

Research Article

Combining effectuation and causation approaches in entrepreneurship: A 20+ years review

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Abstract

Objective: this paper gathers and reviews published empirical or theoretical articles in which the entrepreneurial logics of causation and effectuation, coined by Sarasvathy in 2001, are discussed to answer the research question of “Under what circumstances do firms combine effectuation with causation?”. **Methodology/approach:** The research is based on a systematic literature review of top-tier journals over a 20-year period. **Main results:** Findings suggest causation and effectuation logics can be applied simultaneously or in sequence, depending on factors at the micro (the entrepreneur), meso (the firm), and macro levels (business context—institutional and situational). **Theoretical/methodological contributions:** It delivers a compiled, synthesized, and contrasted set of past work for future researchers to build upon and a preliminary conceptual matrix for further testing and refinement, not to mention an in-depth discussion at the micro, meso and macro level. **Relevance/originality:** Over 20 years after Sarasvathy’s seminal work, most literature investigating decision-making still focuses on contrasting the logics of causation or effectuation, not fully understanding the conditions under which each prevails or when they are combined. **Social / management contributions:** At the micro level, this research can help entrepreneurs better understand their profile and the benefits of considering both logics throughout their decision-making process. At the meso level, companies can benefit from understanding how logics relate at each life stage. Finally, at the macro level, policymakers and educators can help entrepreneurs navigate uncertain and turbulent environments if different logics and circumstances are more broadly acknowledged.

Keywords: Effectuation. Systematic literature review. Decision-making. Entrepreneurship.

Combinando as abordagens de *effectuation* e *causation* no empreendedorismo: Uma revisão de mais de 20 anos

Resumo

Objetivo: Este artigo reúne e revisa artigos empíricos ou teóricos publicados nos principais periódicos internacionais nos quais as lógicas empreendedoras de *causation* e *effectuation*, cunhadas por Sarasvathy em 2001, são discutidas para responder à pergunta de pesquisa: “Em que circunstâncias as empresas combinam tais lógicas?”. **Método/abordagem metodológica:** A pesquisa é baseada em uma revisão sistemática da literatura de revistas de primeira linha durante um período de 20 anos. **Principais resultados:** Os resultados sugerem que as lógicas de *causation* e *effectuation* podem ser aplicadas simultaneamente ou em sequência, dependendo de fatores nos níveis micro (o empreendedor), meso (a empresa) e macro (contexto de negócios – institucional e situacional). **Contribuições teóricas/metodológicas:** Este estudo fornece um conjunto compilado, sintetizado e contrastado de trabalhos anteriores para futuros pesquisadores trabalharem, e uma matriz conceitual preliminar para testes e refinamentos adicionais, além de uma discussão aprofundada nos níveis micro, meso e macro. **Relevância/originalidade:** 20 anos após o trabalho seminal de Sarasvathy, a maior parte da literatura que investiga a tomada de decisão empreendedora ainda se concentra em contrastar as lógicas de *causation* e *effectuation*, não compreendendo completamente as condições sob as quais cada uma prevalece ou quando elas são combinadas. **Contribuições sociais/gerenciais:** No nível micro, esta pesquisa pode ajudar os empreendedores a entender melhor seu perfil e os benefícios de considerar ambas as lógicas ao longo de seu processo de tomada de decisão. No nível meso, as empresas podem se beneficiar ao entender como as lógicas se relacionam em cada estágio da vida de uma empresa. Finalmente, no nível macro, os formuladores de políticas e educadores podem ajudar os empreendedores a navegar em ambientes incertos e turbulentos se lógicas e circunstâncias diferentes forem mais amplamente reconhecidas.

Palavras-chave: *Effectuation*. Revisão sistemática da literatura. Tomada de decisão. Empreendedorismo.



INTRODUCTION

In 2001, Saras D. Sarasvathy published her seminal work entitled "Causation and effectuation: toward a theoretical shift from economic inevitability to entrepreneurial contingency", defining the decision-making logic of effectuation and its opposite causation, the prevailing logic. Over 20 years and 28,000 citations later (considering all her works on the subject), the topic continues to be live (over 5,400 citations over the last two years, as per Google Scholar).

Most theoretical discussions in the literature, however, have focused on the dichotomy of the two decision-making logics and on whether one should be preferable to the other, even though most authors would agree that they are not opposite constructs, but rather dialectical and unified (Zhang et al., 2019). It has long been known that the entrepreneurial process "is not a smooth, continuous, orderly process, but a disjointed, discontinuous, unique event" (Bygrave, 1989). As a result, numerous managers apply both logics either in combination or in sequence. This paper gathers and reviews published empirical or theoretical papers in which the two approaches as well as their combinations are discussed to answer the research question "Under what circumstances do firms combine effectuation with causation?" We do so through a detailed systematic literature review (SLR) of top-tier journals (ranked SCImago Journal Rank greater than 1.0) covering over twenty years (from 2001 to 2022). Our research thus answers to Sarasvathy's call for further studies to determine which circumstances of the different types of logic—effectuation or causation—provide specific advantages or disadvantages (Sarasvathy, 2001, p. 249).

As a result, we deliver a compiled, synthesized, and contrasted set of past work for future researchers to build upon and a preliminary conceptual matrix for further testing and refinement, not to mention an in-depth discussion at the micro, meso and macro level of interest to academics and practitioners. Our search variation of results regarding the decision logic choice of entrepreneurial firms confirms the importance of such a SLR, of our research question and our resulting matrix. Challenging the dichotomy of effectuation versus causation, which focuses on the implicit effectuation theory assumption of the "pilot in the plane" only, at the micro level (the entrepreneur), to focus on the circumstances that allow both logics to co-exist, at all three levels (micro, meso and macro) is what make this research interesting and novel.

The paper is structured as follows: Section 2 discusses the theoretical background necessary to understand decision-making logics; Section 3 explains the methodology; Section 4 synthesizes and reports our findings. Section 5 discusses those findings and proposes a preliminary concept matrix. Finally, we conclude by listing future research opportunities, limitations and contributions of this work.

THEORETICAL REFERENCE

Decision-making has been intensively studied, generating various theories to explain the process adequately in the strategy and organizations fields and, more recently, in the International Business (IB) literature. Sarasvathy (2001), before contributing to the field with her own theory of effectuation, presents a remarkable acknowledgment of the contributions of several important authors in these fields from whom she learned and was inspired by.

Causation versus effectuation

When Sarasvathy started defining the logic of effectuation in 2001, she contrasted it with what she considered to be the previously prevailing logic, which she referred to as causation (Sarasvathy, 2001). Whereas with causation one may "take a particular effect as given and focus on selecting between means to create that effect" (Sarasvathy, 2001, p. 245), with effectuation, the opposite occurs;

thus, one takes "a set of means as given and focuses on selecting between possible effects that can be created with that set of means" (Sarasvathy, 2001, p. 245).

According to effectuation logic, decision-makers neither present their plans in full nor focus on previously defined goals, such as maximizing expected returns, as assumed by causation logic. Instead, they calculate affordable losses they (as entrepreneurs and/or as a company) can handle and identify partners that create mutually beneficial business relationships to let the feasible effects emerge (Sarasvathy, 2001). The effectuator leverages contingencies while exploring their available means, which they identify by answering three questions: "Who am I?"; "What do I know?"; and "Whom do I know?" (Sarasvathy, 2001). Hence, the decision-maker chooses between effects that they can achieve by leveraging their available means (Sarasvathy, 2001).

In another work, Sarasvathy (2008) tested the decision-making habits of 27 expert entrepreneurs. It turned out that 24 of them applied effectuation logic in at least one of the five later conceptualized effectuation principles (Sarasvathy, 2008):

- Bird-In-Hand: meaning that decision-makers leverage whatever they already have.
- Affordable Loss: indicating that instead of accurately calculating potential profits, decision-makers should consider what they can afford to lose.
- Crazy Quilt: to restrict risks and affordable losses, this principle uses partnerships as a fundamental resource expansion method, forming networks that resemble quilts.
- Lemonade: this principle promotes leveraging contingencies and trying to benefit from embracing unforeseen circumstances.
- Pilot-In-The-Plane: the pilot symbolizes the effectuator, highlighting the importance of the individual making the decisions.

Causation, on the other hand, assumes that the environment is predictable, leading to another major difference between the two logics: the possibility of making plans and forecasts.

Table 1 below highlights the main differences between causation and effectuation logics.

Table 1

Main Differences between the causal and effectuation logics

Issue	Causation	Effectuation
Environment	Static and linear	Dynamic and nonlinear
Future perspective	opportunities are objective	opportunities are subjective
	Predictive	Creative → "Bird-In-Hand"
	Future projectable	Future not projectable
Decision maker's first question	Goals are pre-defined	Goals emerge
	What exact result do I want to achieve?	Who am I? What do I know? Who do I know?
Action orientation	Goal-driven	Means driven
	Goals determine actions, even if constrained by means	Goals emerge, based on given means
Risk attitude	Focus on upside to maximize returns	Focus on downside → "affordable loss"
	Pursue maximum opportunity with required resources	Pursue satisfactory opportunity without additional Resources
Network approach	Competitive analysis	Coalition building → "Crazy Quilt"
	Create partnerships only to protect the firm	Leverage partnership to conquer new markets
Handling unforeseen	Avoid	Leverage → "Lemonade"
Unforeseen contingencies	Contingencies threaten the accurate plan	Without planning, contingencies create opportunities
Theory focuses on	Firm	Entrepreneur → "Pilot-In-The-Plane"
Market entrance	Late	Early
	Exploit opportunities in existing markets	Exploit opportunities in new markets

Note: Elaborated by the authors based on Dew et al. (2009, p. 290); Harms and Schiele (2012, p. 98); Fisher (2012, p. 1022)



Effectuation and causation

The two models may differ in several dimensions but are not opposite constructs nor mutually exclusive. As explained by Sarasvathy herself, both are an “integral part of human reasoning that can occur simultaneously, overlapping or intertwining over different contexts of decisions and actions” (Sarasvathy, 2001, p. 245).

In a later work, Sarasvathy expanded on this important issue: “Empirically, entrepreneurs use both causal and effectual approaches, in a variety of combinations. Use of and preference for particular modes is related to the entrepreneur’s level of expertise and where the firm is in its life cycle. Theoretically, however, it makes sense to analyze causal and effectual approaches as a strict dichotomy” (Sarasvathy, 2008).

From both quotes of Sarasvathy seminal articles, we infer that we combined use of both logics may depend on the entrepreneur, on the company or on the decision context. In other words, on a micro, meso or macro level. But has research really evolved towards exploring those three levels of analysis to understand ‘Under what circumstances do firms combine effectuation with causation?’, or has it been stuck in the original “pilot in the plane” implicit assumption of the model, at a micro level?

In the following sections, we organize (section 4) and discuss (section 5) several studies that have investigated this issue.

METHOD

Following Kraus et al. (2020) and Tranfield et al. (2003), we have structured our systematic literature review (SLR) in three main stages:

Planning the research

The first thing was to determine the need of the research. Over 20 years after Sarasvathy’s seminal work, most literature investigating decision-making still focuses on contrasting the logics of causation or effectuation, not fully understanding the conditions under which each prevails or when they are combined, although much has been published. The aim of this paper is to understand the circumstances under which firms apply both logics – effectuation and causation, in combination or alternately – rather than one exclusively. These were determined as the study’s conceptual boundaries, following the example of Karami et al. (2020).

The method chosen for the analysis of the selected literature was a systematic literature review, that is, a structured, transparent, comprehensive, and reproducible method (Bearman et al., 2012; Petticrew & Roberts, 2006) that attempts to “identify, appraise and synthesize all relevant studies (of whatever design) to answer a particular question (...)” (Petticrew & Roberts, 2006, p. 27). The SLR technique aims to reduce systematic errors, such as personal biases, predominantly by attempting to assess and summarize all relevant studies to answer a specific question (Bearman et al., 2012). To achieve such unbiased result, a simple but detailed search protocol was developed (details in the next section).

Conducting the research: identifying the studies

The articles selected were a result of a systematic search in academic databases (PROQUEST and EBSCO). The search used as keywords: ‘effectuation,’ AND ‘Causation’ in the papers’ abstracts. To ensure higher validity for the research, some exclusion criteria were also determined. First, only peer-reviewed articles from respected academic journals were considered in this work. This criterion was satisfied by including only articles from papers with an SJR score of at least 1.0 (see *Scimago Journal & Country Rank*). Additionally, a 21-year period (from 2001 to 2022) filter was added. This specific time span is due to the date of publication of the original effectuation logic paper, published in 2001 (Sarasvathy,

2001), which represents a fundamental part of this work. Finally, only articles written in English and published in IB and IE fields were considered.

After the above filters were used, the authors read every resulting paper’s abstract and scope as a qualitative filter to ensure that all were related to the research problem. Sometimes the use of causation and/or effectuation logics were not central to the paper; on others the paper did not adopt the same unit of analysis (the firm) for example. When needed, the co-authors revised and validated the decisions. In addition to the systematic search, the authors also engaged in a manual references-checking process to avoid missing any important paper. So, we included some articles derived from citations and references in our review due to their significance and relevance to the theme.

Organizing and reporting the results

Only 38 articles remained after the peer review, date, language, repetition, and qualitative examination, which are analyzed and discussed in the sections to follow. The papers were fully read, with data extracted and synthesized in Table 2. To facilitate analyzing and reporting, papers were initially separated and later analyzed under two main categories: (1) seminal and theoretical articles (mostly summarized at theoretical background section); and (2) empirical papers investigating decision-making logics. The second category was then subdivided into (2a) decision-making logics applied exclusively (either causation or effectuation); and (2b) decision-making logics applied in combination or in alternating sequences. We then further explored the categories in our analysis section (aided by some of the other theoretical articles) to answer our research question, “under what circumstances do firms combine the logics of effectuation and causation?”

Each paper was analyzed in terms of its context (geographical, institutional, and situational) as well as considering the characteristics of the companies under analysis (life cycle stage mainly) and individual entrepreneurs. As a result, we could understand the phenomena from macro, meso, and micro perspectives, respectively.

It is worth noting that this paper followed a systematic procedure of searching; however, the discussion is structured as a narrative review rather than a meta-analysis. “This involves systematically extracting, checking, and narratively summarizing information on their methods and results” (Petticrew & Roberts, 2006, p. 57).

RESULTS

Our systematic literature review identified theoretical papers (8, to be precise) as well as empirical ones (30) describing real-life entrepreneurial business situations in which effectual decision-making logic prevailed (20) and some in which causation could be the preferred logic (12). However, most described or even argued for combined decision-making logics, deployed concurrently (20) or with one replacing the other through time (19)¹. The empirical articles were based on case studies (12), in-depth interviews (4), surveys (10) and others (3), but the research method does not seem to have an influence on the results. They mostly investigated companies in their entrepreneurial stage² (24 exclusively on entrepreneurial stage while 8 investigated companies on all stages and 5 did not disclose that information) and non-routine decision-making in complex and/or uncertain context.

In Table 2, we compile, review, and briefly describe the literature found. By thoroughly analyzing the articles found, we also identified several patterns and gained insights, thus enabling us to respond to our research question concerning the circumstances and results of combining effectual and causal logics. Specifically, by cross referencing and analyzing the detected decision logics to explanations, we find that decision logic choice is related to the level of analysis. This will be discussed in detail in the next section.

Table 2
Summary of search

continued

Author(s)	Summary	Method	Type of decision	Context	Life cycle stage of the firm	Decision logic detected / recommended				Choice dependent on	Level
						Effectuation	Causation	Combining (concurrent)	Alternating		
Sarasvathy (2001)	Seminal article on effectuation, explaining how firms and markets are created. Explanations and examples on effectuation versus causation logic: prediction versus control	Theoretical	Creation of artifacts	Complex and uncertain	Entrepreneurial	x	x	x	x	Life stage, decisions	Micro, meso and macro
Sarasvathy (2008)	Chapter book reporting on Sarasvathy's research on effectuation, "a logic of entrepreneurial expertise."	Theoretical	Decision logics in general	Uncertain (cross border)	Entrepreneurial	x	x	x	x	Entrepreneur expertise, firm life cycle	Micro and meso
Dew et al. (2009)	Behavior and decision-making process of 27 expert entrepreneurs and 37 MBA students in creating a new venture. Entrepreneurial experts tend to use effectual logic, while the students use a more causal logic, "going by the textbook"	Protocol analysis	Launch of a new venture	NA	Entrepreneurial	x	x	MBA students	x	Entrepreneur profile	Micro
Schweizer et al. (2010)	Internationalization not as an outcome of deliberate efforts to expand internationally (causation), but as a by-product to some other action, here entrepreneurial action (effectuation).	Case study	Internationalization	Uncertain	Entrepreneurial	x				Context and entrepreneur	Micro and macro
Andersson (2011)	Shows how a born global (BG) company can enter many markets in a short time, by co-operating with local partners, with the founders' prior knowledge and networks being important determinants.	Case study	Entry modes, market selection	Complex and uncertain (BG)	Entrepreneurial	x				Life cycle and entrepreneur profile	Micro and meso
Harms and Schiele (2012)	Experienced entrepreneurs tend to prefer effectuation, with uncertainty not having a systematic influence. Entrepreneurs using causation-based venture creation processes tend to engage in export-type entry modes.	Survey, n = 65	Entry Mode	Complex and uncertain (high growth; new territories)	Entrepreneurial	x	x	Exports		Entrepreneur	Micro
Fisher (2012)	Describes the early development of six new ventures, the underlying behaviors the theories of effectuation, causation, and bricolage, showing how these perspectives contrast and complement one another.	Alternate templates approach	Several	Complex (small new firms)	Entrepreneurial	x		x		Situation / decision to be made and profile	Micro, meso and macro
Brettel et al. (2012)	The results appear to confirm that a strictly planned and prediction-based causal approach is suitable at low levels of innovativeness, while effectuation is suitable at high levels of innovativeness.	Mixed method	R&D decisions	Context of high or low innovation	NA	x	Low innovative contexts			Context	Macro
Kaufmann (2013)	Contrasting of two cases regarding the implementation of biotechnology policies within country borders: the Singaporean government, which used causation logic, and Israeli policy makers, who used effectuation.	Multiple case study, n = 2	Creation of new market	Complex and uncertain (industry and countries)	Entrepreneurial			x		Situation / decision to be made	Macro

Table 2
Summary of search

Author(s)	Summary	Method	Type of decision	Context	Life cycle stage of the firm	Decision logic detected / recommended					Level
						Effectuation	Causation	Combining (concurrent)	Alternating	Choice dependent on	
Sarasvathy et al. (2014)	Outlines observations about IE research through the theoretical lens of effectuation, showing how an effectual approach can help solve four central conflicts and identified knowledge gaps. The paper also presents an illustrative case study from India. Integration of Uppsala model with effectuation theory.	Theoretical with case example	Decision making in general	Uncertain (India)	All stages covered - 1st, 2nd, and 3rd generation	x 1st and 2nd generation	x 3rd generation	x Expert entrepreneurs can combine and alternate when needed - causal first, effectual later		Profile, circumstances	Micro and meso mainly
Crick and Crick (2014)	Managers of 16 rapidly internationalizing SMEs were interviewed to investigate the extent to which strategies were decided from an effectual or causal perspective. Analysis regarding speed, scale, and scope (geographical coverage) of internationalization.	In-depth interviews, n = 16	Strategies in general	Complex and uncertain	Entrepreneurial (< 3 years, rapidly internationalizing SMEs)			x		Situation / decision to be made	Macro
Sitoh et al. (2014)	Both logics were simultaneously applied during the project's prototyping and marketing phases, while a different constellation was preferred during other phases (towards causation), eventually drifting back in some instances. Authors argue that effectuation and causation can co-exist and thus, managers should consider both logics in combination.	Case study	Definition of business models (several build-in decisions)	Complex and uncertain (industry and nature of decision)	Entrepreneurial			x In parallel, for different decision	x Effectual early, causal later	Life cycle / size and situation / decision to be made	Meso and macro
Nummela et al. (2014)	To understand strategic decision-making logics within born-global software companies, cases in Finland, Ireland, and Israel are analyzed. Findings: effectuation in early stages; causation over time. Critical incidents may trigger change, e.g., change of key persons and the search for external funding. Coexistence of the two logics possible.	Longitudinal study	Business Growth	complex and uncertain (BG software co)	Entrepreneurial			x	x Effectual early, causal later	Profile of decision maker, time and situation	Micro, meso and macro
Galkina and Chetty (2015)	Paper integrates effectuation theory with the revisited Uppsala model to understand how entrepreneurs make decisions about networking under conditions of uncertainty as they enter foreign markets and why entrepreneurs commit to specific network relationships.	Multiple case study, n = 7	Network decisions in entering foreign markets	Uncertain and complex	SMEs < 10 years of internationalization	x			x Effectual early, causal later	Life cycle, entrepreneur networks	Micro and meso
Dutta et al. (2015)	U.S. students surveyed on whether their entrepreneurial intentions were driven by causal or effectual logic. Individual perception, entrepreneur's innovativeness as well as experience and knowledge were significant influencing factors. The authors suggest a combination of logics.	Survey, n = 164	Launch of a new venture	Complex and uncertain	Entrepreneurial			x		Profile (mainly) and situation / decision to be made	Micro (mainly) and macro

Table 2
Summary of search

continued

Author(s)	Summary	Method	Type of decision	Context	Life cycle stage of the firm	Effectuation	Causation	Combining (concurrent)	Alternating	Choice dependent on	Level
Maine et al. (2015)	30 decisions made by 3 scientific entrepreneurs operating in the biotechnology industry were analyzed and both effectuation and causation logics were detected individually as well as in combination.	In depth interviews	Creation of business opportunity	Complex and uncertain (industry)	Entrepreneurial	x	x Funding, planning and forecasting	x	x Effectual early, causal later	Life cycle / size and situation / decision to be made	Meso and macro
Chetty et al. (2015)	Analysis of entrepreneurial software firms from Finland and New Zealand (NZ) to identify how and why they were internationalizing. Authors suggest that the choice of logic depends on the prevailing decision context.	Case study	Internationalization decisions (entry mode and market selection)	Less uncertain countries;	Entrepreneurial and/or mature	x Entry mode and market selection - NZ	x Market selection - Finland			Situation / decision to be made	Macro
Berends et al. (2015)	352 new product development events examined, revealing small companies substantially differ from those of large ones, favoring effectuation over causation. Effectuation applied especially in early stages, and combination thereafter.	Case study	New product development	SMEs	Entrepreneurial and/or mature	x SMEs			x Effectual early, causal later	Time / life cycle	Meso
Reymen et al. (2015)	385 decisions in nine technology-based companies launching new businesses were examined. Hybrid logic consisting of effectual and causal components, with the dominant one shifting overtime. Effectuation typically preferred in earlier phases and causation later.	Case study	Launch of a new venture	Complex (tech firms)	Entrepreneurial				x Effectual early, causal later	Time	Meso
Guo et al. (2016)	180 Chinese Internet companies with < 10 y surveyed showing growth is positively affected by both logics, but effectuation for pioneering, and causation for stabilization. The authors recommend combining both logics to support growth.	Survey, n = 180	Business Growth	Complex and uncertain	Entrepreneurial and/or mature				x Effectual for pioneering and causal for stabilization	Situation / decision to be made	Macro
Crick and Crick (2016)	Study finds that a variety of factors affects the decision to start exporting, including the influence of the management team, particularly their perceptions. The authors support combining the best of both logics simultaneously.	Appreciative inquiry	Decision to start exporting	Complex	Entrepreneurial (SMEs)			x		Profile and "perception of the situation"	Micro and macro
Alsos et al. (2016)	Examines how the social identity of an entrepreneur influences their behavior when engaged in new venture formation (causation versus effectuation)	Mixed-Interviews, n = 6 and survey, n = 350	Decision making in general	New industry	Entrepreneurial	x	x			Profile	Micro
Randerson (2016)	Depending on the contextual factors of a specific decision in a specific situation, entrepreneurs apply a different approach, so overall the process lines are not followed exclusively, but combined	Theoretical	Decision making in general	NA	All stages				x	Situation / decision and life stage	Meso and macro

Table 2
Summary of search

continued

Author(s)	Summary	Method	Type of decision	Context	Life cycle stage of the firm	Decision logic detected / recommended				Level
						Effectuation	Causation	Combining (concurrent)	Alternating	
Zhang et al. (2016)	Explores the impacts of psychological factors on entrepreneurs' preferences for causal and effectual decision-making logics.	Survey, US, n = 116 and China, n = 132	Decision making in general	Varying complexity (US and China)	Not disclosed			x	x	Profile Micro
Shirokova et al. (2017)	Paper explores the drivers of causal and effectual decision logic in students starting new ventures, focusing on the role of university entrepreneurship-related offerings and student's prior business experience.	Survey, n = 2179	New venture creation	Various (26 countries)	Entrepreneurial	x	x		x	Profile (experience and university courses) Micro
Hubner and Baum (2018)	Analysis of human resources development (HRD) approaches employed by entrepreneurs based on causation and effectuation, on different life stages.	27 interviews	HR decision	Dynamic context (tech industry)	Different stages - entrepreneurial and larger firms			x	x	Life cycle Meso
Chang and Rieple (2018)	Investigates when, how, and why students use causation, effectuation, and bricolage in a fundraising project (a microcosm). Results indicate varied approaches at different stages.	Qualitative Observational, 124 students in 25 teams	Creation/ recognition of business opportunity	Non-complex with times of uncertainty	All stages			x	x	Profile and time/life cycle Micro and meso
Urban (2018)	Results indicate that entrepreneurs apply effectual principles to recognize and exploit more opportunities while operating in dynamic and hostile surroundings.	Survey, n = 302	Creation/ recognition of business opportunity	Complex and uncertain (renewable energy, S. Africa)	Entrepreneurial	x				Context Macro
Servantie and Rispal (2018)	Paper examines how the combination of causation, effectuation, and bricolage changes over a particular venture's life cycle using a longitudinal case study of a Colombian foundation.	Case study	Decision making in general	Complex and uncertain (Colombia)	All stages (longitudinal study)			x	x	Time / life cycle Meso
Yang et al. (2019)	Paper argues that entrepreneurial effectuation cognition is associated with more search behaviors and that entrepreneurial causation cognition is associated with more execution behaviors.	Survey, n = 160	Search and execution decisions	China	Several	x	x	Execution phase		Life cycle Meso
Kerr and Coviello (2019)	Systematic literature review on effectuation and networks, resulting in a comprehensive perspective on network development under effectuation logic.	Systematic literature review	Creation and development of networks	NA	NA	x	Most	Some		Profile Micro
Karami et al. (2020)	Systematic literature review on SME internationalization literature and how international opportunities are developed.	Theoretical (literature review)	Creation/ recognition of business opportunity	NA	NA	x		x	x	Various Micro, meso and macro

Table 2

Summary of search

concluded

Decision logic detected / recommended									
Author(s)	Summary	Method	Type of decision	Context	Life cycle stage of the firm	Effectuation	Causation	Combining (concurrent)	Alternating
Ranabahu and Barrett (2020)	Study testing whether and how the use of effectuation and causation logics influences deliberate practice by micro-entrepreneurs in Sri Lanka.	Mixed methods - interview and survey	Decision making in general	Complex and uncertain (Sri Lanka / Microfin)	Entrepreneurial			x	Decision (deliberate practice improvement)
Pattinson et al. (2020)	Use of the Argentine Tango metaphor to understand how novice entrepreneurs become expert entrepreneurs, moving from predictive to effectual logic.	Theoretical	Decision making in general (thematic paper)	Complex and uncertain	Entrepreneurial				Time / experience
Coudounaris and Arvidsson (2021)	Reviews articles investigating effectuation, causation and bricolage and the international performance of the firm	Theoretical (systematic literature review)	Internationalization	Different contexts	Mostly entrepreneurial	x	x	x	Causation earlier, effectuation later
Nyoni and Moos (2022)	The study found that effectuation and its components of experimentation and flexibility had statistically significant relationships with financial business growth.	Survey	Business growth	Complex and uncertain -S.Africa townships	Entrepreneurial (small business)	x			Context / situation
Servantie and Hlady-Rispal (2022)	Focused on their combination/ complementarity of entrepreneurial logics (effectuation, causation and bricolage) in the emergence and subsequent international growth of Born Globals (BG) firms.	Multiple case study, n = 7	complementarity emergence and international growth	French Born Globals	Entrepreneurial (BG)			x	Entrepreneur mindset, Life stage, context/ situation
Khurana et al. (2022)	Studying US distilleries, the article addresses arbitrage opportunity development during COVID-19, revealing the primacy of both causation and effectuation-based entrepreneurial decision logics and the role of double-loop learning.	Multiple case study, n = 8	Arbitrage decisions emerging from crisis	Complex and uncertain (covid)	Entrepreneurial (small business)			x	Context situation (opportunity)
								Different proportions in different phases	More causal first, more effectual later

Note: Elaborated by the authors.

DISCUSSION

Pure causation or effectuation logics: A micro level issue on a defined context

Based on our search, the most important determinant for a pure decision logic appears to be the decision-maker. Personality and personal background traits appear to influence how one thinks and makes decisions (Coudonaris & Arvindsson, 2021). A person with a more entrepreneurial or adventurous profile tends to opt for an effectual approach, (Alsos et al., 2016; Sarasvathy, 2001; 2008; Dew et al., 2009), while someone with an analytic or planning profile would tend to adopt a causal approach to making decisions (Sarasvathy, 2001; 2008; Dew et al., 2009). Other psychological traits such as self-efficacy and perspective-taking also appear to be antecedents of effectual logic (Zhang et al., 2019). Research also shows that previous knowledge (experiential or formal) on business/entrepreneurship (Andersson, 2011; Chang & Rieple, 2018; Dew et al., 2009; Dutta et al., 2015; Harms & Schiele, 2012; Shirokova et al., 2017) or a strong network (Galkina & Chetty, 2015) shape preferences for logics, with experienced entrepreneurs tending to effectuation and those with less experience but a strong formal education tending towards causation, at least during the initial years of the enterprise (Chang & Rieple, 2018; Pattinson et al., 2020). A change in top management/decision makers can thus influence a company's decision-making logic (Nummela et al., 2014; Pattinson et al., 2020).

Additionally, and not very surprising, applying causation logic alone does not appear to be recommended in complex and/or uncertain markets (Sarasvathy, 2001; Kaufmann, 2013; Crick & Crick, 2014; Sitoh et al., 2014; Nummela et al., 2014; Berends et al., 2015; Dutta et al., 2015; Maine et al., 2015; Reymen et al., 2015; Guo et al., 2016; Urban, 2018; Nyoni & Moos, 2022) and is better suited for contexts involving lower levels of innovation or changes (Sarasvathy, 2001; Brettel et al., 2012) or, in other words, more predictable and stable markets. But even with more predictable and less complex contexts, uncertain and complex situations / decisions to be made may surface, requiring the entrepreneur to adopt fewer causal approaches (Chetty et al., 2015; Chang & Rieple, 2018). This shows us that context (geographical, institutional, and situational) appears to be an important determinant or influencing factor of the decision-logic.

Alternating between the two logics: a life cycle issue (meso or micro level)

Seventeen out of the nineteen studies in our search that describe, or advocate for, the alternate use of both effectuation and causation logics, mention the life-cycle stage of the enterprise as an important determinant of decision-making logic. According to most of the papers, effectuation appears to be more effective in the early stages and more associated with search and opportunity creation behaviors, while causation slowly takes place as the company matures and progresses to execution phases (Sitoh et al., 2014; Berends et al., 2015; Maine et al., 2015; Reymen et al., 2015; Guo et al., 2016; Servantie & Rispal, 2018; Yang et al., 2019). "While effectual approaches open up and create new markets at low costs of failure, causal approaches can help stabilize and establish leadership in those markets" (Sarasvathy et al., 2013, p. 83). This finding supports Proposition 3 of Sarasvathy's seminal paper:

Successful firms, in their early stages, are more likely to have focused on forming alliances and partnerships than on other types of competitive strategies, such as sophisticated market research and competitive analyses, long-term planning and forecasting, and formal management practices in recruitment and training of employees. (Sarasvathy, 2001, p. 261)

These practices, however, might be necessary as companies mature because the financial stakeholders that secure funding for growth and formal regulators have begun to require them (Maine et al., 2015). Also, as companies grow, decisions become less dependent on a single individual (and their style and experience) and more on a collection of individuals, who need to be ruled by norms and most probably adopt a causal logic. Despite all the above, it is worth noting that effectuation theory is not limited to SMEs but is applicable to companies of any size (Galkina & Chetty, 2015; Read et al., 2016; Karami et al., 2020).

Simões et al. (2012) state that born-global companies do change as they become older, and that change happens for reasons that are both internal and external to the companies "framed by top management mental models" (Simões et al., 2012, p. 1). Although the authors do not discuss effectuation and causation decision logics specifically (thus the paper is not included in Table 2), their discussion is pertinent to ours. Simões et al. (2012) believe firms' growth and adaptation to new realities usually require new configurations and structures from the organization, but pre-foundation characteristics remain deeply entrenched. Ambos and Birkinshaw (2010) also discuss the changes that entrepreneurial firms experience in the process of growth, stating that they can either (a) transition smoothly to a next phase of development, sustaining most of the characteristics they had before; or (b) disruptively, with the abandonment of some or most of their prior characteristics, capabilities, and achievements. A change of top management as the company matures and requires new leadership might lead to an alternance of decision logics for example (Pattinson et al., 2020; Sarasvathy et al., 2014; Nummela et al., 2014).

A few studies in our survey (Harms & Schiele, 2012; Chang & Rieple, 2018; Pattinson et al., 2020), however, found evidence to support that early ventures may use causal logics and move towards effectuation as they mature. These cases discuss the evolution or change in decision logic, analyzing the time frame/life cycle of the entrepreneurs (a micro issue in this case), already discussed above, with entrepreneurial experience of the decision maker determining the change in decision logic. Sarasvathy (Sarasvathy, 2008) reinforces the importance of experiential knowledge, highlighting that "Sustained performance over long periods of time requires that experts outlive failures, cumulate successes, and learn from both" (p.20). Another one (Khurana et al., 2022) found evidence of combinations of both logics but in alternating magnitudes, with a higher proportion of causation first and of effectuation later in the specific context of opportunity exploitation.

Combining both logics: A macro level issue or a matter of joined forces

As in the case of Khurana et al. (2022), the use of combined logics is usually a macro level decision, in other words, when context is complex and variable, requiring the decision logic to follow. It is not necessarily dependent on the entrepreneur/decision maker or on the age/life cycle of the enterprise, the decision logic depends on the situation/decision at hand, needing to be analyzed and decided on a case-by-case basis (Fisher, 2012; Kaufmann, 2013; Crick & Crick, 2014; Sitoh et al., 2014; Nummela et al., 2014; Dutta et al., 2015; Maine et al., 2015). It is worth noting though that being an experienced entrepreneur/decision-maker is considered essential in this case, as it is not easy to combine two logics (Chang & Rieple, 2018; Dutta et al., 2015; Pattinson et al., 2020; Sarasvathy et al., 2014). When dealing with a management team – instead of a sole entrepreneur – multiple profiles (Zhang et al., 2019) or perceptions (Crick & Crick, 2016) might determine adopting a combined decision logic.

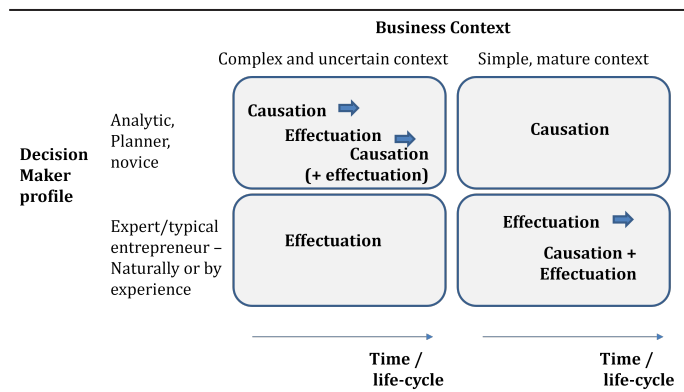
Analysis on more than one level (micro, meso and macro)

Only a few papers (Sarasvathy, 2001; 2008; Karami et al., 2020; Servantie & Hlady-Rispal, 2022) reported all three levels (micro, meso and macro) in determining decision logics, and because most were theoretical papers or literature reviews. Most relied more heavily on one or two levels, as already discussed. But in practice, it is impossible to separate one from another; moreover, “an entrepreneurs’ emphasis on these logics shifts, often repeatedly, over time” (Reymen et al., 2015).

So, resulting from our findings, a preliminary conceptual matrix that tries to synthesize the circumstances under which firms use the logics of effectuation and causation was created (Figure 1).

Figure 1

Conceptual matrix on the combination of causation and effectuation logics



Note: Elaborated by the authors.

As previously discussed, and by inspecting Figure 1, a novice, analytical, and planning-centered decision-maker tends to adopt a causation logic (Sarasvathy, 2001; 2008; Dew et al., 2009), especially with simpler and more mature contexts for which outcomes are more predictable. But even in less predictable environments, the decision-maker will tend to adopt a causal approach—at least initially—as it is their first instinct. Indeed, an analytic decision-maker may always want to start working with plans and forecasts, trying to predict the unpredictable to find some comfort. However, a complex and uncertain environment will probably demand more flexibility and thus a more effectual approach in the process (Pattinson et al., 2020; Sarasvathy et al., 2014). As time passes, the decision-maker gathers experience, reviewing their approach along the way and gradually shifting to a more effectual stance (Harms & Schiele, 2012; Chang & Rieple, 2018; Pattinson et al., 2020), culminating at a point at which, as an expert, they can combine both approaches, adopting one or another depending on the decision at hand (Chang & Rieple, 2018; Dutta et al., 2015; Pattinson et al., 2020; Sarasvathy et al., 2014).

On the other end of the of a decision-maker profile spectrum, we have what we could call a ‘typical entrepreneur’: someone with a more entrepreneurial profile either according to psychological traits (Alsos et al., 2016; Sarasvathy, 2001; 2008; Dew et al., 2009) or entrepreneurial experiential knowledge and expertise (Andersson, 2011; Chang & Rieple, 2018; Dutta et al., 2015; Shirokova et al., 2017), who tends to adopt a more effectual approach, especially if working in complex and uncertain contexts. Even in simple, mature, and predictable contexts, those ‘typical entrepreneurs’ tend to start with effectuation logic. But eventually later, at some point, must adopt a causation approach (Sitoh et al., 2014; Berends et al., 2015; Maine et al., 2015; Reymen et al., 2015; Guo et al., 2016; Servantie & Rispal, 2018; Yang et al., 2019). Larger and more mature companies need more planning, control and forecasting tools in place, even if only for satisfying financial stakeholders and regulators (Maine et al., 2015; Servantie & Hlady-Rispal, 2022). But, again, expert

entrepreneurs usually can, and should, be able to manage both approaches (Chang & Rieple, 2018; Dutta et al., 2015; Pattinson et al., 2020; Sarasvathy et al., 2014).

The above matrix is obviously a simplification of research and consequently of reality. It is intended to shed light on such an important debate. There can be many possible combinations, especially in the process of changing from one to the other; but most authors would agree that the ideal situation would involve decision-makers having the best of both logics and using a combined version during the process since there is apparently “no exclusive approach that is more appropriate than any other” (Servantie & Rispal, 2018).

CONCLUSION

This study performed a systematic literature review to uncover “Under what circumstances do firms combine effectuation with causation?”. Even though “theoretically [...] it makes sense to analyze causal and effectual approaches as a strict dichotomy” (Sarasvathy, 2008, p. 16), a careful analysis of the literature resulting from our search confirms that causation and effectuation logics can be applied simultaneously or in sequence, providing the decision-maker with distinct advantages. Moreover, “considering the dual relationship [...] provides a more realistic explanation of SMEs’[internationalization] efforts” (Karami et al., 2020, p. 26).

Our systematic literature review indicates that decision making logic is defined based on circumstances at the micro (the entrepreneur), meso (the firm – life stage mainly), and macro levels (business context—institutional and situational). Our framework (Figure 1) complies all three levels of analysis, something to the best of our knowledge not yet done in literature. As our SLR reveals, most research tackles one, or at most two levels at a time, not gathering therefore the full picture.

This work therefore contributes to the academic literature not only by compiling, synthesizing, and contrasting past work for future researchers to build upon, but also suggesting a preliminary conceptual matrix to be further tested and refined, and indicating additional avenues for further research in the field. For practice, we offer contributions to the micro, meso, and macro levels. At the micro level, we believe the cases, theoretical papers, and preliminary systematization will help entrepreneurs better understand their profile and the benefits of considering both effectual and causal logics throughout their decision-making process. At the meso level, we believe companies can benefit from understanding how logics relate to and can help growth at each life stage. And finally, at the macro level, policymakers and educators can help entrepreneurs navigate uncertain and turbulent environments if different decision logics and circumstances to adopt them are more broadly acknowledged. As Sarasvathy in her original study sought to understand and identify the teachable and learnable elements of entrepreneurship, it is only fair that now those elements are more broadly taught and learned.

Despite the already discussed limitation of the proposed matrix, we would like to add the limitation of (1) having mostly cases from companies in the entrepreneurial stage, for which we suggest further studies with more mature companies, as well as (2) limitations of our systematic search (chosen parameters – search bases and languages, for example), for which we strove for reliability and replicability by entirely revealing our selection parameters.

For future research, we would also like to focus on the business environment slightly more and how it influences the adoption of one logic over the other. For example, do companies starting out in different business environments where culture, language, and policies clearly differ from one another adopt different decision logics? Is the industry or country/institutional environment more important in determining which logic(s) to adopt? Studies

contrasting emerging markets and developing economies and different industries would be welcome. Does the type of product/service being offered and how it is produced influence the decision logic (standardized vs customized)? We would also like to welcome more studies encompassing larger and more mature companies, and obviously studies involving the three levels of analysis. Lastly, we believe that further studies, both qualitative and quantitative, are necessary to test and refine our preliminary conceptual matrix.

Endnotes

- 1 Note that total does not amount to 38 as some papers are multiple case studies or are a result of surveys/interviews, thus reporting on more than on logic.
- 2 By entrepreneurial stage we mean companies in their early years, in opposition to companies in more mature stages of their business life cycle. This was a qualitative and discretionary classification, as no exact threshold could be established due to differences in papers 'parameters.

Conflit of interest statement

The authors declare that there is no conflict of interest.

Authors' statement of individual contributions

Roles	Contributions		
	Kogut C. S.	Mello R. D. C. de	Skorupski R.
Conceptualization	■		
Methodology	■		
Software		N. A.	
Validation	■		
Formal analysis	■		■
Investigation	■		■
Resources		■	
Data Curation	■	■	
Writing - Original Draf	■		■
Writing - Review & Editing	■	■	
Visualization		■	
Supervision	■	■	
Project administration	■		
Funding acquisition		■	

Note: Acc. CRediT (Contributor Roles Taxonomy): <https://credit.niso.org/>

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