WHAT IS THE APPROPRIATE DEPENDENT VARIABLE IN EFFECTUATION RESEARCH?

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ABSTRACT

Research on effectuation is moving from an early to a more mature phase. Thus, it is important to better understand the appropriate dependent variables for effectuation research. Although researchers are currently developing unique dependent variables in their empirical work, there has not yet been a discussion — let alone a consensus - of the appropriate variables. Rather, research appears to be following a somewhat arbitrary path, which makes building a cumulative body of knowledge difficult. We theoretically discuss and empirically measure the effects of effectuation and causation on firm-level performance in both the short- and long-run. Implications for future research are discussed.

INTRODUCTION

Effectuation research has recently begun to transition from an emerging state to a more intermediate state of development (Perry et al., 2012). Since Sarasvathy’s (2001) introduction of the effectuation concept, numerous studies have built upon her work. The list of effectuation research now includes increased discussions of the make-up of the construct (Dew & Sarasvathy, 2002), comparisons of the prevalence of effectuation between novices and experts (Dew et al., 2009), the exploration of the use of effectuation in corporations (Brettel et al., 2012), and the development of an operationalization of the key constructs (Chandler et al., 2011). Sarasvathy (2001) states that effectuation is not inherently superior to causation in issues of performance. Nevertheless, there has been a more tacit undertone in the literature that the use of effectuation is superior. Further, a meta-analysis of the relationship between principles of effectuation and new venture performance has provided some evidence that using effectuation may lead to superior outcomes (Read et al., 2009). However, the study draws upon very broad definitions of the principles of effectuation. For example, the analysis includes entrepreneurial experience, industry experience, functional area experience, partner expertise, and related human capital as a way to measure relevant “means” and risk taking as a measure of “affordable loss”. Although the results of the meta-analysis demonstrate that the use of effectuation has a significant impact on the performance of the firm, its broadness suggests the need for further more rigorous investigation.

We believe that one reason for the limited findings of the impact of effectuation on firm performance is that effectuation and causation may be predicated on differing grounds. For instance, Sarasvathy (2001) argues that one central tenet of causation is the focus on expected returns, which would suggest a ‘maximizing financial returns’ mindset. That is, entrepreneurs using a causal process will pursue new opportunities based on the expected upside potential (Read et al., 2009). Yet, Sarasvathy contrasts this with effectuation, where the focus is primarily affordable loss, suggesting that entrepreneurs pursue opportunities that allow them to invest only what they can afford to lose. This would thus imply a focus on limiting downside potential as opposed to maximizing financial returns. From this perspective, it is unlikely that instead of
leading to superior financial performance, effectuation would be more likely associated with loss/failure avoidance. At the same time, the empirical development of the effectuation construct was based on think aloud protocols using expert entrepreneurs. Read et al. (2009) found that “expert entrepreneurs are significantly more likely to use heuristics based on an effectual logic” thus identifying “distinct mechanisms for keeping costs down and pushing revenues up”. From this perspective, those using effectuation would have superior performance.

The result of these diverging views is a lack of evidence as to the effectiveness of effectuation and limited guidance as to how researchers studying effectuation should measure appropriate performance outcomes. In response to this challenge, in this paper, we untangle the important dilemma of potential firm-level outcomes from effectuation. We theoretically address and empirically examine the role of effectuation on different measures of firm performance, both in the short- and long-term. Following Chandler et al.’s (2011) treatment of effectuation as a formative construct, we examine the different sub-components of effectuation (affordable loss, flexibility, experimentation, and pre-commitments). We thereby respond to calls for more work to determine the best performance measures if the field of effectuation research is going to continue to develop (Perry et al., 2012).

We offer two main contributions to the literature. First, we directly address the notion of performance as an outcome of the use of effectual logic. This helps to tease out some of the tacit explanations in the literature into a more explicit set of hypotheses about the impact of effectuation. We differentiate between types of performance outcomes in new ventures such as the achievement of important milestones, the timing of those milestones, as well as both short- and long-term performance outcomes. This is important as the outcomes of effectuation may be more nuanced than simply financial performance. This allows us to provide more specific guidance for future researchers about the potential varying outcomes of the use of effectuation and causation, thus constituting more concrete advice for future research. Second, we empirically test these ideas using a sample of new ventures. We provide not only initial evidence about the outcomes of effectuation, but further our theoretical predications. Combined, our theoretical development and empirical testing contribute to the establishment of a theory of effectuation for decision making under conditions of uncertainty.

**THEORY & HYPOTHESIS DEVELOPMENT**

Traditional approaches to decision making are based on linear, goal-driven, and analytical processes. Sarasvathy (2001) refers to these rational processes as ‘causation’. These approaches are frequently those taught in business schools. Effectuation offers an alternate view, where instead of being prediction-oriented, decision making is based on a process where, “current means are transformed into co-created goals with others who commit to building a possible future” (Wiltbank et al., 2006, p. 983). The reasoning behind effectual logic is that the future in uncertain environments is unpredictable and therefore decision making processes that are prediction-oriented are less applicable. Researchers have some evidence that expert entrepreneurs often employ effectuation as logic for decision making – where means-driven actions include flexibility, experimentation, and collaboration. Additionally, while both causal and effectual logics seek control over the future, causation focuses on the predictable aspects of the future whereas effectuation focuses on the controllable aspects (Sarasvathy, 2008). Effectual approaches to decision making have been argued to be especially important in entrepreneurial environments, where uncertainty is high. Effectuation as an alternative view of decision making has been
described as a “paradigmatic shift in the way that we understand entrepreneurship” (Perry et al., 2012).

Despite the potential paradigmatic shift of effectuation, the development of empirical work on effectuation has been limited. As is common for developing areas, much of the empirical research has been qualitative and experimental in nature, such as protocol analysis methodologies (e.g. Sarasvathy’s original 1998 study) and case analyses (e.g. Evers, Andersson, & Hannibal, 2012; Evers & O’Gorman, 2011). More recent work has focused on the antecedents of employing effectuation such as looking at differences between experts and novice entrepreneurs (Read, et al., 2009), the role of expertise in employing control-based logic (Gustavsson, 2006), and marketing capabilities in international new ventures (Evers, et al., 2012). The outcomes of effectuation are much less understood. We have limited knowledge of the the impact of effectuation on firm outcomes (Read, Song & Smit, 2009; Wiltbank et al., 2009). As such, we are increasing our knowledge of effectuation as a general theory of decision making, but we know very little about outcomes—essentially “does it really matter.” Furthermore, the most recent literature appears to be following a somewhat arbitrary path in identifying and testing the theory which makes development of a cumulative body of knowledge difficult. Identifying those critical “outcomes” which may or may not be similar to traditional financial measures, is critical to not only identify those outcomes that are central to the theory of effectuation, but also to begin to build a cumulative set of results that can provide guidance to researchers and normative outcomes to entrepreneurs.

Empirical work on effectuation has established that effectuation is a latent construct made up of our core principles: 1) Affordable loss, reflecting that goal setting is based on what entrepreneurs can afford to lose as opposed to maximizing return on investment; 2) Pre-commitments by engaging in strategic alliances with other stakeholders to engage and co-create the project; 3) Flexibility in order to exploit contingencies as unexpected events occur and thereby helping to reshape outcomes; and 4) Experimenting with different solutions in order to control unpredictable futures instead of trying to predict them (Sarasvathy, 2008). Chandler et al. (2011) tested and validated a scale to measure these core principles in a sample of new ventures. Their study offers support for these core ideas and also demonstrates that effectuation is a formative, multi-dimensional construct. However, they also find that the principle of Pre-commitments was shared between both effectual and causal logics.

This latter finding underlines an important, but underdeveloped point in the effectuation literature. Importantly, effectuation and causation are not polar opposites of the same scale. Rather, they represent different approaches that might be used at different times or under different circumstances (Perry et al., 2012; Sarasvathy, 2008). As such, effectuation and causation are not a matter of a binary option to decision making, but rather a selection from among a number of differing options and principals, on the basis of the decision maker and the task at hand (Sarasvathy, 2001).

Further, it is important to emphasize that Sarasvathy (2001) states that neither effectuation nor causation are inherently “better” when it comes to predicting performance. However, it is logical to expect that decision-making processes in the formative stage of venture creation are likely to impact the development of the business, including financial outcomes. Read et al. (2009) conducted a meta-analysis by analyzing broad principles of effectuation as they had been measured by earlier studies. Their findings suggest that these principles do impact performance. In an unpublished working paper, using the measures developed by Chandler et al. (2011) and data from 305 Chinese companies, Cai and Guo (2013) found that experimentation, flexibility and pre-
commitments all had a positive effect on organizational performance. They also showed that new ventures do not benefit more from effectuation than do established companies. Instead, flexibility has a stronger positive effect on established company performance. Exploratory learning has a partly and fully mediating effect on the relationship between experimentation and flexibility and organizational performance respectively and has a stronger positive effect on established company performance.

Similar to Cai and Guo (2013), one of the advantages of our approach is that we separate the differing components of effectuation. This follows the survey-based operationalization of the effectuation construct, as captured in Chandler et al., (2011). However, since there is no theoretical reason to argue why there may be varying outcomes based on the individual sub-components of effectuation, we state our hypotheses using a generic ‘effectuation’ perspective. However, to move beyond the work of Cai and Guo (2013), we adopt a broad approach to performance outcomes.

Short-Run Performance Measures—Milestones

Achieving the first sale is a major milestone in a start-up venture (Aspelund, Berg-Utbya, & Skjeydal, 2005; Brush, Manolova, & Edelman, 2008; Davidsson & Honig, 2002; Schoonhoven, Eisenhardt, & Lyman, 1990). In addition, firms that achieve sales faster than other firms are likely to gain early cash flow, external visibility and legitimacy, early market share, and are more likely to survive (Schoonhoven, et al., 1990). As reported by Jelinek and Schoonhoven, (1990, p. 314) in an interview with the CEO at National Semiconductor Charles Sporch “Time is a real fact, and it is an awesome fact. If you get the product out six months [later], even though it may be better, the market may be lost, and so you have failed.” Effectual logic allows entrepreneurs to experiment with an idea, be flexible and change direction, pivot, and move quickly. It is critical in dynamic and uncertain markets that entrepreneurs have the logic to experiment, fail fast, and move to alternative solutions. Those with an effectual logic are able to deal with contingencies in the market. Thus, we argue that effectuation will be positively related to achieving the first sale.

In addition, effectuation is based upon the principal that possible outcomes are based upon given means. That is, entrepreneurs build ventures based upon who they are, what they know, and whom they know (Sarasvathy, 2001). The use of an effectual logic makes it possible for entrepreneurs to quickly assemble resources and utilize their own knowledge, ability, and social networks rather than having to seek out and acquire resources in the market. Thus, we argue that the use of effectuation will be positively related to achieving profitability and to the time required to achieve profitability. To be clear, we are not arguing that profitability endures over the long run, simply that it is achieved quicker. Our formal hypotheses are:

\[ H1a: \text{The use of effectuation will be positively related to having achieved first sales.} \]
\[ H1b: \text{The use of effectuation will be positively related to time to first sales.} \]
\[ H2a: \text{The use of effectuation will be positively related to having achieved profitability.} \]
\[ H2b: \text{The use of effectuation will be positively related to time to profitability.} \]

Short-Run Performance Measures—Relative Performance

In this section we develop the hypotheses surrounding the relative performance measures. Chandler and Hanks (1993) provide evidence for the external validity of asking entrepreneurs to compare their performance with that of their competitors. The firms in our sample are young and
research has shown that performance in these firms is oftentimes best captured relative to the firms’ most important competitors (Birley & Westhead, 1990; Chandler & Hanks, 1993; Yang, Wang, Zhu & Wu, 2012).

In the short-run effectual logic allows (as we noted above) entrepreneurs to experiment, be more flexible, and utilize the means they have at their disposal. In addition, effectual logic is related to an affordable loss principle. That is, entrepreneurs using an effectual logic are more likely to select ideas based on affordable loss or acceptable risk (Sarasvathy, 2001). They will be able to identify and quickly take advantage of trends and niches in the market while limiting the risk (and time) associated with larger projects and markets. Thus, experimentation, flexibility, the use of their own resources, and their affordable loss principle makes it more likely that they will find opportunities thereby increasing short run performance. Our formal hypotheses are:

- **H3a**: The use of effectuation will be positively related to ROI.
- **H3b**: The use of effectuation will be positively related to cash flow.
- **H3c**: The use of effectuation will be positively related to sales growth.
- **H3d**: The use of effectuation will be positively related to customer relationships.

**Long-Term Performance**

While the effectuation principles of experimentation and flexibility may lead to greater opportunity identification and thus short-run performance, the affordable loss principle provides a limitation to the size, scope, and risk-bearing potential involved in larger ideas and projects. Thus, while those using an effectual logic may reach milestones quicker and have greater short-run performance, we argue that over the long run, those who identify longer-term viable projects will have greater performance over time. Causal processes are based on expected returns and individuals using this logic develop well structured, specific, long-range plans. Their ultimate decision criterion is based upon maximization of expected returns. Thus, our formal hypotheses are:

- **H4a**: The use of causation will be positively related to higher sales in the long-run.
- **H4b**: The use of causation will be positively related to larger firm size in the long-run.
- **H4c**: The use of causation will be positively related to sales growth in the long-run.
- **H4d**: The use of causation will be positively related to employment growth in the long-run.

**METHOD**

**Sample**

This study is based on survey data from 196 two- to five-year old firms in two industries (plastic products and prepackaged software) in the United States. Both of these industries provide appropriate testing grounds for effectuation theory as they both involve relatively high amounts of uncertainty. While uncertainty is found in almost every industry today (Read, et al., 2009), these two industries are particularly volatile and uncertain due to market fragmentation, competitive pressures, and new customer demands. For example, the environmental concerns surrounding the use of plastics range from production (plastic is a derivative of petroleum which is a finite resource and also represents a source of air and water pollution) to disposal and health concerns (e.g., BPA). There is also considerable pressure and uncertainty in the pre-packaged software industry surround new delivery, pricing (e.g. software to rent) and the growing movement to
customization. Further, focusing on two specific industries allows us to reduce potential heterogeneity based on industry differences. A complete list of firms fitting these criteria was developed based on the Dun & Bradstreet database. We collected primary data from firm founders in 2005 and secondary data regarding firm performance collected in both 2005 and 2008. We received responses from 196 firms, reflecting a response rate of 17.1%. The firms were primarily quite small, with 81% of the sample having 20 or fewer full time employees. Fewer than 8% of the sample had 50 or more employees. Among founders, almost 75% were men and 60% were over 45 years old. We examined the potential for response bias based on the information that was obtained from Dun & Bradstreet, such as age, employment and revenues levels, and industry membership. We found no statistically significant differences (p > 0.10), suggesting that the potential of non-response bias is limited.

Variables & Measures

**Dependent variables:** The overarching theme in this paper is to examine the different performance outcomes of the use of effectuation. We therefore approach ‘performance’ as a multi-faceted component, measuring performance both in the short-run and the long-run using both self-report and secondary data. Short-run performance includes the achievement of milestones (achievement of, and time to [in months], both sales and profitability) and early performance (ROI, cash flow, profit margin, sales growth, relationships with customers) relative to competitors which we captured during the survey while the firms were two- to five-years old. A major milestone in the life of the firm is its first sale (Aspelund, Berg-Utbya, & Skjevdal, 2005; Brush, Manolova, & Edelman, 2008; Davidsson & Honig, 2002; Schoonhoven, Eisenhardt, & Lyman, 1990). Specifically, we asked “Has your company achieved its first sale” with “yes” and “no” as potential responses. We followed up with “if yes, how much time elapsed between recognition of the opportunity and your first sale (in months)?” Similarly we asked “Has your company achieved profitability” with “yes” and “no” as potential responses. We followed up with “if yes, how much time elapsed between recognition of the opportunity and achieving profitability (in months).

Next, we asked, in separate questions, “Relative to competitors how would you rate your performance with respect to ROI, cash flow, profit margin, sales growth, relationships with customers.” We used a five-point scale ranging from “well below” to “well above”. We elected to use a relative measure because we are examining young and primarily small firms where performance is oftentimes best captured relative to the firms’ most important competitors (Birley & Westhead, 1990; Chandler & Hanks, 1993; Yang, Wang, Zhu & Wu, 2012). We treat these measures individually. However, we also combine these four into one index of financial performance to examine patterns across broader aspects of financial performance (α=.851).

To measure the long-run performance of the firm we captured secondary data collected from Dun & Bradstreet three years after the administration of the survey. These measures include size of the firm (number of employees and overall sales) and sales and employment growth over the three year span. We examine the growth rates of these two variables. In order to insure normal distributions of the variables, we conduct a logarithmic transformation.

**Independent variables:** The key independent variables were captured using multiple items validated in the literature. We employ Chandler et al.’s (2011) operationalization of causation and the different sub-constructs of effectuation. This includes separating effectuation into four different sub-components: 1) Flexibility, 2) Experimentation, 3) Affordable loss, and 4) Pre-commitments. Each of these was measured using multiple items on five-point Likert scales. Each of the subcomponents had strong internal reliabilities.
Control variables: We use three control variables in this study, in order to control of potential differences based on founder experience and characteristics. Each of these variables has previously been shown to have potential effects on new firm performance. We examine the education level of the founder, the gender of the founder, and the age of the founder. These three variables were based on self-reports as part of the survey. Education level was based on six categories focusing on highest level of education completed. Responses included: did not complete high school; high school or GED; some college or technical school; bachelor’s degree; master’s degree; and Ph.D., M.D. or equivalent. The age of the founder was captured using categories of age ranges where responses included: less than 25 years old, 25-34 years old, 35-44 years old, 45-54 years old, 55-64 years old, and more than 64 years old.

ANALYSES & RESULTS

We first examine the descriptive statistics and bivariate correlations of the variables. All of the variables satisfied requirements for conducting analyses, including not having any problematically high correlations. These results are available upon request from the first author. We conduct hierarchical regression in order to test our hypotheses. For the achievement of milestones hypotheses (i.e., H1), we use logistic regression. We do this as the achievement of the milestone is a binary outcome. For all other regressions (i.e., H2-4), we use OLS regressions. We transformed the dependent variables (notably the growth variables in the long-term) in order to satisfy normal distribution requirements. In Table 1, we report the results of our regressions on the short-term (survey based) performance outcomes. In Table 2, we present the results from our analyses of the long-term (i.e., three year lagged) dependent variables.

Our results demonstrate diverging effects of effectuation and causation on firm performance. For the achievement of milestones (Achieved first sales and Achieved profitability) as visible in the first two columns of Table 1, we find that higher levels of education are a negative predictor of having achieved profitability (p < 0.05) and having pre-commitments is a positive predictor of profitability (p < 0.10). This implies that we cannot support H1a and offer mixed support for H1b. Achieving profitability is an important stepping stone in the development of a new firm. In fact, profitability is vital for understanding the survival of new firms as well as the potential ability to successfully grow the firm (Delmar, McKelvie & Wennberg, 2013). We do not find any statistically significant predictors of Achieving first sales. This may be due to the fact that only 11 firms had not yet achieved first sales by the time of data collection, and therefore offered relatively limited variance. Because of this, we also examined the length of time elapsed to achieve these milestones. Note that since the amount of time increases, a negative coefficient in the regression results implies that a firm achieved these milestones more quickly. We find that the use of affordable loss is a predictor for achieving first sales (p < 0.10) and profitability (p < 0.05) more quickly. We also find that using pre-commitments and flexibility lead to quicker time to achieve first sales (p < 0.05), but not profitability. Again, we find mixed support for H2a and H2b.

We now turn our attention to the performance outcomes relative to competitors. We examined four financial performance outcomes (ROI, cash flow, profit margin and sales growth). The results can be found in the middle columns in Table 1. We also indexed these into a total Financial performance variable, which can also be found in Table 1. We find a relatively consistent pattern across the financial performance variables. Specifically, we find that causation, flexibility and the use of pre-commitments are important positive predictors of subsequent performance. These three factors are also positive predictors of the indexed financial performance variable. The use of
affordable loss is a negative predictor of sales growth (p < 0.05) but a positive predictor of cash flow (p < 0.10). Flexibility and pre-commitments are positively related (p< 0.10) to developing relationships with customers, as demonstrated in the right-most column of Table 1.

Finally, we examine the long-term impact of the use of causation and effectuation. These results can be found in Table 2. We find a surprisingly limited number of relationships between our core variables and long-term outcomes. We find that the use of causation has a positive relationship with the size of the firm in terms of number of employees (p< 0.05), thus supporting H4b. We also see that the use of pre-commitments has a positive relationship with growth (p< 0.10). This suggests that the use of effectuation and causation processes during firm emergence have limited impact on the long-term performance of new firms. We do not find support for H4a, H4c, or H4d.

**DISCUSSION**

The overarching purpose of this paper is to theoretically address and empirically examine the potential firm level outcomes of the use of effectuation. To that end, we hope to further contribute to the establishment of effectuation as a theory of decision making under uncertainty and offer guidance for future research into the appropriate dependent variable using effectual logic. By examining multiple outcome variables, we hope to address a more nuanced view of the outcomes of effectuation.

We find a pattern of mixed results. These results are important in two ways. First, we do not find a uniform outcome of effectuation or causation. This is important in the sense that we do not find a one-size-fits-all role of effectuation or causation on important firm-level outcomes. This suggests that any theory of effectuation as a mode of decision making under uncertainty must identify a theoretically important dependent variable. In other words, our finding that the role of effectuation is important for different dependent variables suggests stronger consideration for the outcomes that researchers study. This would include both the nature of the variable (early-stage milestone, comparative performance) and timing of performance (short- or long-term). The dependent variables that appear to be most germane for effectuation research include the temporal achievement of milestones as well as the relative comparative performance in the short-term. However, and importantly, the use of causation also leads to the same comparative performance outcomes. We return to this point later.

Second, we find that the different sub-components of effectuation have varying impact on outcomes. The use of affordable loss and pre-commitments seem to be stronger predictors of the length of time to achieve important firm milestones. Further, the use of flexibility was important to achieving first sales, but not profitability. The use of flexibility and pre-commitments was an important predictor of financial performance outcomes, whereas affordable loss was a negative predictor of (comparative) sales growth. Flexibility and pre-commitments were also positively related to the development of relationships with customers. Finally, pre-commitments have a positive relationship with growth in the longer-term – growth in terms of both sales and employment. This mix of findings is important inasmuch as it helps to provide useful details to the impact of effectuation. It appears as though only certain components help drive performance outcomes – and in some cases have opposite roles to play. This helps to further establish effectuation as a multi-faceted latent construct where all of the sub-components do not have an equal role to play.
Relatedly, causation seems to be positively related to comparative financial performance in the short-term, but not other outcome variables. This is perhaps not as surprising given that one of the starting points of the use of causation was to focus on maximizing returns (Sarasvathy, 2001). We find that this this prediction-based approach to decision making does appear to have financial benefits. However, the fact that some of the sub-components of effectuation also lead to the same performance variables provides further buffering of the argument that causation and effectuation are not two sides of the same coin. Rather, there appear to be overlaps in their use. Indeed, Chandler et al., (2011) find that pre-commitments overlap with both effectuation and causation principles. This may also be a reflection of our industry choice. Although these industries were selected based on the prevalence of higher levels of uncertainty, we do not directly control for the role of uncertainty in these decisions. In fact, our direct effects approach to the role of effectuation may be better illustrated by a contingency approach, where the effectiveness of effectuation is dependent on the level of uncertainty faced by the decision maker.

One of the more interesting findings from our study was the changing role of effectuation over time. There is a long line of research that shows that early-stage decisions and strategies have a long lasting impact on firm performance (Baron, Hannan & Burton, 1999). However, we find that that only the use of pre-commitments had any effect on the subsequent growth of the firms; and this was marginal statistical support. This suggests that the use of effectuation does not seem to fit into the list of factors that contributes to long-term performance differences. This is surprising as effectuation may capture many of the cognitive or culture-based components of new ventures. What this finding does suggest is that any early impact of effectuation or causation seems to dissipate over time. Instead, there may be other later activities that have a large impact than these early-stage activities. This may be a reflection of using effectuation in early stages of firm development and then causation at later stages. Sarasvathy (2001) notes that these two logics may be used sequentially.

However, this lack of results in the long-term might be due to empirical considerations. Almost 50% of the firm in the sample did not grow over the three years after the survey was conducted. As a result, there were a large number of firms that stayed the same size over time. Since pursuing growth is a risky choice by entrepreneurs, where there are potential benefits and risk, we cannot always assume that achieving growth is preferential for the entrepreneur (McKelvie & Wiklund, 2010). As such, using OLS regression to capture variance in the dependent variable is a challenge as there is some potential skewing of the results due to non-growth.

While only marginally supported, it was not surprising that the use of pre-commitments would have a positive effect on growth. Agreements among customers, suppliers and other organizations generally identify expectations and clarify responsibilities; thereby providing for a method of reducing uncertainty. Because pre-commitments were strongly significant in the short-run, it is unclear whether the marginal support in the long-run is due to their value (perhaps over time these agreements become more routinized and thus less critical) or whether it means that firms using these pre-commitments are limited in growth potential. Future research is necessary to tease out these results.

Our finding that causation is related to larger firms (as measured by number of employees) is also interesting. Because entrepreneurs following causal logic are more likely to develop predictions of the future, it may be that entrepreneur’s over-optimism (Forbes, 2005) results in the growth of employees prior to it becoming necessary. If this is the case, future research should examine whether the costs associated with similar firms (following different logic) results in higher costs for those following a causal logic. If nothing else, better understanding the changing
role of effectuation in firms of different sizes and ages would help support further theoretical development of effectuation (Brettel et al., 2012; Johansson & McKelvie, 2012).

Our approach to capture effectuation based on the Chandler et al. (2011) operationalization is much more behavioral and action oriented than other measures. The wording of the items focus more on what was done and the strategies employed rather than the characteristics of the entrepreneurs. In contrast, in the Read et al. (2009) meta-analysis there is a heavy focus on individual based characteristics more similar to human capital. As such, the slightly diverging findings may be attributed to these differences – our intent is more about what founders do as part of the development of a new venture as opposed to the human capital of the founder. Nevertheless, we did control for some founder characteristics such as age, education, and gender. Effectuation research has long examined the role of expertise in understanding the choice of logic espoused – with the implication that experts are likely to ‘know better’ and therefore ‘do better’. Our control variables capture tangential aspects of ‘expertise’; although less than ideal measures, age and education have been considered as reflecting a component of expertise. In our study, age and education show limited positive impact of performance. In fact, education was a negative predictor of time to first sales, achieving profitability, and relationships with customers. Age, on the other hand, has a positive relationship with cash flow and customer relationships. In general, our behavioral approach to effectuation offered stronger linkages to firm outcomes than did the founder traits.

What does a theory of effectuation actually predict? Sarasvathy (2001) argues that effectuation inherently focuses on how individuals make decisions under conditions of uncertainty. This has become a go-to theoretical concept for entrepreneurs, who frequently face uncertain decisions about the pursuit of opportunities – both in terms of launching new products or services (McKelvie, Haynie & Gustavsson, 2011) or the launch of a new venture. Does effectuation really demonstrate a superior way of pursuing opportunities? We find that effectuation effectively provides a way of understanding a more expedient way of achieving new venture milestones and some short-term performance implications. In other words, effectuation seems to best predict getting up and running faster – and likely based on the notion of beginning with ones one means and attempting to create the future as opposed to a prediction-oriented logic. However, given the importance of causation in predicting short-term performance, we cannot provide support for the notion that effectuation is ‘superior’.

Limitations

We acknowledge that our research has some limitations, each of which may limit the impact of our work but also offer the opportunity for future research to build off of our findings. The main limitations are a reflection of the methodological choices made. To begin with, we select certain types of outcomes based on the use of effectuation. Our novel approach to include the achievement of milestones, comparative performance and long-term financial performance, extend previously known outcomes of effectuation. However, there may be other outcomes that we did not address. For instance, we have not directly captured any measures of the ‘quality of the opportunity’ nor the length of time taken to determine whether the opportunity was worth pursuing. The use of effectuation may also provide quick market feedback to inform the entrepreneur that there is no opportunity to be pursued. There may also conceivably be other performance outcomes that are germane to this context as well. Further, we rely on self-report data from the founder in regards to their use of effectuation, achievement of milestones and the comparative performance of the firms. These methodological choices are common for new venture research, but raise the risk of retrospective recall bias, common source bias, and validity of some
of the self-report data. We view our study as an important first step along the lines of examining the outcomes of effectuation. Clearly more work would be beneficial. We also recognize that there may be limitations to generalizability given that we focus our study on two specific industries where we argue uncertainty is high. The role of uncertainty is central to effectuation theory and therefore further examining other industries with varying levels of uncertainty would be beneficial to capture the impact the linkage between effectuation and appropriate dependent variables.

CONCLUSIONS

We began this paper with a deliberately provocative title, asking what the appropriate dependent variable in effectuation research should be. As research of effectuation matures, providing additional theoretical development and empirical results help to further establish effectuation as a theory of decision making under uncertainty. Toward this end, we addressed some of the underlying thinking in effectuation research to tease out some of the core distinctions in assumptions between effectuation and causation, including their role of achievement of milestones, the timing of such milestones, and comparative performance in the short- and long-term. Our findings illustrate different outcomes where the benefits of effectuation are most salient in speeding up important outcomes in the short-term. However, we also find that two sub-components (flexibility and the use of pre-commitments) also help establish financial performance differentials. The use of causation had a more consistent impact on the financial performance of the firm. In the long-term, on the other hand, these performance differences based on the use of effectuation disappear. These combined results offer some initial evidence as to what the appropriate variables are in effectuation research and, in doing so, we move the needle in effectuation research by providing guidance as to appropriate outcomes for other effectuation researchers.

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REFERENCES


Table 1. Effects of effectuation and causation on performance (short-term)

<table>
<thead>
<tr>
<th></th>
<th>Achieved first sale</th>
<th>Achieved profitability</th>
<th>Time to first sale</th>
<th>Time to profit</th>
<th>ROI</th>
<th>Cash flow</th>
<th>Profit margin</th>
<th>Sales growth (relative)</th>
<th>Financial Performance</th>
<th>Customer relationships</th>
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<td>-.093</td>
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<td>-.052</td>
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<td>-.130</td>
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<tr>
<td>Precom.</td>
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<td>.352+</td>
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<td>.219**</td>
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<td>.195*</td>
<td>.233*</td>
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<td>-2 Log like.</td>
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<td>Cox &amp; Snell R²</td>
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<td>.140***</td>
<td>185***</td>
<td>.083**</td>
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Notes: Achieved first sale and Achieved profitability use Logistic regression. All others use OLS regression. Standardized coefficients presented. + p < 0.10; * p < 0.05; ** p < 0.01, *** p < 0.001
Table 2. Effects of effectuation and causation on performance (long-term)

<table>
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<th>Sales (absolute)</th>
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<td>Pre-commitments</td>
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<td>.034</td>
<td>-.027</td>
<td>.021</td>
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</table>

Notes: Sales and employees (absolutes) represent values three years after the collection of the independent variables. The growth variables represent change rates over the three years past the collection of the independent variables. Standardized coefficients presented. + p < 0.10; * p < 0.05; ** p < 0.01, *** p < 0.001