Building Sustainable Innovation Through Changes in Employee Behavior and Organizational Capabilities

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Abstract

Recent research has highlighted the potential of employee behavior and organizational capabilities to enhance the sustainable renewal and change process. Research investigating various dimensions of employee behavior and organizational capabilities and their effect on value creation in a resource constrained environment is scarce. This is especially true for the effect on sustainable innovation, a topic that requires further investigation. Thus, this chapter makes a contribution to the literature by investigating what dimensions of employee behavior and organizational capabilities are connected to the sustainable innovation of organizations. This chapter provides an empirical examination of the topic for 160 Finnish organizations. The empirical evidence shows that employees' role clarity, citizenship, and motivation are connected to the sustainable innovation of an organization. Second, the more an organization invests in organization capabilities (in terms of communication and strategic understanding), the more likely it is to achieve sustainable innovation. The practical contribution of these findings is to increase the understanding of the determinants of sustainable innovation and thereby assist practitioners in constructing their value propositions.

1 Introduction

Frugal innovations are offerings, products, or services targeted for resource-constrained environments (Brem and Ivens, 2013; Zeschky et al., 2014). The value proposition of frugal innovation focuses primarily on satisfying basic needs, thus offering basic functionalities (Rosca et al., 2017). Weyrauch and Herstatt (2017) concluded that they are usually characterized by three main elements: substantial cost reduction, concentration on core functionalities, and optimized performance level. The top priority of frugal innovation is not to diminish environmental concerns, but to contribute to resource efficiency by saving material and energy (Le Bas, 2016). Thus, as frugal innovations do not have an obvious sustainability impact (Rosca et al., 2017) in terms of all three dimensions, frugal innovation can be considered a subset of sustainable innovation.

Frugal innovations, as an example of sustainable innovation, not only involve new technologies, but also innovative ways of altering traditional value creation (Rosca et al., 2017), which requires departing from the existing knowledge base. As frugal innovation is about being able to generate more value with less input, prior research has concluded that an organization's capability to utilize its employees' and organizational capabilities are key strategic knowhow with the potential to influence future actions toward sustainability (e.g., Castiaux, 2012; Boons and Lüdeke-Freund, 2013; Ketata et al., 2015; Jorna, 2017; Mousavi and Bossink, 2017; Cillo et al., 2019; Pellegrini et al., 2019). While the generation of frugal innovation can be considered essential for dealing with future sustainability challenges, an understanding of these capabilities is crucial in facilitating sustainable innovations (Mousavi and Bossink, 2017). In this chapter, organizational capabilities refer to an organization's practices that support, for example, the communication and strategic objectives of the work. It has been demonstrated that these capabilities can contribute to value creation by organizations (cf. Aral et al., 2007). This can also assist in creating the conditions necessary for improving employee behavior in terms of increased role clarity, citizenship, and motivation (e.g., Anderson et al., 2014). According to Cillo et al. (2019), there is scarce evidence regarding factors that determine sustainable practices in organizations; especially, the micro foundations of

such practices require further research. This is especially true with regard to the impact of employee behavior and organizational capabilities on sustainable innovation, a topic in need of further investigation - also with regard to the domain of frugal innovation in organizations.

Using a conceptual framework of the determinants of sustainable innovation, this chapter focuses on the employee behavior and organizational capabilities that allow organizations to operate sustainably within their innovation activities. This operationalization also forms a basement for the implementation of frugal innovation. We suggest conceptually that the knowledge required for successful sustainable innovation requires taking into account multiple dimensions. We argue that this needs to be reflected in certain dimensions of both employee behavior and organizational capabilities. The research question is as follows: What dimensions of employee behavior and organizational capabilities are connected to sustainable innovation? The research follows a quantitative approach, and the data set was gathered from a cross-section of organizations located in Finland. Statistical analyses were conducted to trace the relationship between employee behavior, organizational capabilities, and sustainable innovation.

The chapter is structured as follows. First, prior research serving as the conceptual framework is presented. The following paragraphs describe the empirical case and methodology. Next, the results are presented in terms of which dimensions of employee behavior and organizational capabilities are connected to sustainable innovation. This section is followed by conclusions, implications for research and practice, an explanation of the study limitations, and suggestions for future research.

2 Building sustainable innovation

Sustainable innovation usually refers to “the renewal of products, services and processes that not only delivers an improved economical performance, but also an enhanced environmental and social performance, in both the short and long term” (Bos-Bouwers, 2010). However, Bos-Bouwers (2010) suggested that sustainable innovation in small and medium-sized enterprises (SMEs) tend to be characterized as incremental in nature and as tak-

ing small steps in the right direction. Similarly, Jorna (2017) considered sustainable innovation as the continuous process of human action that aims at adjusting the entity, for example, the organization, to the social or natural environment. In this chapter, the concept of sustainable innovation is used with the understanding that most innovations aim at providing value in the multiple aspects of sustainable development. Some innovations tend to be sustainability improving concerning environmentally sustainable practices, while others aim primarily at improving social welfare. What is common in all types of sustainable innovation is the urge to renew actions in a way that supports the change toward a more sustainable operation. Thus, in this chapter sustainable innovation refers to an innovation that aims at organizational renewal toward a more sustainable operation. Next, the interplay between sustainable innovation and frugal innovation is described.

2.1 Sustainable innovation and frugal innovation

Even though previous studies focused on the analyses of how frugal innovations drive sustainable development (e.g., Basu et al., 2013), the interplay between sustainable innovation and frugal innovation is ambiguous. According to Weurach and Herstatt (2017), studies in the field of frugal innovation usually define frugal innovations as having attributes such as limited features, lower costs, ease of use, and low environmental impact. Radjou and Prabhu (2014) presented six principles underlying frugal innovations, including, for example: engaging and iterating, creating sustainable solutions, and co-creating value with prosumers. Rosca et al. (2017) argued that frugal innovation can be considered an inclusive approach to innovation that maximizes value for different organizational and societal stakeholders while significantly reducing the use of natural and financial resources, especially in developing countries. As such, according to prior studies, the concept of frugal innovation is important for facing sustainability challenges in developing countries and can also generate new types of business models in industrialized countries.

The concept of frugal innovation can also be seen through the paradox of "doing more with less" (Rosca et al., 2017). Some authors have further argued that being able to generate more with less, companies need to employ and develop their capabilities. Cunha et al. (2014) found that while companies have to develop their capabilities to do more with less, the paradigm of frugal innovation can be considered crucial for dealing with future sustainability challenges.

Based on the existing literature, there is a wide range of determinants that affect an organization's sustainable innovation. These determinants include, among others, organizational practices, human effort and motivation, support culture, and goals and continuous effort (e.g., Castiaux, 2012; Boons and Lüdeke-Freund, 2013; Ketata et al., 2015; Jorna, 2017; Mousavi and Bossink, 2017; Cillo et al., 2019; Pellegrini et al., 2019). Next, employee behavior and organizational capabilities are introduced as the key determinants of sustainable innovation.

2.2 Employee behavior and sustainable innovation

All in all, it is commonly agreed that employees are one of the most important sources of sustainable innovation within an organization (e.g., Ketata et al., 2015; Jorna, 2017; Delmas and Pekovic, 2018; Pellegrini et al., 2019). The consequences of employee behavior have been studied in a variety of contexts (e.g., Franco Santos et al., 2012). Some studies have focused on the factors that facilitate role clarity (Kauppila, 2014), and other studies have focused on the relationship between role stressors and job performance (e.g., Gilboa et al., 2008) or between role stressors and specific aspects of job performance, such as organizational citizenship behavior (e.g., Eatough et al., 2011). Many studies have also focused on the consequences of management control systems or strategy-making patterns on employee behavior with respect to desired goals (Hall, 2008; Franco-Santos et al., 2012; Kauppila, 2014; Ukko et al., 2017). Thus, in this chapter employee behavior is defined in terms of role clarity, citizenship, and motivation (cf. Franco-Santos et al., 2012).

Innovation is more likely in a situation where people demonstrate high levels of integrity, competence, reliability, loyalty, openness to others, and

view others as equals. Creating these types of favorable conditions for innovation involves having employees understand their roles (Dobni, 2008). “Role clarity” can be defined as having two aspects: goal clarity, meaning the extent to which the outcome goals and objectives of the job are clearly stated and well defined, and process clarity, meaning the extent to which the individual is certain about how to perform his or her job (Hall, 2008). Role clarity refers to individual beliefs about the expectations and behaviors associated with an individual’s work role (Hall, 2008). Organizations benefit when employees complete tasks beyond their job descriptions, for example, when employees perform "acts of citizenship," such acts contributing positively to the organization, for example, in terms of effectiveness and innovation (Dekas et al., 2013; Wojtczuk-Turek and Turek, 2016). Therefore, the following hypothesis was suggested:

H1. Sustainable innovation adoption is shaped by employees’ role clarity.

As a second determinant of sustainable innovation, organizational *citizenship* behaviors can be defined as “extra-role” behaviors (Williams and Anderson, 1991), or as behaviors above and beyond the requirements of the job (Burnley et al., 2009). In the context of this chapter, it refers to a behavior that shapes an organization’s resources and processes in ways that result in sustainable innovation (Pellegrini et al., 2019). It can also be seen as “individual behavior that is discretionary, not directly or explicitly recognized by the formal reward system, and that in the aggregate promotes the effective functioning of the organization” (Organ, 1988, p. 4). This study explores whether organizational citizenship behaviors (i.e. discretionary, extra-role behaviors aimed at the organization) advance sustainable innovation (Pellegrini et al., 2019). Therefore, the following hypothesis was suggested:

H2. Sustainable innovation adoption is shaped by employees’ citizenship behavior.

Employees' commitment, motivation, positive attitude, and behavior are believed to be influential in creating sustainable value for an organization (e.g., Saunila, 2017; Delmas and Pekovic, 2018). People who possess creativity and intrinsic motivation with respect to their work will be influential in creating a work environment that supports the creation of innovation

(Amabile, 1997). Work *motivation* can be divided into intrinsic and extrinsic work motivation. Intrinsic motivation involves people performing an activity because they find it interesting and derive spontaneous satisfaction from the activity itself (Porter and Lawler, 1968). Extrinsic motivation, in contrast, requires an instrumentality between the activity and some separable consequences, such as tangible or verbal rewards, and satisfaction does not come from the activity itself, but rather from the extrinsic consequences to which the activity leads (Porter and Lawler, 1968; Gagné and Deci, 2005). Intrinsic motivation involves the performance of an act or behavior because it is inherently interesting. Such behaviors are not motivated by readily identifiable causes or consequences (Gagné and Deci, 2005; Delmas and Pekovic, 2018). Therefore, the following hypothesis was formulated:

H3. Sustainable innovation adoption is shaped by employees' motivation.

2.2 Organizational capabilities and sustainable innovation

The organizational capabilities of an organization oriented toward innovation (e.g., Ketata et al., 2015; Pellegrini et al., 2019) differ from other organizations with regard to decision-making processes and formalization. For example, organizational capabilities include communication. Communication processes at all levels of an organization can also be characterized as organizational capabilities (Franco-Santos et al., 2012). According to Tang (1998), communication acts as a link between employees, the organization, and the external environment. Furthermore, proper communication infrastructure is one means of facilitating the processes of innovation development (Tang, 1998).) Ketata et al. (2015) studied the open culture that permits revelation to a variety of external knowledge origins for sustainable innovation, and found that communication is necessary for the process of creating and reinforcing innovation (Van Winkelen and Tovstiga, 2009; Van Hemert et al., 2013). Therefore, the following hypothesis was suggested:

H4. Sustainable innovation adoption is shaped by organizational communication.

A second organizational capability is *strategic understanding*. Research by López-Nicolás and Meroño-Cerdán (2011) showed that strategic knowledge management, which is related to the processes and infrastructures that organizations employ to acquire, create, and share knowledge for formulating strategy and making strategic decisions, has an impact on performance. Similarly, Skarzynski, and Gibson (2008) stressed that the organization needs to share a common vision with regard to innovation, as well as a disciplined approach to building innovation capabilities across the organization. This includes a strategy of understanding how highly sustainable innovation is to be achieved (Boons and Lüdeke-Freund, 2013; Boons et al., 2013). Therefore, the following hypothesis was formulated:

H5. Sustainable innovation adoption is shaped by organization's strategic understanding.

2.3 Research model

To summarize, there is a scarcity of evidence about factors that determine sustainable practices in organizations and especially, the micro foundations (i.e., the implications of employee-level determinants) of such practices require further research. Furthermore, the extant literature does not sufficiently incorporate multi-level perspectives on the phenomenon to improve our understanding of the determinants toward sustainable innovation. Previous studies have mostly concentrated on capturing the effects of individual factors for sustainability (e.g., Mousavi and Bossink, 2017; Delmas and Pekovic, 2018; Pellegrini et al., 2019) and the role of distinct resources in its reinforcement (Castiaux, 2012; Ketata et al., 2015). The results of this chapter take this one step further by investigating the relationship between sustainable innovation and the multiple determinants that affect it. In this chapter, the classification of variables into employee behavior and organizational capabilities is not exhaustive, but is instead based on relevance. It is guided by previous works, such as the framework by Franco-Santos et al. (2012), which proposed a categorization of organizational outcomes as a plausible overarching framework to guide research on the different organizational-level consequences. Using that as a conceptual framework of the determinants of sustainable innovation,

this chapter examines the antecedent status of different dimensions of employee behavior and organizational capabilities on sustainable innovation.

Figure 1. Conceptual framework

3 Empirical examination of sustainable innovation

3.1 Data collection

The data set was gathered from a cross-section of organizations located in Finland. The initial sample was 2653 human resources professionals. After the responses were received, the data was screened. Responses were excluded if they met any of the following criteria: first, if most of the items included missing values; second, if it was clear that the responses were deliberately incorrect throughout the survey (i.e., the best possible response was selected in all of the survey items); and third, if there were inconsistencies in the responses. Also, responses from micro-companies (less than 10 employees) were excluded. This process resulted in 160 responses being considered valid, which equals a response rate of 6 percent. Approximately 69 percent of the responses originated from private sector organizations. Twenty-four percent of the respondents represented public sector organizations, and 7 percent originated from third-sector organizations. Twelve percent of the respondents represented small organizations with less than

50 employees. Thirty-two percent of the responses originated from medium-sized organizations and 56 percent from large organizations. The respondents represent a variety of industries, such as manufacturing and construction, retail, services, ICT, banking and finance, consulting/education, and social and health services.

3.2 Measurements

The unit of analysis was the individual respondent's perceptions of employee behavior, organizational capabilities, and sustainable innovation in their organization. The items were constructed based on scales informed by previous studies. The independent variables representing employee behavior were role clarity (employees' awareness of their responsibilities and expected results of their work), citizenship (employees' devotion to their work and care for organizational property), and motivation (employees' intrinsic motivation). The independent variables representing organizational capabilities were communication (the effective collaboration and dissemination of information) and strategic understanding (of strategy and the links between functions). Each of the independent variables was measured using two items. The dependent variable, meaning sustainable innovation (seeking innovative ideas, renewing operation, and accepting new ways of action for sustainable operation), was measured by three items. For each of the items, the respondents were asked to indicate their opinion on a scale ranging from 1 (weak) to 4 (excellent). Two control variables—number of employees (objective) and industry (objective)—were also entered in the survey.

The validity of the variables was examined prior to hypothesis testing. Construct validity (i.e., whether or not the research truly measures what it intends to measure) of the scales was established by assessing content validity and criterion validity (Hair et al., 2010). To ensure content validity, existing measurements that had been empirically tested in previous studies were used. Criterion validity was assessed through correlation analyses, which showed that the constructs behaved in a credible manner. Reliability, which measures the extent to which the items in a scale represent the same phenomenon, was assessed by computing Cronbach's Alpha (Table

1). The alpha values were greater than 0.50, which is considered acceptable.

3.3 Results of analyses

Table 1 presents the mean values, standard deviations, and correlation matrices for employee behavior, organizational capabilities, and sustainable innovation. The matrix shows significant correlations throughout between the independent variables (i.e., the dimensions of employee behavior and organizational capabilities) and the dependent variable (i.e., sustainable innovation).

Table 1. Descriptive statistics and intercorrelations of the variables

	Mean	Std. Dev.	Cronbach´s alpha	1	2	3	4	5
1 Role clarity	2,9135	,53631	,831	1,000				
2 Citizenship	3,2147	,46874	,560	,390***	1,000			
3 Motivation	3,1186	,45477	,636	,216**	,580***	1,000		
4 Communication	2,3750	,49391	,611	,391***	,308***	,222**	1,000	
5 Strategic understanding	2,4615	,55805	,523	,561***	,300***	,315***	,494***	1,000
6 Sustainable innovation	2,6474	,57951	,777	,384***	,504***	,430***	,410***	,367***

Sign. *** ≤ 0.001

The regression analyses (Table 2) show that the majority of the hypotheses were supported. Model 1 shows that the relationship between the control variables and the organizations' sustainable innovation was insignificant. Thus, it seems that conditions such as organization size (as measured by the number of employees) and the industry classification do not influence the organizations' ability to innovate in a sustainable way. Our second model (Model 2) for testing the actual hypotheses explains 41.8 percent of

the variance in sustainable innovation. All dimensions of employee behavior, namely role clarity, citizenship, and motivation, were significant in the model. When it comes to organizational capabilities, communication was significant, but strategic understanding was non-significant in the model. Table 3 summarizes the results of the analyses.

Table 2. The results of regression analyses

Models	β	SE	St. β	t	R	R^2	Adj. R^2	SE	F
1. (Constant)	3,125	,252		12,408	,153	,023	,011	,57432	1,889
Size	-,116	,065	-,141	-1,789					
Industry	-,016	,017	-,074	-,932					
2. (Constant)	-,438	,409		-1,071	,646	,418	,390	,45254	15,169***
Size	,021	,054	,025	,389					
Industry	-,032	,014	-,148	-2,283*					
Role clarity	,176	,085	,163	2,074*					
Citizenship	,342	,103	,277	3,309***					
Motivation	,264	,101	,207	2,620**					
Communication	,238	,087	,203	2,738**					
Strategic understanding	-,074	,085	,071	,867					

Sign. *** ≤ 0.001, ** 0.001 < p ≤ 0.01, * 0.01 < p ≤ 0.05

Table 3. Summary of the results

Hypothesis	Support	Interpretation
Employee behavior		
H1. Sustainable innovation adoption is shaped by employees' role clarity.	Supported	The clearer the employees' roles are, the more likely the organization will adopt sustainable innovation.

H2. Sustainable innovation adoption is shaped by employees' citizenship behavior.	Supported	The more the employees possess citizenship behavior, the more likely the organization will adopt sustainable innovation.
H3. Sustainable innovation adoption is shaped by employees' motivation.	Supported	The more motivated the employees are to conduct their work, the more likely the organization will adopt sustainable innovation.
Organizational capabilities		
H4. Sustainable innovation adoption is shaped by organizational communication.	Supported	The better the communication functions, the more likely the organization will adopt sustainable innovation.
H5. Sustainable innovation adoption is shaped by organization'sstrategic understanding.	Not supported	The level of strategic understanding among the organization does not contribute to sustainable innovation adoption.

4 Concluding remarks

As a novel perspective of leveraging frugal innovation in organizations, this chapter has presented the dimensions of employee behavior and organizational capabilities that are connected to sustainable innovation. First, the results of this study confirm that the sustainable innovation of an organization is increased by enhancements in employee role clarity, citizenship, and motivation. As frugal innovation can be considered a type of sustainable innovation (Rosca et al., 2017), all the three dimensions of employee behavior can also be considered essential in order to generate frugal innovations. This can be justified by presenting that citizenship behavior together with motivation can be considered as drivers for principles of frugal innovations such as engagement and iteration, creation of sustainable solutions, and co-creating value with prosumers (cf. Radjou and Prabhu; 2014). This is also in line with previous research suggesting that sustainable innovation is increased if employees are motivated (e.g., Delmas and Pekovic, 2018) and/or if they complete tasks to a standard beyond that required by their job descriptions (e.g., Pellegrini et al., 2019). In line with these prior studies, the results of this study also suggest that employees' activities are key in influencing an organization's sustainable and frugal innovations.

In addition to employee behavior, organizational capabilities are important in sustainable innovation. On the other hand, the results form a basement for the implementation of frugal innovation. The results support prior studies that presented organizational capabilities as key elements when promoting future actions toward sustainability (cf. Boons and Lüdeke-Freund, 2013; Ketata et al., 2015; Pellegrini et al., 2019). The results showed that the more an organization invests in communication, the more likely it is to pursue sustainable innovation. Organizational capabilities can also be considered meaningful with regard to frugal innovations. For example, Rosca et al. (2017) argued that being able to generate more with less, companies need to employ and develop their capabilities. However, the second studied organizational capability, strategic understanding among the organization, does not contribute to sustainable innovation adoption. According to Bos-Bouwers (2010), sustainable innovation in SMEs tends to be characterized as incremental or frugal in nature and as taking small steps in the right direction, which may explain the non-significant result of strategic understanding. Strategic understanding may provide value if the created innovations are more radical in nature. The results emphasize not only the variety of factors that determine an organization's sustainable and frugal innovation, but also the fact that there are no remarkable differences between organizations of different sizes and industries with respect to sustainable innovation. Thus, this research indicates that small organizations are able to sustainably innovate and deliver more value through less inputs by implementing frugal innovations.

4.1 Managerial implications

This chapter provides several instructions for managers developing and implementing frugal innovation in organizations. This chapter has shown a connection between employee behavior and sustainable innovation in terms of employees' role clarity, citizenship, and motivation. In addition, a connection between organizational capabilities (e.g., communication) and sustainable innovation was found. The practical implication of these findings is to increase the understanding of the determinants of sustainable innovation and its subset, frugal innovation, and to assist practitioners in

constructing their actions toward sustainable innovation processes. In addition, clarifying the individual determinants of sustainable innovation is easier than attempting to manage the phenomenon of sustainable innovation and its frugality as a whole.

4.2 Limitations and avenues for future study

In terms of limitations, the empirical findings of this study only cover a specific country and may not be fully generalizable. This research is cross-sectional in nature, which is a possible limitation.

This chapter offers interesting possibilities for further research. First, it is not certain whether or to what extent each of the dimensions of employee behavior and organizational capabilities correlates with each of the sustainability performance constructs (e.g., social, cultural, etc.) or specific sustainable innovation types, such as frugal or reverse innovation. This could be an interesting subject for future research. Second, due to the limitations associated with the data used in this study, further research should validate the results by examining organizations in other regions.

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