new wrapping for existing concepts? In *Proceedings of the 36th International Conference on Information Systems*. Fort Worth, USA.
- Chan, R. Y. K., & Ma, K. H. Y. (2017). Impact of executive compensation on the execution of IT-based environmental strategies under competition. *European Journal of Information Systems*, 26(5), 489–508. <http://doi.org/10.1057/s41303-017-0052-3>
- Cooke, R. A., & Rousseau, D. M. (1988). Behavioral norms and expectations: A quantitative approach to the assessment of organizational culture. *Group & Organization Studies*, 13(3), 245–273. <http://doi.org/10.1177/105960118801300302>
- Corbett, J. (2013). Designing and using carbon management systems to promote ecologically responsible behaviors. *Journal of the Association for Information Systems*, 14(7), 339–378. <http://doi.org/10.17705/1jais.00338>
- Csikszentmihalyi, M. (1975). Play and intrinsic rewards. *Journal of Humanistic Psychology*,

15(3), 41–63. <http://doi.org/10.1177/002216787501500306>

- Deci, E. L., & Ryan, R. M. (2000). The “What” and “Why” of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 11*(4), 227–268. [http://doi.org/10.1207/S15327965PLI1104\\_01](http://doi.org/10.1207/S15327965PLI1104_01)
- Dennis, A. R., & Valacich, J. S. (2001). Conducting research in information systems. *Communications of the Association for Information Systems, 7*(1), 1–34. <http://doi.org/10.4018/978-1-60566-040-0.ch001>
- Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011). From game design elements to gamefulness: Defining “Gamification.” In *Proceedings of the 15th International Academic MindTrek Conference: Envisioning Future Media Environments* (pp. 9–15). Tampere, Finland. <http://doi.org/10.1145/2181037.2181040>
- DeYoung, R. (2000). Expanding and evaluating motives for environmentally responsible behavior. *Journal of Social Issues, 56*(3), 509–526. <http://doi.org/10.1111/0022-4537.00181>
- Diamantopoulos, A., Riefler, P., & Roth, K. P. (2008). Advancing formative measurement models. *Journal of Business Research, 61*(12), 1203–1218. <http://doi.org/10.1016/j.jbusres.2008.01.009>
- Diamantopoulos, A., & Winklhofer, H. M. (2001). Index construction with formative indicators: An alternative to scale development. *Journal of Marketing Research, 38*(2), 269–277. <http://doi.org/10.1509/jmkr.38.2.269.18845>
- Dobson, A. (2007). Environmental citizenship: Towards sustainable development. *Sustainable Development, 15*, 276–285. <http://doi.org/10.1002/sd.344>
- Elgaaied, L. (2012). Exploring the role of anticipated guilt on pro-environmental behavior – a suggested typology of residents in France based on their recycling patterns. *Journal of Consumer Marketing, 29*(5), 369–377. <http://doi.org/10.1108/07363761211247488>

- Elliot, S. (2011). Transdisciplinary perspectives on environmental sustainability: A resource base and framework for IT-enabled business transformation. *MIS Quarterly*, 35(1), 197–236.
- Fischer, C. (2008). Feedback on household electricity consumption: A tool for saving energy? *Energy Efficiency*, 1(1), 79–104. <http://doi.org/10.1007/s12053-008-9009-7>
- Flüchter, K., & Wortmann, F. (2014). Promoting sustainable travel behavior through IS-enabled feedback - Short-term success at the cost of long-term motivation? In *Proceedings of the 35th International Conference on Information Systems*. Auckland, New Zealand.
- Foster, D., Lawson, S., Blythe, M., Cairns, P., & Pool, B. (2010). Wattsup?: Motivating reductions in domestic energy consumption using social networks. In *Proceedings of the 6th Nordic Conference on Human-Computer Interaction: Extending Boundaries* (pp. 178–187). Reykjavik, Iceland. <http://doi.org/10.1145/1868914.1868938>
- Franceschi, K., Lee, R. M., Zanakis, S. H., & Hinds, D. (2009). Engaging group e-learning in virtual worlds. *Journal of Management Information Systems*, 26(1), 73–100. <http://doi.org/10.2753/MIS0742-1222260104>
- Gardner, G. T., & Stern, P. (2002). *Environmental problems and human behavior* (2nd ed.). Boston, USA: Pearson Custom Publishing.
- Gatersleben, B., Steg, L., & Vlek, C. (2002). Measurement and determinants of environmentally significant consumer behavior. *Environment and Behavior*, 34(3), 335–362. <http://doi.org/10.1177/0013916502034003004>
- Gnauk, B., Dannecker, L., & Hahmann, M. (2012). Leveraging gamification in demand dispatch systems. In *Proceedings of the 2012 Joint EDBT/ICDT Workshops on EDBT-ICDT '12* (pp. 103–110). Berlin, Germany. <http://doi.org/10.1145/2320765.2320799>
- Griskevicius, V., Tybur, J. M., & Van den Bergh, B. (2010). Going green to be seen: Status,

- reputation, and conspicuous conservation. *Journal of Personality and Social Psychology*, 98(3), 392–404. <http://doi.org/10.1037/a0017346>
- Hamari, J. (2013). Transforming homo economicus into homo ludens: A field experiment on gamification in a utilitarian peer-to-peer trading service. *Electronic Commerce Research and Applications*, 12(4), 236–245. <http://doi.org/10.1016/j.elerap.2013.01.004>
- Hamari, J. (2017). Do badges increase user activity? A field experiment on the effects of gamification. *Computers in Human Behavior*, 71, 469–478. <http://doi.org/10.1016/j.chb.2015.03.036>
- Hamari, J., Koivisto, J., & Pakkanen, T. (2014). Do persuasive technologies persuade? - A review of empirical studies. In *Proceedings of the International Conference on Persuasive Technology* (pp. 118–136). Salzburg, Austria. [http://doi.org/10.1007/978-3-319-07127-5\\_11](http://doi.org/10.1007/978-3-319-07127-5_11)
- Hunecke, M., Blobaum, A., Matthies, E., & Hoger, R. (2001). Responsibility and environment: Ecological norm orientation and external factors in the domain of travel mode choice behavior. *Environment and Behavior*, 33(6), 830–852. <http://doi.org/10.1177/00139160121973269>
- Ibanez, L., Moureau, N., & Roussel, S. (2016). How do incidental emotions impact pro-environmental behavior? Evidence from the dictator game. *Journal of Behavioral and Experimental Economics*, 66, 1–6. <http://doi.org/10.1016/j.socec.2016.04.003>
- Jung, J. H., Schneider, C., & Valacich, J. (2010). Enhancing the motivational affordance of information systems: The effects of real-time performance feedback and goal setting in group collaboration environments. *Management Science*, 56(4), 724–742. <http://doi.org/10.1287/mnsc.1090.1129>
- Karlin, B., Zinger, J. F., & Ford, R. (2015). The effects of feedback on energy conservation: A meta-analysis. *Psychological Bulletin*, 141(6), 1205–1227.

<http://doi.org/10.1037/a0039650>

- Keizer, K., Lindenberg, S., & Steg, L. (2008). The spreading of disorder. *Science*, 322(1681), 1681–1685. <http://doi.org/10.1126/science.1161405>
- Keller, J., & Blomann, F. (2008). Locus of control and the flow experience: An experimental analysis. *European Journal of Personality*, 22(7), 589–607. <http://doi.org/10.1002/per.692>
- King, P., & Tester, J. (1999). The landscape of persuasive technologies. *Communications of the ACM*, 42(5), 31–38. <http://doi.org/10.1145/301353.301398>
- Koo, C., & Chung, N. (2014). Examining the Eco-Technological Knowledge of Smart Green IT Adoption Behavior: A Self-Determination perspective. *Technological Forecasting and Social Change*, 88, 140–155. <http://doi.org/10.1016/j.techfore.2014.06.025>
- Koufaris, M. (2002). Applying the technology acceptance model and flow theory to online consumer behavior. *Information Systems Research*, 13(2), 205–223. <http://doi.org/10.1287/isre.13.2.205.83>
- Landers, R. N., Bauer, K. N., & Callan, R. C. (2017). Gamification of task performance with leaderboards: A goal setting experiment. *Computers in Human Behavior*, 71, 508–515. <http://doi.org/10.1016/j.chb.2015.08.008>
- Leimeister, J. M., Huber, M., Bretschneider, U., & Krcmar, H. (2009). Leveraging crowdsourcing: Activation-supporting components for IT-based ideas competition. *Journal of Management Information Systems*, 26(1), 197–224. <http://doi.org/10.2753/MIS0742-1222260108>
- Lindenberg, S. (2017). The dependence of human cognitive and motivational processes on institutional systems. In B. Jann & W. Przepiorka (Eds.), *Social dilemmas, institutions, and the evolution of cooperation* (pp. 85–106). Oldenburg, Germany: De Gruyter.
- Lindenberg, S., & Foss, N. J. (2011). Managing joint prediction motivation: The role of goal-

- framing and governance mechanisms. *Academy of Management Review*, 36(3), 500–525. <http://doi.org/10.5465/AMR.2011.61031808>
- Lindenberg, S., & Steg, L. (2007). Normative, gain and hedonic goal frames guiding environmental behavior. *Journal of Social Issues*, 63(1), 117–137. <http://doi.org/10.1111/j.1540-4560.2007.00499.x>
- Lindenberg, S., & Steg, L. (2013). Goal-framing theory and norm guided environmental behavior. In H. van Trijp (Ed.), *Encouraging sustainable behavior* (pp. 37–54). New York, USA: Psychology Press.
- Liu, D., Li, X., & Santhanam, R. (2013). Digital games and beyond: What happens when players compete? *MIS Quarterly*, 37(1), 111–124. <http://doi.org/10.25300/MISQ/2013/37.1.05>
- Liu, D., Santhanam, R., & Webster, J. (2017). Towards meaningful engagement: A framework for design and research of gamified information systems. *MIS Quarterly*, 42(4), 1011–1034. <http://doi.org/10.1007/s13398-014-0173-7.2>
- Liu, Y., Alexandrova, T., & Nakajima, T. (2011). Gamifying intelligent environments. In *Proceedings of the 2011 International ACM Workshop on Ubiquitous Meta User Interfaces* (pp. 7–12). Scottsdale, USA. <http://doi.org/10.1145/2072652.2072655>
- Lo, S. H., Peters, G.-J. Y., & Kok, G. (2012). A review of determinants of and interventions for proenvironmental behaviors in organizations. *Journal of Applied Social Psychology*, 42(12), 2933–2967. <http://doi.org/10.1111/j.1559-1816.2012.00969.x>
- Locke, E. A. (1986). *Generalizing from laboratory to field settings: Research findings from industrial organization, organizational behavior, and human resource management*. Lexington, MA.: Lexington Books.
- Loock, C.-M., Staake, T., & Thiesse, F. (2013). Motivating energy-efficient behavior with Green IS: An investigation of goal setting and the role of defaults. *MIS Quarterly*, 37(4),

1313–1332. <http://doi.org/10.1029/2012WR012398>

- Lounis, S., Neratzouli, X., & Pramadari, K. (2013). Can gamification increase consumer engagement? A qualitative approach on a green case. In *Proceedings of the Conference on e-Business, e-Services and e-Society* (pp. 200–212). Athens, Greece. [http://doi.org/10.1007/978-3-642-37437-1\\_17](http://doi.org/10.1007/978-3-642-37437-1_17)
- Lounis, S., Pramadari, K., & Theotokis, A. (2014). Gamification is all about fun: The role of incentive type and community collaboration. In *Proceedings of the 22nd European Conference on Information Systems*. Tel Aviv, Israel.
- Lowry, P. B., Hammer, B., Gaskin, J., Roberts, T. L., & Twyman, N. (2013). Taking “fun and games” seriously: Proposing the hedonic-motivation system adoption model (HMSAM). *Journal of the Association for Information Systems*, 14(11), 617–671. <http://doi.org/10.17705/1jais.00347>
- Mankoff, J., Fussell, S. R., Dillahunt, T., Graves, R., Grevet, C., Johnson, M., ... Setlock, L. (2010). StepGreen.org: Increasing energy saving behaviors via social networks. In *Proceedings of the Fourth International AAAI Conference on Weblogs and Social Media* (pp. 106–113). Manley Park, USA.
- Matallaoui, A., Koivisto, J., Hamari, J., & Zarnekow, R. (2017). How effective is “Exergamification”? A systematic review on the effectiveness of gamification features in Exergames. In *Proceedings of the 50th Hawaii International Conference on System Sciences* (pp. 3316–3325). Hawaii, USA. <http://doi.org/10.24251/HICSS.2017.402>
- McDonald, F. (2014). Developing an integrated conceptual framework of pro-environmental behavior in the workplace through synthesis of the current literature. *Administrative Sciences*, 4(3), 276–303. <http://doi.org/10.3390/admsci4030276>
- McGrath, K. (2006). Affection not affliction : The role of emotions in information systems and organizational change. *Information and Organization*, 16(4), 277–303.

<http://doi.org/https://doi.org/10.1016/j.infoandorg.2006.09.001>

- Mekler, E. D., Brühlmann, F., Tuch, A. N., & Opwis, K. (2017). Towards understanding the effects of individual gamification elements on intrinsic motivation and performance. *Computers in Human Behavior*, *71*, 525–534. <http://doi.org/10.1016/j.chb.2015.08.048>
- Melville, N. (2010). Information systems innovation for environmental sustainability. *MIS Quarterly*, *34*(1), 1–21. <http://doi.org/10.2307/20721412>
- Mertens, W., Pugliese, A., & Recker, J. (2017). *Quantitative data analysis: A companion for accounting and information systems research*. Heidelberg, Germany: Springer. <http://doi.org/10.1007/978-3-319-42700-3>
- Morschheuser, B., Riar, M., Hamari, J., & Maedche, A. (2017). How games induce cooperation? A study on the relationship between game features and we-intentions in an augmented reality game. *Computers in Human Behavior*, *77*, 169–183. <http://doi.org/10.1016/j.chb.2017.08.026>
- Novak, T. P., Hoffman, D. L., & Yung, Y. F. (2000). Measuring the customer experience in online environments: A structural modeling approach. *Marketing Science*, *19*(1), 22–44. <http://doi.org/10.1287/mksc.19.1.22.15184>
- Onwezen, M. C., Antonides, G., & Bartels, J. (2013). The norm activation model: An exploration of the functions of anticipated pride and guilt in pro-environmental behaviour. *Journal of Economic Psychology*, *39*, 141–153. <http://doi.org/10.1016/j.joep.2013.07.005>
- Oppong-Tawiah, D., Webster, J., Staples, S., Cameron, A.-F., & De Guinea, A. O. (2014). Encouraging sustainable energy use in the office with persuasive mobile information systems. In *Proceedings of the 35th International Conference on Information Systems*. Auckland, New Zealand.
- Remus, W. (1986). Graduate students as surrogates for managers in experiments on business



- decision making. *Journal of Business Research*, 14(1), 19–25.  
[http://doi.org/10.1016/0148-2963\(86\)90053-6](http://doi.org/10.1016/0148-2963(86)90053-6)
- Ruchala, L. (1999). The influence of budget goal attainment on risk attitudes and escalation. *Behavioral Research in Accounting*, 11, 161–191.
- Ruepert, A. M., Keizer, K., & Steg, L. (2017). The relationship between corporate environmental responsibility, employees' biospheric values and pro-environmental behaviour at work. *Journal of Environmental Psychology*, 54, 65–78.  
<http://doi.org/10.1016/j.jenvp.2017.10.006>
- Ruepert, A. M., & Steg, L. (2018). Environmental considerations as a basis for employee pro-environmental behaviour. In V. K. Wells, D. Gregory-Smith, & D. Manika (Eds.), *Research handbook on employee pro-environmental behaviour* (pp. 106–127). Cheltenham, UK: Edward Elgar Publishing Ltd.
- Russell, J. A. (2003). Core affect and the psychological construction of emotion. *Psychological Review*, 110(1), 145–172. <http://doi.org/10.1037/0033-295X.110.1.145>
- Ryan, R. M., & Deci, E. L. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology*, 25(1), 54–67.  
<http://doi.org/10.1006/ceps.1999.1020>
- Santhanam, R., Liu, D., & Shen, W. C. (2016). Gamification of technology-mediated training: Not all competitions are the same. *Information Systems Research*, 27(2), 453–465. <http://doi.org/10.1287/isre.2016.0630>
- Scheiner, C., Haas, P., Bretschneider, U., Blohm, I., & Leimeister, J. M. (2017). Obstacles and challenges in the use of gamification for virtual ideas communities. In S. Stieglitz, C. Lattemann, S. Robra-Bissantz, R. Zarnekow, & T. Brockmann (Eds.), *Gamification - Using game elements in serious contexts* (pp. 65–76). Cham, Switzerland: Springer.
- Schöbel, S., Janson, A., Leimeister, J. M., & Ernst, S. (2017). How to gamify a mobile

- learning application – A modularization approach. In *Proceedings of the 38th International Conference on Information Systems*. Seoul, South Korea.
- Schöbel, S., Söllner, M., & Leimeister, J. M. (2016). The agony of choice – Analyzing user preferences regarding gamification elements in learning management systems. In *Proceedings of the 37th International Conference on Information Systems*.
- Seidel, S., Chandra Kruse, L., Székely, N., Gau, M., & Stieger, D. (2017). Design principles for sensemaking support systems in environmental sustainability transformations. *European Journal of Information Systems*, 1–38. <http://doi.org/10.1057/s41303-017-0039-0>
- Seidel, S., Recker, J., & Pimmer, C. (2010). Enablers and barriers to the organizational adoption of sustainable business practices. In *Proceeding of the 16th Americas Conference on Information Systems*. Lima, Peru.
- Seidel, S., Recker, J., & Vom Brocke, J. (2013). Sensemaking and sustainable practicing: Functional affordances of information systems in green transformations. *MIS Quarterly*, 37(4), 1275–1299. <http://doi.org/10.25300/MISQ/2013/37.4.13>
- Sicilia, M., Ruiz, S., & Munuera, J. L. (2005). Effects of interactivity in a web site. *Journal of Advertising*, 34(3), 31–44. <http://doi.org/10.1080/00913367.2005.10639202>
- Skadberg, Y. X., & Kimmel, J. R. (2004). Visitors' flow experience while browsing a web site: Its measurement, contributing factors and consequences. *Computers in Human Behavior*, 20(3), 403–422. [http://doi.org/10.1016/S0747-5632\(03\)00050-5](http://doi.org/10.1016/S0747-5632(03)00050-5)
- Song, H., Kim, J., Tenzek, K. E., & Min, K. (2013). The effects of competition and competitiveness upon intrinsic motivation in Exergames. *Computers in Human Behavior*, 29(4), 1702–1708. <http://doi.org/10.1016/j.chb.2013.01.042>
- Sparrow, B., Liu, J., & Wegner, D. M. (2011). Google effects on memory: Information at our fingertips. *Science*, 333, 776–778. <http://doi.org/10.1126/science.1207745>

- Steg, L., Bolderdijk, J. W., Keizer, K., & Perlaviciute, G. (2014). An integrated framework for encouraging pro-environmental behaviour: The role of values, situational factors and goals. *Journal of Environmental Psychology, 38*(4), 104–115. <http://doi.org/10.1016/j.jenvp.2014.01.002>
- Steg, L., Dreijerink, L., & Abrahamse, W. (2005). Factors influencing the acceptability of energy policies: A test of VBN theory. *Journal of Environmental Psychology, 25*(4), 415–425. <http://doi.org/10.1016/j.jenvp.2005.08.003>
- Steg, L., & Vlek, C. (2009). Encouraging pro-environmental behaviour: An integrative review and research agenda. *Journal of Environmental Psychology, 29*(3), 309–317. <http://doi.org/10.1016/j.jenvp.2008.10.004>
- Stern, P. C. (2000). Toward a coherent theory of environmentally significant behavior. *Journal of Social Issues, 56*(3), 407–424. <http://doi.org/10.1111/0022-4537.00175>
- Sun, H., & Zhang, P. (2006). The role of affect in information systems research: A critical survey and a research model. In P. Zhang & D. Galletta (Eds.), *Human-computer interaction and management information systems: Foundations* (5th ed., pp. 295–329). Armonk, USA: M.E. Sharpe.
- Te'eni, D. (2016). Contextualization and problematization, gamification and affordance: A traveler's reflections on EJIS. *European Journal of Information Systems, 25*(6), 473–476. <http://doi.org/10.1057/s41303-016-0028-8>
- Tiefenbeck, V., Goette, L., Degen, K., Tasic, V., Fleisch, E., & Lalive, R. (2018). Overcoming salience bias: How real-time feedback fosters resource conservation. *Management Science, 64*(3), 1458–1476. <http://doi.org/10.1287/mnsc.2016.2646>
- United Nations Framework Convention on Climate Change. (2018). Achieving the sustainable development goals through climate action. Retrieved August 13, 2018, from <https://unfccc.int/achieving-the-sustainable-development-goals-through-climate-action>

- Unsworth, K. L., Dmitrieva, A., & Adriasola, E. (2013). Changing behaviour: Increasing the effectiveness of workplace interventions in creating pro-environmental behaviour change. *Journal of Organizational Behavior*, 34(2), 211–229. <http://doi.org/10.1002/job.1837>
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425–478. <http://doi.org/10.2307/30036540>
- Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, 54(6), 1063–1070. <http://doi.org/10.1037/0022-3514.54.6.1063>
- Watson, R. T., Boudreau, M. C., & Chen, A. J. (2010). Information systems and environmentally sustainable development: Energy informatics and new directions for the IS community. *MIS Quarterly*, 34(1), 23–38. <http://doi.org/10.2307/20721413>
- Watson, R. T., Boudreau, M. C., Chen, A. J., & Sepulveda, H. H. (2011). Green projects: An information driven analysis of four cases. *Journal of Strategic Information Systems*, 20(1), 55–62. <http://doi.org/10.1016/j.jsis.2010.09.004>
- Weiser, P., Bucher, D., Cellina, F., & De Luca, V. (2015). A taxonomy of motivational affordances for meaningful gamified and persuasive technologies. In *Proceedings of the ICT for Sustainability (ICT4S)*. Copenhagen, Denmark. <http://doi.org/10.2991/ict4s-env-15.2015.31>
- Yee, N., Bailenson, J. N., & Ducheneaut, N. (2009). The proteus effect: Implications of transformed digital self-representation on online and offline behavior. *Communication Research*, 36(2), 285–312. <http://doi.org/10.1177/0093650208330254>
- Young, M. F., Slota, S., Cutter, A. B., Jalette, G., Mullin, G., Lai, B., ... Yukhymenko, M. (2012). Our princess is in another castle: A review of trends in serious gaming for

education. *Review of Educational Research*, 82(1), 61–89.

<http://doi.org/10.3102/0034654312436980>

Zhang, P. (2008). Motivational affordances: Reasons for ICT design and use.

*Communications of the ACM*, 51(11), 145. <http://doi.org/10.1145/1400214.1400244>

Zhang, P. (2013). The affective response model: A theoretical framework of affective

concepts and their relationships in the ICT context. *MIS Quarterly*, 37(1), 247–274.

<http://doi.org/10.25300/MISQ/2013/37.1.11>

Zhang, X., Zuo, B., Erskine, K., & Hu, T. (2016). Feeling light or dark? Emotions affect

perception of brightness. *Journal of Environmental Psychology*, 47, 107–111.

<http://doi.org/10.1016/j.jenvp.2016.05.007>

Zicherman, G., & Cunningham, C. (2011). *Gamification by design: Implementing game*

*mechanics in web and mobile apps*. Sebastopol, CA: O'Reilly Media.

**Appendix F: Multiple-Choice Questions Adopted from Sparrow et al. (2011)**

| No.                   | Question (adapted from Sparrow et al. (2011))                    | Answers provided                                                                                          |
|-----------------------|------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| Trial Questions       |                                                                  |                                                                                                           |
| 1                     | How much more square miles does Denmark contain than Costa Rica? | 7,185<br>5,327<br>8,159<br>0                                                                              |
| 2                     | What is a quince?                                                | Fruit<br>Vegetable<br>Animal<br>Technology                                                                |
| Performance Questions |                                                                  |                                                                                                           |
| 1                     | Which music lesson did Benjamin Franklin give?                   | Piano<br>Guitar<br>Violin<br>Harp                                                                         |
| 2                     | What does an Italian deck of cards not contain?                  | Jacks<br>Suns<br>Goblets<br>Swords                                                                        |
| 3                     | What did Alfred Hitchcock not eat?                               | Meat<br>Fish<br>Eggs<br>Tomatoes                                                                          |
| 4                     | In which months are the most babies conceived?                   | July, August, September<br>December, January, February<br>October, November, December<br>April, May, June |
| 5                     | How many countries have less than two colors in their flag?      | 3<br>5<br>1<br>0                                                                                          |
| 6                     | When was Czar Nicholas II executed?                              | 1917<br>1918<br>1920<br>1924                                                                              |
| 7                     | What is Krypton's atomic number?                                 | 43<br>38<br>36<br>10                                                                                      |

**Appendix F: Continued**

|    |                                             |                                                                                 |
|----|---------------------------------------------|---------------------------------------------------------------------------------|
| 8  | What is the average age of a human eyelash? | 150 – 200 days<br>100 – 150 days<br>50 – 100 days<br>1 – 50 days                |
| 9  | When was Pompey defeated by Julius Caesar?  | 45 B.C.<br>46 B.C.<br>48 B.C.<br>49 B.C.                                        |
| 10 | When were family names first used?          | Roman Times<br>Etruscan Times<br>Greek Times<br>Celtic Times                    |
| 11 | What is myrmecophobia?                      | Anxiety for spiders<br>Anxiety for ants<br>Anxiety for cats<br>Anxiety for dirt |
| 12 | What is the most common name in the U.S.?   | Jones<br>Smith<br>Miller<br>Moore                                               |

### **Appendix G: Normative Information Included in Treatments**

All participants in the *normative goal* condition, *hedonic and normative goal frames* condition, and the *gain and normative goal frames* condition received the following information on the energy consumption of Blackle and Google:

#### ***Details on the energy consumption of Blackle vs. Google***

Google gets about **nine billion searches** per day. If each query is displayed for only about ten seconds, Google will show up on computer screens, every day, for 25 million hours.

Adjusting the background color can save 15 watts per search on conventional screens. If all searches worldwide were made on Blackle instead of Google, that would save a global total of **137 gigawatt hours**. The savings generated using Blackle are comparable to an annual electricity consumption of 44,000 two-person households. By using Blackle alone, it is possible to save energy worth around **EUR 14 million** at an electricity price of ten Cents per kilowatt hour.



## Appendix H: Manipulation Checks and Control Variables

### H.1. Manipulation Checks for the Hedonic and Normative Goal Frames Condition

---

Positive and negative affect schedule (PANAS; D. Watson et al., 1988)

( $\alpha = .862$ ,  $M = 5.058$ ,  $SD = 0.715$ )

---

This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer. Indicate to what extent you feel this way right now, that is, at the present moment.

Active  
Interested  
Excited  
Strong  
Enthusiastic  
Proud  
Inspired  
Attentive  
Distressed  
Upset  
Guilty  
Scared  
Hostile  
Irritable  
Alert  
Ashamed  
Nervous  
Determined  
Jittery  
Afraid

---

*Note.* All items were measured on a seven-point Likert scale from [1] strongly disagree to [7] strongly agree.

## H.2. Manipulation Checks for the Gain and Normative Goal Frames Condition

---

Competitive performance (adapted from Landers et al. (2017))  
( $M = 2.730$ ,  $SD = 0.506$ )

---

How was your performance goal determined?

- (1) There was no goal.
  - (2) The goal was predetermined and could not be adapted.
  - (3) The goal could be set and adapted by myself.
- 

*Note.* Measured on a seven-point Likert scale from [1] strongly disagree to [7] strongly agree.

## H.3. Control Variables

---

Environmental beliefs and attitudes (EBA; Gatersleben et al., 2002)  
( $\alpha = .850$ ,  $M = 5.806$ ,  $SD = 0.731$ )

---

To which degree do you support the following statement?

- Environmental pollution affects my health.
  - Environmental problems have consequences for my life.
  - I worry about environmental problems.
  - I can see with my own eyes that the environment is deteriorating.
  - Environmental problems are a risk for the future of my children.
  - Environmental problems are exaggerated.
  - Too much attention is payed to environmental problem.
  - The attention given to the greenhouse effect is exaggerated.
  - Saving threatened species is unnecessary luxury.
  - I am optimistic about the environmental quality in the future.
  - A better environment starts with myself.
  - People who do not take the environment into account try to escape their responsibility.
- 

*Note.* All items were measured on a seven-point Likert scale from [1] strongly disagree to [7] strongly agree.

**H.3. Continued**


---

 Personal norms (PN; Steg et al., 2005)

( $\alpha = .848$ ,  $M = 4.894$ ,  $SD = 0.937$ )

---

To which degree do you support the following statement?

I feel personally obliged to save as much energy as possible.

I feel morally obliged to save energy, regardless of what others do.

I feel guilty when I waste energy.

I feel morally obliged to use green instead of regular electricity.

People like me should do everything they can to reduce energy use.

If I would buy a new washing machine, I would feel morally obliged to buy an energy efficient one.

I do not feel guilty at all when I buy vegetables and fruit from distant countries.

I feel obliged to bear the environment and nature in mind in my daily behavior.

I would be a better person if I saved energy.

---

*Note.* All items were measured on a seven-point Likert scale from [1] strongly disagree to [7] strongly agree.

---

 Personal ecological norm (PEN; Hunecke et al., 2001)

( $\alpha = .897$ ,  $M = 4.930$ ,  $SD = 1.187$ )

---

To which degree do you support the following statement?

I feel obliged to use a car as seldom as possible in my leisure time for environmental reasons.

I feel obliged to support initiatives that show commitment to ecologically sound transportation planning.

I feel obliged to use bicycle or subway for trips to the city business district for environmental reasons.

I feel responsible for not impairing the quality of life in my dwelling area by using a car.

I feel responsible for not endangering other people's health by pollutions caused by my car.

I feel responsible for preserving the environment in my choice of daily means of transportation

---

*Note.* All items were measured on a seven-point Likert scale from [1] strongly disagree to [7] strongly agree.

**H.3. Continued**


---

 Personal innovativeness in the domain of information technology

(PIIT; Agarwal &amp; Prasad, 1998)

 ( $\alpha = .877$ ,  $M = 4.034$ ,  $SD = 1.279$ )
 

---

To which degree do you support the following statement?

If I heard about a new information technology, I would look for ways to experiment with it.

Among my peers, I am usually the first to try out new information technologies.

In general, I am hesitant to try out new information technologies.

I like to experiment with new information technologies.

---

*Note.* All items were measured on a seven-point Likert scale from [1] strongly disagree to [7] strongly agree.

---

## Computer playfulness (CP; Agarwal &amp; Prasad, 1998)

 ( $\alpha = .842$ ,  $M = 4.854$ ,  $SD = 0.923$ )
 

---

To which degree do you support the following statement?

I am spontaneous when I interact with the WWW.

I am unimaginative when I interact with the WWW.

I am playful when I interact with the WWW.

I am flexible when I interact with the WWW.

I am uninventive when I interact with the WWW.

I am creative when I interact with the WWW.

I am unoriginal when I interact with the WWW.

---

*Note.* All items were measured on a seven-point Likert scale from [1] strongly disagree to [7] strongly agree.

---

## Attitude toward using technology (ATUT; Venkatesh et al., 2003)

 ( $\alpha = .868$ ,  $M = 5.491$ ,  $SD = 0.920$ )
 

---

To which degree do you support the following statement?

Using information systems is a good idea

Information systems make work more interesting

Working with information systems is fun

I like working with information systems

---

*Note.* All items were measured on a seven-point Likert scale from [1] strongly disagree to [7] strongly agree.