Some principles are more equal than others: Promotion- versus prevention-focused effectuation principles and their disparate relationships with entrepreneurial orientation

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Research Summary: Recent research suggests that effectuation principles such as flexibility, precommitments, and affordable loss may differ substantially from one another. Responding to the call to clarify the effectuation concept, our study introduces the distinction between promotion- and prevention-focused effectuation principles. It argues that promotion-focused (prevention-focused) principles are positively (negatively) associated with a firm’s entrepreneurial orientation (EO). It further argues that causation also promotes-focused and positively associated with EO. An analysis of 151 Swiss energy small and medium-sized enterprises supports this account. Thus, our study suggests that some effectuation principles are more similar to causation in their underlying regulatory focus and their relationship with EO than they are to other effectuation principles. We offer several paths for future research on effectuation, causation, and EO that emerge from these findings.

Managerial Summary: Practitioner-oriented presentations and texts on entrepreneurial decision making frequently portray the means-driven effectuation approach as opposite to the goals-driven causation approach. Our study challenges this portrayal by highlighting substantial differences between the individual effectuation principles. Specifically, our research suggests that these principles differ in the underlying psychological processes and consequently in their relationships with key organizational attributes such as the firm’s entrepreneurial orientation. In these important regards, some effectuation principles are actually more similar to causation than they are to other effectuation principles. Our study has substantial
implications for the adoption of effectuation and for the “mixing and matching” of effectuation and causation. It not only makes a difference whether decision makers pursue an effectuation or causation approach, but also which effectuation principles they choose.

KEYWORDS
causation, effectuation, entrepreneurial orientation, prevention focus, promotion focus, regulatory focus theory

1 | INTRODUCTION

Since Sarasvathy (2001) distinguished the means-driven effectuation approach to entrepreneurial decision making from the goal-oriented causation approach, effectuation has become a main interest of entrepreneurship research (Mauer, Wuebker, Schlüter, & Brettel, 2018; Reymen et al., 2015). Whereas causation subsumes efforts to predict the future and work toward an envisioned end, effectuation refers to a set of principles by which decision makers attempt to control the future without having to predict it (Sarasvathy, 2008, 2014). Effectuation principles include generating new opportunities from available means (experimentation), leveraging unexpected contingencies (flexibility), getting stakeholder precommitments, and emphasizing affordable loss as a selection criterion (Smolka, Verheul, Burmeister-Lamp, & Heugens, in press).

Recently, a Dialogue in the Academy of Management Review concluded that the effectuation principles differ considerably as they reflect different cognitive processes and behaviors (Arend, Sarooghi, & Burkemper, 2015) and confound different aspects of control (Read, Sarasvathy, Dew, & Wiltbank, 2016). Arend et al. (2015) and Read et al. (2016) also agree that a sound understanding of the implications of pursuing effectuation is essential. This constellation leaves us with the question whether the effectuation principles also differ substantially in their implications. This question is especially relevant because effectual decision makers do not need to adopt the entire set of principles, but can focus on selected principles as they see fit (Engel, Van Burg, Kleijn, & Khapova, 2017). Comprehending whether, and if so, how the principles differ in their implications supports decision makers when choosing among them. Yet, we know rather little about this issue.

With the exception of Brettel, Mauer, Engelen, and Küpper (2012), emergent quantitative work on the implications of pursuing effectuation has either studied effectuation as a whole (Murnieks, Haynie, Wiltbank, & Harting, 2011; Parida, George, Lahti, & Wincent, 2016; Wiltbank, Read, Dew, & Sarasvathy, 2009) or hypothesized uniform effects across its different principles (Deligianni, Voudouris, & Lioukas, 2017; Read, Song, & Smit, 2009; Smolka et al., in press). However, unexpected results in the latter studies suggest that effectuation principles could exert opposite effects on the same criterion—while some principles promote the criterion, others impede it (Deligianni et al., 2017; Smolka et al., in press). In contrast, Brettel et al. (2012) do not find support for the expected opposite effects across principles. Thus, our knowledge about whether and why effectuation principles exert opposite effects on the same criterion is currently characterized by unexpected findings.

To overcome this unsatisfactory situation, the first purpose of our study is to look at the principles' underlying regulatory focus in order to predict their association with the entrepreneurial orientation (EO) of small and medium-sized enterprises (SMEs). EO represents "a firm-level attribute that is recognizable through the exhibition of sustained entrepreneurial behavioral patterns" (Covin & Lumpkin, 2011, p. 859). Its theoretical and practical significance (Wales, Gupta, & Mousa, 2013) as well as its acknowledged roots in top management decisions (Covin & Lumpkin,
2011; Covin & Wales, 2012) make EO an attractive criterion for research into the correlates of decision-making approaches. Building on regulatory focus theory (Hmieleski & Baron, 2008; Wu, McMullen, Neubert, & Yi, 2008), we distinguish between effectuation principles that are dominated by a promotion focus and those dominated by a prevention focus. A promotion focus heightens the salience of potential gains to be attained, whereas a prevention focus heightens the salience of potential losses to be avoided (Brockner, Higgins, & Murray, 2004). We argue that the use of promotion-focused effectuation principles is positively related to EO and the use of prevention-focused principles is negatively related to EO. The second purpose of our study is to look at causation’s underlying regulatory focus in order to predict its association with EO. We argue that causation is dominated by a promotion focus and positively related to EO. We test these hypotheses with a sample of 151 SMEs operating in the renewable energy (RE) and energy efficiency (EE) industries that we collected in collaboration with the Swiss Federal Office of Energy (SFOE). The empirical analysis of this data by means of structural equation modeling (SEM) broadly supports our theoretical account. In line with our expectation, it suggests that affordable loss and precommitments are negatively related to EO, whereas flexibility and causation are positively related to EO. The coefficient of experimentation has the expected positive sign, yet is not significant. Our results entail two conclusions: First, effectuation principles can differ substantially in their underlying regulatory focus and relationships. Second, some effectuation principles are actually more similar to causation than to other effectuation principles with respect to their regulatory focus and relationships.

These findings make several key contributions to the academic literature and beyond. First, the distinction between promotion- and prevention-focused effectuation principles responds to recent calls to clarify the effectuation construct (Read et al., 2016; Welter, Mauer, & Wuebker, 2016). Second, our study helps reconcile a paradox in the effectuation literature: Effectuation and causation are commonly depicted as opposites, but some scholars suggest it may be useful to pursue them in combination (Reymen et al., 2015; Sarasvathy, 2001). Our analysis shows that both positions possess some merit: Causation and prevention-focused effectuation principles are opposites as regards their relationship with EO, whereas a combination of causation and promotion-focused effectuation principles is associated with a particularly high level of EO. Third, the EO literature seeks a better understanding of why firms facing similar environments often vary in their EO. To this end, it has called for more research on the relationship between a firm’s level of EO and the way its organizational leaders make decisions (Covin & Lumpkin, 2011; Wales, 2016). Our study of effectuation and causation approaches to decision making as correlates of EO responds to this call. Finally, our findings provide management education and practice with valuable insights on differences among the effectuation principles and on similarities between some effectuation principles and causation. They also offer sought-after insights on approaches by which practitioners can alter their firm’s EO (Wales et al., 2013).

### 2 | THEORETICAL FRAMEWORK AND HYPOTHESES

Chandler, DeTienne, McKelvie, and Mumford (2011) and Deligianni et al. (2017) distinguish between four effectuation principles—experimentation, flexibility, precommitments, and affordable loss. Our study seeks to examine whether these principles have congruent or disparate relationships with SMEs’ EO. If the principles have congruent relationships, then all of them will be positively or all of them will be negatively associated with EO. If, however, they have disparate relationships, then some principles will be positively and others negatively associated with EO. Additionally, our study examines whether causation is positively or negatively related to EO. This analysis intends to determine whether some of the effectuation principles are actually more similar to causation in their relationship with EO than they are to other effectuation principles.

In studying the EO of SMEs, we adopt Covin and Lumpkin’s (2011, p. 859) conceptualization of EO as “a firm-level attribute that is recognizable through the exhibition of sustained entrepreneurial behavioral patterns.” When EO is conceptualized in this way, a firm that engages only in sporadic acts of entrepreneurial behavior does not possess a strong EO (Covin & Lumpkin, 2011, p. 858; Covin & Miller, 2014, p. 27). While the EO concept can be
broadened to cover further aspects of entrepreneurial behavior (e.g., Lumpkin & Dess, 1996, 2001; Lumpkin, Cogliser, & Schneider, 2009), most studies concentrate on entrepreneurial behavior in terms of risk taking, proactivity, and innovativeness to depict EO (see Miller, 2011; Rauch, Wiklund, Lumpkin, & Frese, 2009; Wales et al., 2013). Our analysis does the same because this common focus is consistent with Covin and Lumpkin’s (2011) conceptualization (Covin & Lumpkin, 2011, p. 859). In SMEs, where entrepreneurs and their management teams possess considerable discretion and decision-making power (Cope, Kempster, & Parry, 2011; Finkelstein, Hambrick, & Cannella, 2009; Herrmann & Nadkarni, 2014), EO is likely to be influenced by the approaches that these organizational leaders adopt to make entrepreneurial decisions (Covin & Lumpkin, 2011; Lumpkin & Dess, 1996). In order to predict whether the application of causation or a given effectuation principle is positively or negatively related to EO, we develop a theoretical framework, which is grounded in regulatory focus theory.

Regulatory focus theory calls attention to the motivational and strategic tendencies underlying human decisions (Brockner et al., 2004; Burmeister-Lamp, Lévesque, & Schade, 2012; Higgins, 1998). It distinguishes between a promotion focus and a prevention focus to argue that these two regulatory foci shape individuals’ strategic decisions (Higgins, 1998; Hmieleski & Baron, 2008; McMullen & Zahra, 2006). This distinction has proven to provide a useful and relevant perspective to study entrepreneurs’ cognitive processes and the implications of their cognitions (Brockner et al., 2004; Burmeister-Lamp et al., 2012; Kammerlander, Burger, Fust, & Fueglistaller, 2015). The two foci differ in terms of the motives people are trying to satisfy, the goals and standards they are striving for, and the outcomes salient to them (Brockner et al., 2004, p. 204; Wu et al., 2008, pp. 589–590): When people possess a promotion focus, their growth and advancement needs motivate them to pursue approach-oriented or “maximal” goals, that is, to achieve accomplishments and aspirations. In contrast, when people exhibit a prevention focus, their security and safety needs motivate them to pursue avoidance-oriented or “minimal” goals, that is, to fulfill obligations and prevent harmful failure. A promotion focus heightens the salience of potential gains to be attained; it emphasizes the felt presence of positive outcomes. A prevention focus heightens the salience of potential losses to be avoided; it emphasizes the felt absence of negative outcomes. Consequently, individuals with a promotion focus are strategically inclined to achieve “hits” and avoid “misses”; that is, they aim to recognize a stimulus when it is present and to avoid failing to recognize an existing stimulus. On the other hand, individuals with a prevention focus are strategically inclined to make correct rejections and avoid “false alarms”; that is, they aim to conclude that a nonexistent stimulus is indeed not present and to avoid concluding that a stimulus is present when it is not (Brockner et al., 2004; Higgins, 1998; Tumasjan & Braun, 2012).

Since individuals with a promotion focus are motivated to find potentially valuable hits, they are in a state of eagerness and approach novel opportunities proactively (Kammerlander et al., 2015; Tumasjan & Braun, 2012). The promotion focus stimulates their openness to new ideas and creativity (Brockner et al., 2004; Hmieleski & Baron, 2008; Tumasjan & Braun, 2012). Focusing on potential gains, organizational leaders with a promotion focus are often willing to “put themselves, their companies, and stakeholders at substantial risk” (Hmieleski & Baron, 2008, p. 297). Since proactiveness, innovativeness, and risk taking characterize a strong EO (Covin & Slevin, 1989; Rauch et al., 2009), organizational leaders with a promotion focus can be expected to foster their firm’s EO (Hmieleski & Baron, 2008; McMullen & Zahra, 2006). In contrast, individuals with a prevention focus are in a state of vigilance (Bryant, 2009; McMullen & Zahra, 2006). As they strive to avoid losses and commitments to “wrong” opportunities, they become more conservative and likely to adopt precautionary tactics (Higgins, 1998; Wu et al., 2008). When organizational leaders exhibit a prevention focus, they can be expected to limit their firm’s EO (Hmieleski & Baron, 2008; McMullen & Zahra, 2006).

The two regulatory foci are independent of each other, that is, an individual can score high on both of them (Bryant, 2009; Tumasjan & Braun, 2012). The independence of these foci has a substantial implication for effectuation and causation research: Since an individual can pursue promotion-focused and prevention-focused principles in tandem, principles that organizational leaders sometimes combine—such as the various effectuation principles—need not reflect the same regulatory focus.
Building on these insights, we argue that the diverse decision-making principles distinguished by Chandler et al. (2011)—causation and the four effectual principles experimentation, flexibility, precommitments, and affordable loss—reflect different regulatory foci and that the application of promotion-focused principles by organizational leaders will be positively associated with EO, whereas the use of prevention-focused principles will be negatively associated with EO. Our subsequent hypotheses thus examine whether the focal principle predominantly reflects a promotion or a prevention focus to predict whether its application has a positive or negative relationship with EO, that is, with sustained patterns of risk taking, proactiveness, and innovativeness.

2.1 | H1: Causation

When organizational leaders adopt the causation approach, they perform extensive competitive analysis and engage in elaborate planning processes in order to identify "optimal strategies" that maximize expected returns (Sarasvathy, 2001, p. 252, 2008, p. 81). As their thinking is predominantly concerned with ideals and they strive to attain their wishes, they exhibit a promotion focus and are more sensitive toward positive than negative outcomes (Higgins, 1998; Wu et al., 2008). We therefore expect that pursuing the causation approach is positively related to EO.

First, the promotion focus implied by causation increases leaders' willingness to "put themselves, their companies, and stakeholders at substantial risk" (Hmieleski & Baron, 2008, p. 297). In dynamic and uncertain environments, the payoffs of a given strategic alternative typically diverge markedly across the different potential scenarios; an option that offers very high returns in one case is likely to perform poorly in another (Wiltbank et al., 2009). Causation-oriented organizational leaders who choose among strategic alternatives by opting for those that maximize expected returns in a dynamic environment thus opt for relatively risky investment opportunities (Sarasvathy, Simon, & Lave, 1998). Second, a promotion focus stimulates people's eagerness to approach opportunities proactively (Tumasjan & Braun, 2012). Causation-oriented organizational leaders frequently use the insights from the extensive competitive analysis they perform to devise competitive strategies with which they intend to maximize the market share of their firm (Sarasvathy, 2001). Market share maximization is a key objective of proactiveness (Lumpkin & Dess, 1996). Third, insights resulting from their analysis and planning efforts allow organizational leaders to specify clear strategic goals, which they can communicate to their employees (Brinckmann, Grichnik, & Kapsa, 2010). While their promotion focus probably makes leaders target quite challenging goals (Wu et al., 2008), grounding these goals in extensive planning and analysis allows them to make sure that these goals do not become impossible to reach. Clearly specified and ambitious, yet well-grounded, strategic goals frequently enhance employee creativity (Amabile, 1998). Employee creativity is an important driver of a firm's innovativeness (Glynn, 1996).

Therefore,

**Hypothesis 1 (H1)** *Use of the causation approach is positively related to a firm's EO.*

Turning to the effectuation principles, our hypotheses will again predict their respective association with EO by considering if the focal principle reflects a promotion or prevention focus. We will suggest that some effectuation principles reflect a promotion focus, whereas others reflect a prevention focus. Previous research pointed toward the possibility for such differences among the effectuation principles by highlighting two contrasting ways in which effectuation is enacted: the expansion of available resources and means as well as the accretion of constraints on the venture (Sarasvathy, 2008; Sarasvathy & Dew, 2005; Sarasvathy, Kumar, York, & Bhagavatula, 2014). These two ways are indicative of the two regulatory foci. Efforts to expand the available resources and means encourage organizational leaders to be open to new possibilities (Sarasvathy et al., 2014). Trying to expand resources and means, leaders experiment with "as many strategies as possible [...] and prefer] options that create more options in the future over those that maximize returns in the present" (Sarasvathy, 2001, p. 252). In so doing, they are aware that not all experiments and options will turn out favorably, but their openness to new, disconfirming information "allows unfruitful experiments to be abandoned" (Sarasvathy et al., 2014, p. 74). Organizational leaders thus strive to achieve
hits rather than avoid false alarms. As the inclination to focus more on achieving hits than on avoiding false alarms represents a promotion focus (Brockner et al., 2004; Tumasjan & Braun, 2012), leaders’ efforts to expand resources and means are governed by a promotion focus. In contrast, the inclination to focus on fulfilling obligations and avoiding harmful failure characterizes a prevention focus (Brockner et al., 2004; Wu et al., 2008). When organizational leaders try to limit potential losses, deepen mutual commitments with their stakeholders, and place constraints on their venture by doing so, their efforts are guided by a prevention focus. As was the case with causation, our hypotheses predict that the application of promotion-focused effectuation principles will be positively related to EO, whereas the use of prevention-focused effectuation principles will be negatively related to EO.

2.2 | H2: Experimentation

When organizational leaders adopt the experimentation principle, they rely on the means at hand to generate potential opportunities (Chandler et al., 2011; Sarasvathy et al., 2014). They insert the means into a series of trial-and-error changes in order to identify potential new applications and a viable basis for competition (Chandler et al., 2011). They know a priori that not every experiment will work out as hoped and are willing to abandon unfruitful experiments (Sarasvathy et al., 2014). Thus, leaders who adopt the experimentation principle exhibit a promotion focus since they are inclined to strive for hits rather than to avoid false alarms (Baron, 2004; Brockner et al., 2004). We therefore expect that the application of the experimentation principle is positively related to EO.

First, experimentation serves to identify distinct, radically different approaches to given problems (Ahuja & Lampert, 2001). Organizational leaders who use experimentation thus devote financial and other resources to exploring alternative solutions with uncertain outcomes. Since many experiments will not turn out favorably, this approach is inherently risky (March, 1991). Second, experimentation is conducive to the initiation of competitive actions that other firms react to. The initiation of such actions may be considered a real-world experiment. With experiments as a series of trial-and-error changes (Andries, Debackere, & Looy, 2013), a firm shaped by leaders who value experimentation seems likely to initiate such actions and change them if competitors’ reactions warrant changes. The initiation of such actions is characteristic of proactive firms (Covin & Slevin, 1989). Finally, experiments traditionally play a central role in developing new products and processes (Thomke, 1998). The importance of experiments tends to increase the more such research and development projects progress from a firm’s current technology (Ahuja & Lampert, 2001). As a consequence, a strong preference for experiments on the part of its leaders allows a firm to be highly innovative. Therefore,

Hypothesis 2 (H2) Use of the experimentation principle is positively related to a firm’s EO.

2.3 | H3: Flexibility

Organizational leaders who adopt the flexibility principle embrace unexpected contingencies, see them as opportunities rather than threats, and hence try to leverage rather than to avoid them (Chandler et al., 2011; Dew, Read, Sarasvathy, Wiltbank, 2009). When leaders see contingencies as opportunities, they focus more on identifying potentially valuable hits than on avoiding false alarms. Their willingness to switch to new business opportunities and deviate from their previous activities thus implies a promotion focus (Brockner et al., 2004; Hmieleski & Baron, 2008; Wu et al., 2008). We therefore expect that the adoption of the flexibility principle is positively related to EO.

First, organizational leaders of entrepreneurial firms typically operate under considerable uncertainty (Burns, Barney, Angus, & Herrick, 2016; Read et al., 2009), which implies that emerging alternative opportunities and their implications are generally poorly understood (Hmieleski & Baron, 2008; Shane & Venkataraman, 2000). The more the novel opportunities deviate from the firm’s previous course of action, the less useful the firm’s accumulated knowledge frequently becomes for their assessment (Alvarez & Barney, 2007; Sleptsov & Anand, 2008). Switching to novel opportunities requires substantial adaptations in the firm’s resources and the way they are applied (Sarasvathy,
The more its leaders are inclined to pursue novel, poorly understood opportunities, the more risk a firm often has to take to make these adaptations (Ardichvili, Cardozo, & Ray, 2003). Second, a firm's resources and means play a crucial role in the recognition, creation, and evaluation of opportunities (Sarasvathy, 2008). A novel opportunity embraced by a firm may thus not have been available or attractive to other firms (Haynie, Shepherd, & McMullen, 2009). In contrast, embracing opportunities that are already exploited by many firms may be unattractive for a small firm with limited resources (Yamakawa, Peng, & Deeds, 2008). A firm may thus shy away from pursuing such an opportunity, unless it finds a new way to approach it (Chen & Hambrick, 1995). Whether a firm embraces novel opportunities or new ways to approach opportunities, its level of proactiveness is high (Nakos, Brouthers, & Dimitratos, 2014). Third, the firm's level of innovativeness will also be high as it has to develop new products, services or solutions to leverage novel opportunities or to approach opportunities in an innovative way (Lumpkin & Dess, 1996). Therefore,

**Hypothesis 3 (H3)** *Use of the flexibility principle is positively related to the firm’s EO.*

### 2.4 | H4: Precommitments

Organizational leaders who adopt the precommitment principle disclose their ideas to potential external partners early on, ask these stakeholders for input, and try to get these stakeholders' commitment for collaboration from the onset of their endeavors (Chandler et al., 2011; Sarasvathy, 2008). The resources, means, and goals of involved stakeholders influence what the firm will do (Sarasvathy et al., 2014). To avoid disinterested parties having a voice in shaping the activities and goals of the venture, only stakeholders that are willing to commit themselves are included: "the effectual commitment always favors the error of letting possible customers go as opposed to letting noncustomers drive the decision process" (Sarasvathy & Dew, 2005, p. 545; emphasis in original). Put differently, leaders looking for stakeholders to involve prefer avoiding "false alarms" and making correct rejections over achieving hits. Thus, they exhibit a prevention focus (Brockner et al., 2004; Tumasjan & Braun, 2012). We therefore expect that the adoption of the precommitment principle is negatively related to EO.

First, when firms exploit opportunities jointly with external parties, benefits and costs can be shared among the parties (Chandler et al., 2011). While this approach reduces the costs that the focal firm has to bear, it also limits the returns the firm can reap. Since firms that possess a strong EO typically attempt to maximize potential returns (Covin & Slevin, 1989), a firm's EO should be limited when its leaders emphasize precommitments. Moreover, when firms agree to collaborate in order to exploit an opportunity jointly, they usually do not commit all the resources that might be necessary in the course of the exploitation at the outset, but rather agree on certain milestones (Ariño & de la Torre, 1998). Partners can reconsider their commitments at these points and decide whether they want to proceed or not. Thus, collaborations tend to induce more incremental investment decisions instead of the "bold, wide-ranging acts" that are typical for high levels of EO (Covin & Slevin, 1989, p. 86). Second, a common intention of firms characterized by a strong EO is to anticipate new opportunities before competitors do (Covin & Slevin, 1989) in order to "beat competitors to the punch" (Miller, 1983, p. 771). However, organizational leaders favoring precommitments prefer exploiting opportunities jointly with others as this can reduce the uncertainty associated with such an endeavor and spread out responsibility (Chandler et al., 2011; Tocher, Oswald, & Hall, 2015). They are typically willing to "work with any and all self-selected stakeholders" (Sarasvathy, 2008, p. 89), including customers, suppliers and competitors (Chandler et al., 2011). Thus, the firms that these leaders manage will ally and coordinate some of their decisions with such "self-selected stakeholders." To attract external partners, the focal firm typically has to reveal its intentions early on to some extent so that competitors may become aware of them at the onset. Competitors can thus take these insights into account in their own strategy formulation, before the focal firm's intentions turn into overt actions in the marketplace. This effect is aggravated the more the firm's coordination with external partners is time-consuming, giving competitors more time to develop an appropriate strategy in advance of the focal firm's overt
actions. As a result, the focal firm’s proactiveness is likely to decline (Covin & Slevin, 1989). Third, firms that seek commitments from external partners usually also have to commit themselves to these partners, joint objectives, agreed-upon processes, and coordinated courses of action (Burns et al., 2016; Luo, 2008). As a consequence, external commitments cause a firm to be inert and less inclined to innovate (Greve, 2003). Put differently, there is a “fundamental clash” between the logics of innovation and external commitments (Sivadas & Dwyer, 2000, p. 32). A meta-analysis reveals that even in the case of external commitments specifically made for innovation purposes, advantages are hard to reap for SMEs (Rosenbusch, Brinckmann, & Bausch, 2011). Thus,

**Hypothesis 4 (H4)** *Use of the precommitment principle is negatively related to a firm’s EO.*

### 2.5 H5: Affordable loss

Investments in entrepreneurial opportunities typically entail both an upside potential (potential gain) and a downside potential (potential loss) (DeCarolis & Saparito, 2006; Janney & Dess, 2006). Organizational leaders who adopt the affordable loss principle determine the maximum level of investment they are comfortable losing in the worst case. In choosing among options, they select an alternative whose worst case is still acceptable to them (Sarasvathy, 2001). As leaders strive to avoid losses that would threaten the survival of their venture (Dew, Sarasvathy, Read, Wiltbank, 2009), they pursue avoidance-oriented or “minimal” goals and hence exhibit a prevention focus (Brockner et al., 2004; Wu et al., 2008). We therefore expect that the adoption of the affordable loss principle is negatively related to EO.

First, firms with a strong EO are typically characterized by a preference for high-risk projects that offer chances of very high returns, but also entail the possibility of substantial losses (Covin & Slevin, 1989; Rauch et al., 2009). Leaders who emphasize affordable loss likely prefer more conservative projects over those that could result in substantial losses. Moreover, affordable loss-oriented leaders tend to favor a sequence of stepwise investments over singular, far-reaching commitments in order to lower potential losses (Dew, Sarasvathy, et al., 2009). Promoting such an incremental approach is also likely to be negatively associated with a firm’s EO since firms with a strong EO typically try to realize their objectives by adopting “bold, wide-ranging acts” rather than incremental procedures (Covin & Slevin, 1989, p. 86). Second, a strong EO typically implies proactive behaviors such as “introducing new products or services ahead of the competition and acting in anticipation of future demand to create change and shape the environment” (Lumpkin & Dess, 2001, p. 431). Large investments will typically be required if a firm intends to create change and shape the environment (Sorescu, Chandy, & Prabhu, 2003). The size of the investments their firm would have to make in pursuit of these objectives can easily exceed what affordable loss-oriented leaders would be comfortable losing in the worst-case scenario. Firms of affordable loss-oriented leaders are therefore likely to forego some opportunities that would imply proactiveness. Further, even when these firms actually act on such opportunities, their leaders’ preference for stepwise investments is likely to induce multiple rounds of commitment re-examination and renewal along the way (Sarasvathy, 2001). These re-examinations reduce the speed with which these firms can pursue such opportunities in comparison to firms that rely on one far-reaching commitment (Dew, Sarasvathy, et al., 2009). This slowdown should limit their EO since firms with a strong EO tend to realize opportunities ahead of the competition (Lumpkin & Dess, 2001). Third, the high level of innovativeness associated with a strong EO usually implies a predisposition toward introducing new products and processes and toward emphasizing technological leadership and novelty in doing so (Lumpkin & Dess, 2001; Rauch et al., 2009). However, developing new products and processes can be very resource-consuming and many development projects do not turn out favorably (Joshi & Sharma, 2004). The more such projects diverge from a firm’s current technology, the lower the success rate and the higher the costs tend to be (March, 1991; Salomo, Talke, & Strecker, 2008). Firms with leaders who focus on affordable loss can consequently be expected to forego or abandon some development projects. Therefore,

**Hypothesis 5 (H5)** *Use of the affordable loss principle is negatively related to a firm’s EO.*
3 | DATA AND METHODS

We opted for a survey study design to examine whether the use of causation or a focal effectuation principle by entrepreneurs and their management teams is positively or negatively related to the EO of SMEs. Collecting primary data for this purpose offers the advantage that established survey instruments are available for both the effectuation and causation approaches and EO, whereas detailed secondary information on these issues is hard to get for a sufficiently large number of firms, especially for SMEs (Lyon, Lumpkin, & Dess, 2000; Perry, Chandler, & Markova, 2012). We focus on SMEs because entrepreneurs and their management teams typically exert an enormous influence on these firms and the firms’ EO (Covin & Slevin, 1991; Miller, 2011; Wang, Thornhill, & De Castro, 2017). To evaluate the primary survey data with respect to our hypotheses, we use maximum likelihood SEM because SEM considers the convergent and discriminant validity of psychometric measures and accounts for potential biasing effects of random measurement error (Kline, 2010; Medsker, Williams, & Holahan, 1994). We will subsequently describe in greater detail how we collected and evaluated the data.

3.1 | Sampling frame

To examine the associations between decision-making principles and EO, we chose to study the RE and EE industries because these industries are dynamic and characterized by high levels of uncertainty and risk in the technological, regulatory, and market spheres (Foxon et al., 2005; Furr, Cavarretta, & Garg, 2012; Wuebker, Hamp, & Wüstenhagen, 2015). Hence, they afford ample opportunity for entrepreneurial activity (Knudsen & Lien, 2015). Further, we chose to analyze firms in Switzerland because this country is characterized by owner-managed firms—approximately 99.4% of all Swiss firms are SMEs (Bundesamt für Statistik, 2007). We therefore contacted the SFOE to gain support for our endeavor. Fortunately, the SFOE agreed to collaborate on implementing a survey with us. We subsequently compiled a list of candidate firms for empirical study from a directory of all firms active in the RE/EE industries in Switzerland provided by the SFOE, from exhibitor lists from industry fairs, and from industrial supplier directories. Companies with more than 250 employees, subsidiaries of larger companies, firms headquartered outside of Switzerland (or Liechtenstein), and consulting and trading companies active in the RE/EE industries were excluded. As an exception, companies with up to 500 employees were included if they met both of the following criteria: First, secondary sources (e.g., company websites, newspaper articles) indicated that they exceeded the 250 employee threshold only after they had entered the energy sector. The respective firms hence made some of the decisions covered by the effectuation and causation scales below while having 250 employees or less. Second, the companies were at least 10 years old when they entered the energy sector. Since our sample focuses on new entrants into this sector (as we will outline subsequently), the respective companies spent the vast majority of their lives within the 250 employee threshold and grew bigger only recently. If the exact number of employees could not be determined, firms were only included if they clearly fell in the SME category of firms.

We collected information on all remaining candidate companies through internet and telephone inquiry, with the objective of identifying those firms that had entered the energy sector with a new or significantly modified product within the last 5 years. A focus on new entrants was chosen in order to select firms in which important entrepreneurial decisions had recently been made. Moreover, these firms had to deal with a high degree of uncertainty, as they had not previously been exposed to the specific environment of the energy sector. In such a situation, a firm typically becomes particularly susceptible to the influence of its organizational leaders (Marquis & Tilcsik, 2013). Hence, these firms offer a promising opportunity to examine the relationships between leader-related and firm-level variables. All the firms that did not meet this requirement were also excluded, leaving a final population of 503 companies.
3.2 | Measurement

The constructs considered in this investigation refer to approaches that organizational leaders adopt to make entrepreneurial decisions as well as to the firms that these leaders manage. As organizational leaders possess considerable discretion and decision-making powers in SMEs, their decisions exert a strong direct influence on firm-level outcomes (Daily, McDougall, Covin, & Dalton, 2002; Finkelstein et al., 2009), and the organizational leadership and the firm levels converge in SMEs (Covin & Slevin, 1991; Rauch et al., 2009). Numerous studies show that this effect allows scholars to link organizational leadership variables directly to SME-level phenomena without further consideration of multilevel issues (e.g., Hmieleski, Carr, & Baron, 2015; Miller & Le Breton-Miller, 2011; Simsek, Heavey, & Veiga, 2010). Following this lead, we link decision-making variables directly to EO, whose roots in decisions made by organizational leaders have been emphasized repeatedly (Covin & Lumpkin, 2011; Covin & Wales, 2012).

We collected survey data on all measures. As detailed at the end of this section, we tested the data extensively to rule out single respondent bias and common method variance (CMV) and to assess the reliability and validity of our measures. The measurement model is presented in Figure 1.

3.2.1 | Endogenous variables

Several articles have been devoted to the question of how EO should be measured (e.g., Covin & Lumpkin, 2011; Covin & Wales, 2012; George, 2011; Lyon et al., 2000). These articles recommend choosing a measurement approach based on the research question and context since no approach is superior to alternative approaches per se. Our choice is based on the recommendations of these articles. First, we adopt a survey-based approach to
measuring EO since this approach allows for in-depth insights and is particularly appropriate in small firms, which are typically not covered widely in published sources (Lyon et al., 2000). Second, we operationalize EO as a reflective second-order construct because we want to better understand the correlates of EO as a higher-order construct (George, 2011). Specifically, our second-order construct entrepreneurial orientation is derived from the first-order constructs risk taking, proactiveness, and innovativeness whose items are adopted from Covin and Slevin (1989). We adopt Covin and Slevin’s (1989) measure because it is consistent with the conceptualization of EO embraced in the current paper (Covin & Lumpkin, 2011, p. 859) and because “it has been applied successfully in numerous studies of EO” (Lyon et al., 2000, p. 1066). The items are reproduced in the Appendix A, which provides a detailed account of all our item-based measures and their Cronbach’s alpha.

3.2.2 | Exogenous variables
We employ Chandler et al.’s (2011) established scales to measure the extent to which organizational leaders use effectuation and causation. The scales ask respondents how they made important decisions related to a recent entrepreneurial endeavor such as developing a new product for a new market. The scales refer to decisions related to the initiation of this endeavor as well as to decisions related to its subsequent evolution and thus cover the use of effectuation and causation over a period of time. As our sample consists of small firms that entered the RE/EE industries with a new or substantially modified product within the last 5 years, the time frame of our study is comparable to the one considered in recently published applications of Chandler et al.’s (2011) scales (Deligianni et al., 2017; Smolka et al., in press). Chandler et al. (2011) propose a final set of five scales; adopting all of them provides us with measures of the extent to which organizational leaders use causation, experimentation, flexibility, precommitments, and affordable loss.

3.2.3 | Control variables
We controlled for firm age (years since establishment), firm size (number of employees), the firm’s R&D expenditures, and the entrepreneur’s entrepreneurial experience (number of years the respondent has been working as an entrepreneur).

3.3 | Implementation
Validated academic procedures of questionnaire design (Dillman, 2000) informed the production of a fully standardized questionnaire with which we collected data on the above measures. Before it was sent to the owner by email, the arrival of the questionnaire was announced in a personal letter, which also communicated SFOE’s support for the survey. Owners were given an account of the aims of the study, were guaranteed confidentiality, and were offered a summary of the study results. Reminder emails were sent 8 and 16 days following the initial mailing. Data collection was closed after 28 days at the end of 2011. Of the 503 firms, 151 responded, yielding a favorable response rate of 30.02%. We compared respondents and nonrespondents with regard to firm size, firm age, and with respect to the probability of business closure 3–5 years after the survey. Two-tailed t tests indicated no significant differences between respondents and nonrespondents at p < 0.10 or smaller.

3.4 | Single respondent bias and CMV
Following the recommendations of Chang, van Witteloostuijn, and Eden (2010) and Podsakoff, MacKenzie, and Podsakoff (2012), we employed multiple procedural and statistical approaches to rule out single respondent bias and CMV at the design and evaluation stages of our survey.

Procedural remedies such as using established instruments to measure our constructs and using a counterbalanced question order minimized the potential for CMV ex ante. Moreover, a comparison between the responses of participants who completed our questionnaire in multiple sessions on different days (22 of 151 people; 14.57%) and
the responses of the remaining 129 participants suggests that our results are not substantially biased by the fact that most participants provided their responses at a single point in time (c.f., Johnson, Rosen, Chang, & Lin, 2015).

In terms of statistical remedies, Podsakoff et al. (2012, p. 564) "recommend using the CFA marker technique or the common method factor technique [... to] control for measurement error." To gain multiple insights into the possibility of CMV, we used both of these techniques and also conducted the three phases of Williams, Hartman, and Cavazotte's (2010) confirmatory factor analysis (CFA) marker technique for two different CFA markers—the "green-ness" of the focal firm's products and the importance of "indirect subsidies." Overall, the various statistical remedies corroborate that our results are unlikely to be substantially biased. Details and results are available upon request.

3.5 | Assessment of reliability and validity of the measures

To ensure the reliability of our scales, we calculated Cronbach's alpha for each of them (see Appendix A for results; Nunnally & Bernstein, 1994). Convergent validity was verified by calculating overlap-corrected correlations between an item and the scale it pertains to (results available on request; Nunnally & Bernstein, 1994). Finally, discriminant validity was examined by comparing the square root of the variance shared between the items and their scales (i.e., the average variance extracted) to the correlation coefficients among the scales (see Table 1 for results; Fornell & Larcker, 1981; Staples et al., 1999). Overall, these methods indicate that our measures are reliable and valid.

4 | RESULTS

Table 1 provides descriptive statistics and correlations for all the variables. We adopted the two-step approach to SEM proposed by Anderson and Gerbing (1988) and recommended by numerous researchers (e.g., Mathieu & Taylor, 2006; Medsker et al., 1994; Simsek, Veiga, Lubatkin, & Dino, 2005).

4.1 | Phase 1: CFA model results

In the first phase of Anderson and Gerbing's (1988) approach, a CFA model is fit to the observed data to assess the fit of the overall measurement model and to examine the psychometric properties of the constructs. Each latent variable in SEM needs to be explicitly assigned a metric or a measurement range (Kline, 2010). We did so by setting a loading to 1.0 for one indicator per latent variable.

Judging by standards of good empirical practice (e.g., Bollen, 1989; Kline, 2010; Teo, Wie, & Benbasat, 2003), the hypothesized CFA model fits the data well ($\chi^2 = 401.622$ with $267 \text{ df}$, $p < 0.001$; Goodness of Fit Index (GFI) = 0.84; Adjusted Goodness of Fit Index (AGFI) = 0.79; Normed Fit Index (NFI) = 0.72; Non-Normed Fit Index (NNFI) = 0.85; Comparative Fit Index (CFI) = 0.88; Root Mean Square Error of Approximation (RMSEA) = 0.058). We compared its fit with the fit of several alternative models in which indicators loading onto two separate latent constructs in the hypothesized measurement model load onto one common latent construct instead (Yuan & Woodman, 2010). $\chi^2$ difference tests indicated that the hypothesized measurement model fits the data significantly better than any of these alternative models ($p < 0.01$ or smaller in every case). These results suggested that our measurement model is adequate and that we could proceed with the second phase of the two-step approach (Simsek et al., 2005).

4.2 | Phase 2: Sequence of nested structural models results

In the second phase of Anderson and Gerbing's (1988) approach, contrasts between nested structural models are used to obtain the model that best accounts for the covariances observed between the models' exogenous and endogenous constructs.

To this end, we compared the following structural models: our hypothesized model, in which the relationships of EO with causation and the four individual effectuation principles are tested concurrently, five models that constrain
### TABLE 1  Descriptive statistics and correlations

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Affordable loss</td>
<td>0.791</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimentation</td>
<td>−0.068</td>
<td>0.540</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Precommitments</td>
<td>0.064</td>
<td>−0.110</td>
<td>0.781</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flexibility</td>
<td>0.321**</td>
<td>0.288**</td>
<td>0.274**</td>
<td>0.679</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Causation</td>
<td>0.188*</td>
<td>0.061</td>
<td>0.411****</td>
<td>0.440***</td>
<td>0.566</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entrepreneurial orientation</td>
<td>−0.095</td>
<td>0.270**</td>
<td>0.027</td>
<td>0.432***</td>
<td>0.523***</td>
<td>0.802</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R&amp;D expenditures</td>
<td>−0.195**</td>
<td>0.107</td>
<td>0.046</td>
<td>−0.183*</td>
<td>0.133</td>
<td>0.184*</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entrepreneurial experience</td>
<td>0.106</td>
<td>0.102</td>
<td>−0.065</td>
<td>0.151</td>
<td>−0.086</td>
<td>0.166*</td>
<td>−0.125</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firm size</td>
<td>−0.058</td>
<td>−0.061</td>
<td>0.011</td>
<td>−0.101</td>
<td>0.131</td>
<td>−0.057</td>
<td>0.539****</td>
<td>−0.230***</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>Firm age</td>
<td>−0.061</td>
<td>−0.145</td>
<td>0.118</td>
<td>−0.036</td>
<td>0.063</td>
<td>−0.094</td>
<td>0.243***</td>
<td>−0.166**</td>
<td>0.473****</td>
<td>1.000</td>
</tr>
<tr>
<td>Mean</td>
<td>5.049</td>
<td>3.412</td>
<td>3.897</td>
<td>5.222</td>
<td>4.618</td>
<td>4.373</td>
<td>466,339</td>
<td>7</td>
<td>52</td>
<td>35</td>
</tr>
<tr>
<td>SD</td>
<td>1.750</td>
<td>0.976</td>
<td>1.687</td>
<td>1.300</td>
<td>1.124</td>
<td>0.983</td>
<td>882,920</td>
<td>10</td>
<td>72</td>
<td>31</td>
</tr>
<tr>
<td>Min</td>
<td>1</td>
<td>1.25</td>
<td>1</td>
<td>1.5</td>
<td>1</td>
<td>1.5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Max</td>
<td>7</td>
<td>6</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>6.75</td>
<td>6,000,000</td>
<td>40</td>
<td>480</td>
<td>154</td>
</tr>
</tbody>
</table>

Notes. The bold diagonal elements are the square root of the variance shared between the items and their scales (i.e., the average variance extracted). Off diagonal elements are the correlations between the constructs. For discriminant validity, the diagonal elements should be larger than any other corresponding row or column entry (Staples, Hulland, & Higgins, 1999). *p < 0.10; **p < 0.05; ***p < 0.01; ****p < 0.001.
the relationship between EO and one of our hypothesized exogenous variables at a time to zero, and one baseline model in which the relationships of EO with all five hypothesized exogenous variables are constrained to zero. $\chi^2$ difference tests indicate that the fit of our hypothesized model is significantly better ($p < 0.05$ or smaller) than the fit of all but one of the nested, constrained models. The one exception whose fit is not significantly worse is the nested model in which the relationship between experimentation and EO is constrained to zero. With this observation in mind, we use the hypothesized model reproduced in Figure 1 to test our hypotheses.

### 4.3 Results of hypotheses testing

Comparing two versions of our hypothesized model—with and without the full set of control variables—indicates that including the control variables does not significantly affect whether our hypotheses are statistically supported or not. Extensive results for the full model that includes paths and coefficients for all the control variables are available upon request. Figure 1 reports the coefficients and paths from the more parsimonious model without manifest control variables to enhance readability.

Four of the five hypotheses are supported: H1, which maintained a positive relationship between causation and EO, at $p < 0.001$; H3, which predicted a positive relationship between flexibility and EO, at $p < 0.05$; H4, which posited a negative relationship between precommitments and EO, at $p < 0.05$; and H5, which proposed a negative relationship between affordable loss and EO, at $p < 0.01$. With respect to H2, which assumed a positive relationship between experimentation and EO, we observe that the coefficient of experimentation has the expected positive sign, but is not significant. Thus, H2 is not supported. This last result is in line with the aforementioned observation that the fit of the nested model in which the relationship between EO and experimentation is constrained to zero is not significantly worse than the fit of our hypothesized model.

### 5 DISCUSSION

Recently, scholars have increasingly pointed toward substantial differences between the various principles that make up the effectuation approach to entrepreneurial decision making (e.g., Arend et al., 2015; Chandler et al., 2011; Read et al., 2016). Since a sound understanding of the implications of pursuing effectuation is essential for scholars and practitioners alike (Arend et al., 2015; Read et al., 2016), our study examines whether the four effectuation principles distinguished by Chandler et al. (2011) and Deligianni et al. (2017)—experimentation, flexibility, precommitments, and affordable loss—differ in their respective relationship with the EO of SMEs. Building on regulatory focus theory (Brockner et al., 2004; Hmieleski & Baron, 2008), we look at the principles’ predominant regulatory focus to argue that principles with a promotion focus (experimentation, flexibility) tend to be positively related to EO, whereas principles with a prevention focus (precommitments, affordable loss) are likely to be negatively related to EO. Moreover, we argue that the causation approach tends to be positively related to EO, as it is also dominated by a promotion focus. Testing these predictions with Swiss SMEs in the RE and EE industries provides support for all our hypotheses except for experimentation. These findings have important implications for the academic literature, management education, and management practice.

#### 5.1 Implications for the academic literature

First, our study delves into the differences between the various effectuation principles, which have recently been highlighted as a main area for further effectuation research (Read et al., 2016; Welter et al., 2016). The effectuation literature has been criticized for describing effectuation as a “single construct” and thus as “an internally consistent set of ideas that forms a clear basis for action [... although] the construct appears to be an amalgam instead—a composite of several different cognitive processes and behaviors” (Arend et al., 2015, p. 642). Leading proponents of the
effectuation framework reaffirm this criticism by admitting that "we seem to be confounding" several aspects in the effectuation concept (Read et al., 2016, p. 531). To resolve this problem, these proponents recommend using "well-developed theories from psychology" to distinguish between hitherto confounded aspects within the concept (Read et al., 2016, p. 531). Following their recommendation, we respond to the call to clarify the effectuation concept by applying regulatory focus theory, which provides a "well-developed framework" to understand differences in the cognitions and behaviors of entrepreneurs (Burmeister-Lamp et al., 2012, p. 460). In so doing, our study introduces the distinction between promotion- and prevention-focused effectuation principles. The predominant regulatory focus has "a major impact on people's feelings, thoughts, and actions" (Higgins, 1998, p. 2). Distinguishing the effectuation principles according to their underlying regulatory focus therefore clarifies the effectuation concept with respect to the basis of action as demanded by Arend et al. (2015): Organizational leaders with a promotion focus attend to what they might gain by acting and apply eagerness means, whereas prevention-focused leaders attend to what they might lose by acting and apply vigilant means. Eagerness means denote actions to ensure hits and to avoid errors of omission, while vigilant means denote actions to ensure correct rejections and to avoid errors of commission (Hmieleski & Baron, 2008; Tumasjan & Braun, 2012). Consequently, we find that promotion- and prevention-focused effectuation principles can have opposite associations with a focal criterion; specifically, we observe positive (promotion focus) versus negative (prevention focus) associations with EO. The distinction between promotion- and prevention-focused principles therefore also clarifies the effectuation concept with respect to its implications, which belong to the most important criteria to assess effectuation (Read et al., 2016).

Second, our study shows that the promotion-focused effectuation principles can be more similar to causation in their association with relevant criteria than they are to the prevention-focused effectuation principles because causation is also promotion-focused. In contrast to prevention-focused effectuation principles, which are found to be negatively related to EO, causation and the promotion-focused effectuation principles tend to be positively related to EO. This finding illustrates that the widespread practice of depicting effectuation and causation as opposites (Brettel et al., 2012; Dew, Read, et al., 2009; Reymen et al., 2015; Sarasvathy, 2001) may be helpful for illustrative purposes, but can also be misleading: While prevention-focused effectuation principles and causation may indeed have opposite associations with a focal criterion, promotion-focused effectuation principles and causation can exhibit congruent associations with said criterion. As a consequence, the level of EO can be higher when organizational leaders pursue causation and promotion-focused effectuation principles in combination than it is when leaders engage in a trade-off between them. This insight extends the argument that effectuation and causation can be pursued in combination (e.g., Chandler et al., 2011; Perry et al., 2012; Reymen et al., 2015) by illuminating the implications of such a combined pursuit. So far, studies into the implications of pursuing effectuation, which do not treat effectuation and causation as the endpoints of a continuum, have rarely included causation in their analyses (see Smolka et al., in press, for a notable exception). The implications of combling effectuation and causation are therefore still relatively poorly understood. Our findings indicate that these implications may not be homogenous across various effectuation principles: Relative to an exclusive pursuit of causation, pursuing causation in combination with effectuation principles can be associated with higher or with lower levels of a criterion such as EO. A higher level of this criterion may be observed if the promotion-focused causation approach is combined with promotion-focused effectuation principles, whereas lower levels can be found if causation is combined with prevention-focused effectuation principles. Our analysis thus generates insights that respond to Read et al.'s (2016, p. 531) call to study "useful ways to mix and match" effectuation and causation.

Third, many scholars agree that the EO of an SME is substantially driven by the organizational leaders (Covin & Slevin, 1991; Miller, 1983; Rauch et al., 2009). Studies that went beyond this general notion and examined the influence of specific leader-related antecedents on EO in greater detail have primarily focused on leaders' demographic and psychological characteristics (e.g., Miller & Le Breton-Miller, 2011; Poon, Ainuddin, & Junit, 2006; Simsek et al., 2010; see Wales et al., 2013 for an overview). In contrast, relatively few of these efforts analyze how a firm's EO is influenced by leaders' approaches to decision making (for a notable exception, see Chaston and Sadler-Smith's (2012) study on leaders' use of intuitive cognition in making decisions). This scarcity of corresponding research has
left us with a substantial knowledge gap. The approaches leaders adopt to make important decisions tend to have substantial implications for organizational attributes such as EO (Covin & Wales, 2012; Engel et al., 2017). Research into decision making as a correlate of EO is therefore "most promising" (Daily et al., 2002, p. 394) and calls to advance our knowledge along these lines have accumulated in recent years (Covin & Lumpkin, 2011; Lumpkin, Steier, & Wright, 2011; Slevin & Terjesen, 2011; Wales, 2016). Our study contributes to closing the identified knowledge gap by focusing on approaches to decision making that have developed into core concepts in strategy and entrepreneurship research—effectuation and causation (Arend et al., 2015; Read et al., 2016; Reymen et al., 2015).

5.2 | Paths for future research

In addition to these contributions, our study has several further implications for future research. Our finding that prevention-focused effectuation principles tend to be negatively associated with EO raises the question whether they make a positive contribution to firms' entrepreneurial success and, if so, what their contribution looks like. Sarasvathy (2001, 2008) derived the effectuation principles from an analysis of how expert entrepreneurs make entrepreneurial decisions. It therefore seems likely that the application of these principles by organizational leaders will not be detrimental to entrepreneurial success per se. This reasoning could stimulate two lines of research: First, scholars could search for specific criteria that are relevant to entrepreneurial success and that are positively related to prevention-focused effectuation principles. For example, Covin and Lumpkin (2011) and Slevin and Terjesen (2011) advance the notion that there may be alternative forms of EO that reflect other first-order constructs than risk taking, proactivity, and innovativeness. As our results suggest that promotion-focused effectuation principles tend to be positively related to the established form of EO, it could be that prevention-focused effectuation principles are positively related to an alternative form of EO. Exploring this possibility is a promising path for future research since alternative forms of EO represent one of two "high-potential research foci" regarding EO identified by Covin and Lumpkin (2011, p. 867). The idea that principles such as affordable loss and precommitments could be positively related to the sought-after construct might provide some guidance to scholars in search of an alternative form of EO.

Second, Baron (2004, p. 231) suggests that entrepreneurs who "temper [...] their" promotion focus with some aspects of a prevention focus might be more adept at distinguishing between truly excellent opportunities and less viable ones than entrepreneurs who adopt a pure promotion focus. This tempering of leaders' promotion focus could represent an essential contribution of prevention-focused effectuation principles to entrepreneurial success. Future research should seek to improve our understanding of how promotion and prevention focus can work together to advance entrepreneurial success. Such research may find that there are success-related criteria for which fruitful combinations of prevention-focused effectuation principles and the promotion-focused causation approach exist. Such findings would further extend our knowledge about "useful ways to mix and match" effectuation and causation (Read et al., 2016, p. 531). Moreover, future research could also build on Baron's (2004) argument in order to search for firm-level attributes that act as complements to EO in affecting success-related outcome measures. Since our findings indicate that EO is rooted in leaders' promotion focus, reasoning in analogy to Baron (2004) suggests that EO may exert a stronger effect on success when it is tempered by a firm-level attribute that is rooted in leaders' prevention focus than when it occurs in isolation. Such research would respond to the calls to intensify the analysis of moderators of the EO-performance relationship (Rauch et al., 2009; Wales, 2016; Wang et al., 2017).

The notion that effectuation and causation can be mixed and matched presents another promising opportunity for future research. Our study, like previous efforts (e.g., Chandler et al., 2011; Read et al., 2016; Reymen et al., 2015; Sarasvathy, 2001), argues that it is possible to pursue effectuation and causation approaches to decision making in combination. The cognitive underpinnings of this popular claim, however, are rather poorly understood. Most research that makes this claim, including our study, refers to a certain time frame—such as the start-up phase or a new product development endeavor—in which these approaches are combined. It is less clear if decision makers can also combine effectuation and causation approaches at a single point in time and how easily they can switch between these approaches. Research grounded in cognitive psychology and potentially even neuroscientific methods, such as
functional magnetic resonance imaging, could improve our understanding of these important issues (Laureiro-Martinez, Brusoni, Canessa, & Zollo, 2015; Ott, Eisenhardt, & Bingham, 2017).

We conclude this section by encouraging research to extend our analysis. Since effectuation and causation approaches to decision making as well as EO have each developed into central concepts in the strategy and entrepreneurship literatures (Read et al., 2016; Slevin & Terjesen, 2011; Wales et al., 2013), the relationships of effectuation and causation with EO deserve further attention. Future research may build on our insights by examining moderators and mediators of the relationships under consideration here. Table 2 presents some suggestions for research along these lines.

5.3 Limitations

Future research could also address the limitations of our study. First, our empirical analysis focused on firms from the Swiss RE and EE industries, even though our theoretical arguments are not specific to this particular country or this particular sector. Future research could therefore test our theoretical claims in different settings. Second, our study shares the common limitation that a cross-sectional design only allows us to infer association, not causality. The direction of influence we propose—from decision-making approaches adopted by the organizational leaders to the firm-level concept of EO—is supported by much prior research that has highlighted leaders’ influence on the properties of their (small) firms. This supporting prior research includes some empirical studies with research designs that can establish temporal precedence (e.g., Furr et al., 2012; Mihalache, Jansen, Van den Bosch, & Volberda, 2014; Simsek et al., 2010). Nevertheless, future research could deploy longitudinal designs to address causality in the relationship between effectuation and EO more comprehensively. Third, like other recent empirical efforts on effectuation (Deligianni et al., 2017; Smolka et al., in press), our study restricts itself to the scales developed by Chandler et al. (2011). In line with Sarasvathy (2001), Chandler et al. (2011) feature four effectuation principles, but this selection need not be exhaustive. For instance, Sarasvathy (2008) herself occasionally refers to five (pp. 15–16) or six (p. 255) principles. Future research may work on establishing the predominant regulatory focus of effectuation principles not included here. Fourth, whereas four of our five hypotheses are supported, we do not observe a significant result for experimentation. A potential explanation for this result can be found in recent approaches to the development of new products for new markets (e.g., design thinking and the lean start-up methodology). These approaches recommend testing new product ideas through a series of quick, focused, and frugal experiments with customers (Blank, 2013; Furr & Dyer, 2014). These repeated experiments are specifically designed to reduce risk and costs, render the firm’s new products tried and true early on, and contribute to a gradual exploration of the environment (Furr & Dyer, 2014). The emerging approaches therefore illustrate that experiments can also entail characteristics of a low EO (Covin & Slevin, 1989). Overall, the relationship between experimentation and EO may be more complex than previously thought. A fine-grained analysis of this relationship seems to be especially promising as more and more firms apply the lean start-up method and other similar approaches. Moreover, our nonsignificant result regarding experimentation points toward another avenue for additional research. Organizational leaders could use experimentation—or “trial and error” (Chandler et al., 2011, p. 380)—to test the effects of their intentions and their means at hand on others until they find a solution that works (Read, Sarasvathy, Dew, & Wiltbank, 2015). Read et al. (2015, p. 11) argue that such trial and error goes beyond the effectuation perspective as it neglects the active involvement of committed stakeholders in the transformation of the means. Consequently, experimentation as such does not always describe effectuation’s means-based approach adequately. Future research may therefore reexamine the scale for the means-based principle in light of these insights.

5.4 Implications for management education and practice

Our findings offer several important insights to management education and management practice. First, our findings suggest that the effectuation principles differ in their relationships with relevant organizational attributes and should therefore not be interchanged at will. Pursuing promotion-focused effectuation principles and pursuing prevention-
### TABLE 2  Suggestions for potential moderators and mediators of the effectuation/causation–entrepreneurial orientation (EO) relationships

<table>
<thead>
<tr>
<th>Our findings</th>
<th>Suggested path for future research</th>
<th>Short motivation</th>
<th>Theoretical foundation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Causation and effectuation principles are related to EO</td>
<td>Does the institutional environment moderate such relationships?</td>
<td>Institutional environments may differ in the extent to which they consider EO legitimate (Kreiser, Marino, &amp; Weaver, 2010). Legitimacy considerations could pull firms toward a certain level of EO (Bruton, Ahlstrom, &amp; Li, 2010). Efforts to keep the deviation from this level low could influence the relationships of causation and effectuation principles with EO.</td>
<td>Institutional theory (Bruton et al., 2010)</td>
</tr>
<tr>
<td>Causation tends to be positively related to EO</td>
<td>Does a firm’s planning capability moderate this relation?</td>
<td>A firm’s planning capability may affect the quality of its plans (e.g., the comprehensiveness of issues covered) and its ability to allocate resources to planned initiatives (Slotegraaf &amp; Dickson, 2004). A strong planning capability may hence help firms sense and seize opportunities (Wolf &amp; Floyd, 2017). As a result, the effectiveness of causation could increase with increases in the level of a firm’s planning capability.</td>
<td>Dynamic capabilities (Teece, 2007; Wolf &amp; Floyd, 2017)</td>
</tr>
<tr>
<td>Experimentation may be positively related to EO</td>
<td>Do the firm’s exploitation endeavors moderate this relation?</td>
<td>Experimentation has been associated with exploration (March, 1991). The ambidexterity literature highlights both challenges and potential benefits of combining exploration and exploitation (Lavie, Stettner, &amp; Tushman, 2010). The firm’s exploitation endeavors may therefore influence the effectiveness of experimentation.</td>
<td>Ambidexterity (Lavie et al., 2010)</td>
</tr>
<tr>
<td>Flexibility tends to be positively related to EO</td>
<td>Does the firm’s level of absorptive capacity moderate this relation?</td>
<td>Absorptive capacity helps firms collect external information, understand new opportunities to serve their customers, and respond to changing market demands (Jansen, Van Den Bosch, &amp; Volberda, 2005). A high level of absorptive capacity should support firms switching to emerging opportunities to make the most of their flexibility.</td>
<td>Absorptive capacity (Volberda, Foss, &amp; Lyles, 2010)</td>
</tr>
<tr>
<td>Precommitments tend to be negatively related to EO</td>
<td>Do attributes of the committing parties moderate this relation?</td>
<td>Attributes of the committing parties may not only affect the quality of the collaboration, but they may also influence attributes of the focal firm. As a result, the firm’s attributes and the partners’ attributes can become more compatible (Bundy, Vogel, &amp; Zachary, 2018). This could imply that precommitments will be less detrimental to EO if the firm collaborates with parties that possess a strong EO themselves.</td>
<td>Organization-stakeholder fit (Bundy et al., 2018)</td>
</tr>
<tr>
<td>Emphasis on affordable loss tends to be negatively related to EO</td>
<td>Do factors grounded in organizational culture and organizational climate moderate this relation?</td>
<td>The affordable loss principle places a constraint on the resources available for entrepreneurial endeavors. Factors grounded in team climate (e.g., open communication, psychological safety) have been found to affect the relationship between resource constraints and outcomes such as team creativity (Rosso, 2014; Weiss, Hoegl, &amp; Gibbert, 2011). It therefore seems possible that factors grounded in organizational climate and culture have an impact on the relationship between affordable loss and EO.</td>
<td>Resource-constrained innovation (Reinhardt, Gurtner, &amp; Griffin, 2018)</td>
</tr>
<tr>
<td>Causation and effectuation principles are related to EO</td>
<td>Do organizational leaders’ selective perception and construed reality moderate the relationship between the principles and EO?</td>
<td>Strategic leadership theory suggests that the relationship between executives’ psychological factors (e.g., cognitive style, cognitive model) and organizational outcomes is mediated by executives’ filtering process, including their selective perception and construed reality (Finkelstein et al., 2009, p. 45). As causation and effectuation principles are associated with various cognitive processes (Sarasvathy, 2008), organizational leaders’ selective perception and construed reality might mediate the relationship between the principles and EO.</td>
<td>Strategic leadership theory (Finkelstein et al., 2009)</td>
</tr>
</tbody>
</table>
focused effectuation principles can have fundamentally different implications, such as positive versus negative associations with EO. Consequently, organizational leaders should not only consider the question of whether they want to pursue the effectuation approach or not, but also the question of which effectuation principles they wish to apply.

Second, our study indicates that the effectuation principles also differ in their similarity with causation. Some effectuation principles and causation share the same regulatory focus and exhibit congruent (positive) associations with EO, whereas other effectuation principles and causation possess disparate regulatory foci and exhibit opposite (negative vs. positive) associations with EO. This finding cautions educators and managers against generalizing experiences made with combinations of promotion-focused effectuation principles and causation to combinations of prevention-focused effectuation principles and causation, and vice versa.

Our results suggest that a joint pursuit of causation and the effectuation principle flexibility can be associated with a very high level of EO. Such a joint pursuit means that organizational leaders engage in strategic planning and competitive analysis (causation) but deviate from the intended course of action if promising opportunities emerge (flexibility). To be able to pursue causation and flexibility in combination, organizational leaders need to overcome planning's "natural tendency to engender inflexibility" (Barringer & Bluedorn, 1999, p. 424). The hesitancy to deviate from plans is in part driven by the fear that deviations will be interpreted as flaws in the initial plan, by the fear of loss of face, and by the development of psychological momentum (Barringer & Bluedorn, 1999). To overcome these psychological impediments to flexibility, organizational leaders should emphasize the provisional nature of their plans from the outset. Moreover, leaders should explicate the critical assumptions underlying their plans and collect information that allows them to assess whether these assumptions are appropriate (Mullins & Komisar, 2010). Leaders can complement periodic reviews in which they check whether their firm has met its specified targets with repeated assessments in which they check whether once appropriate assumptions continue to hold. These checks can stimulate leaders' receptivity for upcoming developments and facilitate the switch to emerging opportunities. Finally, organizational leaders can allow for flexibility when implementing their plans. For instance, they can negotiate contracts that favor adjustments or they can choose multi-purpose over highly specialized equipment.

The effectuation principles, which have been derived from an analysis of expert entrepreneurs (Sarasvathy, 2008), represent "teachable and learnable elements of entrepreneurial expertise" (Sarasvathy et al., 2014, p. 73). Now that these principles have been extracted, virtually "anyone can learn these tools" (Read et al., 2015, p. 4). The same applies to causation techniques (Dew, Read, et al., 2009). Research on the implications of applying effectuation and causation is therefore likely to be very relevant for management education. Our findings encourage management education to pay more attention to the individual effectuation principles and the differences among them instead of focusing only on effectuation as a unitary concept. Moreover, our study highlights commonalities between causation and some effectuation principles, which deserve to be discussed alongside the differences between the approaches. Such insights should help organizational leaders reflect upon and adapt their own decision-making approach to influence their firms in the desired direction.

6 | CONCLUSION

Responding to the call to clarify the effectuation concept (Read et al., 2016; Welter et al., 2016), our study introduces the distinction between promotion- and prevention-focused effectuation principles, which exhibit opposite (positive vs. negative) associations with a firm's EO. This distinction also allows us to reconcile the paradox that the literature concurrently depicts effectuation and causation as opposites, yet suggests that it may be useful to pursue them in combination (Reymen et al., 2015; Sarasvathy, 2001). Our study indicates that both positions possess some merit: Causation and prevention-focused effectuation principles are opposites with respect to their underlying regulatory focus and their association with EO. At the same time, the combined pursuit of promotion-focused effectuation principles and causation—which each exhibit a positive association with EO—is related to a particularly high level of this criterion. Future research may deepen our knowledge about the implications of distinguishing between promotion-
and prevention-focused effectuation principles. For the moment, we conclude that it not only makes a difference whether decision makers pursue an effectuation or causation approach, but also which effectuation principles they choose.

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**APPENDIX**

**A. DETAILED ACCOUNT OF THE STUDY’S ITEM-BASED MEASURES**

**Risk taking (Cronbach’s alpha = 0.704; Covin & Slevin, 1989).** (RiTa1) In general, the top managers of my firm have (1) a strong proclivity for low risk projects (with normal and certain rates of return) (7) a strong proclivity for high-risk projects (with chances of very high returns); (RiTa2) In general, the top managers of my firm believe that (1) owing to the nature of the environment, it is best to explore it gradually via timid, incremental behavior (7) owing to the nature of the environment, bold, wide-ranging acts are necessary to achieve the firm’s objectives; (RiTa3) When confronted with decision-making situations involving uncertainty, my firm (1) typically adopts a cautious, “wait-and-see” posture in order to minimize the probability of making costly decisions (7) typically adopts a bold, aggressive posture in order to maximize the probability of exploiting potential opportunities.
Proactiveness (alpha = 0.603; Covin & Slevin, 1989). (PrAc1) In dealing with its competitors, my firm (1) typically responds to actions which competitors initiate (7) typically initiates actions which competition then respond to; (PrAc2) In dealing with its competitors, my firm (1) is very seldom the first business to introduce new products/services, administrative techniques, operating technologies, and so on. (7) is very often the first business to introduce new products/services, administrative techniques, operating technologies, and so on.

Innovativeness (alpha = 0.668; Covin & Slevin, 1989). (Inno1) In general, the top managers of my firm favor (1) a strong emphasis on the marketing of tried and true products or services (7) a strong emphasis on R&D, technological leadership, and innovations; (Inno2) Changes in product or service lines have (1) been mostly of a minor nature (7) usually been quite dramatic; (Inno3) What percentage of sales did you generate with new products (less than 5 years old)? (1) 0–5%, (2) 5–15%, (3) 15–30%, (4) 30–50%, (5) 50–70%, (6) 70–90%, (7) 90–100%.

Causation (alpha = 0.754; Chandler et al., 2011). To what extent do the following statements apply to your approach? “1” means “not at all,” “7” “completely”: (Caus1) We analyzed long run opportunities and selected what we thought would provide the best returns; (Caus2) We developed a strategy to best take advantage of resources and capabilities; (Caus3) We designed and planned business strategies; (Caus4) We organized and implemented control processes to make sure we met objectives; (Caus5) We researched and selected target markets and did meaningful competitive analysis; (Caus6) We had a clear and consistent vision for where we wanted to end up; (Caus7) We designed and planned production and marketing efforts.

Experimentation (alpha = 0.605; Chandler et al., 2011). To what extent do the following statements apply to your approach? “1” means “not at all,” “7” “completely”: (Exp1) We experimented with different products and/or business models; (Exp2) The product/service that we now provide is essentially the same as originally conceptualized; (Exp3) We tried a number of different approaches until we found a business model that worked; (Exp4) The product/service that we now provide is substantially different than we first imagined.

Flexibility (alpha = 0.646; Chandler et al., 2011). To what extent do the following statements apply to your approach? “1” means “not at all,” “7” “completely”: (Flex1) We allowed the business to evolve as opportunities emerged; (Flex2) We were flexible and took advantage of opportunities as they arose.

Precommitments (alpha = 0.753; Chandler et al., 2011). To what extent do the following statements apply to your approach? “1” means “not at all,” “7” “completely”: (Preco1) We used a substantial number of agreements with customers, suppliers and other organizations and people to reduce the amount of uncertainty; (Preco2) We used precommitments from customers and suppliers as often as possible.

Affordable loss (alpha = 0.842; Chandler et al., 2011). To what extent do the following statements apply to your approach? “1” means “not at all,” “7” “completely”: (AfLo1) We were careful not to commit more resources than we could afford to lose; (AfLo2) We were careful not to risk more money than we were willing to lose with our initial idea; (AfLo3) We were careful not to risk so much money that the company would be in real trouble financially if things did not work out.