# Success Dependency on Decision-Making Logic and Available Information

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**Abstract**: One of the most cited emerging theories in entrepreneurship is effectuation (Sarasvathy, 2001; Fisher 2012). This research applies effectuation theory and contrasts it to the traditional approach to entrepreneurship – causation (Sarasvathy, 2001) in the context of social and health care SMEs in South Ostrobothnia, Finland. The purpose of this paper is to examine whether causation/effectuation decision-making logics affect the performance of social and health care SMEs and whether one is dominant. The paper seeks to clarify causation boundary conditions relative to experimentation (one dimension of effectuation's construct), particularly the role of risk and uncertainty in relation to the utilization of information. The objectives of this study are follows: 1) to examine the effect of causation and effectuation (specifically experimentation dimension) decision-making logics on firm performance, 2) to examine the impact of performance measurement system (PMS) adoption on firm performance, and 3) to examine the effect of causation logic on performance measurement system adoption. Using empirical data collected by a survey from 46 Finnish social and health care SMEs we test a path model examining the hypothesized effects. Even though the data is small, it represents well social and health care SMEs in the area. The path model explains 53 percent of the variance in firm performance. Results show that both causation decision-making logic and performance measurement system adoption have positive and direct effect on firm performance. In addition, causation decision-making logic has a positive effect on performance measurement system adoption, and performance measurement system adoption partially mediates the effect of causation decision-making logic on firm performance. The path model explains 53 percent of the variance in firm performance. Social and health care industry is one of the growth industries in Finland and firms in the field do not experience uncertainty in their future business. In addition, many firms in the field consider public sector as their primary customer and rely on the public sector's need to outsource tasks in the long term. Therefore, they experience no particular risk in their relative stable future business environment. The future is predictable by the information available and favors causation decision-making logic.

**Keywords**: causation, experimentation, performance, PMS, social and health care industry

## 1. Introduction

Originally, causation and effectuation are used in the new venture development process (Saravathy, 2001). However, Matalamäki et al. (2017) demonstrated that they are suitable logics in existing companies, too. Causation has connotations in rational planning (ex ante) (Ansoff, 1988; Minzberg, 1978), whereas effectuation is associated with (ex post) emergent strategies. In a causation process, an individual makes rational choices based on all possible information relevant to the decision and an estimated expected utility for each option (Viale, 1992).

In her seminal work, Sarasvathy (2001) distinguished between decision-making logics that focus on prediction and those that focus on non-predictive control. Prediction can have an essential function in goal-directed pursuit (Stroe, Parida and Wincent, 2018). If individuals can predict the future, they can control outcomes and are thereby more likely to experience success. This is characteristic of the causation and refers to pursuing success with the help of estimates and analysis that make accurate factual predictions of expected future outcomes. However, in the context of complex and uncertain competitive environment these predictions are less accurate and useful (Dew, Read, Sarasvathy, & Wiltbank, 2009; Read, Song, & Smit, 2009). In contrast, effectuation refers to a framework of internally coherent heuristic principles that focus on developing and controlling solutions to uncertainty. In entrepreneurship, uncertainty diminishes the utility of causal approaches or planning, and increases the need to adopt effectual methods (Sarasvathy, 2001). Causal logic is most adapted when the environment is stable, and the expected outcomes are known in advance.

Risk perception is a psychological construct that are central to entrepreneurial decision-making. Causal and effectual entrepreneurs have different approaches regarding risk. The way a person evaluates change and probability is a critical factor in the choice between predictive or non-predictive decision-making logic (Sarasvathy, 2008). Welter and Kim (2018) stated that effectuation is the dominant decision-making strategy

in both uncertain and risky environments until the entrepreneur can predict the future with a very high degree of accuracy. According to the authors firm performance using causation improves dramatically once an entrepreneur can predict the future with at least 75 % accuracy. In their study the performance of effectuation strategies show limited variance with regard to the predictive ability of the entrepreneur. As opposed to the performance of causation strategies which very much depend on the predictive ability of the entrepreneur.

The predictive ability depends on the information available. Which, in turn, depends on the available systems for collecting information and measuring the performance. The use of performance measurement system (PMS) occurs in health care also at the micro-economic level, whereby managers are called to collect, monitor and analyze information through PMS in order to improve the quality of care provided by health care organizations (Demartini and Trucco, 2017). Thus, PMS is supposed to support managerial decision-making within health care organizations (Grigoroudis, Orfanoudaki and Zopounidis, 2012), which, in turn, is expected to deliver improved and more efficient processes of care (Schultz, Zippel-Schultz and Salomo, 2012). Simons (1994) defined the strategic use of PMS as "the use of performance measurement system to detect strategic uncertainties; and strategic uncertainties relate to changes in competitive dynamics and internal competencies that may create opportunities or threats".

Because effectuation and causation have different effects on the innovativeness and success of firms, it is worth examining how they appear in a relative regulated industry, where the primary customer is public healthcare. For example, the private welfare sector in Finland produces large-scale care services, medical services, rehabilitation, physiotherapy, child protection, oral health care, early childhood services, and substance abuse and mental health services. Social and health care costs account for slightly more than half of the municipal costs. Social and health services are Finland's most employing sectors. The total number of private service providers is over 18,000 and the majority of service providers are professional companies or small SMEs. In 2015, the total revenue of the private welfare sector totaled approximately EUR 6 billion. The provision of social and health services is regulated by many different standards. In addition, the provision of private social and health services has its own legislation. In addition, industry development is heavily dependent on legislation.

Objectives of the present study are as follows: 1) to examine the effect of causation and effectuation (specifically experimentation dimension of effectuation) decision-making logics on firm performance, 2) to examine the impact of performance measurement system (PMS) adoption on firm performance, and 3) to examine the effect of causation logic on performance measurement system adoption.

## 2. Measure the strategic decision-making logics

Causation and effectuation are two alternative approaches that entrepreneurs use in the new venture development process (Sarasvathy, 2001). In a causation process, an individual makes rational choices based on all possible information relevant to his decision and an estimated expected utility for each option (Viale, 1992).

Based on Sarasvathy (2001), Chandler et al (2011) outlined four principles that differentiate causation and effectuation approaches: 1) a focus on short-term experiments to identify business opportunities in an unpredictable future (effectuation) versus prediction of an uncertain future by defining the final objective up front (causation), 2) a focus on projects where the loss in a worst-case scenario is affordable (effectuation) versus maximization of expected returns (causation), 3) an emphasis on pre-commitments and strategic alliances to control an unpredictable future (effectuation) versus business planning and competitive analyses to predict an uncertain future (causation), and 4) exploitation of environmental contingencies by remaining flexible (effectuation) versus exploitation of pre-existing capabilities and resources (causation). However, causation and effectuation are not entirely exclusive choices. Even if those concepts seem to be in opposition, Sarasvathy (2001) explains, "both causation and effectuation are integral parts of human reasoning that can occur simultaneously" (Sarasvathy, 2001, p. 245). During an entrepreneurial process, both causal (planning) and effectual logics can be present in a complementary way (Sarasvathy, 2001; Read et al, 2009; Fisher, 2012; Reymen et al, 2015; Smolka et al, 2016) and the entrepreneur can navigate from one to the other. For this reason, our hypothesis are formulated and analyses separately for both causation and one dimension of effectuation, the experimentation. According to Sarasvathy (2011) effectuators are likely to try different approaches in the marketplace through experimentation. Experimentation has been described as "a series of trial and error changes pursued along various dimensions of strategy, over a relatively short period of time, in

an effort to identify and establish a viable basis for competing" (Nicholls-Nixon et al 2000, 496). Because the business and competition in the industry are relatively regulated, we are interested in whether actors in the industry use experiments to differentiate their business and to stand out from competition and how this is reflected in decision-making in relation to the perceived risk and uncertainty and availability of information.

On the aforementioned principles, Chandler et al (2011) developed measures that allow differentiating between predominant logic of causation vs. those predominant logic of effectuation. They capture the multidimensional nature of effectuation based on explicit observations by Sarasvathy (2001) and Dew et al (2009). Chandler et al (2011) developed four subdimensions: 1) experimentation (focus on short terms experiment to identify opportunities versus prediction of the future), 2) affordable loss versus maximization of expected returns, 3) emphasis on pre-commitments and strategic alliances to control the future versus competitive contingencies by remaining flexible versus exploiting pre-existing capabilities and resources (Chandler et al, 2011, p. 377). Chandler et al (2011, p. 381) found that these different factors are each conceptually distinct from each other and tap into varying dimensions of effectuation. However, they stated that although they argued that one of the most important potential antecedents might be factor of uncertainty (based on Sarasvathy's argument), they "do feel that other antecedents and consequences differ among subcomponents" (Chandler et al, 2011, p. 381). They found that pre-commitments may be part of both processes (causation and effectuation). While pre-commitments may reduce uncertainty (effectuation) it also can be applied successfully in causation processes "in which the involved parties have been clearly identified and the product/service offerings have been specified" and thus it is shared in nature (Chandler et al, 2000, p. 384). Finally, they showed that causation measures are negatively related to measures of uncertainty and experimentation is positively related to measures of uncertainty.

Chandler et al (2011) measured causation processes with components described by Sarasvathy (2001) including envisioning the end from beginning, maximizing expected returns, business planning and competitive analysis to predict an uncertain future, and exploiting pre-existing knowledge. In effectuation processes entrepreneurs experiment with alternatives in which potential losses in the worst-case scenario are affordable, and they remain flexible so they can take advantage of changing environmental contingencies (Chadler et al, 2011). The authors found that effectuation is a formative construct consisting of the sub-dimensions of experimentation, affordable loss, and flexibility. The sub-dimension Pre-commitments are shared between causation and effectuation. They developed Likert-type measures that capture the more broadly defined effectuation construct upon the insights of Sarasvathy (2001) and Dew et al (2009) to explicitly capture the multidimensional nature of effectuation.

The literature indicates that one way to test different approaches in the marketplace is through experimentation. Experimentation has been described as "series of trial and error changes pursued along various dimensions of strategy, over a relatively short period of time, in an effort to identify and establish a viable basis for competing" (Nicholls-Nixon et al, 2000, p. 496; Chandler et al, 2011, p. 380). Chandler et al (2011, p. 380) stated that "the effectuation process may be viewed as a series of experiments to identify a business model that works".

According to Chandler et al (2011) under conditions of uncertainty, unique circumstances make it impossible to draw statistical inferences. They do not developed reliable measures that will help accurately predict (performance) outcomes, either.

Based on previous research, following hypothesis are presented:

H1: Causation logic has a positive effect on firm performance.
H2: Effectuation (measured by one independent dimension of construct) logic has a positive effect on firm performance.
H3: Performance measurement system adoption has a positive effect on firm performance.
H4: Causation logic has a positive effect on performance measurement system adoption.
H5: Performance measurement system adoption partially mediates the effect of causation logic on firm performance.

## 3. Data gathering and measuring instrument

The data for this research was gathered from Finnish SMEs operating in the field of Social and Health Care in the region of Southern Ostrobothnia. Statistics Finland provided a list of social and/or health care firms in the region. Based on the list, the survey was sent to 433 postal addresses of these firms. In addition, the survey was sent by email to those same firms, whose e-mail addresses were found (188 emails from 433 firms). To increase the response rate, 45 phone calls were made and surveys were passed on to entrepreneurs on two different occasions. Finally, 46 enterprises answered the survey. Even though the response rate was low, the respondents represented a wide spectrum of SMEs in social and health care in the region. 72 percent of respondents were women (on average, 70 % of entrepreneurs in the industry are women, Tervanen 2018).

Half the enterprises had a turnover of over 250 000 euros, while the other half had a turnover under 250 000 euros (on average, 95 % of firms in the industry the turnover is circa 1 million Euros, Tervanen 2018). 61 percent operated in the field of health care and the rest of the respondents operated in the field of social sector such as child welfare (the companies in the industry are approximately egually divided into the social and health care sectors, Tervanen 2018).

To measure causation processes, we used seven items validated by Chandler et al (2011). Effectuation is a formative construct consisting of the sub-dimensions of experimentation, affordable loss, and flexibility. In this research, we focused on experimentation. Experimentation was measured with a scale consisting four items developed from description of Sarasvathy (2001) and the work of Brown and Eisenhardt (1997) and Koberg et al (2003). The following items were used to measure these constructs with five-point Likert scale:

### 3.1 Causation

We analyzed long run opportunities and selected what we thought would provide the best returns.
We developed a strategy to best take advantage of resources and capabilities.
We designed and planned business strategies.
We organized and implemented control processes to make sure we met objectives.
We researched and selected target markets and did meaningful competitive analysis.
We had a clear and consistent vision for where we wanted to end up.
We designed and planned production and marketing efforts.

### 3.2 Experimentation

We experimented with different products and/or business models.
The product/service that we now provide is essentially the same as originally conceptualized.
The product/service that we now provide is substantially different than we first imagined.
We tried a number of different approaches until we found a business model that worked.

Reliability of the decision-making scales were acceptable. Cronbach's alpha for causation logic was 0.91 (min 2, max 5) and for experimentation 0.76 (min 1, max 4,5).

For measuring the adoption of performance measurement systems (PMS) we used ten items. We asked respondents to rate the use of information in different perspectives (such as financial, customer, employee, suppliers, processes, quality) when they are evaluating the firm performance. A seven-point Likert-scale ranged from 1 (not used at all) to 7 (used extensively). We applied Ittner et al. (2003) instrument to measure PMS adoption. The reliability of the scale was good. The Cronbach's alpha for measuring the adoption of performance measurement systems was .93 (min 1.3, max 6.7).

For measuring firm performance, we used a 10 item instrument developed by Chapman and Kihn (2009). This instrument was originally developed by Govindarajan and Fisher (1990) and Chenhall and Langfield-Smith (1998). Respondents were asked to rate their firm performance relative to competitors during the past three years. Items covered both financial (ROI, profit, cash flow from operations, cost control) and non-financial metrics (development of new products, sales volume, market share, market developments, personnel developments, political-public affairs). A five-point Likert scale was used (1 unsatisfactory - 5 excellent). The reliability of the scale was good. The Cronbach's alpha for the scale was 0.86 (min 1.0, max 4.6).

For testing the hypothesis, we conducted a path analysis with SPSS Amos 25. Path analysis is an extension of multiple regression models and it allows to test several dependent variables and chains of influence (Steiner, 2005). Byrne (2010) suggests different fit indices to evaluate path model fit. For path model fit, acceptable model was operationalized as X2 /degrees of freedom (df) ratios (CMIN/DF) less than 3.0, Comparative Fit Index (CFI) values greater than .90, Normal Fit Index (NFI) values greater than 0.95 and Root Mean Square Error of Approximation (RMSEA) values less than .08.

## 4. Results

Table 1 presents the correlation table for the variables. Tolerance and VIF-values were analyzed to see that there was not a threat of multicollinearity between independent variables.

**Table 1**: Correlation table for the study variables

| | **1.** | **2.** | **3.** |
|---|---|---|---|
| 1. Causation | 1 | | |
| 2. Experimentation | ,394** | 1 | |
| 3. PMS | ,616** | ,198 | 1 |
| 4. Performance | ,644** | ,236 | ,662** |
| **. Correlation is significant at the 0.01 level (2-tailed). | | | |

The Figure 1 presents the empirical model. The model has good fit measures (Chi-square 0,184, p=0,668; NFI=0,997, CFI=1,000, RMSEA=0,000). The squared multiple correlation of a variable is the proportion of its variance that is accounted for by its predictors (Arbuckle 2007). Results show, that the tested model explains 53% of the variance in the firm performance. Causation logic explains 37 % of the variance in PMS adoption.

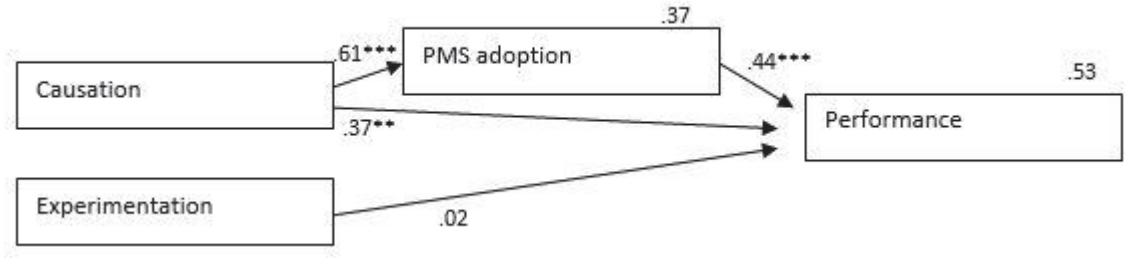


**Figure 1**: Empirical model

Table 2 presents the estimates for empirical model with significant effects. Causation logic has a significant and positive impact on PMS adoption (β=.61 p<0.001). This result supports hypothesis 4. Causation decision-making logic has also a positive and significant effect on firm performance (β=.37 p<0.01). Hence, hypothesis 1 is supported. PMS adoption has a significant and positive impact on firm performance (β=.44 p<0.01) supporting hypothesis 3. Finally, experimentation does not have a significant effect on firm performance (β=.02). This means that hypothesis 2 is not supported.

With path analysis, the relationships can be conceptualized as direct, indirect and total effects. The total effect of one variable on another is the sum of its direct and indirect effects. Total effect of causation logic on firm performance is .63, with an indirect effect via PMS adoption .27. Hence, hypothesis 5 is supported: performance measurement system adoption partially mediates the effect of causation strategy on firm performance.

**Table 2**: Estimates for the empirical model

| **Path to** | | **Path from** | **Estimate** | **Stand. regr.weight** | **S.E.** | **C.R.** | **P** | |
|---|---|---|---|---|---|---|---|---|
| PMS adoption | ← | Causation | ,938 | ,612 | ,183 | 5,135 | *** | H4 supported |
| Performance | ← | Causation | ,298 | ,366 | ,115 | 2,592 | ** | H1 supported |

| Path to | | Path from | Estimate | Stand. regr.weight | S.E. | C.R. | P | |
|---|---|---|---|---|---|---|---|---|
| Performance | ← | PMS adoption | ,231 | ,435 | ,071 | 3,254 | *** | H3 supported |
| Performance | ← | Experimentation | ,015 | ,019 | ,092 | ,164 | ,870 | H2 not supported |

## 5. Discussion

This paper seeks to clarify causation boundary conditions relative to experimentation, particularly the role of risk and uncertainty in relation to the utilization of information. The objectives of this paper was: 1) to examine the effect of causation and effectuation (specifically experimentation dimension) decision-making logics on firm performance, 2) to examine the impact of performance measurement system (PMS) adoption on firm performance, and 3) to examine the effect of causation logic on performance measurement system adoption.

Despite a growing body of research examining a variety of applications of effectuation, there have been several critiques of effectuation as a theory. One common critique has been the lack of clarity regarding effectuation's boundary conditions relative to causation; particularly the role of risk and uncertainty.

Environmental variables can be modeled as antecedents to the choice of causation against effectuation. It has been suggested that entrepreneurs choose effectual or causal behaviours, or combination of them depending on their perception of the level of uncertainty (Chandler et al. 2011; Sarasvathy 2008). Welter and Kim (2018) stated that effectuation enables entrepreneurs to perform well through experimentation, rather than having perfect knowledge. Causation strategies reveal how accurate entrepreneurs' predictive abilities are. If an entrepreneur predicts very well, they can perform very well. When predictive ability is high, causation outperforms effectuation across the whole range of uncertainty. In risk-based contexts, prediction would seem to be effective strategy, too.

The first finding was that the causation decision-making logic is influential in firm performance in social and health care SMEs in South-Ostrobothnia, in Finland. As mentioned above, studies have shown that causation is more effective in environments where the future is easy to predict whether the environment is uncertain or risky. The predictability can be caused by many different factors. One factor may be the information entrepreneurs have in their strategic processes. Stroe, Parida and Wincent (2018, 270), on the other hand, stated that perception of risk alone is not either sufficient to steer entrepreneurs toward a non-predictive decision process i.e. experimentation.

The second finding was that causation has positive impact on PMS adoption. In causation, goals are defined prior to decision-making. In addition, entrepreneurs rely on causation and deal with uncertainty by trying to plan ahead by using business planning. Formal business planning requires input data that can be forecasted with certain amount of accuracy. PMS adoption increases the ability of entrepreneurs to obtain accurate information to support decision-making. Thus, causation logic increases the need of accurate information and PMS adoption. Even experienced entrepreneurs (who tend to be effectuators) may choose causation-based approach in predictable environments (Harms and Schiele 2012) or perceived predictable by accurate information.

The third finding was that PMS adoption has also positive impact on firm performance. This study investigate the design and implementation of both financial and non-financial measurement tools. The non-financial information included into a balanced scorecard (BSC). Theoretical and empirical results from the non-financial performance measurement literature have stressed that the non-financial information reported in the balanced scorecard (BSC) and other non-financial performance measurement tools improved quality of the health care service (Grigoroudis, Orfanoudaki and Zopounidis, 2012, Cattinelli et al, 2011). Prior studies have stressed the need for health care managers to use non-financial performance indicators in a strategic way in order to align operational activities with organizational strategy (Eccles and Serafeim, 2013), facilitate strategic change (Naranjo-Gil, 2009), enhance decision-making, and address strategic benchmarking to improve organizational innovation performance.

The fourth and predominant finding was that PMS adoption partially mediates the effect of causation logic on firm performance. Advanced information practices appear to be a necessary condition for the effective

implementation and use of PMS in SMEs (Garengo and Bitice, 2007), and strict planning pays off, but only when entrepreneurs can be very accurate in their predictive decisions. To achieve and enhance organizational performance, it is argued that an organization should design and develop business strategies that are continuously monitored to ensure their attainment, through formal systems - the performance measurement systems (PMS) (e.g. Atkinson et al, 1997). Additionally, scholars suggest the linkages between PMS and business strategy are imperative, as PMS provide information to achieve the organisational goals and objectives (e.g. Kaplan and Norton, 2008, Chenhall, 2005). Thus, it is proposed that an indirect effect on organizational performance of the use on PMSs can be achieved through business strategy.

In this study only the experimentation has no significant effect on firm performance. Entrepreneurs are able to gather data to estimate potential outcomes of their strategies. Gathering data is often quicker and cheaper than running experiments (Alvarez and Barney, 2010). Therefore, if the appropriate data can be gathered prior to any execution causation would likely outperform effectuation (Welter and Kim, 2016).

Although the effectuation strategy has been assumed to be more effective decision-making logic and thus it influences positively on the performance of the company, it seems to be true only if the company does not seek to utilize information systems or there is no accurate information available because of e.g. environmental dynamism. On the contrary, when the company utilize PMS, it is able to reduce the uncertainty in the decision making by relatively accurate information, then causation logic proved to be more efficient.

The contribution of the study relates to the research framework. Effectuation decision-making logic is assumed to have a positive impact on the company's performance but previous research has not unambiguously succeeded in combining it with the success of a business when performance is measured by both financial and non-financial metrics. In addition, the previous research has not been able to demonstrate that the performance measurement system and the information obtained increases the positive effect of causation decision-making on the performance of the company. Accurate information can help to reduce environmental uncertainty, and at the same time makes future more predictable. Thus, it makes the causation process more efficient.

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