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Published in:
Business Strategy and the Environment

DOI:
10.1002/bse.2925

Publication date:
2022

Document Version
Publisher's PDF, also known as Version of record

Received: 21 May 2021 | Revised: 24 September 2021 | Accepted: 8 October 2021

DOI: 10.1002/bse.2925

RESEARCH ARTICLE

Business Strategy and the Environment

WILEY

Reinforcing or counterproductive behaviors for sustainable entrepreneurship? The influence of causation and effectuation on sustainability orientation

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Funding information
Theo and Friedl Schöller-Foundation

Abstract

Effectuation, as an emerging theoretical approach in entrepreneurship, is receiving increasing attention in research and practice. Still, the integration of effectuation in sustainable entrepreneurship literature is sparse, and its influence on the sustainability orientation of ventures has so far not been examined in the academic literature. This article, therefore, investigates the influence that causal and effectual behaviors have on the sustainability orientation of established entrepreneurial ventures. This is important to consider, especially if entrepreneurial behaviors were to influence sustainability orientation negatively, this could potentially thwart the venture's ability to create lasting sustainability value. Based on a quantitative survey among 140 sustainable ventures, we find support for the hypothesis that causal behaviors reinforce sustainability orientation. We demonstrate that effectual behaviors exert a positive influence on sustainability orientation as well. Thus, the experimentation and flexibility of goals that ventures possess reflect that effectual behaviors are not at the expense of sustainability orientation. These results can inform sustainable entrepreneurs and educators to use both behaviors purposefully and highlight causal and effectual behaviors are equally important elements for sustainable entrepreneurship education.

KEYWORDS
causation, effectuation, experimentation, flexibility, sustainability orientation, sustainable entrepreneurship

1 | INTRODUCTION

Sustainable entrepreneurship bears great potential to contribute to sustainable development, especially in its potential to replace unsustainable products and services with sustainable ones, to create additional environmental and social value, and to transform markets and societies toward sustainability (e.g., Belz & Binder, 2017; Esteves et al., 2021; Schaltegger & Wagner, 2011). Thus, sustainable entrepreneurship can be defined as the process of recognizing, creating, and exploiting opportunities "to bring into existence future goods and services with economic, social and ecological gains" (Belz & Binder, 2017, p. 2; see also Cohen & Winn, 2007; Dean & McMullen, 2007; Eller et al., 2020). Still, if sustainable entrepreneurship is to actually create lasting sustainability value, transform

markets, and contribute to sustainable development, it is not sufficient that sustainability orientation is present only in early venture creation stages. Rather, entrepreneurial ventures must find a way to maintain or even strengthen the sustainability orientation, once established, in order to fulfill their original sustainability missions (DiVito & Bohnsack, 2017; Parrish, 2010).

While previous research has investigated inter alia the influence of sustainability orientation on entrepreneurial intention (Gibbs, 2009; Kuckertz & Wagner, 2010) leading to entrepreneurial action in early venture creation stages (Muñoz & Dimov, 2015), we know preciously little whether particular entrepreneurial behaviors are reinforcing or counterproductive to sustainability orientation in established ventures. This is important to consider, especially if certain entrepreneurial behaviors were to influence sustainability orientation negatively, this could potentially thwart the venture's ability to create lasting sustainability value (Ebrahim et al., 2014; Stubbs, 2017). Previous research has regarded how mission drift, i.e., actions that deviate from ventures' original sustainability values, by diverting their attention and focus, possibly even diminishing the ability to create positive social and environmental impacts (Battilana & Lee, 2014; Jones, 2007; Ramus & Vaccaro, 2017). A potential risk would be that sustainable ventures fail to make a substantial contribution to sustainable development because their original sustainability values and identity are lessened or outright abandoned (Gomez-Valencia et al., 2021).

To address this research gap dealing with the influence of entrepreneurial behaviors on sustainability orientation, we delineate two distinct and relevant sets of behavior from the entrepreneurship literature, namely, causation and effectuation (Chandler et al., 2011; Fisher, 2012; McKelvie et al., 2020), and test whether these behaviors have an influence on sustainability orientation. Causal and effectual behaviors on the firm level are chosen as exemplary entrepreneurial behaviors (McKelvie et al., 2020), not only because they experience increasing attention in entrepreneurship research and practice (e.g. Chandler et al., 2011; Sarasvathy, 2001), but particularly because effectuation is highly associated with flexibility, eagerness to experiment, and abstinence from long-term goals (Chandler et al., 2011; McKelvie et al., 2020). Entrepreneurial behaviors highly associated with flexibility, eagerness to experiment, and lack of long-term planning might initiate or even encourage the desire to deviate from original, sustainability-oriented values; and thus, this becomes particularly relevant for investigating in the context of sustainable entrepreneurship.

In this article, causation is considered the more conventional and rigid goal-oriented approach to entrepreneurship, in which entrepreneurs decide on a predetermined goal and then select between available means to achieve this goal (Sarasvathy, 2001). Alternatively, effectuation describes dynamic processes of experimental and flexible decision making in order to create new artifacts, leverage unexpected contingencies, and contemplate affordable loss, which is especially useful in uncertain contexts (Sarasvathy, 2008; York & Venkataraman, 2010). Furthermore, effectuation is beneficial in the establishment of new ventures based on the entrepreneurs' knowledge, skills, and social networks (Fisher, 2012; Sarasvathy, 2001). Several formative subconstructs characterize effectuation, including experimentation, affordable loss, and flexibility (Chandler et al., 2011). Drawing on distinct constructs presented by Chandler et al. (2011) and further elaborated by McKelvie et al. (2020), who highlight the importance of differentiating between effectual logics and effectual behavior, we thereby focus on the latter, to address the research gap on how entrepreneurial behaviors on the venture level can positively or negatively influence sustainability orientation.

Combining the existing research on causation, effectuation and sustainability orientation, we frame the following research question: *How do causal and effectual behaviors influence sustainability orientation in existing ventures*? Based on a literature review, we hypothesize that causal behaviors have a *reinforcing*, positive influence on sustainability orientation in established ventures as it establishes a consistent long-term goal approach during sustainable venture creation. Causal behaviors entail the identification of market failure causing environmental and social impairment as well as the exploitation of opportunities directly associated with market failure (Cohen & Winn, 2007; Dean & McMullen, 2007; Eller et al., 2020; Johnson & Schaltegger, 2020). Next, we hypothesize that effectual behaviors have a *counterproductive*, negative influence on sustainability orientation. Effectual behaviors related to experimentation, affordable loss, lack of long-term goals, and flexibility may encourage a significant deviation (or a shift) from the original sustainability mission, which might run counterproductive to the sustainability orientation of the venture (DiVito & Bohnsack, 2017). Finally, we hypothesize that the negative influence of effectuation on sustainability orientation remains negative only if the perceived social support for sustainable entrepreneurship is low.

To our knowledge, this is the first paper to investigate entrepreneurial behaviors from two known constructs in the entrepreneurship literature, effectuation and causation, using sustainability orientation as construct of core sustainability values. Until now, the literature has looked at individual actions and not cumulative entrepreneurial behaviors when investigating potential mission drift and resulting organizational tensions (Grimes et al., 2019). In so doing, this article complements prior research, including research on the development of sustainable ventures (Muñoz & Dimov, 2015; DiVito & Bohnsack, 2017) as well as the growing body of literature on causation and effectuation (Chandler et al., 2011; Fisher, 2012). Furthermore, it adds to the relatively few articles combining the two conceptual themes (Akemu et al., 2016; Sarasvathy & Ramesh, 2019; York et al., 2016). Nevertheless, these limited papers have not considered the relationship between causation, effectuation, and sustainability orientation and what this means for reinforcing or weakening the ventures' sustainability values. This article follows the call by Muñoz and Cohen (2018) to not analyze sustainable entrepreneurship from a top-down corporate sustainability perspective but to employ more bottom-up entrepreneurship frameworks in sustainable entrepreneurship research. Additionally, the results of this article may inform the effects of entrepreneurial behavior in connection with mission drift (Ebrahim et al., 2014; Ramus & Vaccaro, 2017; Stubbs, 2017) and tensions in decision making between multiple sustainability dimensions (DiVito & Bohnsack, 2017; Smith et al., 2013).

We provide the literature review and theoretical background in the next section, including the hypothesis development. This is proceeded by the methodology and findings. In the discussion, we connect our findings with the previous literature and provide implications for entrepreneurial practice and future research on causal and effectual behaviors in sustainability-oriented venture development.

2 | LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1 | Sustainable entrepreneurship: Sustainability orientation and perceived social support

With an original mission based on the founders' sustainability orientation, including strong sustainability values and convictions, entrepreneurial ventures can spearhead the innovation of new products and markets, transform existing markets with the inclusion of higher sustainability values, and make a significant contribution to sustainable development (Cohen & Winn, 2007; Hockerts & Wüstenhagen, 2010; Pacheco et al., 2010; Schaltegger & Wagner, 2011). Due to its strong mission to generate sustainability solutions, sustainability-oriented ventures have the potential to destroy current unsustainable production and consumption patterns and replace them with lasting sustainable goods, services and institutions (Hockerts & Wüstenhagen, 2010; Pacheco et al., 2010). The question remains if such ventures stay true to their intended course and do not deviate from original goals due to both internal and external pressures and tensions (Corner & Ho, 2010; DiVito & Bohnsack, 2017; Stubbs, 2017).

Thus, a key challenge for sustainable entrepreneurs is not to weaken, but rather to maintain and even strengthen their sustainability orientation beyond creation and into more mature venture development phases (Parrish, 2010). Kuckertz and Wagner (2010, p. 531) define *sustainability orientation* as "underlying attitudes and convictions" that provides a causal link to "entrepreneurial intention focused on sustainable development." Several authors (Parrish, 2010; Stubbs, 2017) emphasize that sustainability orientation helps to instruct and maintain a healthy balance between all three sustainability dimensions, including social, environmental, and economic goals. This is important, as sustainable ventures are frequently confronted by sustainability decision tradeoffs due to competing institutional logics (e.g., between economic values and environmental/social values; see DiVito & Bohnsack, 2017; Hall & Wagner, 2012).

Kuckertz and Wagner (2010) found that sustainability orientation has a positive influence on entrepreneurial intention; however, this positive effect diminishes over time, particularly due to an advanced business education (e.g., MBA) and practical business experience. This motivated this article to investigate if certain entrepreneurial behaviors can reinforce or weaken sustainability orientation in existing sustainability ventures. Causal and effectual behaviors are chosen as entrepreneurial behaviors of specific interest for this study as they experience increasing attention in entrepreneurship research and practice (e.g., Shirokova et al., 2021; Tolstoy et al., 2021). Additionally, effectuation is associated with a growing flexibility and eagerness to experiment in entrepreneurial ventures (Chandler et al., 2011; Sarasvathy, 2001). This might initiate trends of decreasing sustainability orientation with growing business experience (Kukertz & Wagner, 2010). Thus, investigating the influence of effectual entrepreneurial behavior on sustainability orientation is particularly relevant in the context of sustainable entrepreneurship.

Additionally, *social support systems* can help sustainable ventures to maintain or further strengthen their high levels of sustainability orientation (Muñoz & Dimov, 2015). Therefore, perceived social support has experienced increasing attention in sustainable entrepreneurship research (e.g., Anna et al., 2000; Sousa-Filho et al., 2020). It describes in how far the external environment of the respective venture is perceived to support the specific cause of the venture. Entrepreneurs are often able to "perceive support from the community where the venture was created" (Muñoz & Dimov, 2015, p. 644), which encourages them to pursue particular sustainability-oriented ventures. Additional external support mechanisms include favorable financing for sustainability-oriented ventures, e.g., through crowdfunding and impact investments (Calic & Mosakowski, 2016; Petruzelli et al., 2019) as well as educational and incubation programs centered on sustainable start-ups (Fichter & Tiemann, 2018; Klofsten et al., 2019; Wagner et al., 2019), but also sustainability-oriented business partners and NGOs (Esteves et al., 2021; Ramus & Vaccaro, 2017; Roxas, 2021). Still, Muñoz and Cohen (2018) highlight that sustainable entrepreneurship research has not yet sufficiently taken into account how ventures are embedded in social systems.

Despite the previous contributions to sustainable entrepreneurship literature, it is not exactly clear how particular entrepreneurial behaviors might strengthen or weaken the sustainability orientation of established sustainability ventures. If particular entrepreneurial behaviors even were to weaken the sustainability orientation of existing ventures, this may create an unwanted mission drift (Grimes et al., 2019; Stubbs, 2017) and lead to additional tensions in decision-making for sustainability-oriented ventures (DiVito & Bohnsack, 2017; Parrish, 2010). This could present a problem for ventures with high sustainability intentions, and additionally, it presents a significant research gap, which this article addresses. Only a few studies have explicitly mentioned entrepreneurial behaviors linked to causation and effectuation in relation to the sustainable entrepreneurship literature (Akemu et al., 2016; Corner & Ho, 2010; di Domenico et al., 2010; York & Venkataraman, 2010; Sarasvathy & Ramesh, 2019); however, these studies have not directly tested the relationship between these constructs, namely causation, effectuation, and sustainability orientation.

2.2 | Causal and effectual behaviors in sustainability-oriented ventures

Previously, the literature on sustainable entrepreneurship has often framed entrepreneurial behaviors in close association with identifying and exploiting environmentally and socially relevant market failures

(Cohen & Winn, 2007; Cohen et al., 2008; Dean & McMullen, 2007). Market failure in the environmental sustainability context is defined by Dean and McMullen (2007, 51) as "barriers to the efficient functioning of markets for environmental resources," providing the stimulus for sustainability-oriented entrepreneurial behavior. The process of opportunity identification has become a well-established and common view in the sustainable entrepreneurship literature (Muñoz & Dimov, 2015). The framing of entrepreneurial opportunities according to environmentally and socially relevant market failures closely reflects behaviors related to the *discovery theory* of entrepreneurial opportunities (Alvarez & Barney, 2007). From a discovery perspective, it appears that sustainability-oriented opportunities are exogenous to the entrepreneurs and merely waiting for entrepreneurs to discover. This places emphasis on specific entrepreneurial actions, including possessing a high sensitivity to sustainability-related issues combined with expert knowledge of certain markets and vision to bring these opportunities into fruition (Muñoz & Dimov, 2015; Shepherd & Patzelt, 2011; Tilley & Young, 2009).

According to discovery theory, the literature suggests that entrepreneurs rely heavily on set goals directly linked to market imperfections, such as negative environmental externalities, market inefficiencies, improper pricing, and information asymmetries (Cohen & Winn, 2007; Dean & McMullen, 2007). From this perspective, entrepreneurs are able to achieve multiple goals, including (1) lessen environmental and social burdens through the discovery and exploitation of these market failures, (2) alleviate the abuse of public goods, and (3) provide additional information on sustainability qualities through effective marketing and public relation campaigns (Cohen & Winn, 2007; Dean & McMullen, 2007). These goal-oriented entrepreneurial behaviors lead to both environmental and social improvements as well as economic advantages for those willing to take risks and tackle such issues through entrepreneurial endeavors.

The discovery theory related to sustainable entrepreneurship assumes reasonably predictable behaviors, which allows entrepreneurs to connect market failures caused by environmental and social problems as well as establish long-term goals in overcoming these problems (Dean & McMullen, 2007; Schaltegger & Wagner, 2011). Behaviors of the discovery perspective appear to be closely related to *causal behaviors*. Causal behaviors are described as opportunity recognition, goal-setting, and exploitation based on preexisting and predictable market situations. In this case, the emphasis is placed on a given end, i.e., a focused outcome or goal (Fisher, 2012; Sarasvathy, 2001). It assumes that uncertainty is relatively low, and goal setting often leads to (but not necessarily guarantees) successful exploitation in early venture creation stages (Fisher, 2012).

An alternative to the explanations of venture development through market failure emerges as *creation theory*, which emphasizes "iterative, inductive, and incremental decision-making" (Alvarez & Barney, 2007, p. 17). Alvarez and Barney (2007) relate creation to evolutionary theory in social sciences and highlight several key constructs in the entrepreneurship literature, including bricolage (Baker & Nelson, 2005) and effectuation (Sarasvathy et al., 2003). According to Sarasvathy (2001, p. 245), *effectual behaviors* imply the utilization of "a given set of means to achieve new and different goals that puts the entrepreneur in control of an unpredictable future" (Sarasvathy, 2008, p. 20). Effectual behaviors are enacted through the entrepreneurs' own imagination, talent, and contacts, which are not necessarily connected directly to present or real market issues, such as market failures (Sarasvathy, 2001). Rather, effectual behaviors are enacted based upon entrepreneurs' own skills, knowledge, and social networks as catalyst for opportunity creation (Sarasvathy, 2008). It offers a different explanation to opportunity development, especially in areas of higher uncertainty, such as current market issues dealing with climate change and biodiversity loss (York & Venkataraman, 2010).

Chandler et al. (2011) established that effectual behavior is a formative, multidimensional construct with several related subdimensions, including experimentation, affordable loss, and flexibility. First, experimentation depicts a reiterative process of trial and error, where effectual entrepreneurs "are likely to try different approaches in the marketplace before settling on a [fixed] business concept" (Chandler et al., 2011, p. 380). Through a process of trial and error, nascent ventures experiment with various approaches and business models in product development, value creation, and market entry (Schaltegger et al., 2016). Second, ventures reprising effectual behaviors weigh all available options and consider the amount of loss that is affordable to them, instead of attempting to predict the expected returns of a single opportunity (Fisher, 2012). Affordable loss means what venture would be willing to lose in case the opportunity development proves unsuccessful (Sarasvathy, 2008). Finally, ventures may often remain flexible throughout their development, as they recognize the advantages of contingent opportunities arising from external environments and stakeholder inclusion. It is recognized that flexibility provides a clear advantage over incumbent firms, as they can quickly adapt to market and institutional shifts (Fisher, 2012).

Until now, studies combining sustainable entrepreneurship and effectuation have only investigated a few specific issues at the interface, such as the role of agency in venture formation (Akemu et al., 2016), identity coupling in hybrid organizations (York et al., 2016), and the role of co-creation and collective action in addressing sustainability challenges and effectual opportunities (Sarasvathy & Ramesh, 2019). While these studies provide novel insights of effectual behaviors useful for studying sustainability-oriented ventures, these articles have not investigated how causal and effectual behaviors may strengthen or weaken sustainability orientation in established ventures.

Considering effectual behaviors in sustainable entrepreneurship, we theorize that sustainable ventures may begin with an entrepreneurial idea, which has not merely emerged from the recognition of environmentally or socially relevant market failures, but rather emergent via creative experimentation, considerations of affordable loss, and flexibility. Here, effectual behaviors expect that original goals can alter considerably during venture development. Additionally, effectual behaviors embody flexibility, meaning entrepreneurial ventures are not necessarily afraid of failing early and often (Chandler et al., 2011; Fisher, 2012). During this process, alternative entrepreneurial ideas may arise, for instance through the integration of key stakeholders,

also known as co-creators (Dew et al., 2009), as well as from the encouragement of social support systems surrounding these ventures (cf. Fichter & Tiemann, 2018). If entrepreneurial ventures are open to experimentation as well as do not shy away from failing early and often (Fisher, 2012), we see at least the potential of a diversion from the initial sustainability orientation as a form of compromise (Jolink & Niesten, 2015). As effectuation would leverage experimentation and flexibility for the sake of long-term goals, sustainability orientation may diminish.

In contrast, causal behaviors do not promote experimenting with alternative ideas, flexibility of goals, and failing early and often. Instead, sustainability-oriented ventures employing causal behaviors would attempt to realize a pre-determined sustainability-oriented goal (i.e., the given end). In sustainable entrepreneurship, this means that an emphasis is placed behaviors that are attached to clear goals stemming from a strong sustainability orientation to exploit opportunities based in observable environmentally and socially related market failures (Dean & McMullen, 2007; Schaltegger & Wagner, 2011).

Thus, we hypothesize the following:

> **Hypothesis 1.** A higher concentration of causal behaviors strengthens the sustainability orientation of sustainable ventures.

> **Hypothesis 2.** A higher concentration of effectual behaviors weakens sustainability orientation of sustainable ventures.

As described above, alternative entrepreneurial aims can arise from effectual behaviors stemming from the inputs in a venture's surrounding support system. However, these alternative aims stimulated by the ventures support systems do not by definition entail *weaker* levels of sustainability orientation. It appears that support systems can be specifically favorable for sustainable entrepreneurs (Cohen, 2006; Muñoz & Dimov, 2015). These support systems may entail business support systems, including favorable market policies, customer demand for social and environmental products, and local business networks (Johnson & Schaltegger, 2020), but also business partners and NGOs (Esteves et al., 2021; Roxas, 2021). In fact, Cohen (2006) finds the strength of local networks to be a critically important factor in the establishment of sustainability-oriented ventures.

Further examples of social support systems include university education and incubation programs (Fichter & Tiemann, 2018; Klofsten et al., 2019) or alternative forms of financing, such as crowdfunding or impact investments directly funneled towards sustainability-oriented ventures (e.g. Calic & Mosakowski, 2016), but also business partners and NGOS (Esteves et al., 2021; Roxas, 2021). Furthermore, it has been found that stakeholder engagement can help ventures to counterbalance the effects of mission drift, realigning strong sustainability values with those of the surrounding community (Ramus & Vaccaro, 2017). If the social support system is favorable towards sustainable development, effectual behaviors relate closely to the sustainability orientation of ventures and do not necessarily weaken this orientation. This can for example be the case, if members of the social support system present strongly sustainability oriented alternative ideas, which a venture is flexible to adopt and experiment with, thus showing effectual behavior. Thus, we assume that perceived social support of existing ventures moderates the influence of effectual behaviors on sustainability orientation:

> **Hypothesis 3.** The influence of effectuation on sustainability orientation is moderated by the perceived social support. Hence, the influence of effectual behaviors on sustainability orientation is only weakened if perceived social support is low.

Figure 1 displays a summary of the hypotheses.

3 | METHODOLOGY

3.1 | Sample and procedure

In this study, we are motivated by the call for more empirical quantitative research in the field of sustainable entrepreneurship, identified in the systematic literature review by Muñoz and Cohen (2018). We selected ventures in Germany as a purposive sample design. All selected ventures were members with direct affiliation to German networks for sustainable, social, or environmental entrepreneurship or have disclosed they were associated to a sustainability-oriented business incubator in early venture development. The ventures were contacted by email in May 2020, in which they were provided with a link to the online survey. After 12 days, a reminder email was sent to all those participants that had not completed the survey. Nevertheless, the data collection lasted over a month in total. Based on previous research on incentivizing respondents, it has been established that incentivizing decreases bias and improves the quality of responses (James & Bolstein, 1990); an incentive was offered for the successful completion of the survey. For each completed response, 5 Euros were donated to either an environmental or a social cause.

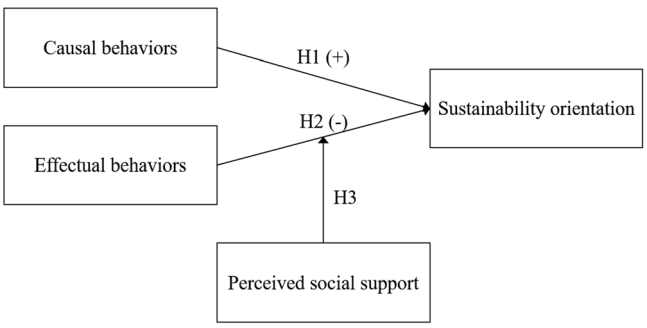

FIGURE 1 Model on the effect of causal and effectual entrepreneurial behaviors on ventures sustainability orientation, moderated by perceived social support

In total, we contacted 726 ventures, of which 140 completed the survey. This corresponds to a response rate of 19.28%. Additionally, 135 ventures started answering the survey but did not complete it. We excluded incomplete responses from the analysis. In order to identify a potential non-response bias, we tested whether significant differences between the complete and the incomplete responses exist and *t* tests for all relevant items were conducted. We did not obverse systematic differences for any of the variables considered in the analysis. Table 1 summarizes the main characteristics of the final sample as well as the correlation matrix. It indicates that the average age of the ventures is 4.94 years old and that on average the sampled ventures have 10.44 employees.

3.2 | Measures

The dependent variable, i.e., venture's sustainability orientation, was taken from the six-item measurement scale developed by Muñoz and Dimov (2015). Following the recommendation by McKelvie et al. (2020) to specify the appropriate unit of analysis in effectuation research, we adapted the six items suggested by Muñoz and Dimov (2015) on the firm level. For example, one of the statements of sustainability orientation was written as follows, *regardless of the nature of my business, it has to make a responsible use of natural resources*. All items were assessed on a 5-point rating scale, ranging from 1 *do not agree at all* to 5 *completely agree*. The reliability of this measurement scale was confirmed, based on a Cronbach's α of 0.826. The final items for all constructs can be found in Appendix A.

In contrast to the dependent variable "sustainability orientation," the moderator variable, i.e., perceived social support, refers not to the venture itself but to its external environment. It was measured using four items suggested by Muñoz and Dimov (2015), thus using the same source as sustainability orientation. Again, a 5-point rating scale ranging from 1 *do not agree at all* to 5 *completely agree* was used and the high Cronbach's α (0.882) value confirmed the reliability of the measurement approach.

To measure causation and effectuation, items developed by Chandler et al. (2011) were slightly adapted to the firm level as the unit of analysis, also recommended by McKelvie et al. (2020). We measured causation using seven items, which indicate that causal behavior comes along with goal setting and following through with strict plans. An exemplary item included in the causation construct is as follows: "Our company had a clear and consistent vision for where we wanted to end up." For these items, we used the same 5-point rating scale as above. Again, a high Cronbach's α of 0.721 confirmed the reliability of the construct. For the measurement of effectuation, the subdimensions of effectuation were incorporated, including experimentation, affordable loss, and flexibility about aims (Chandler et al., 2011). We included three items per subdimension in this construct to allow an equal balance between the different subdimensions. These items reflect, unlike causal behavior, that effectual behavior is more open-ended about the final outcome of entrepreneurship. Sample items for the each subdimensions include the following: "Our company tried a number of different approaches until we found a business model that worked" (experimentation); "Our company was careful not to commit more resources than we could afford to lose" (affordable loss) and "Our company allowed the business to evolve as opportunities emerged" (flexibility). As suggested by Laskovaia et al. (2017), we did not include the dimension pre-commitments of others as a relevant subdimension of effectuation, as it is shared between causation and effectuation. The resulting Cronbach's α value of 0.697 shows a sufficiently high value given that the number of items is smaller than 10 and the constructs includes multiple dimensions (Bagozzi & Yi, 2012; Loewenthal, 2004).

As control variables, the analysis included company-size, non-profit orientation and the industry sector, as these can have a substantial impact on sustainability orientation (e.g., Frondel et al., 2008; Gallo & Christensen, 2011). We used the number of employees as a proxy for company size, operationalizing it as a metric count of the number of employees. Non-profit orientation was measured as a dummy variable for which participants indicated whether the respective organization operates on a for-profit basis. Likewise, an industry–sector dummy differentiates service companies on the one hand from producing and further companies.

To test whether the data are affected by a common method bias, we used the Harman single-factor method. It shows that the first factor explains only 14.909% of the total variance, indicating that no single factor accounts for the majority of the measures' covariance.

TABLE 1 Descriptive statistics and correlations

Variable	Mean	S.D.	1.	2.	3.	4.	5.	6.	7.	8.
1. Age of venture	4.942	4.018	1.000	0.253**	0.168*	−0.013	−0.074	−0.164	−0.006	−0.054
2. No. of employees	10.441	18.101		1.000	0.191*	−0.013	−0.071	0.150	0.064	−0.045
3. Nonprofit	0.286	0.453			1.000	0.104	0.071	−0.081	−0.027	0.144
4. Sector	0.543	0.500				1.000	0.045	−0.003	−0.094	−0.004
5. Effectuation	0.000	0.541					1.000	0.188*	0.082	0.312**
6. Causation	0.000	0.612						1.000	0.149	0.256**
7. Perc. soc. supp.	0.000	0.859							1.000	0.064
8. Sust. orientation	0.000	0.731								1.000

**$p < 0.01$. *$p < 0.05$.

Consequently, the one-factor model is rejected, and the data do not seem to be affected by a common method bias.

4 | RESULTS

We provide up two regression models to test the hypotheses. Both models use sustainability orientation as the dependent variable. The first model includes only the control variables and the main effects of the independent variables. To test Hypothesis 3, model two additionally captures the interaction effect between effectuation and perceived social support.

Correlations higher than 0.800 and variance inflation factors (VIFs) above 10 typically indicate serious multicollinearity (Kennedy, 1992). Given that no correlation is higher than 0.312 (Table 1) and none of the three models shows VIFs higher than 1.090 (Table 2), multicollinearity is not problematic. We confirmed normal distribution of the error terms using histograms and q-q-plots. To ensure that no issues related to heteroscedasticity are present in the data, the White test as well as the modified Breusch–Pagan test were employed. Both tests showed non-significant result and thus do not provide indication for heteroscedasticity.

TABLE 2 Regression models

	Model 1	Model 2
Controls		
Constant term	−0.011 (0.097)	0.006 (0.097)
Company size	−0.004 (0.003)	−0.004 (0.003)
Nonprofit	0.270* (0.136)	0.257 (0.136)
Sector	−0.054 (0.120)	−0.062 (0.120)
Main effects		
Effectuation	0.344** (0.116)	0.347** (0.115)
Causation	0.275** (0.101)	0.271** (0.100)
Perceived social support	0.011 (0.070)	0.003 (0.070)
Interaction effects		
Effectuation × perceived social support	−/−	−0.175 (0.125)
Model fit		
Sign. model	0.001	0.001
Adj. r^2	0.127	0.133
n	140	140

Note: Dependent variable: Sustainability orientation; the cells provide unstandardized regression coefficients; standard errors are provided in parentheses.
**$p < 0.01$. *$p < 0.05$.

Table 2 displays the results of the regression analyses. Both models are significant and explain a relevant share of the variance in sustainability orientation, indicated by adjusted r^2 values of 0.127 or respectively 0.133. Among the control variables, only non-profit orientation exerts a significant influence on sustainability orientation (and only in Model 1).

Concerning Hypothesis 1 on the effect of causation on sustainability orientation, both models show significant positive influence (Model 1: $b_{causation} = 0.275^{**}$; Model 2: $b_{causation} = 0.271^{**}$) confirming Hypothesis 1. To our surprise, the effect of effectuation on sustainability orientation is not only significant, but in contrast to Hypothesis 2, it is positive (Model 1: $b_{effectuation} = 0.344^{**}$; Model 2: $b_{effectuation} = 0.347^{**}$). Thus, effectuation exerts has positive, significant influence with sustainability orientation. Therefore, we have to reject Hypothesis 2. With regard to Hypothesis 3, which expected the influence of effectuation to be moderated by perceived social support, the interaction effect between perceived social support and effectuation is not significant. This is most likely due to the absence of a significant main effect in Hypothesis 2. Thus, we do not find support for Hypothesis 3.

5 | DISCUSSION AND CONCLUSIONS

5.1 | Causal and effectual behaviors reinforce sustainability orientation

This article investigates the influence of causal and effectual behaviors on sustainability orientation in established ventures. By doing so, it provides several novel insights on these relationships. First, causal behaviors have a positive influence on sustainability orientation. As predicted in the first hypothesis (Hypothesis 1), causal behaviors have a reinforcing, positive influence on sustainability orientation of firms by following the predetermined goals and mission of the venture. Thus, we find support for our first hypothesis. This is in line with the assumption that causation emphasizes realizing a preexisting (sustainability-oriented) goal (Fisher, 2012; Sarasvathy, 2001) and identifying and following a process of opportunity identification related to environmentally and socially relevant market failures, which remains essential to sustainable entrepreneurship (Dean & McMullen, 2007; Schaltegger & Wagner, 2011).

In contrast to our second hypothesis (Hypothesis 2), we find that effectual behaviors have in fact a reinforcing, positive influence on sustainability orientation. Thus, we must reject our second hypothesis. This finding emphasizes that behaviors resembling experimentation, flexibility, and affordable loss strengthen sustainability orientation, rather than weaken it. This presents a novel finding in the sustainable entrepreneurship literature, which previously emphasized the importance of clear goal setting underlined by processes of planning and prediction models in accordance with the entrepreneurs' sustainability orientation (Chen, 2012; Hockerts, 2015; Neck et al., 2009).

We provide two possible explanations for this unexpected finding. First, it can be assumed that sustainable entrepreneurs are

strongly influenced by their own sustainability-oriented values. Thus, if sustainable entrepreneurs follow effectual behaviors in line with Fisher (2012) and Sarasvathy (2001), the entrepreneurs' knowledge, skills, and networks may be closely tied to sustainability, which could be the driving force behind this reinforcing, positive effect of effectual behavior on sustainability orientation. Further research may be conducted to test the relationship between personal values and effectual behaviors.

Second, effectuation cannot be equated with mission drift, but rather with providing multiple, viable options (or rather opportunities) for entrepreneurs to pursue sustainability-oriented goals. Using a hypothetical example, an entrepreneurial venture would like to eliminate plastic waste in landfills and oceans, which serves as a strong sustainability orientation. Effectual behaviors would promote multiple options based on the entrepreneurs' means, including knowledge, skills, and social networks. This may lead to outcomes different to the initially intended goals; however, all these ventures still may be characterized by strong levels of sustainability orientation, such as a no-plastic, self-packaging concept grocery store, a manufacturer of 100% organic, plastic-free packaging, or a non-profit organization educating the public about the current plastic problem and ways to overcome it. In the end, all results would still maintain and even strengthen the existing sustainability orientation, which would also be considered viable business model innovations for sustainability (Jolink & Niesten, 2015; Schaltegger et al., 2016).

With regard to our third hypothesis (Hypothesis 3), we do not find any indication that perceived social support moderates the relationship between effectual behaviors and sustainability orientation. Thus, we cannot confirm our third hypothesis. One explanation for this could be that high levels of perceived social support do not turn the relationship between effectuation and sustainability orientation positive, as it already is positive (see the results for Hypothesis 2). Nevertheless, it remains surprising that the positive effect of effectuation is not significantly strengthened by high levels of perceived social support, as further stakeholder engagement can reinforce existing sustainability values (Ramus & Vaccaro, 2017). Corresponding to our explanation of the unexpected results on Hypothesis 2, this could indicate that sustainable ventures have so strong and stable levels of sustainability orientation that social support systems (sustainability oriented or not) are largely unable to shake this heightened sustainability orientation.

5.2 | Implications for future research and limitations

These key insights highlight the general importance of the concepts of causation and effectuation for sustainable entrepreneurship research, as both have positive, significant impacts on ventures' sustainability orientation. Thus, we follow the suggestions that more research should be conducted on the relationship between effectuation and sustainability-oriented ventures as an underlying theoretical approach in sustainable entrepreneurship research (Hall et al., 2010; Sarasvathy & Ramesh, 2019). Furthermore, our results are also relevant for entrepreneurship research in general, as they suggest that causation and effectuation are not at odds with each other, as previously depicted (e.g., "causation VERSUS effectuation"), but instead, we provide support for the view that causal and effectual behaviors are rather necessary complements (i.e., "causation AND effectuation" in McKelvie et al., 2020, p. 711).

As another implication for research, the insight that both causation and effectuation reinforce sustainability orientation in ventures raises the implicit expectation that an absence or lack of causal as well as effectual entrepreneurial behavior may be detrimental for the sustainability orientation of entrepreneurs. Future research should test this implicit expectation, as this would imply a great need for entrepreneurs to purposefully choose (any) forms or combinations of causal or effectual behavior.

Based on the unexpected rejection of Hypothesis 2, we follow the recommendation of Edmondson and McManus (2007) to investigate unexpected findings in quantitative, mature theory research using qualitative methods. Thus, we recommend future research to qualitatively explore (alternative) possible explanations for the unexpected finding that effectual behaviors, including experimentation, affordable loss, and flexibility, reinforce sustainability orientation. Based on the explanation suggested above, this could be done by investigating whether and how flexibility and experimentation helped sustainable entrepreneurs to strengthen the sustainability orientation of their venture. We explained our unexpected findings with the expectation that sustainable ventures have strong, stable sustainability orientations and thus the alternative ideas they create through experimentation and flexibility are sustainability oriented as well. Based on this rational, future research should replicate our study addressing conventional, instead of sustainable ventures, which cannot be expected to show equally high levels of sustainability orientation.

Concerning the third hypothesis, further research is required for social support systems. This will help to verify whether social support systems really do not substantially affect sustainability orientation of ventures. Future research could explore the extent of influence that social support systems has on sustainable ventures (cf. Cohen, 2006). Specifically, we recommend to explore how sustainability orientated social support systems would need to be designed, to effectively favor effectual (and also causal) sustainable entrepreneurs, as current sustainability-oriented social support systems seem to be ineffective in this regard. A possible explanation for the insignificant effect of social support systems might be the relatively young age of the ventures included in our sample (average age of the ventures is 4.94 years old). Potentially, social support systems will take longer time to positively influence the sustainability orientation of ventures. Based on the limitation that our sample included relatively young ventures and the insight that the influence of social support systems might only evolve in more mature entrepreneurial stages, this study might be replicated using a sample of more established ventures that are "harvesting the venture" (Choi & Gray, 2008). Another explanation for the lack of a moderating influence of social support systems might be related to the measurement approach of this variable. While this

approach is established in research and is frequently used in connection with sustainability orientation (Muñoz & Dimov, 2015), the items included in this construct are not related to specific types of business support. Using a measurement approach that more directly related to specific elements of business support systems (such as incubators, start-up finance, etc.) might lead to different insights.

As another limitation of our research, we did not conduct a longitudinal study of venture development, but rather a combined current and retrospective assessment of entrepreneurial behaviors in established ventures to test the influence of effectual and causal behaviors on sustainability orientation. Future research could therefore examine temporality, especially in early venture creation stages where both causation and effectuation appear to take roles that are more prominent (York et al., 2016). For example, experimentation, affordable loss, and flexibility may become necessary in the early venture creation stages (e.g., idea formation, resource acquisition, and stakeholder engagement), whereas causation is needed for more mature stages (e.g., marketing forecasts, establishing organizational structures, and harvesting the venture).

5.3 | Implications for entrepreneurial practice

In addition to these implications for research, several practical implications exist. First, the positive influence of causal entrepreneurial behaviors on ventures sustainability orientation implies that sustainable entrepreneurs are recommended to search for environmentally and socially relevant market failures (following the discovery view) and set targets accordingly for predicable forecasts leading to exploitation of these failures. Second, the positive influence of effectual behaviors will encourage sustainability-oriented entrepreneurs to engage in practices of experimentation, including trial and error, and being flexible to unforeseeable changes, without fear of losing their sustainability orientation along the way. For example, entrepreneurs engaged in finding sustainability solutions in areas of high uncertainty, such as climate change and biodiversity (York & Venkataraman, 2010), can employ practices of trial and error and leveraging contingencies to create new markets without losing sight of their overall sustainability goals.

Lastly, entrepreneurship practice and education should embrace both logics, effectuation and causation, as they are important elements of courses taught in combination with sustainable entrepreneurship. This study reveals that both behaviors are able to reinforce sustainability orientation. University-level courses could find innovative ways to combine both behaviors in useful ways, encouraging students to simulate market forecasting and drafting business plans, while using the principles of trial and error, affordable loss, and flexibility through leveraging of contingencies in simulation models.

ACKNOWLEDGMENTS

We are sincerely indebted to Saras Sarasvathy for providing very helpful comments on an earlier version of this manuscript. We would also like to thank the editor, Richard Welford, Scott Lam as well as the reviewers for their constructive comments in the revision of the paper. Lastly, we would like to thank Svenja Rehwinkel for her support in setting up the online survey as well as the Theo and Friedl Schöller-Foundation for their financial support in conducting the survey.

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How to cite this article: Johnson, M. P., & Hörisch, J. (2022). Reinforcing or counterproductive behaviors for sustainable entrepreneurship? The influence of causation and effectuation on sustainability orientation. *Business Strategy and the Environment*, *31*(3), 908–920. https://doi.org/10.1002/bse.2925

APPENDIX A.

ITEMS INCLUDED IN EACH CONSTRUCT

Construct	Items	Cronbach's α	Source
Effectuation (9 items constituting of 3 combinable subdimensions: Experimentation, affordable loss, and flexibility)	Experimentation (3 items) • Our company experimented with different products and/or business models. • The product/service that our company now provides is substantively different than we first imagined. • Our company tried a number of different approaches until we found a business model that worked.Affordable loss (3 items) • Our company was careful not to commit more resources than we could afford to lose. • Our company was careful not to risk so much money than we were willing to lose with our initial idea. • Our company was careful not to risk so much money that the company would be in real trouble financially if things did not work out. Flexibility (3 items) • Our company allowed the business to evolve as opportunities emerged. • Our company adapted what we were doing to the available resources. • Our company was flexible and took advantage of opportunities as they arose.	0.697	Adapted from Chandler et al. (2011); firm-level analysis (McKelvie et al., 2020)
Causation (7 items)	• Our company analyzed long run opportunities and selected what we thought would provide the best returns. • Our company developed a strategy to best take advantage of resources and capabilities. • Our company designed and planned business strategies. • Our company organized and implemented control processes to make sure we met objectives. • Our company researched and selected target markets and did meaningful competitive analysis. • Our company had a clear and consistent vision for where we wanted to end up. • Our company designed and planned production and marketing efforts.	0.721	Adapted from Chandler et al. (2011); firm-level analysis (McKelvie et al., 2020)
Perceived social support (4 items)	Please indicate the extent to which you agree or disagree with the following statements. The social norms and culture of your community … • Encourage sustainable behaviors. • Emphasize the responsibility that the venture has in contributing to address community issues. • Promote environmental responsibility. • Encourage young people to be independent and start their own businesses.	0.882	Muñoz and Dimov (2015); firm-level analysis (McKelvie et al., 2020)
Sustainability orientation (6 items)	Please indicate the extent to which you agree or disagree with the following statements …	0.826	Adapted from Muñoz and Dimov (2015); firm-level analysis (McKelvie et al., 2020)

(Continues)

Construct	Items	Cronbach's α	Source
	• I strongly believe in the power of our company in contributing to solve many of the problems we have as a society. • Our company has an obligation to society that extends beyond making money. • Our company has to give back to society since it derives its profits from society. • Regardless of the nature of our business, it has to trade fairly with customers and suppliers. • Regardless of the nature of our business, it has to make a responsible use of natural resources. • When our company chose between the business ideas that the founders had in mind, they always chose the one that helped build a better society.		