THE USE OF EFFECTUATION IN PROJECTS INSIDE THE CORPORATION:

A SYSTEMATIC LITERATURE REVIEW

Ricardo Kahn (ricardok@usp.br) - Departamento de Engenharia de Produção / Escola Politécnica, Universidade de São Paulo (USP)

Marly Monteiro de Carvalho (marlymc@usp.br) - Departamento de Engenharia de Produção / Escola Politécnica, Universidade de São Paulo (USP)

ABSTRACT

Effectuation has been used in processes such as new products development, new business development and research and development inside startups for a while, as Sarasvathy (2001) has shown in her seminal article. However, the use of effectuation-based methodologies inside corporations is still a growing phenomenon. Literature studying the topic is still incipient. This article organizes the literature about the subject through a Systematic Literature Review (SLR), supporting academics and practitioners, and consolidating new avenues for future research. By organizing the literature about the theme in corporate environment, the paper will support and direct new research efforts.

Keywords: *Project management; Dynamic capabilities; Absorptive capacity; Project success; Knowledge management*

Palavras chave: *Gerenciamento de projetos; Capacidades dinâmicas; Capacidade de absorção; Sucesso em projetos; Gestão do conhecimento.*

1. INTRODUCTION

Effectuation has been proven a very effective thinking logic for entrepreneurial initiative in new ventures (Chandler, DeTienne, McKelvie, & Mumford, 2011). It improves the performance of new ventures (Futterer, Schmidt, & Heidenreich, 2018) and, as proposed in the seminal article by Saras Sarasvathy (2001), is the decision-making logic more associated to successful early entrants in a new industry.

Although a number of new process models (Reymen et al., 2015), initiatives and methodologies (Leal, Tavares, Boas, Romão, & Gurgel, 2021; Ries, 2017) take the challenge of bringing the benefits of Effectuation to the established companies, it is still "underexplored in contexts such as established company's decision-making" (Henninger, Brem, Giones, Bican, & Wimschneider, 2020). Academic interest spurred the exploration of Effectuation-based methodologies in the corporate environment (Brettel, Mauer, Engelen, & Küpper, 2012; Futterer et al., 2018; Roach, Ryman, & Makani, 2016), but literature over this specific topic has not been systematically organized.

In this paper we explore the state of research over the applicability of Effectuation in projects inside established companies through a Systematic Literature Review (SLR). It investigates the current state of literature, its evolution over time and the main topics and research streams associated with the phenomenon.

We employ bibliometric, network and content analyses in order to explore peer-reviewed literature. We develop a codification and deploy it on articles indexed on the most relevant journals databases.

The structure of the paper is: after this introduction, we present the research methodology, formulating the research questions, presenting the process for articles selection and evaluation, as well as the codification system employed. Later we discuss the results and conclude by identifying the paper limitations and suggesting new avenues of research.

2. RESEARCH METHODS

Although several recent studies discuss the use of Effectuation logic in projects in established companies, the literature about the subject has not been organized through a specific Systematic Literature Review (SLR).

This paper intends to develop a SLR for supporting further research and clarifying the characteristics of literature around the topic.

We defined two main research questions and deployed them in sub-questions (as in Franco, Hirama, & Carvalho, 2018) in order better orient the SLR efforts. The results can be seen in TABLE 1.

Research Questions	Deployment
RQ1. How is the current state of the literature on Effectuation applied to corporate projects evolve over time?	RQ1.1. What are the key journals for this topic? RQ1.2. What are the most influential studies? RQ1.3. What kinds of study have been published?
RQ2. What are the main topics and research streams associated with Effectuation applied to corporate projects found in the scientific literature?	RQ2.1. What are the most relevant research themes associated to the topic? RQ2.2. How is Effectuation characterized in literature? RQ2.3. What types of projects are analyzed in literature?

TABLE 1 - Deployment structure of the research questions

A multi-method combination for SLR is used, as in Takey & Carvalho (2016). On the first step, we address the research questions with a Bibliometrics and Network analysis, using metadata extracted from article databases, such as dates, keywords, references, citations and others. At this phase we will use software such as Microsoft Excel and VOSviewer.

On Phase 2, a thorough Content Analysis will be done, identifying the core concepts, issues and gaps of the topic. The analysis will be done supported based on a careful reading of all the articles, guided by a coding system deployed specifically for addressing RQ3.

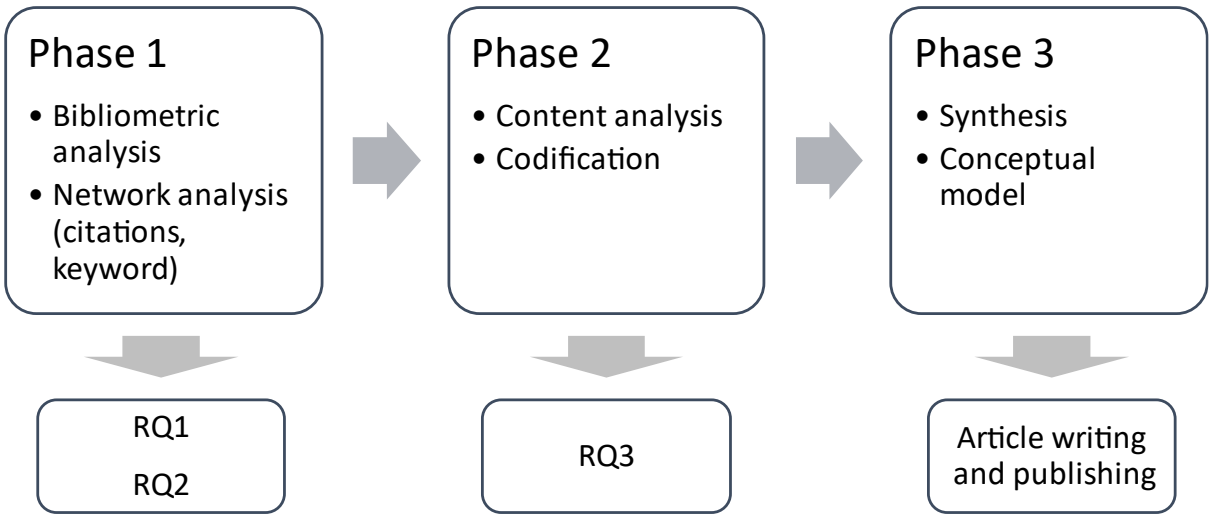

FIGURE 1 - The multi-phased approach for SLR used at this study

1.1 Sample and Procedures

The first sample was obtained through two well-known article databases: the “Web of Science” (WoS) and the “Scopus”. By using organized databases such as those, we could obtain metadata crucial for the bibliometric analysis, including summaries, references, the number of citations, the list of authors and keywords (Takey & Carvalho, 2016). We chose WoS due to the content impact, since all its content had a calculated impact factor in JCR (*Journal Citation Report*).

Additionally, we expected to collect a wider sample by adding the Scopus database, since it is the largest database of peer-reviewed literature (Morioka & Carvalho, 2016).

We considered three main collections of words that would have to be present (or as any of their derivations) in the sample articles title, keywords or abstract: a) The word “Effectuation”, main focus of our research; b) any of the words related to the processes where we would expect to see Effectuation in use in those companies: "innovation", "venturing", "new product development", "new business development", "research and development", "research & development" or "project management". Only three filters were applied to the queries: the area of knowledge was limited to “Business” or “Management”, the language was limited to English, and the kind of content to peer-reviewed content exclusively, such as journal articles, reviews and in-press articles. The query strings are shown in TABLE 2, below.

Query String - Web of Science
((TS = (effectuation) AND (TS = ("innovation" OR "venturing" OR "new product development" OR "new business development" OR "R&D" OR "research and development" OR "research & development" OR "project management") OR SO = ("INTERNATIONAL JOURNAL OF PROJECT MANAGEMENT" OR "PROJECT MANAGEMENT JOURNAL" OR "INTERNATIONAL JOURNAL OF MANAGING PROJECTS IN BUSINESS" OR "JOURNAL OF PRODUCT INNOVATION MANAGEMENT" OR "TECHNOVATION" OR "R D MANAGEMENT")))) AND LANGUAGE: (English) AND DOCUMENT TYPES: (Article OR Early Access OR Review) Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI Timespan=All years
Query String – Scopus
TITLE-ABS-KEY (effectuation) AND TITLE-ABS-KEY (innovation OR venturing OR “new product development” OR “new business development" OR "R&D" OR "research & development" OR "research and development" OR "project management") AND (LIMIT-TO (DOCTYPE, "ar") OR LIMIT-TO (DOCTYPE, "re"))

TABLE 2 - Query strings for Web of Science and Scopus

The WoS sample returned 152 articles, while the Scopus sample returned 86 articles. We used the Rayyan tool for excluding overlapped results, and we reached a first consolidated sample of 179 articles.

In the following step, all the 179 abstracts were read, and the articles not related to the research scope were excluded from the sample. We excluded an article from the sample in all times that they did not mention *Effectuation* in the research context, if it focused only on entrepreneurial start-up companies, or if the article did not approach the processes we expect to study. Later on, as some of the articles proved to be not applicable to these criteria during the full-text reading, the final sample comprised 72 articles.

A summary of the sampling process can be seen in FIGURE 1 below.

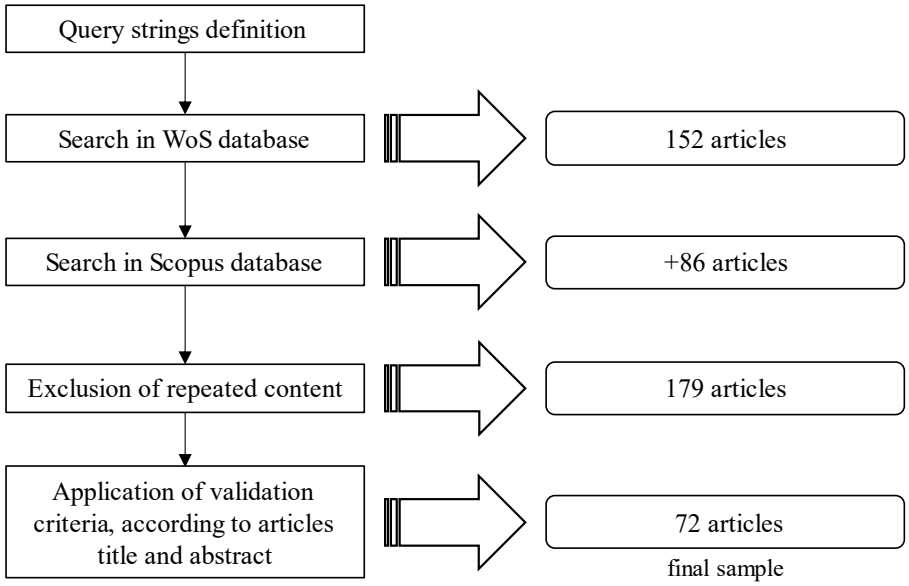

FIGURE 1. Sampling process and outputs

1.2 Data analysis

We detail the analyses over the sample in this chapter.

1.2.1 Bibliometric analysis

Following Carvalho (2013), we used the bibliometric analysis for identifying and qualifying the most prolific authors, the journals, the publishing year, the most influential articles in the sample, and the most used references.

Regular office software (Microsoft Excel) was used to clean, tabulate and generate insights over data and meta-data obtained through the databases.

1.2.2 Network analysis

Still on Phase 1 of the study, we ran a Network analysis for mapping relationships between authors, articles, topics and references. By analyzing data, we could explore the co-authorship and co-citation networks, bibliographic coupling and keyword occurrence (Lima & Leocádio, 2018). We used Microsoft Excel and VOSviewer 1.6.16 software for this step.

1.2.3 Content analysis

For Phase 2, we read and analyzed the full-text of all articles in the sample in two steps.

On a first reading, we assured the relevance of the research problem, the research questions and the methodology chosen for this study. The articles' fit for the exclusion criteria was reviewed at this step. We also generated a codification for the content analysis.

The codification is presented in FIGURE 2, below. Some of the dimensions are related to the research methodology employed in the articles, some to the research targets and some to the effectuation principles and processes approached.

R	Approaches and Research Methods
RL	Qualitative
RLR	Literature review
RLT	Conceptual theoretical
RLC	Case study
RLL	Longitudinal case study
RLE	Experimental
RN	Quantitative
RNS	Survey
RNL	Longitudinal study with statistical sampling
RNM	Mathematical modelling
RNN	Social networks modelling

T	Analysis period
TC	Contemporary
TL	Longitudinal
TR	Retrospective
TN	Not applicable

U	Analytic unit
UJ	Projects
UD	Department / Business Unit
UC	Company
UY	Country
UE	Ecosystem - Network
US	Partnership
UP	Persons
UM	Not applicable

S	Company size
SE	Individual entrepreneur
SS	SME
SL	Large company
SP	Multiple sizes
SN	Not applicable

K	Company Kind
KC	Established company
KS	Startup
KG	Government
KA	Academy
KO	Social / NGO
KM	Multiple kinds
KN	Not applicable

E	Sources of evidences
EB	Bibliography
EG	Big-data
ED	Document analysis
EI	Interview
EP	Press information
EU	Public data
EQ	Questionnaire

P	Effectuation Principles Identified
PA	Affordable loss orientation
PM	Means orientation
PC	Contingency orientation
PP	Partnership orientation
PO	Control orientation

C	Processes analyzed
CR	R&D
CP	New Product Development
CB	New Business Development
CQ	Quality or Continuous Improvement
CM	General management
CS	Strategy planning
CF	Finances
CK	Marketing & Sales
CN	Manufacturing
CO	Others
N/A	Not applicable

FIGURE 2 - Coding for content analysis

On the second reading, we classified all the texts in the sample according to the coding and generated the main insights for Phase 3.

4. RESULTS AND DISCUSSION

4.1 Bibliometric and Network Analyses

Effectuation in the Corporate Environment is a recent topic, with the first related paper identified in the sample being published in 2005 (Sarasvathy & Dew, 2005). Although the number of articles is still very limited, we can realize that the topic gained momentum through time, and had in 2020, 18 articles published. Every year since 2009 the topic had at least one article published. The sample includes only 2 articles published between 2006 and 2010, 17 articles between 2011 and 2015, and 50 articles between 2016 and 2020.

Journals & Papers

The 72 articles in the sample were published in 54 journals. The publication with most articles in our sample was the "*Journal of Business Research*" (JCR Impact Factor: 4.028*; Citescore* 2019: 8.9), with 4 articles published.

The *bibliographic coupling* network (FIGURE 3) evidences the most cited papers. Additionally, this analysis groups the articles in the sample based on the number of cited references they have in common. Three clusters of articles may be identified in the analysis.

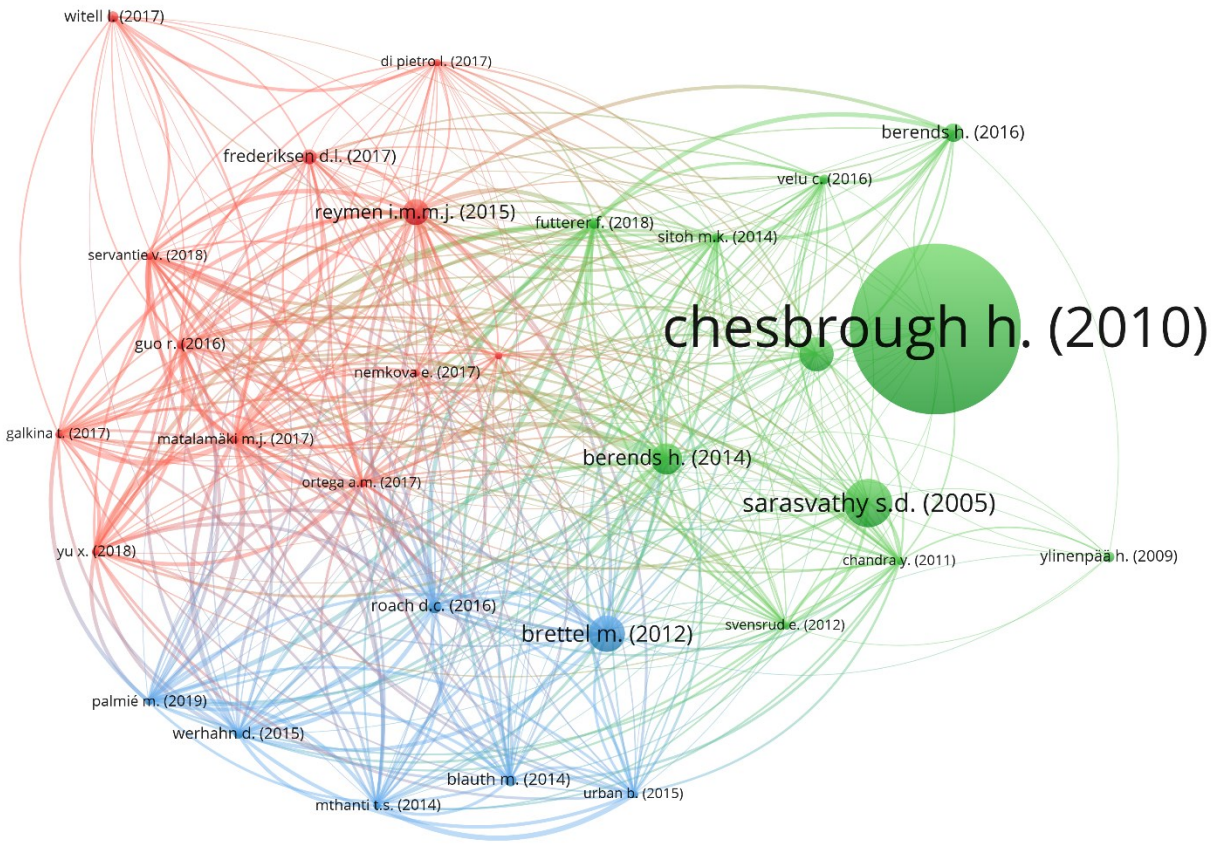

FIGURE 3 - Bibliographic coupling (extracted using VOSviewer)

In TABLE 3 we display the 10 most influential articles in the sample, according to the number of citations.

Authors	Cited by
Chesbrough (2010)	1399
Sarasvathy & Dew (2005)	249
Brettel et al. (2012)	171
Coviello & Joseph (2012)	155
Berends et al. (2014)	136
Reymen et al. (2015)	106
Berends et al. (2016)	67
Frederiksen & Brem (2017)	52
Roach et al. (2016)	43
Blauth et al. (2014)	38

TABLE 3 - The 10 most-cited articles in the sample

The articles were written in 2016 or prior, even representing only 33% of the sample, account for 9 of the 10 most-cited articles in the sample. The prevalence of this group would be expected since a time is required for a paper "gain momentum", and have the citation levels growing.

In FIGURE 4 we can note a vast concentration of the citations in one paper (Chesbrough, 2010). The author gained world-wide repercussion with his research on "Open Innovation" topic (since 2003). This, and the obvious quality of the study, justifies the large number of citations, and also reinforces the growing attention to the topic since its publication.

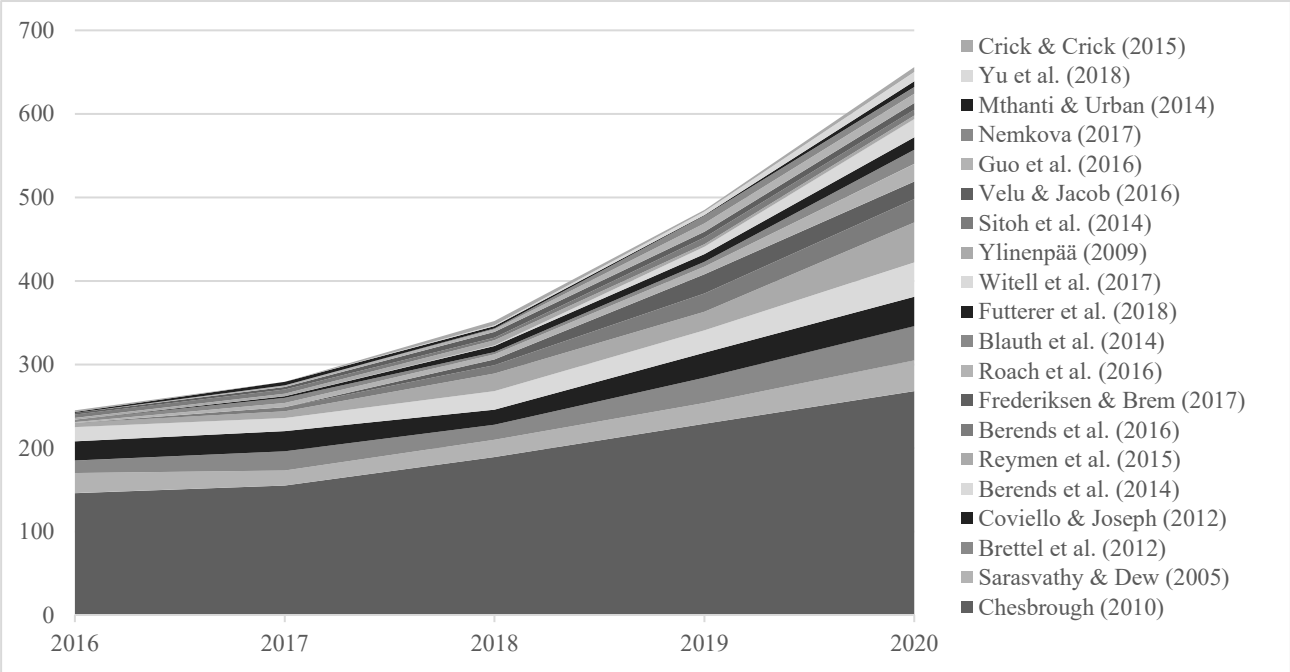

FIGURE 4 - Evolution of the citations of the 20 most cited articles (cumulative)

Authors

Among the 72 articles, 206 authors were mapped. Some network analyses were prepared in order to better understand the relationships between authors, topics and schools of thought. We used VOSviewer 1.6.16 software for composing graphic analyses and supporting our study.

By preparing a co-citation network, based on the sample, we could identify three different clusters, as seen in FIGURE 5.

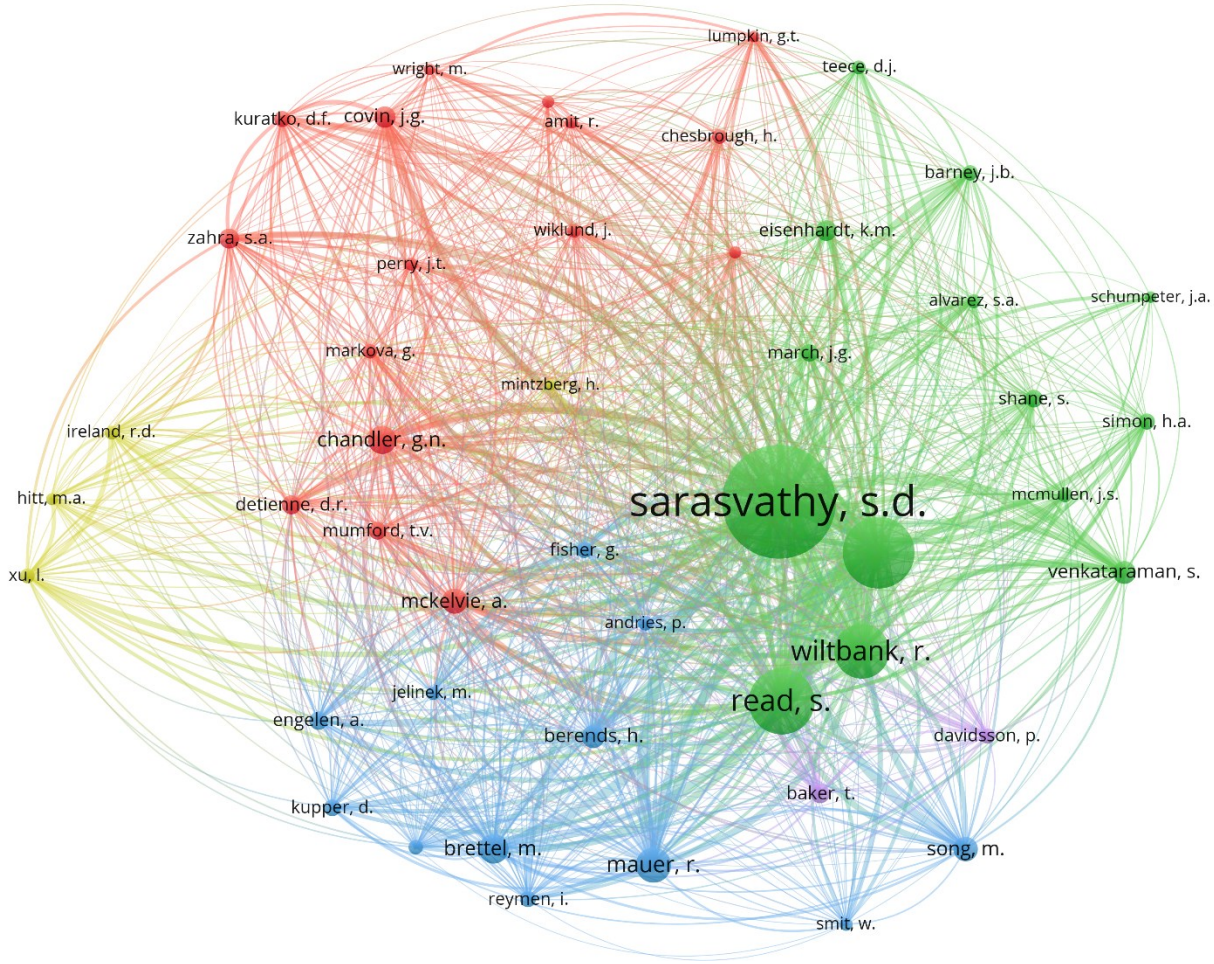

FIGURE 5 - Co-citation network per article (extracted using VOSviewer)

Research themes

We ran a keyword co-occurrence analysis on VOSviewer software, resulting in a keywords network composed of 8 different clusters (FIGURE 6). The most cited keywords are "*effectuation*", "*causation*", "*innovation*", "*entrepreneurship*" / "entrepreneur" and "*decision making*".

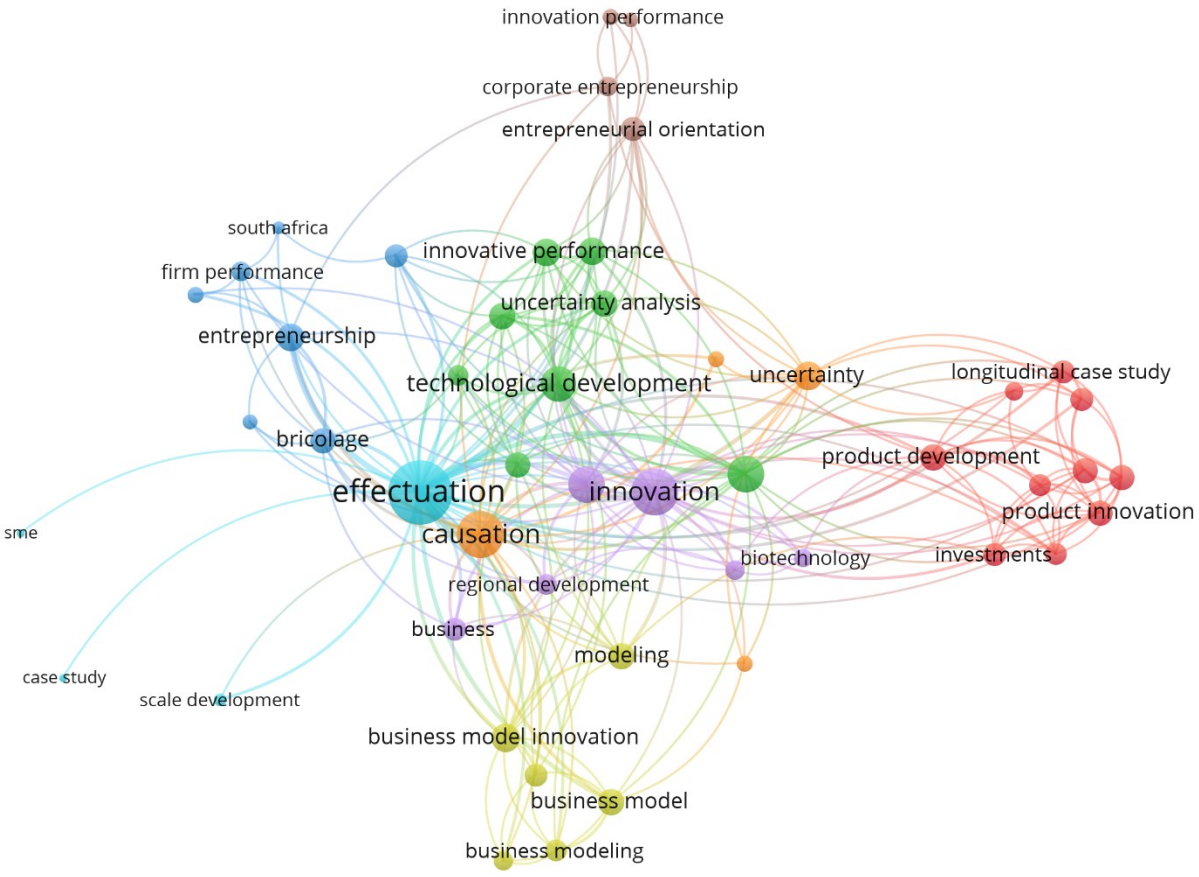

FIGURE 6 - Keyword co-occurrence analysis (extracted using VOSviewer)

4.2 Coding

On Phase 2 of the study, we carefully read the whole articles sample and classified each one of them according to the coding depicted in chapter 1.2.3 (Content Analysis). For each item in TABLE 4, we present the distribution of codes, in both absolute and relative terms. All the articles receive unique classifications for each of the coding dimensions, except for dimension P: *Effectuation Principles Identified*, in which all the appropriate principles were assigned to the articles.

R	Approaches and Methods	72	100%
RL	Qualitative	43	60%
RLC	Case study	19	26%
RLT	Conceptual theoretical	10	14%
RLL	Longitudinal case study	8	11%
RLR	Literature review	5	7%
RLE	Experimental	1	1%
RN	Quantitative	29	40%
RNS	Survey	28	39%
RNM	Mathematical modelling	1	1%

T	Analysis period	72	100%
TR	Retrospective	42	58%
TN	Not applicable	12	17%
TC	Contemporary	10	14%
TL	Longitudinal	8	11%

U	Analytic unit	72	94%
UC	Company	52	72%
UJ	Projects	8	11%
UP	Persons	3	4%
UD	Department / Business Unit	2	3%
UE	Ecosystem - Network	2	3%
UY	Country	1	1%
UM	Not applicable	4	6%

S	Company size	72	100%
SS	SME	26	36%
SL	Large company	23	32%
SP	Multiple sizes	18	25%
SN	Not applicable	5	7%

K	Company Kind	72	100%
KC	Established company	51	71%
KM	Multiple kinds	10	14%
KO	Social / NGO	3	4%
KS	Startup	1	1%
KG	Government	1	1%
KA	Academy	1	1%
KN	Not applicable	5	7%

E	Sources of evidences	72	100%
EQ	Questionnaire	26	36%
EI	Interview	24	33%
EB	Bibliography	13	18%
ED	Document analysis	8	11%
EU	Public data	1	1%

P	Effectuation Principles Identified	72	
PC	Contingency orientation	67	93%
PM	Means orientation	58	81%
PA	Affordable loss orientation	51	71%
PP	Partnership orientation	51	71%
PO	Control orientation	24	33%

C	Processes analyzed	72	100%
CM	General management	20	28%
CP	New Product Development	16	22%
CB	New Business Development	9	13%
CS	Strategy planning	9	13%
CK	Marketing & Sales	9	13%
CR	R&D	2	3%
CF	Finances	2	3%
CQ	Quality or Continuous Improvement	1	1%
CO	Others	1	1%
N/A	Not applicable	3	4%

TABLE 4 - Results of codification in sample articles

4.3 Discussion

The results are discussed in this session, in light of the research questions proposed for this study.

Key journals (RQ1.1) and most influent studies (RQ1.2)

By analyzing the range of journals in the sample articles, we cannot find a significant concentration in any specific set of periodicals. With 54 journals for 72 articles (average: 1.33; std. deviation: 0.69), we note the sample spread among multiple sources.

The periodical with most articles in the sample is *Journal of Business Research*, with only 4 articles. 43 journals have only one article in the sample.

Chesbrough (2010), with 1399 citations, is the most influential article in the sample, as seen in the bibliographic coupling network (FIGURE 3). The remaining 5 articles with more than 100 citations in the list are Sarasvathy & Dew (2005) (249 citations), Brettel et al. (2012) (171 citations), Coviello & Joseph (2012) (155 citations), Berends et al. (2014) (136 citations) and Reymen et al (2015) (106 citations).

The importance of Saras D. Sarasvathy to the theme is indisputable. Of the 72 articles in the sample, 71 cite at least one of her 83 works (according to WoS). 69 cite (Sarasvathy, 2001), the seminal article for the effectuation concept.

When analyzing the co-citation network per article (FIGURE 5) we can find four main clusters. The green cluster contains Saras Sarasvathy, along with her colleagues and typical co-authors, such as Nicholas Dew, Robert Wiltbank and Stuart Read. Some of the most prominent researchers in Management and Social Sciences are also in this cluster, such as J. B. Barney,

K. M. Eisenhardt, D. J. Teece, H. Simon and J. A. Schumpeter. Articles related to this cluster are usually linked to *general characteristics of effectuation*.

In the blue cluster, with authors as H. Berends, M. Brettel, R. Mauer and I. Reymen, articles are more specialized on *effectuation for existing companies* – both corporations or SMEs. The red cluster is anchored by G. N. Chandler, and includes names linked to the study of *innovation and its links to strategy and corporate entrepreneurship*, such as D. F. Kuratko, J. G. Covin, H. Mintzberg and H. Chesbrough.

Kinds of studies published (RQ1.3)

By analyzing the content analysis in **Erro! Fonte de referência não encontrada.**, we have an understanding of the kinds of articles published around the topic of our research.

60% of the articles use qualitative approaches, of which the Case Study is the most common one (19 articles, 26% of total). Conceptual/theoretical articles are 14% of the sample (10 articles). Only 5 articles in the sample (7%) are literature reviews. The 40% of quantitative studies are composed almost exclusively of surveys (28 articles, 39% of total). With this division, we see 26 articles using questionnaires as the main medium for collecting evidences, 24 articles using interviews (33%) and 13 articles relying mostly on the bibliography (18%).

The period studied in most articles is retrospective (58%). 8 articles (11%) are longitudinal (all of them, longitudinal case studies). 10 articles study the contemporary period (14%).

Most of the articles use the company as the analytic unit (52 articles, 72% of the sample). The project is used as analytic unit for 8 articles (11%) and the remainder use people (the entrepreneurs themselves), a specific department, an ecosystem / network or a country. It is important to note that even using different kinds of analytic units, all articles in the sample study topics related to effectuation in projects, since it was an exclusion criterium for refining the sample.

Large companies account for 36% of the articles, while small and medium enterprises account for 23%. 18 articles (25%) study multiple sizes of companies. 85% of the articles in the sample study either established companies (51 articles, 71%) or multiple kinds of companies (10 articles, 14%).

Research themes (RQ2.1)

For investigating the research themes, we base on two main analyses: the bibliographic coupling and the keyword co-occurrence analysis.

Three clusters can be identified in the bibliographic coupling network (FIGURE 3). The green cluster, which contains the two most cited articles, groups content related to *business model innovation* (Berends, Smits, Reymen, & Podoynitsyna, 2016; Chesbrough, 2010; Sitoh, Pan, & Yu, 2014; Velu & Jacob, 2016), *innovation processes* (Berends et al., 2014; Chandra & Yang, 2011; Sarasvathy & Dew, 2005) and *innovation systems* (Svensrud & Åsvoll, 2012; Ylinenpää, 2009). The blue cluster is related to *project performance* (Blauth, Mauer, & Brettel, 2014;

Mthanti & Urban, 2014; Roach et al., 2016), mainly in R&D and new product development projects. The red cluster, composed of a larger number of articles than the two others, is more linked to the understanding of the *entrepreneurial process* inside organizations, (Galkina & Lundgren-Henriksson, 2017; Matalamäki, 2017) and the *processes of new products and new business development* inside the companies (Frederiksen & Brem, 2017; Nemkova, 2017; Ortega, García, & Santos, 2017)

The keyword co-occurrence analysis (FIGURE 6) displays eight different clusters. The pivotal elements are the commonly cited keywords *causation*, *effectuation*, *entrepreneurship* and *innovation*. The clusters led by keywords "*effectuation*" and "*causation*" are the most occurring. While "*effectuation*" is related to "*case study*", "*sme*" and "*scale development*", the keyword "*causation*" is related to "*uncertainty*", "*established companies*" and "*process research*". Two clusters contain the words "*entrepreneurship*"/"*entrepreneur*": one of those is related to keywords "*innovation*" and "*business*" and the other one is related to "*firm performance*" and "*capabilities*".

Characterization of Effectuation in Literature (RQ2.2)

We found many of the articles in the sample using four Effectuation principles in their research methodologies, mostly due to the influence of (Chandler et al., 2011) and (Brettel et al., 2012). 31 articles were found using the principles of "*Means*", "*Contingency*", "*Partnership*" and "*Affordable Loss*" orientations.

The principles used in the sample can be seen in the 5-way Venn diagram displayed in FIGURE 7.

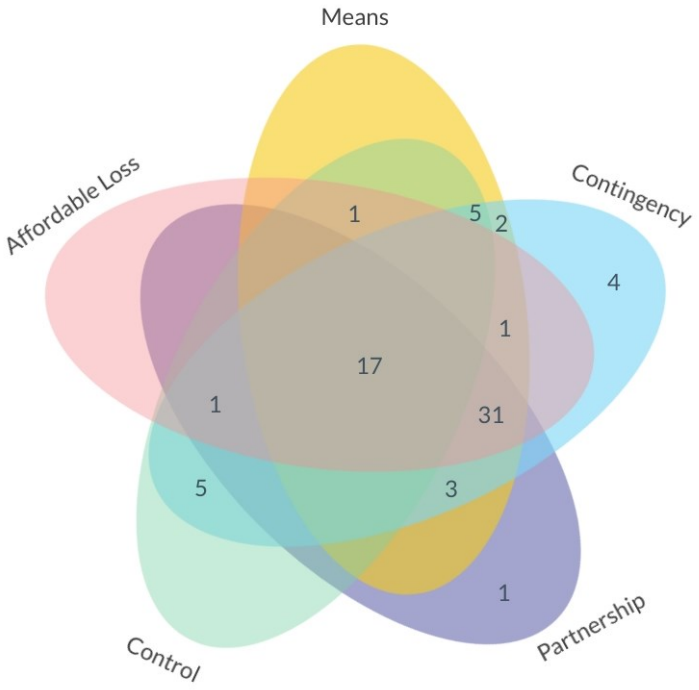

FIGURE 7 - Effectuation principles used in sample articles

Types of projects (RQ2.3)

The company functions related to the growth through current products or services are analyzed in 53% of the articles in the sample. General Management (28%), Strategy planning (13%) and Marketing & Sales (13%).

The functions most typically associated with innovation, such as New Product Development (22%), New Business Development (13%) and Research & Development (3%) account 38% of the articles.

Although quality or continuous improvement is analyzed in several articles among other processes, they are specifically approached in only 1% of the sample.

5. CONCLUSIONS

Using a Systematic Literature Review, we researched the literature over the use of Effectuation in projects in existing companies, and organized the literature with a multi-method approach (composed of bibliometric, network and content analyses).

We found an increasing number of articles related to the topic, with a particular growth of the researchers' interest over the last 5 years. The study analyzed a sample composed of 72 articles selected from major peer-reviewed journals databases.

We noticed both qualitative and quantitative articles around the topic. Empirical evidence is explored mainly through case studies and surveys. Conceptual-theoretic articles have been published, and some literature reviews supported the research practice.

The importance of Saras Sarasvathy and her colleagues and co-authors for the topic is evident, but we noticed a growing flow of researchers examining the topic. They often use the constructs and definitions presented by Sarasvathy, but also use measurable and actionable definitions for the Effectuation principles, such as those found in articles as (Brettel et al., 2012; Chandler et al., 2011).

We contribute for the literature by mapping and organizing the topic of Effectuation in projects in established companies. We expect to foster further research about the theme.

There are two research limitations identified. The first one is related to the research design used: since we used only two article databases (Web of Science and Scopus), maybe some important content was not captured by our research. Second, the implicit subjectivity of the articles selection process, and part of the coding process could add a limited amount of noise to the sample and to the results.

6. REFERENCES

Berends, H., Jelinek, M., Reymen, I., & Stultiëns, R. (2014). Product innovation processes in small firms: Combining entrepreneurial effectuation and managerial causation. *Journal of Product Innovation Management*, *31*(3), 616–635. https://doi.org/10.1111/jpim.12117

Berends, H., Smits, A., Reymen, I., & Podoynitsyna, K. (2016). Learning while (re)configuring: Business model innovation processes in established firms. *Strategic Organization*, *14*(3), 181–219. https://doi.org/10.1177/1476127016632758

Blauth, M., Mauer, R., & Brettel, M. (2014). Fostering creativity in new product development through entrepreneurial decision making. *Creativity and Innovation Management*, *23*(4), 495–509. https://doi.org/10.1111/caim.12094

Brettel, M., Mauer, R., Engelen, A., & Küpper, D. (2012). Corporate effectuation: Entrepreneurial action and its impact on R&D project performance. *Journal of Business Venturing*, *27*(2), 167–184. https://doi.org/10.1016/j.jbusvent.2011.01.001

Carvalho, M. M. de. (2013). *Six Sigma Project: The Portfolio Management Perspective* (pp. 40–49). pp. 40–49.

Chandler, G. N., DeTienne, D. R., McKelvie, A., & Mumford, T. V. (2011). Causation and effectuation processes: A validation study. *Journal of Business Venturing*, *26*(3), 375–390. https://doi.org/10.1016/j.jbusvent.2009.10.006

Chandra, Y., & Yang, S. J. S. (2011). Managing disruptive innovation: Entrepreneurial strategies and tournaments for corporate longevity. *Journal of General Management*, *37*(2), 23–50. https://doi.org/10.1177/030630701103700202

Chesbrough, H. (2010). Business model innovation: Opportunities and barriers. *Long Range Planning*, *43*(2–3), 354–363. https://doi.org/10.1016/j.lrp.2009.07.010

Coviello, N. E., & Joseph, R. M. (2012). Creating major innovations with customers: Insights from small and young technology firms. *Journal of Marketing*, *76*(6), 87–104. https://doi.org/10.1509/jm.10.0418

Franco, E. F., Hirama, K., & Carvalho, M. M. (2018). Applying system dynamics approach in software and information system projects: A mapping study. *Information and Software Technology*, *93*, 58–73. https://doi.org/10.1016/j.infsof.2017.08.013

Frederiksen, D. L., & Brem, A. (2017). How do entrepreneurs think they create value? A scientific reflection of Eric Ries' Lean Startup approach. *International Entrepreneurship and Management Journal*, *13*(1), 169–189. https://doi.org/10.1007/s11365-016-0411-x

Futterer, F., Schmidt, J., & Heidenreich, S. (2018). Effectuation or causation as the key to corporate venture success? Investigating effects of entrepreneurial behaviors on business model innovation and venture performance. *Long Range Planning*, *51*(1), 64–81. https://doi.org/10.1016/j.lrp.2017.06.008

Galkina, T., & Lundgren-Henriksson, E. L. (2017). Coopetition as an entrepreneurial process: Interplay of causation and effectuation. *Industrial Marketing Management*, *67*(December 2016), 158–173. https://doi.org/10.1016/j.indmarman.2017.09.004

Henninger, P., Brem, A., Giones, F., Bican, P. M., & Wimschneider, C. (2020). Effectuation vs. Causation: Can established firms use start-up decision-making principles to stay innovative? *International Journal of Innovation Management*, *24*(1). https://doi.org/10.1142/S1363919620500024

Leal, L. F., Tavares, A., Boas, V., Romão, V., & Gurgel, G. S. (2021). *R & D approach based on multiple partners and Design Thinking , Lean Startup , and Agile concepts : case study in the electricity sector*. *18*(1), 1–12.

Lima, S. H. de O., & Leocádio, Á. L. (2018). Mapeando a Produção Científica Internacional Sobre Inovação Aberta. *Revista Brasileira de Gestão e Inovação*, *5*(2), 181–208. https://doi.org/10.18226/23190639.v5n2.08

Matalamäki, M. J. (2017). Effectuation, an emerging theory of entrepreneurship – towards a mature stage of the development. *Journal of Small Business and Enterprise Development*, *24*(4), 928–949. https://doi.org/10.1108/JSBED-02-2017-0030

Morioka, S. N., & Carvalho, M. M. de. (2016). A systematic literature review towards a conceptual framework for integrating sustainability performance into business. *Journal of Cleaner Production*, *136*, 134–146. https://doi.org/10.1016/j.jclepro.2016.01.104

Mthanti, T. S., & Urban, B. (2014). Effectuation and entrepreneurial orientation in high-technology firms. *Technology Analysis and Strategic Management*, *26*(2), 121–133. https://doi.org/10.1080/09537325.2013.850161

Nemkova, E. (2017). The impact of agility on the market performance of born-global firms: An exploratory study of the 'Tech City' innovation cluster. *Journal of Business Research*, *80*(November 2016), 257–265. https://doi.org/10.1016/j.jbusres.2017.04.017

Ortega, A. M., García, M. T., & Santos, M. V. (2017). Effectuation-causation: what happens in new product development? *Management Decision*, *55*(8), 1717–1735. https://doi.org/10.1108/MD-03-2016-0160

Reymen, I. M. M. J., Andries, P., Berends, H., Mauer, R., Stephan, U., & van Burg, E. (2015). Understanding Dynamics of Strategic Decision Making in Venture Creation: A Process Study of Effectuation and Causation. *Strategic Entrepreneurship Journal*, *9*(4), 351–379. https://doi.org/10.1002/sej.1201

Ries, E. (2017). The Startup Way: How Modern Companies Use Entrepreneurial Management to Transform Culture and Drive Long-Term Growth. In *The Startup Way*. Currency.

Roach, D. C., Ryman, J. A., & Makani, J. (2016). Effectuation, innovation and performance in SMEs: an empirical study. *European Journal of Innovation Management*, *19*(2), 214–238. https://doi.org/10.1108/EJIM-12-2014-0119

Sarasvathy, S. D. (2001). Causation and Effectuation: Toward a Theoretical Shift from Economic Inevitability to Entrepreneurial Contingency. *Academy of Management Review*, *26*(2), 243–263.

Sarasvathy, S. D., & Dew, N. (2005). New market creation through transformation. *Journal of Evolutionary Economics*, *15*(5), 533–565. https://doi.org/10.1007/s00191-005-0264-x

Sitoh, M. K., Pan, S. L., & Yu, C. Y. (2014). Business models and tactics in new product creation: The interplay of effectuation and causation processes. *IEEE Transactions on Engineering Management*, *61*(2), 213–224. https://doi.org/10.1109/TEM.2013.2293731

Svensrud, E., & Åsvoll, H. (2012). Innovation in large corporations: A development of the rudimentary theory of effectuation. *Academy of Strategic Management Journal*, *11*(1), 59–90.

Takey, S. M., & Carvalho, M. M. (2016). Fuzzy front end of systemic innovations: A conceptual framework based on a systematic literature review. *Technological Forecasting and Social Change*, *111*, 97–109. https://doi.org/10.1016/j.techfore.2016.06.011

Velu, C., & Jacob, A. (2016). Business model innovation and owner-managers: The moderating role of competition. *R and D Management*, *46*(3), 451–463. https://doi.org/10.1111/radm.12095

Ylinenpää, H. (2009). Entrepreneurship and innovation systems: Towards a development of the ERIS/IRIS concept. *European Planning Studies*, *17*(8), 1153–1170. https://doi.org/10.1080/09654310902981011