



# EU INNOVATE

## Deliverable D3.5

*Publishable manuscript of the quantitative study results of user integration in company-driven open sustainability innovation process*

Project name: Sustainable Lifestyles 2.0: End User Integration, Innovation and Entrepreneurship

Grant agreement no: 613194

Number of deliverable: D 3.5

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This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 613194



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## **How Can Companies Co-Create Sustainable Value with Customers to Achieve Superior Innovation and Sustainability Performance?**

### **Abstract**

Prior literature emphasizes customer co-creation as an important practice in achieving superior innovation and sustainability performance. However, it remains unclear how firms have to prepare internally to leverage innovation and sustainability as key differentiating factors in today's increasingly dynamic market environment. Building on the extended resource-based view (ERBV) and the extant innovation management and sustainability literature, we therefore argue that the commitment of the top management team and a firm's absorptive capacity are the driving forces behind customer co-creation. Furthermore, we argue that customer co-creation does not directly affect sustainability and innovation performance. It is the creation and development of sustainable value as the results of the collaborative value creation process that mediates these relationships. We analyze the relationships by means of a sample of 128 European firms and a multi-method approach to quantitative analysis, comprising structural equation modeling (SEM) and qualitative comparative analysis (QCA).

## 1 INTRODUCTION

Prior literature emphasizes the increasing importance of customers as partners of firms in the value creation process (e.g. Harrison and Freeman 1999). Customer co-creation is here defined as the “firm’s interaction with customers to co-construct the [value] offering” (Ngo and O’Cass, 2013, p.1338). Other than traditional market research approaches, such as ‘voice of the customer’, customer co-creation is about the active participation of customers in the firm’s internal value creation process (Ngo and O’Cass, 2013; Prahalad and Ramaswamy, 2004). By transforming the value creation process from a firm-centric activity into a highly interactive activity of mutual learning with customers, firms gain access to external market-related knowledge resources that supplement the firm’s internal value creation capabilities and create benefits for both parties (Aarikka-Stenroos and Jaakkola, 2012; Ngo and O’Cass, 2013; O’Hern and Rindfleisch, 2010). Although customers represent a particular group of stakeholders their relationship with the firm is not restricted to the exchange of payments against value. Customers can also function as representatives of the local society or government that assess the value firms create from a broader perspective. Especially if customers directly participate in the firm’s value creation process and have the ability to adapt the intended outcome to their needs and interests, they can significantly contribute to the creation of sustainable value. Sustainable value creation is defined here as the product or service firms aim to create for both their company and the society at large (Gibbs, 2009). Therefore, we build on the extended resource-based view of the firm (ERBV) to analyze the impact of customer co-creation practices on the creation of sustainable value.

However, firms that emphasize the creation of this more sustainable value are rather long-term oriented and assess their performance differently than profitability-driven companies that are rather short-term oriented and primarily interested in the creation of economic value. Whereas the creation of sustainable value captures the development of an innovative and sustainable product or service, the overall success of the firm goes beyond the product/service level and needs to be assessed more globally. For example, just because an automotive firm introduces a more sustainable version of a product (e.g. a more energy-efficient engine), it does not mean that the company is generally more sustainable than its competitors (e.g. regarding employee relationships, societal engagement, energy-efficient production plants or the treatment of labor unions). Therefore, we include two measures of long-term performance into our study that are related to a firm's competitive success in being sustainable and innovative. While sustainability performance captures the success of firms in outperforming competitors on factors related to the triple bottom line (i.e. economic, ecological and social performance), innovation performance captures the success of firms in developing and commercializing superior products or services in a more efficient or timely way. Contrasting a firm's short-term profitability, which can be described as a measure for a firm's current or former competitive advantage, sustainability performance and innovation performance relate to sustainable competitive advantage.

By integrating customers into the value creation process, firms become more dependent on the provision of resources that are not in their own control. While some customers might be more open and willing to share their knowledge in collaborative relationships, others might prefer to maintain a distant relationship that

is primarily based on the articulation of demands. Therefore, firms need to organize internally around co-creation practices and figure out, when co-creation practices are appropriate mechanisms to achieve super long-term oriented performance. According to prior literature, they require two factors that support customer co-creation. The one is the commitment of the top management team and related to resource allocation decisions, the management of customer relationships and credibly fostering corporate social responsibility (e.g. Henriques and Sadosky, 1999), the other a firm's absorptive capacity and associated with the translation of external knowledge into outcomes (e.g. Zahra and George, 2002). Whereas a committed top management team is important for developing and maintaining helpful customer relationships, a firm's absorptive capacity allows firms to extract knowledge from these collaborations and translate it into superior outcomes by means of co-creation practices. Taken together, we therefore, build on the ERBV and analyze how companies can co-create sustainable value with customers to achieve superior innovation and sustainability performance.

Taken together, the purpose of this study is to better understand how firms can prepare internally to leverage close customer collaborations in the value creation process to not only create more innovative and sustainable products or services, but also outperform their competitors on (more globally) innovation- and sustainability-oriented performance outcomes. We propose that these internal antecedents comprise the commitment of the top management team and a firm's absorptive capacity that support customer co-creation and, thus, translate into the creation of sustainable value, which eventually drives a firm's overall innovation and sustainability performance. These relationships are analyzed by means of a sample of 128 European firms and a

multi-method approach to quantitative analysis, comprising structural equation modeling (SEM) and qualitative comparative analysis (QCA).

## **2 THEORETICAL BACKGROUND: DRIVERS OF SUSTAINABLE INNOVATION PERFORMANCE**

In this study, we empirically analyze configurations of internal and external drivers of sustainable innovation performance. The configurations focus on the interplay between customers and the ability of firms to leverage these relationships to acquire and integrate information, knowledge or other resources that are provided by its customers.

### **2.1.1 Top Management Commitment**

Top management commitment is defined as the top management's commitment to and support for environmental and social initiatives (Bannerjee, Iyer, and Kashyap, 2003). Prior literature describes top management commitment as a strong internal force that is responsible for resource allocation decisions, managing customer relationships and fostering corporate social responsibility. The top management team not only makes formal decisions directed towards the management of customers (e.g. as in case of a firm's overall market- or customer orientation), but also serves as a role model for the sustainability-oriented culture within a firm. While the former comprises the formal and measurable allocation of resources to the management of customer needs, the latter relates to the more informal values, norms and beliefs top managers emphasize, communicate and represent (Bannerjee, Iyer, and Kashyap, 2003). In both cases though, the top management team bridges the gap between the economic, social, and ecological environment and the organization (e.g. Fondas and Wiersema, 1997). The

commitment of the top management towards customers and more sustainability-oriented behavior is subsequently – as suggested by upper echelon theory - reflected by the organization as a whole, thus creating congruence between the strategic posture of the firm and their actual doing. This provision of orientation is highly supportive in case of severe uncertainty arising from the different conflicts and trade-offs associated with diverse sustainability goals (e.g. Kortmann, 2015). Hence, we assume that top managers that are committed to the pursuit of sustainability enable firms to better leverage external customer relationships than their competitors with a less committed top management team. Consequently, we hypothesize that top management commitment has a positive influence on customer co-creation:

*H1: The higher a firm's top management commitment towards sustainability, the more firms can benefit from customer co-creation practices.*

### **2.1.2 Absorptive Capacity**

Absorptive capacity is defined as a firm's ability to recognize the value of new external knowledge, assimilate it, and apply it to commercial ends (Zacharia, Nix, and Lusch, 2011). If firms collaborate closely with their customers, they have the opportunity to acquire information and knowledge that are at the same time similar in that sense that they all relate to the firm's activities, but also highly diversified as they are driven by idiosyncratic interests. However, this knowledge only remains a potential source of competitive advantage as long as competing firms do not possess the ability to translate the information and knowledge into more tangible outcomes. Even if firms maintain close relationships with their customers and listen to the demands they are articulating, it might be that firms do not recognize the value in the



stakeholders' input. Therefore, firms require a superior absorptive capacity to recognize and identify potentially valuable ideas and opportunities and to take advantage of them. The more diversified knowledge is absorbed from the environment, the more sophisticated and creative the resulting solutions will be. External knowledge enables firms to rethink their established solutions and to develop more innovative products and services that are not only economically successful, but also create social and ecological value for the firm's customers. Therefore, we hypothesize that firms with a more advanced absorptive capacity are better positioned to benefit from customer co-creation practices:

*H2: The higher a firm's absorptive capacity, the more firms can benefit from customer co-creation practices.*

## **2.2 Co-Creating Sustainable Value**

Although customer relationships provide the opportunity to access valuable knowledge, the firms' success ultimately depends on the extent to which they can leverage it. In this study, we argue that the more firms integrate their value creation processes with customers by means of co-creation practices, the more innovative and sustainable the resulting output will be.

### **2.2.1 Customer Co-Creation**

Customer co-creation is here defined as the "firm's interaction with customers to co-construct the [value] offering" (Ngo and O'Cass, 2013, p.1338). Other than traditional market research approaches, such as 'voice of the customer', customer co-creation is about the active participation of customers in the firm's internal value creation

process (Ngo and O’Cass, 2013; Prahalad and Ramaswamy, 2004). By transforming the value creation process from a firm-centric activity into a highly interactive activity of mutual learning with customers, firms gain access to external market-related knowledge resources that supplement the firm’s internal value creation capabilities and create benefits for both parties (Aarikka-Stenroos and Jaakkola, 2012; Ngo and O’Cass, 2013; O’Hern and Rindfleisch, 2010). Although customers represent a particular group of stakeholders their relationship with the firm is not restricted to the exchange of payments against value. Customers can also function as representatives of the local society or government that assess the value firms create from a broader perspective. Especially if customers directly participate in the firm’s value creation process and have the ability to adapt the intended outcome to their needs and interests, they can significantly contribute to the creation of sustainable value. Therefore, we argue that the more firms make use of customer co-creation practices, the better firms are in adapting the value proposition of a product or service to customer needs. Especially in case of sustainable value creation and a more holistic value proposition, comprising i.e. intertwined social, economic, ecological and inter-generational value (O’Neill et al., 2009), the customers’ direct input can be of great help in reducing complexity, uncertainty and confusion about how to reconcile the goals of the triple bottom line in the value creation process. Hence, we hypothesize:

*H3: The more firms employ customer co-creation practices, the more capable they are in creating more sustainable value.*

## 2.2.2 Sustainable Value Creation

Sustainable value creation is defined as the value firms aim to create for both their own business and society (Gibbs, 2009; Munoz and Dimov, 2015). In line with the triple bottom-line, this holistic value proposition emphasizes the successful reconciliation of multiple inter-conflicting relationships between economic, social and ecological goals. The created value can be products, services or product/service bundles that firms is offering. By emphasizing the sustainable dimensions to the value creation process, firms put the successful reconciliation of conflicting goals at the center of their doing and purposefully use this capability as a differentiating factor against less sustainable competitors. The more consistently the firm works as a whole in the realm of sustainability, the more the firm will assess its success by means of performance indicators that reflect its innovation- and sustainability-oriented nature and positioning in the market. Truly sustainable firms are often perceived as more trustful and credible than their less sustainable counterparts and therefore may have an advantage in building and leveraging profitable customer relationships. While the development and creation of more sustainable products and services can be seen as the core driver of overall innovation- and sustainability-oriented performance, we hypothesize:

*H4: The more a firm emphasizes the creation of sustainable value, the higher will be its subsequent innovation- (H4a) and sustainability-oriented performance (H4b).*

### 3 METHODOLOGY

In this study, we apply a multi-method quantitative approach comprising two complementary techniques to better understand how firms can co-create sustainable value with customers to achieve superior innovation and sustainability performance. These two methods are structural equation modeling (SEM) and qualitative comparative analysis (QCA). First, we employed is the partial least squares (PLS) approach to structural equation modeling (Figure 2) using SmartPLS 2.0 M3 (Ringle et al., 2005). PLS is based on an iterative estimation algorithm, that includes a series of multiple ordinary least squares (OLS) regression analyses (Chin, 1998), principal component analysis, and path analysis. PLS is a distribution-free method with fewer constraints and statistical specifications than covariance-based techniques such as LISREL (Fornell & Bookstein, 1982), and allows for the simultaneous evaluation of theory and data. Moreover, we applied the PLS approach to structural equation modeling because of ‘its ability to model latent constructs under conditions of nonnormality and with small to medium sample sizes’ (Chin et al., 2003, p. 197). Following Nevitt and Hancock (1998), we estimated the statistical significance of the parameter estimates by the use of a bootstrapping method with replacement. We also utilized different samples (250, 500, and 1000) generated from the original dataset to assess the stability of the parameter estimates. Secondly, a fuzzy set qualitative comparative analysis (fsQCA) analysis to understand how certain conditions combine to cause the outcome of interest, here innovation performance as well as sustainability performance (Fiss, 2010; 2011). While well-established approaches, such as multiple regression analyses and structural equation modeling, embrace a correlational understanding of causality within their statistical foundation, fsQCA refers to a set-theoretic method and

considers configurations of factors rather than the individual factors themselves as causal conditions of the outcome (Munoz and Dimov, 2015). Thus, rather than considering the isolated net influence of each variable on the outcome, fsQCA examines how variables combine to configurations to explain the outcome (e.g., Ragin, 2008; Woodside, 2013). As configurational approach, fsQCA eventually accounts for three premises: conjunction (i.e., attributes may not impact the outcome in isolation from each other but the interplay of different attributes causes an outcome), equifinality (i.e., alternative attribute configurations can cause the same outcome), and asymmetry (i.e., causes of the presence of an outcome might differ from causes of its absence) (Fiss, 2011).

### **3.1 Data Collection**

This paper is part of a large-scale survey that was conducted in Europe. For data collection, we acquired a list of email addresses from a commercial provider. We specifically targeted top managers (e.g. managing directors, c-suite managers) as key respondents that are preferred over multiple-respondents as they are regarded as reliable and the most knowledgeable respondents, particularly when the phenomenon under examination refers to the firm's external relationships with customers (Dyer and Hatch, 2006; Simsek et al., 2005). In total, 317 respondents agreed to participate in this survey. However, not all the respondents completed the survey and/or complied with the following key informant criteria. The following key informant criteria were applied to ensure that respondents do not respond beyond their level of responsibility: (i) job title, (ii) involvement in strategic decisions, (iii) involvement in operational decisions, (iv) involvement in innovation-related decisions, (v) involvement in

sustainability-related decisions, (vi) organizational tenure, (vii) industry experience and (viii) managerial experience. After applying these key informant criteria and removing not completed surveys, we yielded a sample of 128 respondents. In line with prior literature (Joshi, Kathuria, and Porth, 2003; Ward and Duray, 2000; Zhao, Sum, Qi, Zhang, and Lee, 2006), we calculated the response rate based on agreements to participate (40.4 %). The results show that included respondents are highly knowledgeable. All the respondents included in the analysis have an appropriate job title that identifies them as the individual leading the company (e.g. CEO, President, Managing Director). On average, they are highly involved in strategic decisions (5.9/7), operational decisions (5.5/7), innovation-related decisions (5.7/7), and sustainability-related decisions (5.6/7). Furthermore, they have been working on average with the current employer for 13.1 years, have an industry experience of 20.4 years and managerial experience in a leading position for 17.9 years. While 16.7 percent of the respondents are female, all the key informants are well distributed over Europe, including Poland, the United Kingdom, Germany, Belgium, Finland, Croatia, Romania, Greece, Spain, Italy, Sweden, Portugal, Denmark, Turkey, the Netherlands, and Austria.

## **3.2 Measures**

### **3.2.1 Outcomes**

*Sustainability performance* and *innovation performance* are three-items constructs and were measured using a 7-item Likert scale adapted from Olson, Slater, and Hult (2005). We used the organizational performance introduced by Olson, Slater and Hult (2005) and applied it to the context of sustainability and innovation performance. To

test their validity and reliability, we employed the constructs average variance extracted (AVE), Cronbach’s alpha (CA) and composite reliability (CR). As can be seen in Table 2, all constructs easily exceed the suggested cut-off values of 0.5 for AVE and 0.7 for both CA and CR. The inter-item reliability is depicted in Table 1.

**Table 1** Inter-item correlations

Top Management Commitment	Absorptive Capacity	Customer Co-Creation	Sustainable Value Creation	Innovation Performance	Sustainability Performance
<b>0.95</b>	0.46	0.39	0.61	0.40	0.55
<b>0.96</b>	0.51	0.41	0.66	0.43	0.57
<b>0.96</b>	0.50	0.40	0.65	0.49	0.59
0.45	<b>0.86</b>	0.46	0.54	0.49	0.36
0.51	<b>0.93</b>	0.45	0.64	0.53	0.49
0.46	<b>0.94</b>	0.44	0.57	0.45	0.36
0.40	<b>0.89</b>	0.35	0.51	0.40	0.39
0.46	<b>0.91</b>	0.38	0.54	0.45	0.36
0.35	0.49	<b>0.90</b>	0.40	0.37	0.24
0.37	0.46	<b>0.93</b>	0.36	0.39	0.27
0.37	0.47	<b>0.90</b>	0.35	0.43	0.25
0.39	0.38	<b>0.91</b>	0.33	0.37	0.22
0.37	0.37	<b>0.90</b>	0.34	0.38	0.23
0.39	0.35	<b>0.89</b>	0.38	0.41	0.28
0.69	0.49	0.36	<b>0.87</b>	0.40	0.49
0.54	0.45	0.31	<b>0.84</b>	0.30	0.40
0.34	0.46	0.17	<b>0.71</b>	0.37	0.34
0.48	0.60	0.31	<b>0.77</b>	0.38	0.39
0.58	0.50	0.41	<b>0.82</b>	0.42	0.53
0.41	0.43	0.43	0.37	<b>0.90</b>	0.58
0.39	0.42	0.32	0.41	<b>0.86</b>	0.54
0.44	0.53	0.42	0.46	<b>0.94</b>	0.64
0.54	0.39	0.26	0.49	0.59	<b>0.93</b>
0.54	0.41	0.23	0.51	0.64	<b>0.92</b>
0.59	0.42	0.28	0.53	0.61	<b>0.96</b>

### **3.2.2 Causal Conditions**

The present study examines the following potential causal conditions that might lead to superior sustainability performance and superior innovation performance: As potential causal conditions leading to superior sustainability performance and superior innovation performance, we referred to the following multiple-item constructs: customer co-creation and sustainable value creation. Customer co-creation refers to the “firm’s interaction with customers to co-construct the [value] offering” (Ngo and O’Cass, 2013, p.1338) and was newly developed for the purpose of this study. Sustainable value creation is new five-items construct that is based on Munoz and Dimov (2015) and defined as the value that firms aim to create for both their own business and society (Gibbs, 2009).

We additionally explored whether various internal drivers might contextually influence the firm’s co-creating efforts for sustainable value creation and referred to top management commitment and absorptive capacity. Top management commitment is a three-item construct and defined as the top management's commitment to and support for environmental and social initiatives (Bannerjee, Iyer, and Kashyap, 2003). Absorptive capacity is a five-item construct and referred to as a firm’s ability to recognize the value of new external knowledge, assimilate it, and apply it to commercial ends (Zacharia, Nix, and Lusch, 2011)

### **3.2.3 Calibration**

FsQCA is based on the idea of set memberships, i.e., each case belongs to a configuration to some degree and exhibits varying degrees of membership across various configurations (Fiss, 2011). Hence, all measurement variables have to be



calibrated into fuzzy sets that range from 0 (full non-membership) to 1 (full membership) and also contain a cross-over point of 0.50 (maximal ambiguity) (Fiss, 2011; Woodside, 2013). The various analysis steps were performed using the software package fs/QCA 2.5, which particularly makes use of the Boolean algebra to reduce numerous, complex causal conditions into a set of conditions that causes the outcome of interest (Fiss, 2007; 2011).

All measurement constructs were measured using a seven-point Likert scale. The corresponding mean values of each measurement variable were used as input for the software package fs/QCA 2.5. To transform these conventional variables into fuzzy sets, we have chosen the following three anchor points: six for full membership, two for full non-membership, and 4 as the indifference point (point of maximum ambiguity) (e.g., Ordanini, Parasuraman, and Rubera, 2013). Table 1 shows the descriptive statistics and correlations for all the calibrated scores.

**Table 2** Descriptive statistics and correlations

	ME	SD	CR	CA	AVE	1	2	3	4	5	6	7	8
1. Top Management Commitment	5.48	1.50	0.97	0.96	0.92	<b>0.96*</b>							
2. Absorptive Capacity	5.56	1.04	0.96	0.94	0.82	0.51	<b>0.91*</b>						
3. Customer Co-Creation	4.32	1.64	0.97	0.96	0.82	0.41	0.46	<b>0.91*</b>					
4. Sustainable Value Creation	5.52	1.04	0.90	0.86	0.65	0.67	0.62	0.40	<b>0.80*</b>				
5. Innovation Performance	4.81	1.26	0.93	0.88	0.81	0.46	0.52	0.43	0.46	<b>0.90*</b>			
6. Sustainability Performance	4.93	1.28	0.96	0.93	0.88	0.59	0.44	0.27	0.54	0.65	<b>0.94*</b>		
7. Firm Age	50.42	55.48	1.00	1.00	1.00	-0.13	-0.22	-0.06	-0.06	-0.18	-0.12	<b>1.00*</b>	
8. Firm Size	3.30	1.33	1.00	1.00	1.00	0.18	-0.01	0.03	0.16	-0.09	0.15	0.44	<b>1.00*</b>

Notes: ME = Mean; SD = Standard Deviation; CR = Composite Reliability; CA = Cronbach's Alpha AVE = Average Variance Extracted; \* Value on the diagonal is the square root of AVE

### **3.3 Configurational Analysis (using fsQCA)**

#### **3.3.1 Analysis of Necessary Conditions**

While performing the fsQCA, we firstly distinguish between the analysis of necessary and the analysis of sufficient conditions. While a necessary condition must be present to cause the outcome, a sufficient condition can produce by itself a certain outcome (Ragin, 1987). With regard to necessary conditions, one can always observe the presence of the necessary condition when observing the outcome. With regard to sufficient conditions, the outcome can be observed without observing the presence of the sufficient condition. The presence of the sufficient condition however might always lead to the presence of the outcome (e.g., Schneider and Wagemann, 2006). A condition is regarded as necessary if the consistency exceeds the threshold of 0.90 (Tóth et al., 2015). In this study, we identified absorptive capacity as a necessary condition for innovation performance (consistency 0.96) and sustainability performance (0.94).

#### **3.3.2 Analysis of Sufficient Conditions**

To analyze for sufficient conditions, we applied the following three steps within fs/QCA 2.5: the construction, redefinition, and analysis of the truth table. The truth table lists all logically possible causal combinations of conditions, representing a data matrix with  $2^k$  row ( $k$  = number of conditions used in the analysis). For reducing the truth table to meaningful configurations, we defined thresholds for both the frequency and consistency level. The frequency level refers to the minimum number of cases that is required to consider a solution as causing the outcome. Given the size

of the sample we used three observations as threshold for the frequency level (e.g., Munoz and Dimov, 2015). The selection of the thresholds for the minimum acceptable level of consistency represents a clear gap in the ordered consistency values within the truth table (Leischnig & Kasper-Brauer, 2015, Munoz and Dimov, 2015). In line with the recommended thresholds of 0.80 to 0.95, we set consistency thresholds at 0.90 for our analyses of innovation and sustainability performance (Munoz and Dimov, 2015; Ragin, 2008). Solutions above this consistency level are considered as being sufficient for causing the outcome of interest, whereas solutions below this consistency level are considering as not sufficient (Tóth et al., 2015).

## **4. RESULTS**

### **4.1 Structural Equation Modeling Analysis**

#### **4.1.1 Common Method Variance and Non-Response Bias**

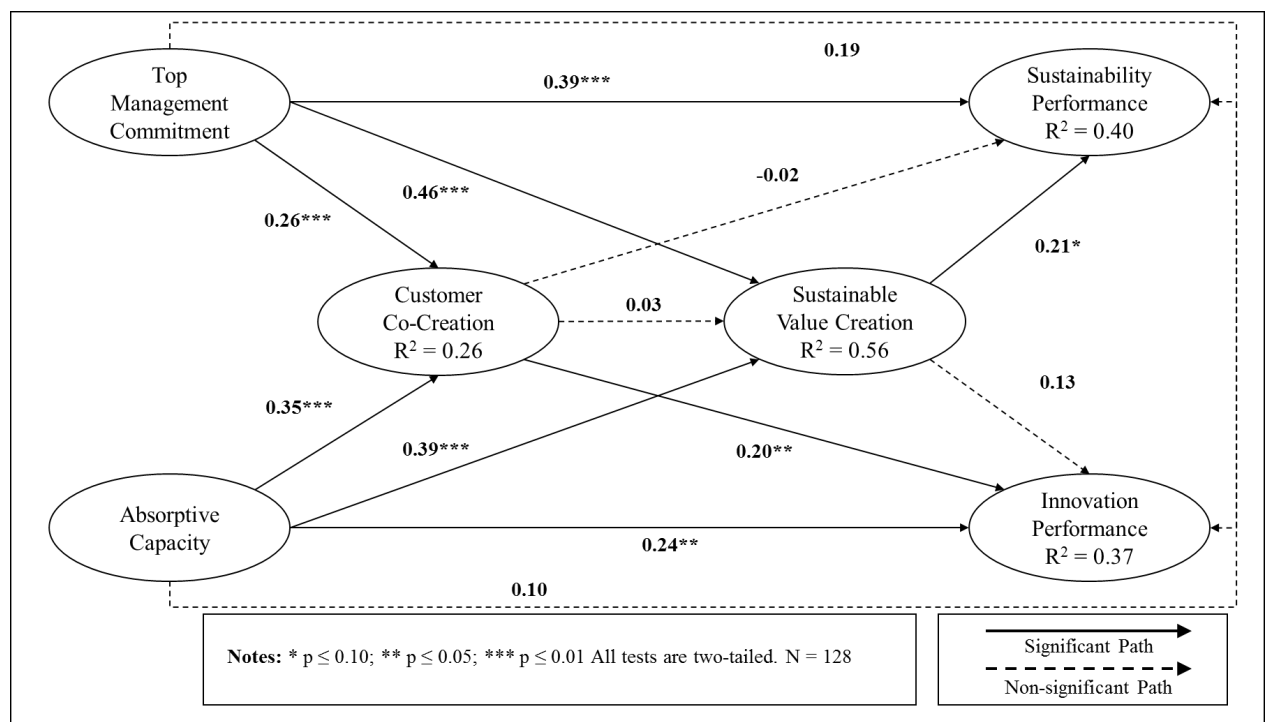
Since we collected data from single informants, common method bias is a threat to the validity of our results (Podsakoff et al., 2003; Podsakoff & Organ, 1986). To assess the impact of common method bias, we used Harman's (1967) single factor approach and a test with an unmeasured latent methods factor (Podsakoff et al., 2003; Liang et al., 2007). Following Harman's single factor approach, the results indicated that no single factor emerged from a factor analysis of all survey items and that no general factor accounted for the majority of the covariance in the independent or mediating variables (Podsakoff & Organ, 1986). In order to assess non-response bias, we conducted a multiple analysis of variance on the mediating and dependent variables,

where we tested for differences of early respondents and late respondents (Armstrong & Overton, 1977), with non-significant results.

#### 4.1.2 Structural Equation Modeling Analysis

Figure 1 and Table 3 reveal the results of the structural equation modeling analysis, using SmartPLS 2.0 M3 (Ringle et al., 2005).

**Figure 1** Results of structural equation modeling analysis (research model)



**Table 3** Results of structural equation modeling analysis (direct relationships)

<b>Relationship</b>	<b>p-Values</b>	<b>β-Values</b>
Top Management Commitment -> Customer Co-Creation	0.62	0.38
Top Management Commitment -> Sustainable Value Creation	0.90	0.81
Top Management Commitment -> Innovation Performance	0.88	0.77
Top Management Commitment -> Sustainability Performance	0.83	0.69
Absorptive Capacity -> Customer Co-Creation	0.67	0.45
Absorptive Capacity -> Sustainable Value Creation	0.75	0.56
Absorptive Capacity -> Innovation Performance	0.73	0.53
Absorptive Capacity -> Sustainability Performance	0.61	0.37
Customer Co-Creation -> Sustainable Value Creation	0.88	0.77
Customer Co-Creation -> Innovation Performance	0.81	0.66
Customer Co-Creation -> Sustainability Performance	0.94	0.89
Sustainable Value Creation -> Innovation Performance	0.78	0.60
Sustainable Value Creation -> Sustainability Performance	0.68	0.47
Firm Age -> Customer Co-Creation	0.75	0.57
Firm Age -> Sustainable Value Creation	0.97	0.94
Firm Age -> Innovation Performance	0.71	0.50
Firm Age -> Sustainability Performance	0.97	0.94
Firm Size -> Customer Co-Creation	0.65	0.42
Firm Size -> Sustainable Value Creation	0.85	0.73
Firm Size -> Innovation Performance	0.79	0.62
Firm Size -> Sustainability Performance	0.70	0.49
Sustainable Value Creation -> Innovation Performance	0.78	0.60
Sustainable Value Creation -> Sustainability Performance	0.68	0.47

Our structural equation modeling analysis shows that hypotheses H1 and H2 are supported. Both top management commitment and absorptive capacity have a positive and significant influence on customer co-creation, underlining the importance of a truly sustainability-oriented top management team and the ability to absorb and extract knowledge from close collaborations with customers. H3, on the other hand, namely the hypothesized relationship between customer co-creation and sustainable value creation is not supported. Given the positive influence of customer co-creation on innovation performance (an economic success factor), we assume that customers primarily possess knowledge on the commercial side of the business and are of less

help in defining a sustainability-oriented value proposition. Since they ultimately have to pay for the products and services of the firm they might perceive additional societal and ecological value less relevant since their basic needs are fulfilled by the product or service as it is. However, the creation of sustainable value is just as customer co-creation driven by top management commitment and absorptive capacity. Hence, we infer that it is equally important for sustainable value creation to be able to extract (external) knowledge from the environment and to have a top management team in place that is committed to sustainability. In case of hypothesis 4 only the direct relationship between sustainable value creation and sustainability performance is supported (H4b), whereas the relationship between sustainable value creation and innovation performance remains non-significant (despite being a core condition in both solutions). This finding contradicts prior literature, who is presenting sustainability as a key driver of innovation and source of competitive advantage (Nidumolu, Prahalad and Rangaswami, 2009).

## **4.2 Configurations for Innovation and Sustainability Performance**

The final configurations derive from the analysis of the complex, parsimonious, and standard solution terms. –Table 4 entails the final configurations as well as the corresponding consistency levels and overall solution coverage, which are both used to assess the adequacy of the solutions. The overall solution coverage explains the portion of the membership in the outcome is covered by the respective configurations (i.e., explanatory power). With regard to the presence of innovation performance, the overall consistency level of the two solutions is 0.93, explaining 70

% of the membership in the outcome. With regard to the presence of sustainability performance, the overall consistency level of the two solutions is 0.96, explaining 89 % of the membership in the outcome. In addition, we assessed the consistency and coverage of each single configuration. The consistency of a single configuration indicates the extent to which the configuration corresponds to the outcome (Ragin, 2008; Tóth et al, 2015). The coverage of a single configuration is assessed by both raw and unique coverage. While raw coverage refers to the portion of memberships in the outcome that is overlapped by certain configurations, unique coverage refers to the portion of memberships in the outcome that is solely explained by one configuration (Munoz and Dimov, 2015; Tóth et al, 2015).

**Table 4** Analysis of sufficient conditions

<b>Configurations for Innovation &amp; Sustainability Performance</b>				
<b>Frequency Cutoff</b>	<b>3</b>		<b>3</b>	
<b>Consistency Cutoff</b>	<b>0.90</b>		<b>0.90</b>	
	<b>Innovation Performance</b>		<b>Sustainability Performance</b>	
	<b>1</b>	<b>2</b>	<b>1</b>	<b>2</b>
<b>External and Internal Drivers</b>				
Top Management Commitment	⊗	●	●	
Absorptive Capacity	●	●	●	●
Customer Co-Creation	⊗	●		⊗
Sustainable Value Creation	●	●		●
Consistency	0.91	0.94	0.97	0.98
Raw Coverage	0.14	0.65	0.86	0.34
Unique Coverage	0.05	0.56	0.55	0.03
<b>Overall Solution Consistency</b>	<b>0.93</b>		<b>0.93</b>	
<b>Overall Solution Coverage</b>	<b>0.70</b>		<b>0.89</b>	

In line with the notation introduced by Ragin and Fiss (2008), black circles were used to indicate the presence of a condition, while the absence of a condition is marked by circles with a cross-out. Furthermore, large circles indicate core conditions, i.e. decisive causal factors that uniquely define configurations, whereas small circles represent peripheral conditions, i.e. complementary factors that reinforce core conditions.

Our results show that there are two solutions for superior innovation performance. Solution 1 is a combination of the two core conditions of the absence of top management commitment and sustainable value creation as well as the absence of customer co-creation and absorptive capacity as peripheral conditions. Solution two is a combination of the two core conditions of sustainable value creation and customer co-creation as well as top management commitment and absorptive capacity as peripheral conditions. Absorptive capacity is furthermore a necessary condition for superior innovation performance. In case of superior sustainability performance, we identified two solutions that lead to the presence of superior sustainability performance. The first is based on top management commitment as a core condition that is combined with absorptive capacity as a peripheral condition. Solution two combines the core condition of sustainable value creation with absorptive capacity and the absence of customer co-creation. As in case of innovation performance, absorptive capacity could be identified as a necessary condition for sustainability performance.

However, this finding might be explained the type of business a firm is operating in. Here, prior literature emphasizes the difference between B2B and B2C businesses in the co-creative relationship with customers (e.g. Baron and Warnaby,



2011). Therefore, we conducted a separate exploratory analysis to identify differences in customer co-creation practices between end users (B2C) and commercial buyers (B2B).

### **4.3 End-Users vs. Commercial Buyers in Customer Co-Creation**

Surprisingly, the results show that neither sustainability performance, nor the creation of sustainable value significantly benefit from the implementation of customer co-creation practices. This finding relativizes the idea of customers being a strong driver of sustainability and attenuates criticism of prior literature that sustainability strategies are not customer-centric enough (e.g. Sheth, Sethia and Srinivas, 2011). To better understand the nature of these conflicting findings, we ran an additional analysis in which we distinguished between different types of customers. Building on prior literature, which emphasizes the difference between B2B and B2C businesses in the co-creative relationship with customers (e.g. Baron and Warnaby, 2011), we included an additional variable into our study measuring if firms specifically target consumers. The results in Table 5 further support the minor role of customer co-creation in sustainability-oriented businesses and further support the importance of sustainability more generally as a competitive factor in B2C businesses. B2C is a core condition for both the creation of sustainable value and superior sustainability performance. Contrasting this, our findings support the strong impact of customer co-creation on innovation performance. Customers often have a direct relationship with the firm that is grounded in the exchange of payments against value. They also have ideas about how to improve the product or service, a solid knowledge

about the architecture of the offered value and a direct incentive to help the firm (Ngo and O’Cass, 2013; Prahalad and Ramaswamy, 2004).

**Table 5** Qualitative comparative analysis (B2C)

<b>Configurations for Innovation &amp; Sustainability Performance</b>					
<b>Frequency Cutoff</b>	<b>3</b>		<b>3</b>		
<b>Consistency Cutoff</b>	<b>0.99</b>		<b>0.90</b>		
	<b>Innovation Performance</b>		<b>Sustainability Performance</b>		
	<b>1</b>	<b>2</b>	<b>1a</b>	<b>1b</b>	<b>2</b>
<b>External and Internal Drivers</b>					
Top Management Commitment	●	●	●	●	●
Absorptive Capacity	●	●	●	●	●
Customer Co-Creation		●	●		●
Sustainable Value Creation		●			●
B2C	●		●	●	
Consistency	0.93	0.94	1.00	0.99	0.99
Raw Coverage	0.29	0.65	0.22	0.25	0.55
Unique Coverage	0.05	0.41	0.02	0.05	0.35
<b>Overall Solution Consistency</b>	<b>0.93</b>		<b>0.93</b>		
<b>Overall Solution Coverage</b>	<b>0.70</b>		<b>0.89</b>		

## 5. DISCUSSION

### 5.1 Innovation Performance

One of the main driver of superior innovation performance is the co-creation of value with customers. Customer co-creation is supported by both top management commitment and absorptive capacity, thus underlining the importance of top managers in initiating close collaborations with stakeholders and the relevance of a

firm's ability to recognize the value of new external knowledge, assimilate it, and apply it to commercial ends. Likewise, sustainable value creation is a core condition for superior innovation performance in both solutions. While not having a direct impact on innovation performance, it seems to be an important variable in the explanation of a firm's success. One explanation might be that a mediating variable is missing that translate the ambition to create sustainable value into innovation performance. This can be, for example, a marketing-related capability that helps firms to better commercialize the sustainable value they have created. The two solutions also suggest that there may be an internal and external approach to superior innovation performance. While in solution one both top management commitment and customer co-creation are absent, they are both present in solution two. In combination with the positive influence of top management commitment on customer co-creation, this finding suggest that the two variables are closely aligned in firms that seek to outperform their competitors by means of superior innovations.

## **5.2 Sustainability Performance**

Top management commitment is shown to be the main or better only driver of superior sustainability performance. The findings are in line with prior literature (e.g. Andersson, Shivarajan, and Blau, 2005) and suggest that firms without the top managements' commitment to and support for environmental and social initiatives are incapable of achieving superior sustainability performance. Top management commitment is both directly influencing sustainability performance as well as through nurturing the creation of sustainable value that eventually likewise drives sustainability performance. The minor role of customer co-creation practices indicates in combination with the presence of absorptive capacity as a necessary condition that

superior sustainability performance is predominantly achieved by internal approaches and capabilities. However, without having a top management team that is committed to sustainability, it is impossible to achieve superior sustainability performance. A finding that is in line with upper echelon theory and the notion that firms are reflections of their top management team (e.g. Hambrick, 1984).

## **6 THEORETICAL IMPLICATIONS**

This paper contributes to the ERBV by empirically analyzing of how customer co-creation practices can be translated the achievement of superior long-term oriented performance. The results underline the importance of the commitment of the top management as well as absorptive capacity as antecedents to customer co-creation. Top management commitment directs all activities of the firm towards a more sustainability-oriented behavior and directly drives superior sustainability performance. The more top managers are committed to sustainable behavior, the more resource are allocated to associated activities, the better and more credibly customer relationships are managed, and the more present are sustainable values, norms, and beliefs (Noble, Sinha, and Kumar, 2002). Top managers function as role models for the organization and balance internal and external directions (Cai, Chen and Bose, 2013). Absorptive capacity, the ability to recognize the value of new external knowledge, assimilate it, and apply it to commercial ends (Zacharia, Nix, and Lusch, 2011) is the second important factor in fostering customer co-creation specifically and superior long-term performance more broadly. The results show that absorptive capability not only facilitates the collaboration with customers in the value creation

process, but also gives firms a competitive edge by fostering superior innovation and sustainability outcomes.

## **7 CONCLUSION**

This study highlights the important, yet contradictory role of customer co-creation in driving superior long-term performance. While in case of innovation performance, customer co-creation is an important driver, it is of limited value for pursuing sustainability-oriented goals. To implement customer co-creation practices, top management commitment and absorptive capacity are elementary factors that need to be in place to leverage the customers' knowledge in the innovation process.

## **8 ACKNOWLEDGEMENTS**

This research is part the large-scale project 'Sustainable Lifestyles 2.0: End User Integration, Innovation and Entrepreneurship (EU-InnovatE)'. The project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 613194.

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