

**Effectuation and Causation: The Effect of Entrepreneurial
Logic on Incubated Start-up Performance**
The predictive value of effectuation in business plans

Master's Thesis

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Abstract and Keywords

Effectual logic, captured in the emerging theory of effectuation, is the logic of expert entrepreneurs and differs significantly from the causal logic predominantly used by managers and MBA students alike. This new school of thought lacks significant empirical evidence of the influence of effectuation, e.g. on performance, and in this thesis I aim to contribute to filling that gap by assessing the impact of effectuation on job creation as performance measure in the context of incubated start-ups. In the process, a coding scheme to measure effectuation in business plans is developed.

The literature review revealed two major ongoing debates: one between discovery theory and creation theory in entrepreneurship research, with effectuation having moved to the front lines of creation theory, and the other an ongoing debate on the merits of planning, mostly in terms of performance, as opposed to learning. This thesis attempts to integrate these debates, looking for evidence of creation theory in (mandatory) business planning leading to higher performance. The literature review also indicated a lack of operationalization in the area of effectuation, being non-existent in the context of business plans. This thesis tries to fill that gap as well.

The data collection method used was cross-sectional manual coding of 92 initial business plans of start-ups in the TOP incubation programme of the University of Twente, written between 1986 and 2005, using employment data mostly from 2008 and 2009. To code the business plans, a coding scheme was developed from a theoretical framework based on literature review.

The findings offer interesting new insights into the workings and effects of effectuation. Effectuation and causation approaches differ significantly in resulting performance. Causal market research has a positive influence on performance, while measurements of means-based, rather than goals-based action and a focus on partnerships both proved that these dimensions of effectuation positively influence performance. Interestingly, attention for competitive analysis also positively influenced performance. Also, experience as a measurement of means, along with the control variables growth intention and company age, proved to be a predictor of the chance that a start-up would successfully transition from a micro business to a small business (more than ten employees). A focus on affordable loss (effectuation), rather than expected return (causation), was hard to measure and did not provide significant results. Apparently, not all effectual constructs are advantageous to start-up performance, and not all measurements within constructs point in the same direction, questioning the reliability of the effectuation constructs themselves. This suggests avenues for further research on the effectual constructs.

The limitations of this thesis are notably the generalizability to groups outside an incubation programme like this, the relatively small sample size, and the cross-sectional design of the study. But most importantly, this thesis contributes to research and practice in two ways: by offering an operationalization for measuring effectuation in business plans, and providing empirical evidence of effectual logic in planning influencing performance, but not univocally in the same direction. Yet the result that the logic behind planning has a big, predictive influence on job creation is an important finding for entrepreneurs, incubators, business angels, teachers, policymakers and scholars alike.

Keywords: *effectuation, performance, start-up, business plan, job creation, growth, incubation, prediction.*

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Foreword and Acknowledgements

This document reports an internal master thesis carried out by Michel Nienhuis at the NIKOS institute, School of Management and Governance of the University of Twente. It entails a study of the relationship between effectuation and start-up performance in terms of job creation, using a sample of business plans of the TOP incubation programme.

I would like to thank my supervisors, Jeroen Kraaijenbrink and Tiago Ratinho, for their constructive inputs on this research, and I would like to thank the NIKOS institute for the opportunity to do this research and thereby allowing me to contribute to the growing body of literature on effectuation. I would also like to thank my loved ones for their support and encouragement during this journey—I owe you all.

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List of Abbreviations

CAU	Causation
DV	Dependent variable
EFF	Effectuation
IV	Independent variable
MBA	Master of Business Administration
RFID	Radio Frequency IDentification
TOP	Tijdelijke Ondernemers-Plaatsen

Chapter 1: Introduction and Research Design

1.1. Background

1.1.1. Motivation

Effectuation is a relatively new theory on decision-making in the field of entrepreneurship research. Sarasvathy and Simon (2000) cite Sarasvathy's (1998) doctoral dissertation as the first source of empirical evidence for the model of effectuation: a logic of entrepreneurial expertise, an entrepreneurial process that is an inverse of the classical causal process. Sarasvathy (2001a) defines that causal processes "take a particular effect as given and focus on selecting between means to create that effect", while defining that "effectuation processes take a set of means as given and focus on selecting between possible effects that can be created with that set of means" (p. 245).

Building on the empirical evidence established in her dissertation, Sarasvathy (2001a) builds the theoretical framework through business examples and thought experiments. To clarify the difference, Sarasvathy uses a simple metaphor (p. 245): a chef that is asked to cook dinner for a host. The causal process would mean that the host chooses a menu, upon which the chef shops for the necessary ingredients and cooks the meal. Hence, the end is given and predictable, and the focus is on acquiring, and selecting between, the means to achieve the end. The effectual process would mean that the host asks the chef to imagine possible menus based on the available means in the kitchen: available ingredients and utensils. Hence, the means are given and the focus is on what can be achieved with them. Sarasvathy and Dew (2005a) contrast causation and effectuation as shown in Table 1.

The empirical basis for the theory of effectuation is laid in Sarasvathy (1998), in which she used verbal think-aloud protocols of 27 expert entrepreneurs that founded companies between \$200 million and \$6.5 billion in size, asking them to identify the market for an imaginary new product. Sarasvathy (2001b), after discussing the theoretical framework more elaborately discussed and theorized in Sarasvathy (2001a) summarizes the findings of her dissertation as follows: "the evidence gathered here has clearly established that expert entrepreneurs have a preference for using effectual reasoning in creating markets for new products. In fact, over 63% of the subjects used effectuation more than 75% of the time" (p. 21). Furthermore, in her dissertation Sarasvathy found support for Shane's (2000) empirical evidence that, depending on their prior experience and education, different entrepreneurs (often) develop different companies (opportunities) and markets when given the same single innovation to start with: the 27 entrepreneurs in Sarasvathy's sample built 18 different companies while starting out with the same imaginary product. Sarasvathy argues that this is a testimony to effectual rather than causal reasoning.

Over the last decade, as the effectuation model continues to gain more foothold in the field of entrepreneurship research, few empirical studies have been performed on the consequences of thinking effectually rather than causally. One of the most obvious consequences is performance. In this thesis, I will address a piece of that gap.

Going back to theory, Sarasvathy (2001a) indicates that the theory of effectuation is influenced by a large list of scholars, e.g. Knight, Weick, March, Buchanan, Vanberg and

Table 1: Contrasting Causation and effectuation (Sarasvathy & Dew, 2005, P. 390)

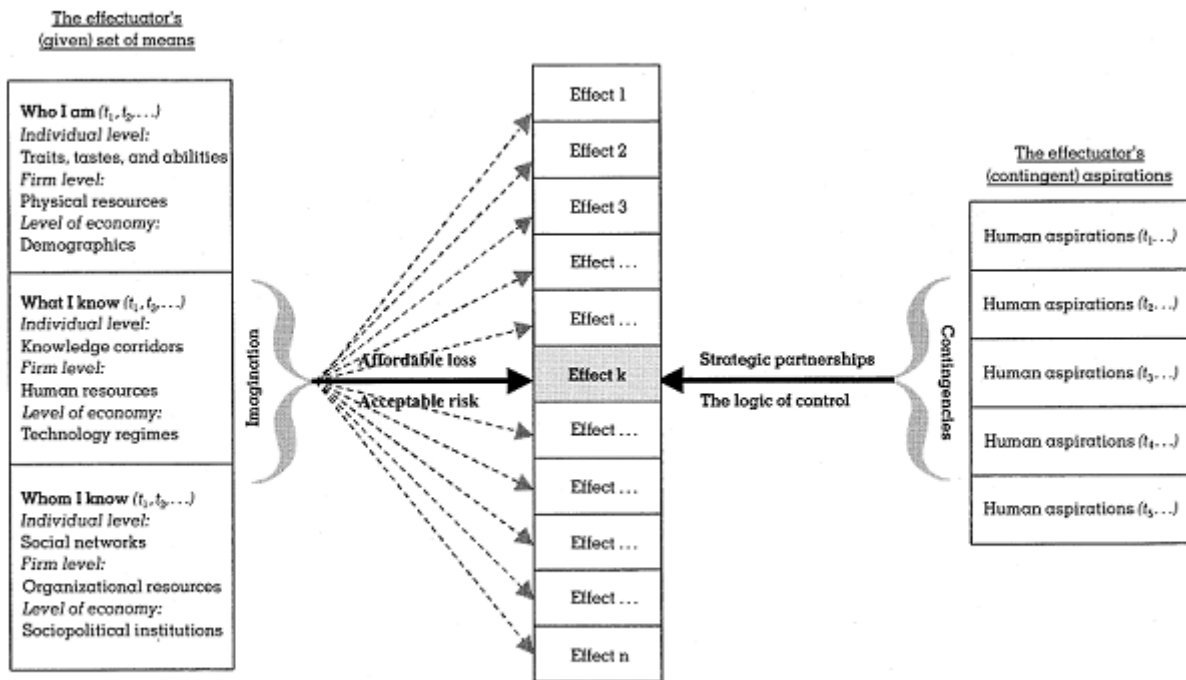
Issue	Causal position	Effectual position
View of the future	<i>Prediction.</i> The future is a continuation of the past; can be acceptably predicted	<i>Design.</i> The future is contingent on actions by willful agents
<i>Constructs pertaining to individual decisions</i>		
Givens	<i>Goals</i> are given	<i>Means</i> (Who I am, what I know, and whom I know) are given
Decision agenda	<i>Resources.</i> What resources ought I to accumulate to achieve these goals?	<i>Effects.</i> What effects can I create with the means I have?
Basis for taking action	<i>Desired worlds.</i> Vision of a desired world determines goals; goals determine sub-goals, commitments, and actions	<i>Possible worlds.</i> Means and stakeholder commitments determine possible sub-goals—goals emerge through aggregation of sub-goals
Basis for commitment	<i>Should.</i> Do what you ought to do—based on analysis and maximization	<i>Can.</i> Do what you are able to do—based on imagination and satisficing
Stakeholder acquisition	<i>Instrumental view of stakeholders.</i> Project objectives determine who comes on board	<i>Instrumental view of objectives.</i> Who comes on board determines project objectives
<i>Constructs in terms of responses to the environment</i>		
Predisposition toward risk	<i>Expected return.</i> Calculate upside potential and pursue (risk adjusted) best opportunity	<i>Affordable loss.</i> Calculate downside potential and risk no more than you can afford to lose
Predisposition toward contingencies	<i>Avoid.</i> Surprises may be unpleasant. So invest in techniques to avoid or neutralize them.	<i>Leverage.</i> Surprises can be positive. So invest in techniques that are open to them and leverage them into new opportunities.
Attitude toward success/failure	<i>Outcomes.</i> Success and failure are discrete outcomes to be sought after or avoided, respectively	<i>Process.</i> Successes and failures are inputs into a process that needs to be managed such that failures are outlived and successes are accumulated
Attitude toward probability estimates	<i>Update beliefs.</i> Estimates are used in a Bayesian fashion—to update ones beliefs about the future.	<i>Manipulate conditionals.</i> Estimates signal which conditionals may be reified or falsified so the future can be skewed through action.
Attitude toward others	<i>Competition.</i> Constrain task relationships with customers and suppliers to what is necessary	<i>Partnership.</i> Build YOUR market together with customers, suppliers and even prospective competitors
Underlying logic	To the extent we can predict the future, we can control it	To the extent we can control the future, we do not need to predict it

Mintzberg. Sarasvathy puts the theoretical framework in the scheme shown in Figure 1.

Effectuation "inverts the fundamental principles, solution process and overall logic of predictive rationality" (S. Read, Dew, Sarasvathy, Song, & Wiltbank, 2009, p. 2). Hence, it offers an alternative to predictive rationality. Read et al. (2009) add that in effectuation, the logic of foresight implicated by predictive rationality is replaced by a logic of non-predictive control.

However, empirical proof of effectuation processes leading to advantages or higher performance in start-ups has only just begun to be gathered. While empirical data has been used extensively to build, refine and reinforce the theory of effectuation, proving that

The Theory of Effectuation^a



^a Effectuation begins with a given set of means and contingent human aspirations to select from a set of possible effects imagined by the effectuator(s). Both means and aspirations change over time. The particular effect selected is a function of the level of loss or risk acceptable to the effectuator(s), as well as the degree of control over the future that the effectuator(s) achieves through strategic partnerships along the way.

Figure 1: The theory of effectuation (Sarasvathy, 2001a, p. 253)

successful entrepreneurs use effectual processes (Dew, Read, Sarasvathy, & Wiltbank, 2009; S. Read, et al., 2009; S. D. Sarasvathy, 1998, 2001b; S. D. Sarasvathy & Dew, 2005a; S. D. Sarasvathy & Kotha, 2001), empirical evidence of effectual processes leading to better performance than causal processes in start-ups has not been gathered yet.

Besides a meta-analytical study using non-effectual studies as source (Stuart Read, Song, & Smit, 2009), the only research that directly measures effectuation and links it to performance is by Wiltbank, Read, Dew and Sarasvathy (2009), but investigate performance differences in angel investing instead of start-ups, and they conclude:

The results of this study provide empirical evidence in support of the arguments in the theory of effectuation, specifically, that efforts anchored on existing means, using the principles of affordable loss, pre-committed partnerships, and leveraging surprise, can provide useful benefits under uncertainty. (p. 129)

They furthermore found that "angel investors who emphasize control experience fewer investment failures without experiencing fewer homeruns. The direct relationship of prediction to outcomes was not supported in this study" (p. 129). While angel investment success cannot be translated directly to entrepreneurial success, these findings do indicate that control-based strategies result in a higher chance of success of the start-ups invested in, and this paper also clearly shows the aforementioned gap of knowledge to be filled: the relation between prediction and outcomes.

1.1.2. Research Goal

In general terms, the empirical question that will be addressed in this thesis stems from the gap identified: whether differences in start-up performance can be attributed to differences

in processes – does an effectuation approach in a single start-up lead to higher firm performance?

In specific terms, the goal is twofold:

- To discover whether there is a relationship between the ultimate firm size and the amount of effectuation evident in the initial business plan, and, in order to do so:
- To develop a research instrument to measure the amount of effectuation in a business plan.

If we can discover a relationship between the thought process used when writing an initial business plan and the subsequent performance of a firm, we would make an important step in entrepreneurship research. Besides empirically proving another aspect of the usefulness of effectual reasoning, the implications for theory are many, and the research instrument contributes to future research as well. The implications for practice are just as important: not only is this interesting to investors, it is also useful for entrepreneurship education. (More on contributions and implications can be found in [1.4. Importance and Contributions to Research and Practice](#), [5.4. Implications for and Contribution to Policy and Practice](#) and [5.5. Implications for and Contribution to Theory and Research](#).)

To measure the approach the entrepreneur takes, this research will focus on the first business plan of the start-up. While writing a business plans seems to be a classic causal process, using planning rather than adapting (S. Read & Sarasvathy, 2005; S. D. Sarasvathy, 2001a), a business plan which is required by an angel investor, or in this case, an incubation programme, could nonetheless contain a certain amount of effectual reasoning, which can be measured. The first goal is hence to develop, from literature, a coding scheme to determine the amount of effectuation present in a business plan. The second goal is to use the coding scheme to code a sample of business plans and search for a relationship between effectuation and start-up performance.

This research will be both qualitative and quantitative. The qualitative aspect is firstly in the instrument that will be developed by deduction from literature and secondly in the qualitative coding of the business plans by myself and a second coder: both subjective and objective measurement by manual reading. The quantitative aspect is in the explanatory analysis of the cross-sectional data gathered, combined with secondary firm size data.

1.2. Research Questions

In order to achieve the research goal stated in the previous section, the central research question of this thesis is:

To what extent do start-ups of different performance show differences in the amount of effectuation versus causation in their initial business plans?

But, as is often the case, this central questions it too broad to answer at once—therefore, it is subdivided into three research questions that will be addressed by three chapters (2, 3 and 4) of this thesis. These research questions leading to an answer to the central research question are:

1. *What is currently known, in terms of literature, about the relationship between planning and performance, in specific effectuation and performance?*
2. *How can the amount of effectuation in a business plan be determined?*

3. *Is there a relationship between firm size and amount of effectuation present in the initial business plan of a start-up?*

The questions are sequential: in order to answer the second research question, the first has to be answered first, and in order to answer the third research question, the second has to be answered first. After answering all three research questions, the central question can and will be addressed in chapter 5.

1.3. Definitions

The following definitions are used in the previous section as well as throughout this thesis:

- *Effectuation*: "Effectuation processes take a set of means as given and focus on selecting between possible effects that can be created with that set of means" (S. D. Sarasvathy, 2001a, p. 245). "The logic for using effectuation processes is: To the extent that we can control the future, we do not need to predict it" (S. D. Sarasvathy, 2001a, p. 252);
- *Causation*: "Causation processes take a particular effect as given and focus on selecting between means to create that effect" (S. D. Sarasvathy, 2001a, p. 245). "The logic for using causation processes is: To the extent that we predict the future, we can control it" (S. D. Sarasvathy, 2001a, p. 252);
- *Performance*: The size of the firm in terms of last known total number of employees, as well as the average personnel growth per year;
- *Business plan*: "A written document that describes the current state and the presupposed future of an organization" (Honig & Karlsson, 2004, p. 29).

1.4. Importance and Contributions to Research and Practice

The findings of the proposed study will be relevant for theory as well as practice. As indicated by the above, more empirical proof of the advantages and drawbacks of effectual reasoning is needed, while the research instrument for measuring effectuation in business plans is also a key step for future research in this area. In terms of practice, proof or disproof of effectuation processes leading to higher performance is key to new and existing entrepreneurs and investors alike, and can for instance be used in entrepreneurial training and education.

The need for this type of study and the contribution to knowledge it will have is articulated by different scholars. Sarasvathy (2001a) argues on the role of effectuation on the firm level:

Researchers trying to understand success and failure factors in new ventures time and again have proposed longitudinal studies as the most effective method to understand them and to develop predictions for separating potential winners from losers. Again, attempts at such longitudinal studies have not provided brilliant illuminations (Van de Ven, Polley, Garud, & Venkataraman, 1999). Reasons include, among other things, the difficulties in comparing firms across industries, technologies, and geographical factors. The theory of effectuation opens up possibilities for true comparisons across such diverse factors. Since all new firms and entrepreneurs, irrespective of which industry or environment they are operating in, make decisions, and since their decisions can clearly be classified into the two categories of causation and effectuation (using the four contrasting principles listed earlier), longitudinal studies can be used to compare them on this one dimension, with a view to separating potential successes and failures. (pp. 260-261)

Entrepreneurship as a Science of the Artificial

Studying boundary sciences is not enough

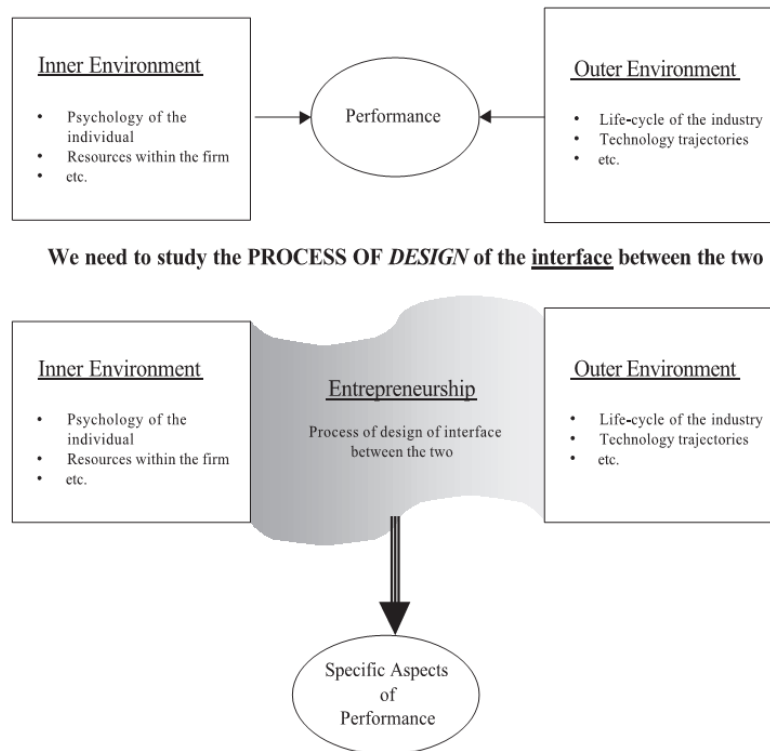


Figure 2: Entrepreneurship as a science of the artificial (Sarasvathy, 2004, p. 715)

As far as I know, the mentioned studies have not been performed yet. However, the proposed research in this proposal will be cross-sectional rather than longitudinal. On the role of effectuation within the firm, at the level of the entrepreneurs, Sarasvathy (2001a) argues:

In addition to carefully separating their anatomical structures, I have clearly delineated four principles on which effectuation processes can be contrasted with causation models in individual decision making. Yet a lot remains to be done in terms of identifying and categorizing particular decisions in particular functional areas inside firms. Methods such as grounded theory building using case studies and qualitative analyses of detailed decision-making experiments might be required to accomplish this empirical objective. (p. 261)

Although I deduct the decisions present in the business plan from existing literature, the instrument may be useful as a starting point for instruments in future research.

Sarasvathy (2004) suggests new research, focussing on the process of the design of the interface between the inner and outer environment, as shown in Figure 2. The proposed research studies this process by studying the business plan and links this to a specific aspect of performance, namely personnel growth.

Read et al. (2009) argue:

Further research might examine the conditions and approaches in which market research improves new venture success. For example, although market research is not positively correlated to performance for radical innovation, it may be beneficial for entrepreneurs to conduct market research if the new firm is creating incremental products that meet existing market needs. Furthermore, although assessing segment size may be useful to a new venture

that intends to offer a mass-produced standard product, it may be irrelevant to a new service venture that can customize each and every engagement. (p. 15)

With this research, the relationship between the amount of market research and the type of market entered is studied, which can partially answer these propositions posed by Read et al. (2009).

Finally, Wiltbank et al. (2009) state:

[the results of this study] question the usefulness and value of current emphases on predictive approaches in entrepreneurship courses that are built around formal business plans and standard analytical techniques. Instead, both potential entrepreneurs and those in the pre-angel phase may benefit from a focus on non-predictive control strategies such as affordable loss and means-based opportunity creation. (p. 129)

The mentioned focus on non-predictive control strategies is exactly what is studied in the proposed research, and is matched with performance data to study the "benefit" mentioned here.

1.5. Research Approach, Strategy and Methodology

To answer the first research question, "*What is currently known, in terms of literature, about the relationship between planning and performance, in specific effectuation and performance?*", all relevant literature has to be studied and integrated into a theoretical framework of the state-of-the-art. This will entail an iterative process of defining keywords and search criteria, backward and forward citation analysis, reading and analysis of papers found and critically reflecting upon these. This framework will form the basis for the hypotheses as well as the research instrument.

To answer the second research question, "*How can the amount of effectuation in a business plan be determined?*", a coding (classification) scheme will be developed. This will be done from the theoretical framework, developing it into indicators of effectuation and causation in business plan content. This will be iteratively tested with sample business plan for validation and verification (inter-rater reliability).

To answer the third and final research question, "*Is there a relationship between firm size and amount of effectuation present in the initial business plan of a start-up?*", first a sample of business plans will be coded. For the sample, this research uses the TOP incubation programme of the University of Twente. The TOP programme – Temporary Entrepreneurial Positions ("*Tijdelijke Ondernemers-Plaatsen*" in Dutch) – was established in 1984 and offers support to entrepreneurs, e.g. through basic financing (loan), assistance, and practical support in technical and business management areas. The selection of start-ups to be included in the programme is based on the presence of a link with research done at the University of Twente as well as a solid business idea, among other criteria. Incubating over 400 companies creating more than 2000 jobs so far (mostly in the Twente region), there is a lot of secondary data available – business plans as well as personnel growth figures as recorded at the Chamber of Commerce (secondary data). The sample will be argued and bias will be taken into account. Because the business plans are present and the Chamber of Commerce data is as well, there was no risk of not obtaining the data – unless all the TOP plans are lost or destroyed, in which case I would have been forced to choose another thesis topic altogether.

Then, the business plans in this sample will be thoroughly read and coded by both myself and a second coder, based on the coding scheme developed. Combining the coded data and the secondary data, statistical analysis will be performed. The results will mainly be presented in table form, after which they will be interpreted. Possible conclusions (results of the analysis) include that none of the effectual indicators has a statistically significant influence on performance, although based on literature we would not expect such an outcome.

When all of this has been done, the central question “*To what extent do start-ups of different performance show differences in the amount of effectuation versus causation in their initial business plans?*” can be addressed by interpreting the results of the statistical analysis in the context of the theoretical framework, discussing these conclusions and assessing the implications they have.

1.6. Outline of the Thesis

In Chapter 2 the conducted literature review will be described, thereby answering the first research question. With the results of this literature review, Chapter 3 shows how the coding scheme was developed and assesses the validity and reliability of all research methods, hence answering the second research question. Chapter 4 contains the data analysis and reports the results of the study, answering the third research question. Chapter 5 concludes the thesis by drawing conclusions and discussing these, as well as discussing the limitations and implications of this thesis.

Chapter 2: Literature Review

2.1. Introduction

The goal of this chapter is to answer the first research question, "*What is currently known, in terms of literature, about the relationship between planning and performance, in specific effectuation and performance?*", by describing the conducted literature review and analysis, and with the results provide a theoretical framework for analysis in the form of a causal model, as well as deducting hypotheses. The structure of this chapter is as follows: Section 2.2 discusses the approach to the literature review by discussing its literature collection and analysis methods. Section 2.3 contains the actual literature review and thereby provides an overview of the state-of-the-art of effectuation, business planning and performance literature relevant to this thesis. Section 2.4 provides the causal model used for this thesis as well as the hypotheses that will be tested. The chapter is concluded in Section 2.5.

2.2. Approach

2.2.1. Literature Collection

As a starting point, the Research area of the Effectuation.org webpage was taken (S. D. Sarasvathy, et al., 2010). The literature was subsequently retrieved via the University of Twente Library & Archive, using their search facilities and databases, e.g. EBSCOhost, Elsevier Science Direct, JSTOR, Sage, Springer, SSRN, and Wiley Interscience. If literature could not be retrieved or found this way, Google Scholar was used.

The second step consisted of performing both backward and forward citation analysis. The backward citation analysis of course pertaining to the references of the literature found, and the forward citation analysis being dependent upon the possibilities offered by the database in question, as well as Google Scholar's "Cited by" function.

In the third step, more literature was retrieved using keyword searches via the search facilities of the University of Twente Library & Archive, the databases mentioned earlier, as well as Google Scholar. The keywords used were (combinations and/or plurals of) *effectuation, causation, expertise, entrepreneur, entrepreneurship, start-up, startup, (new, small, nascent, emerging, early) + (venture, firm, business, company, organization/organisation), plan, planning, performance, prediction, predictor, and growth.*

In the fourth step, the second step was repeated with the newly found literature, after which the literature was characterized by topic.

2.2.2. Literature Analysis

The last step consisted of reading the literature and selecting the literature relevant to this research. After determining relevant content, the redundant, irrelevant or outdated literature in the remaining selection was further narrowed down with three additional criteria:

- Date published: the newer the better (as research usually builds on previous research, newer research may be more relevant, but it should meet the other criteria as well);
- Number of citations: the higher the better (for reliability and quality);
- Journal impact and quality: using ISI Web of Knowledge's 2009 JCR Social Science Edition (ISI, 2009) and giving preference to publication in the five major, dedicated journals in the field of entrepreneurship: Journal of Business Venturing (JBV),

Entrepreneurship Theory and Practice (ET&P), Small Business Economics (SBE), Journal of Small Business Management (JSBM), and Entrepreneurship and Regional Development (ERD) (also for reliability, quality and relevance).

However, it should be noted that the latter two criteria were rarely applied for effectuation-related papers, since effectuation is a rather recent subfield of entrepreneurial research and hence the choice of papers is limited. So, the criteria were not strictly applied but rather used as a guideline for selection.

With several papers being published (online) during the course of the research, the collection, characterization, and analysis were updated when necessary and feasible.

2.3. Overview of Theory and Models: The State of the Art

2.3.1. The Theory of Effectuation

My theoretical lens of choice is effectuation, a new paradigm in entrepreneurship research. After Sarasvathy (2001a) introduced her abducted theory of effectuation, a logic of entrepreneurial expertise, to the main stage of entrepreneurship research, it has remained there ever since. Empirically establishing the existence of effectuation in entrepreneurial decision making, Sarasvathy (2001b) elaborates on how she came to the theoretical foundation set out in Sarasvathy (2001a). In these two important papers, she argued that effectuation is the inverse of causation, and is the predominant logic expert entrepreneurs use when making decisions.

The empirical basis for Sarasvathy's effectuation theory was laid in her cognitive science-based dissertation work (S. D. Sarasvathy, 1998), described in Sarasvathy (2001b). Inspired by the critiques of, among others, Knight, March and Weick regarding the assumptions of predictive rationality (rational choice), pre-existent goals and environmental selection in the domain of entrepreneurial organizations, Sarasvathy (1998, 2001b) proved the existence of effectuation.

Before empirically investigating effectuation, Sarasvathy (2001a) argues how she came to the notion of effectuation. She notes,

The intellectual lineage of the ideas influencing the theory of effectuation presented in this article includes a very large and impressive list of thinkers, ranging from the pragmatic philosophers at the turn of the century to current leaders of thought in economics and management: Peirce (1878), James (1912), Knight (1921), Lindblom (1959), Simon (1959), Vickers (1965), Allison (1969), Weick (1979), Nystrom & Starbuck (1981), Buchanan & Vanberg (1991), March (1982), Burt (1992), and Mintzberg (1994). (p. 254)

The most important influences of these, she argues (S. D. Sarasvathy, 2001a, 2001b), are Knight's notion of a fundamentally unknown future, March's notion of goal ambiguity as essential in organizational decisions in his "garbage can" model, Weick's notion of decision makers as the key sources of selection, who enact their environment, and Mintzberg's observation that probable non-starters regularly turn out to as huge successes due to the "ignorance" of decision makers regarding this supposed, and obviously false, non-starter characteristic attributed to it.

In short, Sarasvathy (2001a) attempted to integrate the problem spaces of Knight, March, and Weick (and perhaps Mintzberg), introducing:

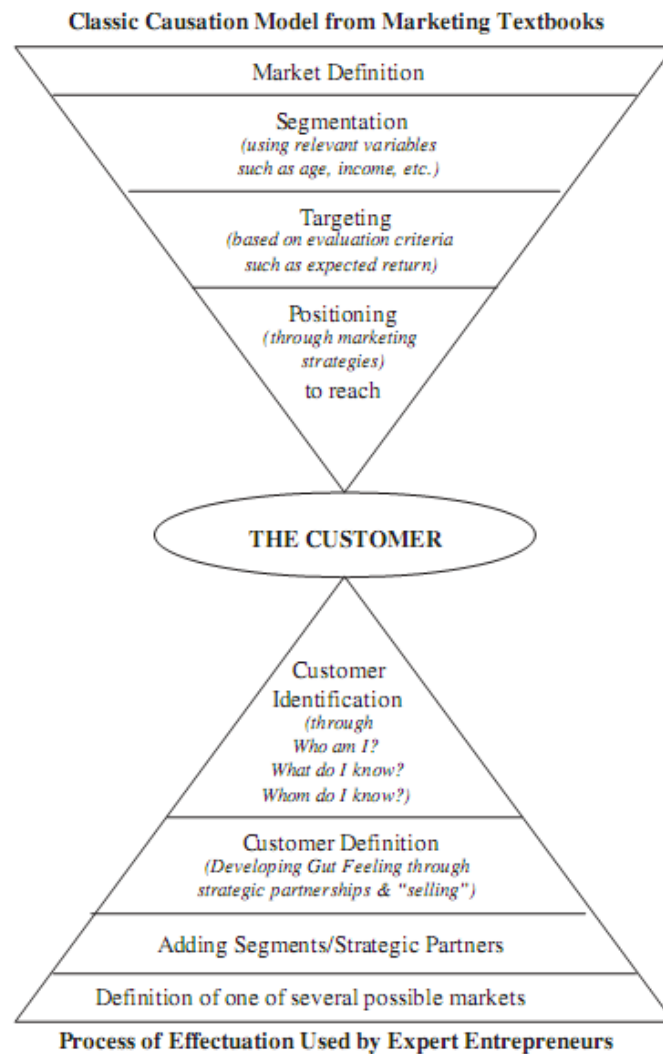


Figure 3: Contrasting the textbook paradigm in marketing with effectuation (Sarasvathy, 2001b, p. 22)

A model of effectual reasoning that explicitly addresses (1) a logic of control (rather than prediction), (2) endogenous goal creation, and (3) a (partially) constructed environment. Additionally, building upon the preceding theories' subconcepts, which basically pose a disconnect of intention, action, and meaning, here I show how effectuation inverts causal reasoning to indicate a new connection among means, imagination, and action that helps generate intentions and meaning in an endogenous fashion." (p. 256)

The four core principles that emerge from this alternative model to causation are 1) "affordable loss rather than expected returns", 2) "strategic alliances rather than competitive analyses", 3) "exploitation of contingencies rather than exploitation of preexisting knowledge", and 4) "controlling an unpredictable future rather than predicting an uncertain one" (p. 252). The model is shown in Figure 1 (p. 3 of this thesis).

Sarasvathy (S. D. Sarasvathy, 1998, 2001b) found empirical evidence of effectuation using a verbal (think-aloud) protocol analysis, as used in cognitive science, to study 27 expert entrepreneurs. The then-emerging idea that firms are often created in the absence of markets led her to ask her subjects, founders of \$200M-\$6.5B companies, to identify the market for one single, fictional, given new product. She hypothesized expert entrepreneurs to "shape and create the potential market rather than divine [sic] it through analytical or estimation techniques" (S. D. Sarasvathy, 2001b, p. 10), and the experiment confirmed this hypothesis:

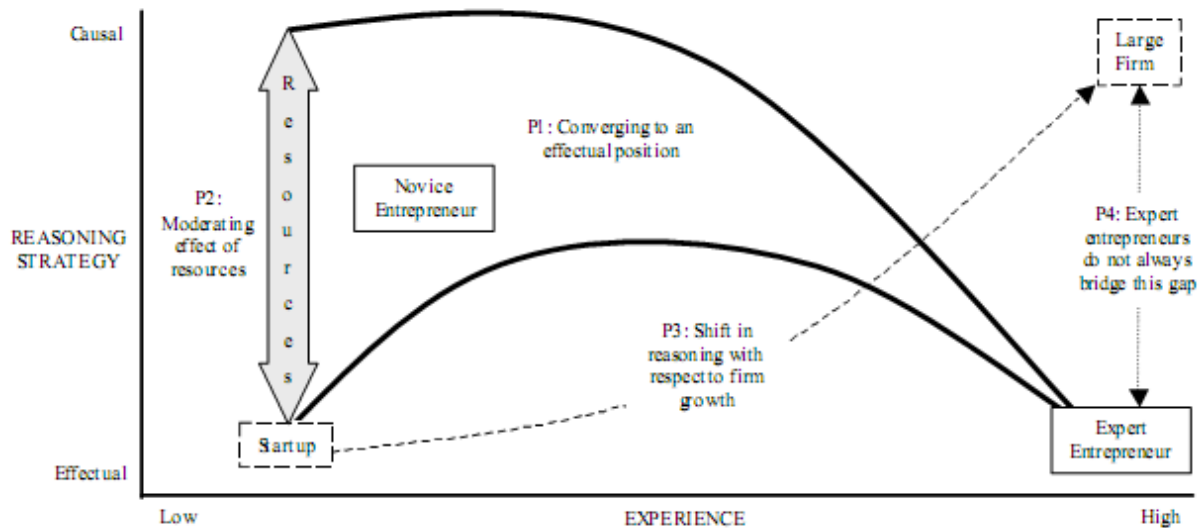


Figure 4: Type of reasoning approach with respect to experience and firm lifecycle (Read & Sarasvathy, 2005, p. 36)

"In fact, more than 63% of all the statements made by 74% of the subjects (20 out of 27) were statements of effectuation; 7 of the 27 did not make *any statements other than EFF*" (p. 15, italics in original). She went on to develop the effectuation process from her data, finding an inverse of the causal, textbook model of marketing, not driven by goals but by path-dependency. Her study revealed that "none of the subjects in this study, including the 4 who suggested using traditional market research techniques, actually used this top-down causal model for creating the market for Venturing" (p. 20, with Venturing being the imaginative product). The contrast can be seen in Figure 3.

An important notion that emerged from Sarasvathy's early works (1998, 2001a, 2001b), is that effectuation is not always preferred: it warrants certain circumstances. Since it assumes an unpredictable future, goal ambiguity and decision-makers that enact their environment, a causal decision model is useful or even necessary for circumstances that do not satisfy these requirements, like when a market that has already been created and human action is not the predominant force that shapes the future. This is a situation that usually occurs when a firm has grown significantly, which relates this to the firm lifecycle as proposed in Figure 4 (S. Read & Sarasvathy, 2005).

This proposition was partially derived from the empirical findings of Read, Wiltbank and Sarasvathy (2003), who found that effectual thought was positively related to entrepreneurial expertise, but causal thought not negatively related. That was in turn empirical proof of Sarasvathy's (2001a) remark that

Both causation and effectuation are integral parts of human reasoning that can occur simultaneously, overlapping and intertwining over different contexts of decisions and actions. Yet in this article I deliberately juxtapose them as a dichotomy to enable clearer theoretical exposition. (p. 245)

The aforementioned notion that for effectuation to be appropriate, certain circumstances must be in place, is further argued in Wiltbank, Dew, Read and Sarasvathy (2006). They theoretically put effectuation in a framework of prediction and control, which are treated as separated dimensions and insert classical strategic management theories. The resulting 2x2 square results in the following four areas: a low emphasis on both control and prediction is

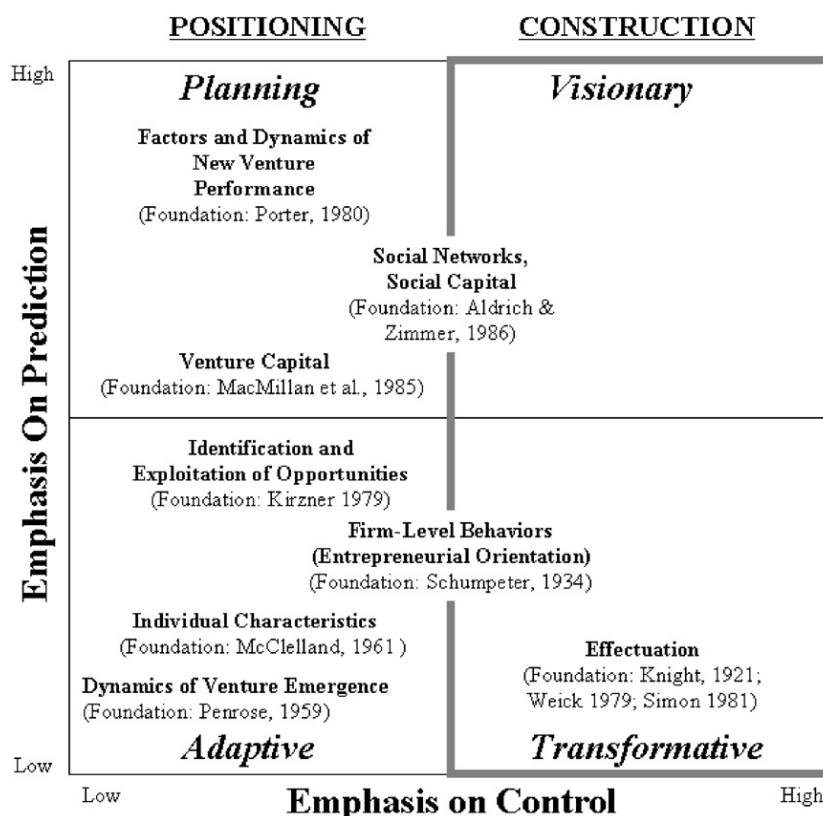


Figure 5: Theoretical convergence areas in entrepreneurship research (Read, Song & Smit, 2009)

labelled adaptive (“move faster to adapt to a rapidly changing environment”, p. 983), a low emphasis on control but a high emphasis on prediction they label planning (“try harder to predict and position more accurately”, p. 983), a high emphasis on both control and prediction is labelled visionary (“persistently build your clear vision of a valuable future”, p. 983), and finally the area of non-predictive control: a high emphasis on control but a low emphasis on prediction, what they call a transformative approach (“transform current means into co-created goals with others who commit to building a possible future”, p. 983). The authors call for an emphasis on control, rather than prediction, which is basically another call to further investigate effectuation. This same framework is used by Read, Song and Smit (2009) to show effectuation as one of the areas of theoretical convergence, depicted in Figure 5.

Going back to the paper that started it all, Sarasvathy (2001a) developed a list in which she contrasted causation and effectuation, as a static theory. This list was subject to several revisions of her own doing, and for this thesis the last known and most elaborate version is used: the one depicted in Sarasvathy and Dew (2005a), shown in Table 1 (p. 2 of this thesis). This will be useful for the construction of the research instrument. We can already see that for this thesis, we cannot measure the construct “predisposition toward contingencies”: the effectual position towards that is often named “leveraging contingencies”, and these contingencies by definition cannot be predicted in the initial business plan—which is the measurement method of choice for this study (more on this in the next chapter).

Sarasvathy and Dew (2005b) developed a dynamic model of effectuation, they state is based on both Sarasvathy's (1998) as well as Dew's (2003, as cited in Sarasvathy & Dew, 2005b) dissertations (the latter one describing the history of the RFID industry). This dynamic model, shown in Figure 6, is also useful for developing the research instrument, albeit less than the static version as we cannot measure the cycles but only one moment in time—the

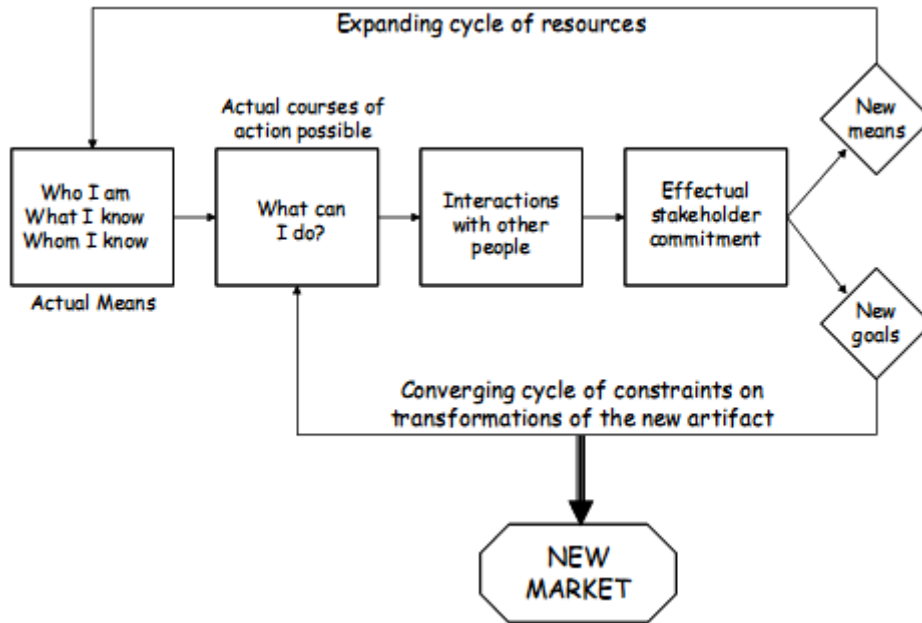


Figure 6: A dynamic model of the effectual network and the new market as an effectual artifact (Sarasvathy & Dew, 2005, p. 543)

initial business plan (elaborated on in the next chapter). As we can see from the dynamic model, the effectual model of entrepreneurship—in specific the creation of new markets—starts with the actual means available, followed by judging what you can do with them, then contact people you know, and start building pre-commitments. New and perhaps unexpected means and goals arise from stakeholders and contingencies, and these result in two cycles, one increasing the means, the other changing the goals available, and these enable you to go back to judging what you can do with the new means, and so on and so forth.

This is in sharp contrast to the classic model, wherein an opportunity is discovered, a business plan is developed on the basis of market research and competitive analysis, stakeholders and resources are gathered based on the goals set out in the business plan, after which the iterative cycle of adapting to the ever-changing environment in order to keep a competitive advantage begins (S. Read & Sarasvathy, 2005). Read, Dew, Sarasvathy, Song and Wiltbank (2009) provide us with a figure of this, adapted from Gartner (1985, as cited in Read, Dew, Sarasvathy, Song & Wiltbank, 2009), shown in Figure 7. Ergo, we can see that the development of a business plan is usually considered a predictive process. However, especially if it is required by a business angel, venture capitalist or incubation programme, it can still be written by start-ups, whose entrepreneur or entrepreneurial team uses a

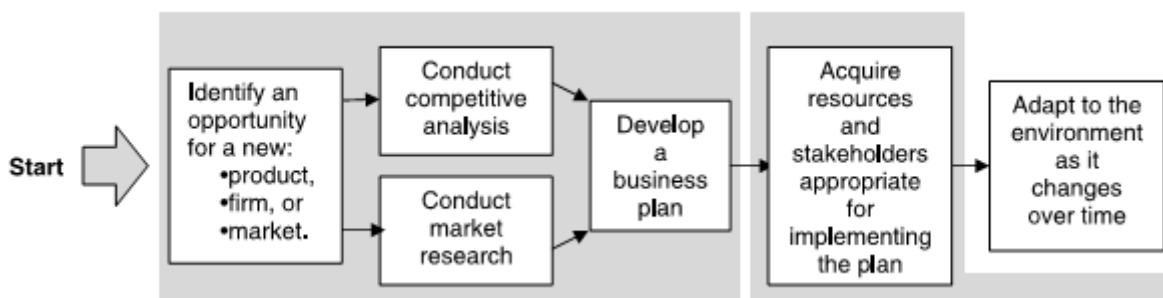


Figure 7: The predictive process (Read, Dew, Sarasvathy, Song & Wiltbank, 2009, p. 4)

predominantly effectual logic.

Read and Sarasvathy (2005) further illustrate the fundamental difference between causation and effectuation by stating that “both market and opportunity are contingent on who comes on board and the actions and goals they enable and constrain; goals and visions of an opportunity seldom determine who comes on board or what resources are gathered” (pp. 16-17).

In a broader context, effectuation is considered a Creation Theory as opposed to a Discovery Theory, e.g. by Alvarez and Barney (2007). Alvarez and Barney emphasize the differences in predictions these theories generate and review the commonalities and differences of these two main theories—while recognizing that Creation Theory, as opposed to Discovery Theory, “has yet to be articulated as a single coherent theory in the literature” (p. 15).

Thus far, there appears to be a decent amount of theorizing on this emerging new theory called effectuation. But, of course, no scientific theory is going to be a real success without empirical evidence. One of the few empirical studies on entrepreneurship, Dew, Read, Sarasvathy and Wiltbank’s (2009) study of the differences between experts and novices is in fact an extension of Sarasvathy’s (1998) dissertation: the 27 expert entrepreneurs are contrasted against 37 MBA students and this confirmed that the differences are stark, with MBA students thinking much more causationally. Using the same data, Read, Dew, Sarasvathy and Song (2009) analyzed the marketing decisions the two different groups made and found again that the expert entrepreneurs used much more effectual logic in their marketing decisions. Because of the lack of empirical papers and the good quality of these studies, the operationalizations contained in these two papers are important for our research instrument.

Wiltbank, Read, Dew and Sarasvathy (2009), adding to the increasing stream of empirical research on entrepreneurship, found that investors who lay more emphasis on control have fewer investments that turn out negatively, while those that lay more emphasis on prediction make larger investment but do not have more successes. This is another testimony to the effectiveness of effectuation. Wiltbank, Sudek and Read (2009) found that investors who had more experience with entrepreneurship themselves, were more effectual in how they see new ventures, another testimony to the existence of effectuation. All in all, the existence of effectuation is no longer a question, but the results of effectual thinking still largely are.

In summary, effectuation as an exponent of Creation Theory, opposing the mainstream Discovery Theory, is here to stay. There is strong empirical support for the notion that expert entrepreneurs think more effectually than causationally, and benefits of using effectual logic are beginning to be empirically established—I hope to add the next piece to this puzzle.

2.3.2. Planning and Its Relationship With Performance

The relationship between planning and performance in big firms is a standard topic in strategic management literature, and this issue has received increasing attention in entrepreneurship research as well. In strategic management, planning is one of the two important streams of research regarding strategy processes, the other being learning (Brews & Hunt, 1999). Brews and Hunt attempted to resolve this debate between the two streams with their empirical study, finding among others that formal planning has a positive influence on performance in all environments, stable or unstable, in support of most literature of the Planning School (with Ansoff as its most famous exponent). The Learning

School's (with Mintzberg as its most famous exponent) anti-planning stance is dealt with by Brews and Hunt with their statement: "The remedy for bad planning is good planning, which includes incrementalism within its ambit." (p. 905). With that conclusion, we will leave this strategic management debate and focus on planning in start-ups, as it is uncertain that what goes for big firms also goes for start-ups: they operate in totally different environments. Rue and Ibrahim (1998) confirmed this contrast in the planning-performance relationship between small and large businesses. They found a relationship between planning sophistication and growth in sales as well as perceived performance relative to the industry, but not for return on investment. However, we will find out that for new ventures it comes down to the same planning versus learning debate.

Planning has largely been considered an essential feature of starting a business, and is in the mainstream entrepreneurship literature with its dominant—and in the past even the only—theory, that Alvarez and Barney (2007) called Discovery Theory, regarded as a static thing that is not really worth investigating much. Luckily, there are exceptions, and the paradigm shift towards what Alvarez and Barney called Creation Theory has certainly been of influence on the growing interest in the usefulness of business planning.

Alvarez and Barney (2007) themselves offer an oversight on the differences regarding business planning between the two theories. This mainly boils down to the judgement the different theories pass on making a lot of changes to a business plan: Discovery Theory suggests this is bad ("poor planning skills", p. 28), especially when the goals or basic assumptions are changed, while Creation Theory encourages this whenever possible and feasible ("good planning skills", p. 28). They do propose however, that each approach should be used ("will outperform the other approach", p. 28) in its own context: risk conditions for Discovery Theory and uncertainty conditions for Creation Theory. These conditions can change over time (Bhide, 1992, as cited in Alvarez & Barney, 2007).

The usefulness of planning is often dealt with by relating it to performance. However, the results for start-ups and small businesses are very mixed and the debate is similar to the one going on in strategic management literature.

For instance, an interesting early venture into this planning-performance relationship is by Robinson and Pearce (1983). They found that small banks using formal planning did not outperform those employing non-formal planning in their sample, in contradiction to research on bigger businesses. Small organizations are more comparable to start-ups than to large organizations, but there remain differences: Matthews and Scott (1995) found for example that entrepreneurial firms use "more sophisticated" planning methods than small firms (p. 45), probably due to the availability of resources.

In another example, opposite to Robinson's and Pearce's findings, Bracker, Keats and Pearson (1988) analyzed small firms in growth industries and found a significant relationship between planning and performance, especially structured strategic planning outperforming structured operational planning and unstructured planning in terms of financial performance. Pretty much supportive of that, Shrader, Mulford and Blackburn (1989) investigated small firms and found that operational planning in general is important, and probably more so for small firms, and that strategic planning also positively related to performance.

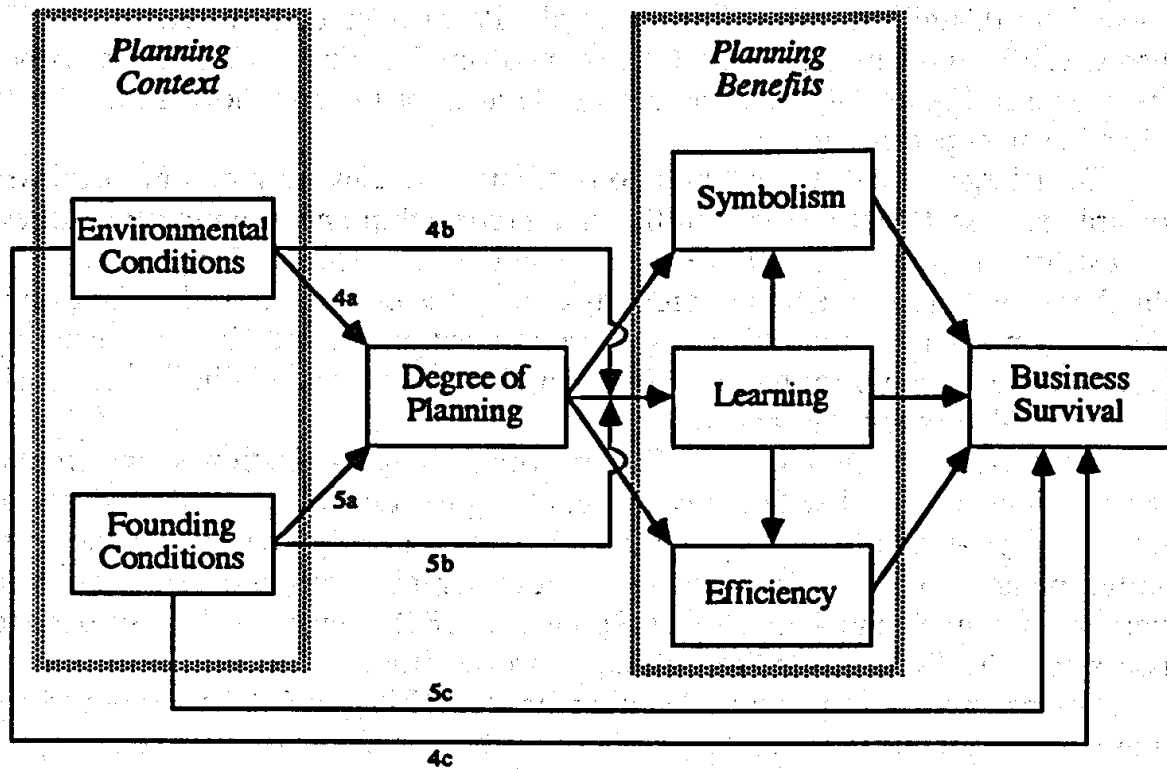


Figure 8: Benefits of pre-startup planning (Castrogiovanni, 1996, p. 810)

To get insight into these mixed results, Schwenk and Schrader (1993) performed a meta-analysis on the relationship between strategic planning and financial performance, focussing on small firms. They concluded, “we were able to provide straightforward support for the general assertion that strategic planning does have a significant, positive association with performance across studies” (p. 60), and although the effect sizes in separate studies were small, aggregated it is unmistakable.

Next to providing an integrated overview of the research up to that date, Castrogiovanni (1996) developed a theoretical framework of pre-startup planning and business survival, taking contextual factors into account. The result is shown in Figure 8. In his view, the degree of planning is indirectly related to business survival through planning benefits, i.e. symbolism, learning and efficiency. However, scholars like Bhidé (2000, as cited in Delmar and Shane, 2003) kept resisting. Castrogiovanni’s view was empirically put to the test by Delmar and Shane (2003)—proving Castrogiovanni’s proposition that business planning facilitates the development of new ventures was their fourth objective (p. 1166) and they report to have reached that objective. They found support for their argument that “business planning would enhance founders’ product development and venture organizing activities and would reduce the hazard of venture disbanding” (p. 1180). As Matherne’s (2004) review of Delmar and Shane’s paper noted rightly:

Delmar and Shane also noted that their study of new ventures did not take into account the quality of the business plans or of their implementation. Consequently, it is impossible to ascertain whether the value provided by business planning was due to the planning process itself or the content of the business plans that resulted. (p. 157)

Shane and Delmar (2004) is another paper on their same study, reassuring us that “new ventures are less likely to be terminated if the entrepreneurs complete business plans before

initiating marketing and promotion and before talking to customers” (p. 781). But there were still scholars, like Honig and Karlsson (2004) who empirically found rather the opposite: no positive relationship between profitability or survival and planning in nascent organizations, which they, rather surprisingly, say supports Castrogiovanni’s view on the indirect effect of planning as in Figure 7. Of additional interest here is the conclusion of Honig and Karlsson that nascent organizations often write business plans because of “institutional variables like coercion and mimetic forces” (p 29). This is exactly the case in this thesis.

The relevant question here is whether business survival is equal to performance. Davidsson (2005) argues that survival is not always a desirable outcome for all stakeholders involved, nor does growth automatically imply that the stakeholders have reached their goals. Besides, he concludes from a literature review, the predictors of survival and growth are not always the same, so we should take this into consideration when applying the framework of Castrogiovanni and the ensuing debate between e.g. Shane and Delmar vs. Honig and Karlsson.

Gruber (2007), tried to resolve the ongoing debate using a process and contingency perspective. He argues that his results confirm those of Shane and Delmar (2004), and he found that the benefits of planning depend on the amount of planning and the focus. As he puts it, “more generally, the results suggest that entrepreneurs need to be efficient planners, and need to know exactly what to plan in new firm creation, rather than “just” plan, to achieve superior outcomes” (p. 801). Moreover, he found that the influence of efficient planning also varies with the dynamism of the environment, and proposes a new paradigm: “Planning processes need to be governed by different planning regimes, depending on the type of founding environment.” (p. 801).

Concluding that the debate was still raging and unresolved, Brinckmann, Grichnik and Kapsa (2010) conducted another meta-analysis, this time focusing on moderating contextual factors. Their analysis confirmed the benefits of planning for both new and established firms, but more importantly, they found several moderating variables, e.g. “uncertainty, limited prior information, and an absence of business planning structures and procedures” (p. 25) that negatively moderated the relationship between planning and performance. The two most important contextual variables that explain the contingency are the development stage (small vs. new firms) and the cultural context, i.e. the amount of uncertainty avoidance imbedded in the culture, that affects the behaviour and the returns after the planning stage. Hence, and in an attempt to integrate the two schools, “we suggest a concomitant and dynamic approach of planning, learning, and doing”. Interestingly, they found that there was no difference in the positive planning-performance relationship between studies focussing on outcome or studies focussing on the sophistication of planning.

In conclusion, we can say that there is strong evidence that there is a positive relationship between planning processes and performance as well as survival. Recent studies suggest that the magnitude of this relationship is likely to be dependent upon contextual factors like culture, as well as the amount and focus of the planning.

2.3.3. The Relationship between Effectuation and Performance

Only one paper was found that directly related effectuation theory—so the theory, and all its dimensions—to performance of start-ups in an empirical way: Read, Song and Smit (2009). They did a meta-analysis on non effectuation based articles in the *Journal of Business Venturing* that did use one of the following four effectual variables as independent variable

(in the view of Read, Song and Smit): means, partnerships, affordable loss and/or leverage of contingencies. So, these articles did not use the theory of effectuation, but used components of it which can be used for a meta-analysis—a smart way to use “old” empirical data. They found 48 studies, totalling 9897 new ventures, and found a positive relationship with performance for each of these, except for Affordable Loss. They were not able to measure the design (as opposed to prediction) construct.

Relevant here, next to their results, is their methodology apart from the meta-analytic side of it. Their operationalization of the constructs is rather obscure and subjective, since they only applied the descriptions of Sarasvathy and Dew (2005a), but the effectual principles the selected studies measured provide inspiration for my operationalization, which can be found in [Chapter 3: Methodology, Validity and Reliability](#).

The fact that meta-analysis of the relation between effectuation and performance yields positive results provides good prospects for this thesis finding a positive relation as well, but only one study, even a meta-study, is not a solid enough basis to conclude that the link between effectuation and performance has been proven—too much depends on accuracy of their subjective operationalization.

2.3.4. Predicting Start-up Performance

To be able to judge the relationship between planning and performance correctly, it is important to realize what other factors, present in the business plan, influence this relationship so that we can control for them.

As a first significant point in the prediction of new venture performance, Cooper (1993) investigated the challenges in the field. His theoretical framework for analysis of predicting performance is shown in Figure 9 below. The characteristics of the entrepreneur, the founding processes and the environment are impossible to extract from business plans in a consistent way, unless they all follow a format that requires them to fill out reliable measures of these—which is not the case in our sample. Hence, the focus will be on the Initial Firm Characteristics, which also reflect the aforementioned variables as shown in the framework.

Another interesting take is by Davidsson (1991), who proposed an abstract overview of the determinants of small venture growth, in which the three objective conditions Ability, Need and Opportunity directly determine Actual Growth, together with the Growth Motivation. Growth Motivation is determined by the subjective conditions Perceived Ability, Perceived Need and Perceived Opportunity, which are results of the objective Ability, Need and Opportunity. This model is shown in Figure 10 on the next page.

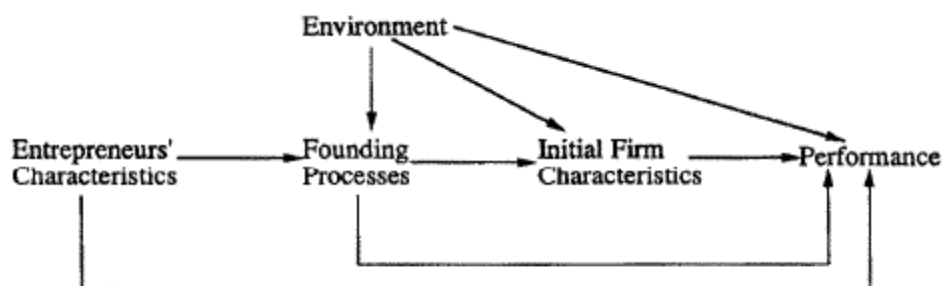


Figure 9: Framework for analysis of new firm performance prediction (Cooper, 1993, p. 243)

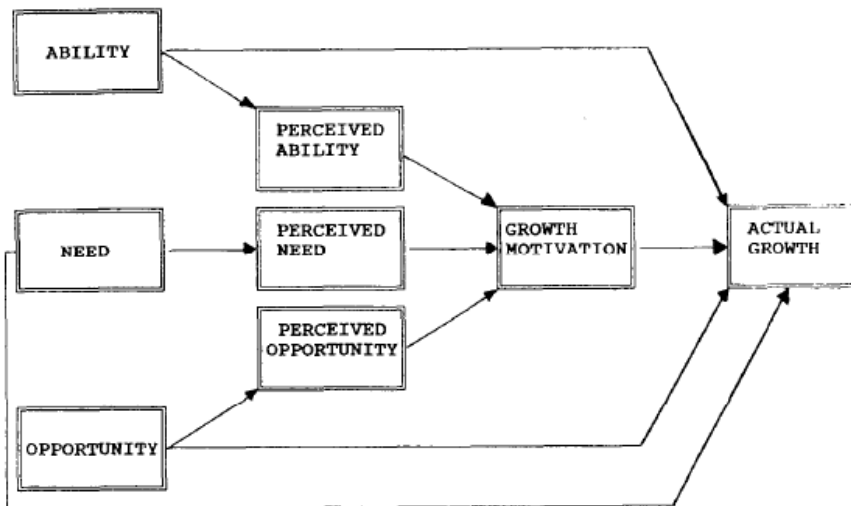


Figure 10: A model of determinants of small firm growth (Davidsson, 1991, p. 407)

Besides growth motivation, no predictors of venture performance were found which can be measured in the business plan. So, we can conclude that growth motivation (intention) should be a control variable.

2.3.5. Measuring and Interpreting Performance

Dependent variables that represent venture performance vary greatly. Among these variables are (growth in) sales, profit, turnover/revenue, employees, return on capital/investment/assets/equity/net worth, market share, earnings yield or earnings per share, stock price increase, etc. (Murphy, Trailer, & Hill, 1996). This is probably caused by convenience and related availability issues. The consequence is that it is harder to compare results across different studies.

Murphy, Trailer and Hill also found that while a certain independent variable may positively influence a certain measure of performance, it may not have the same, or even have the opposite effect on another measure of performance. Hence, conclusions should be limited to the measured aspect of performance only.

Davidsson (2004) makes a strong case for job creation as the dependent variable, because of the role it played in establishing entrepreneurship in policy making, research and media, and because of the implications of such research for societal level outcomes. Also, he argues that the outcomes (the dependent variables) should come from a different point in time and a different source than the explanatory variables, for reasons of credibility, causality and “avoidance of common method variance problems” (p. 129). I take his argument to heart and will focus on job creation, both in size and speed, and will—rather self-explanatory—use another source for that than the business plan.

In summary, the dependent variable performance has no standardized operationalization, and not all existing operationalizations cover the same aspect of performance. Job creation is deemed a suitable candidate because of the historic importance for entrepreneurship as well as the importance for society as a whole.

2.4. Theoretical Framework for Analysis: Hypotheses and the Causal Model

The literature review indicates that expert entrepreneurs, of whom we can expect to perform well, use effectuation most of the time. There is one meta-study directly linking effectuation to performance, concluding from non effectuation studies that three out of four measured effectuation dimensions have a positive relationship with performance, but one meta-study is not enough to base my hypotheses on. The notion that business planning has a positive relationship with performance does have strong support—yet business plans have never been coded for effectuation in order to predict performance.

Hence, there is a large probability that a focus on effectuation in a business plan has an influence on performance, but the direction seems to be rather undecided in the literature, in fact, so little is known about it, that it can even be classified as a whole new area of research. With this in mind, we build the causal model and set up the hypotheses.

To construct the causal model, the literature review is used, especially Table 1. From the constructs contained in that table, those that can be measured in a business plan were selected:

- Non-predictive control (As View of the future. Opposes Prediction, and substitutes the hard-to-measure Design construct. Also measures the Attitude toward Probability estimates);
- Means (As Givens. Opposes Goals);
- Affordable loss (As Predisposition toward risk. Opposes Expected return); and
- Partnerships (As Attitude toward others. Opposes Competition).

Decision agenda, Basis for taking action, Basis for commitment, Stakeholder acquisition, Predisposition toward contingencies, Attitude toward success/failure and Underlying logic were not deemed to be suitable candidates to measure in a business plan.

The resulting causal model for this research is shown in Figure 11 on the next page. Since leveraging contingencies seems to be considered a major construct by Sarasvathy, judging from its appearance in all overviews, it is included in the causal model but shown in a striped box because it could not be measured.

Based on the literature, and in light of the discussion above as well as the resulting causal model, the following hypotheses are put forth:

On non-predictive control versus predictive control:

H1a Start-ups whose initial business plan focuses on control grow more than start-ups whose initial business plan focuses on prediction.

H1b Start-ups whose initial business plan focuses on prediction grow more than start-ups whose initial business plan focuses on control.

On means-based action versus goals-based action:

H2a Start-ups whose initial business plan focuses on means grow more than start-ups whose initial business plan focuses on goals.

H2b Start-ups whose initial business plan focuses on goals grow more than start-ups whose initial business plan focuses on means.

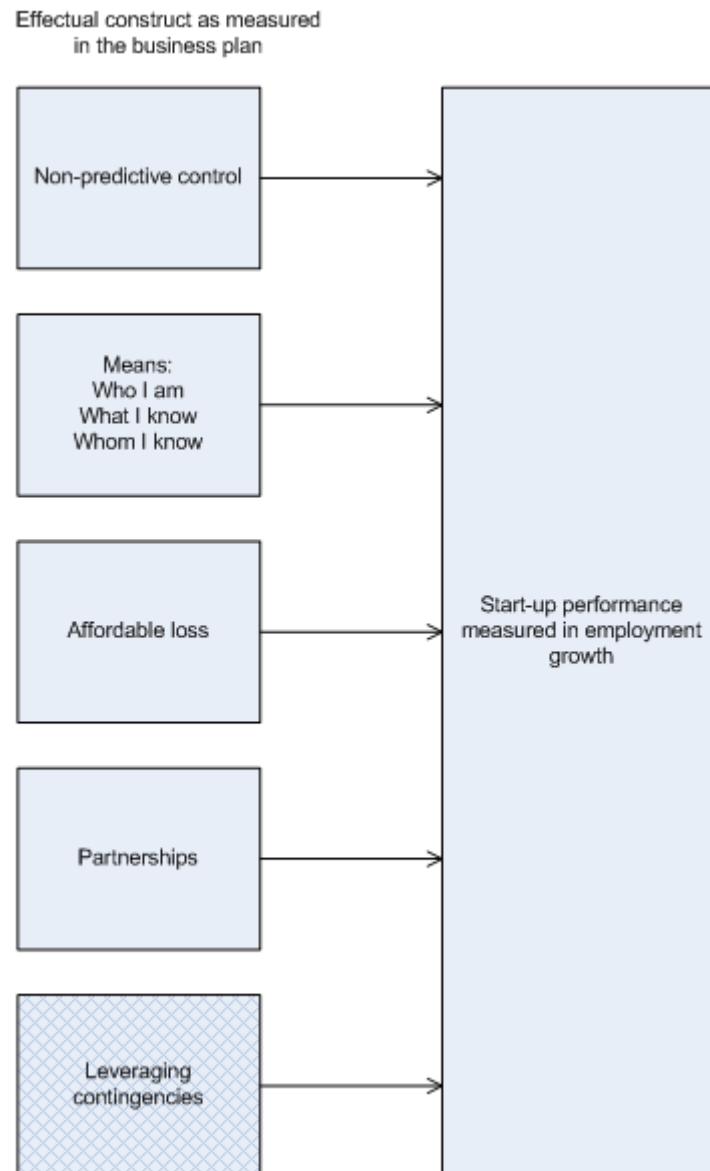


Figure 11: The causal model.

On affordable loss versus expected return:

H3a Start-ups whose initial business plan focuses on affordable loss grow more than start-ups whose initial business plan focuses on expected return.

H3b Start-ups whose initial business plan focuses on expected return grow more than start-ups whose initial business plan focuses on affordable loss.

On partnerships versus competition:

H4a Start-ups whose initial business plan focuses on partnerships grow more than start-ups whose initial business plan focuses on competition.

H4b Start-ups whose initial business plan focuses on competition grow more than start-ups whose initial business plan focuses on partnerships.

2.5. Conclusion

In this chapter, I aimed to answer the research question "*What is currently known, in terms of literature, about the relationship between planning and performance, in specific*

effectuation and performance?". This was done through a thorough literature review, finding firstly that effectuation is a rather new but already pretty established approach to entrepreneurial decision making, enjoying a lot of theorizing articles and empirical evidence proving its existence. Secondly, I also found that there was just one paper that related effectuation to start-up performance. Thirdly, I studied the relationship between planning and performance and although there is a lot of contradiction, as relationship between them is unmistakable. The last part of the literature review focused on other influences on performance that could be distilled from a business plan, in order to control for them, and growth motivation/intention was the result.

On the basis of that review, a causal model and hypotheses were developed. This will form the basis of the operationalization, which is the topic of the next chapter.

Chapter 3: Methodology, Validity and Reliability

3.1. Introduction

The purpose of this chapter is to answer the second research question, "*How can the amount of effectuation in a business plan be determined?*", by operationalizing the constructs of the causal model developed in the previous chapter, and assessing the validity and reliability of the operationalization.

The structure of this chapter is as follows: Section 3.2 focuses on the operationalization of the predictive constructs: the actual development of the coding scheme. Section 3.3 describes on the operationalization of the observed, outcome variables. Section 3.4 explains the measurement and analysis procedures, including inter-rater reliability analysis. Section 3.5 is dedicated solely to assessing validity. Section 3.6 considers the ethical dimensions of this research, and finally, Section 3.7 gives the conclusion of this chapter.

3.2. Data Collection and Operationalization: The Coding Scheme

The design of this study is cross-sectional: all businesses are only measured once. For this, we use their initial business plan. This communication product needs to be measured in a way that covers effectuation best, which will surely include both quantitative and qualitatively measures as we want to measure both objective and subjective aspects of effectuation. Therefore, our preferred method is manual reading of the business plans, rather than using automated text analysis of word counts and the like.

The initial business plans that will be used for this research, are required for admittance to the TOP incubation programme (see p. 7). Since we are looking for measures of whether the owners design (control) the shape of the future environment, rather than predict it, we are looking for measures of effectuation in these business plans. In chapter 2, we found that there have been a few empirical papers on effectuation, which means they have operationalized effectuation before. Their operationalization was however based on e.g. verbal think-aloud protocol analysis, or meta-analysis, so we will have to adapt them.

Control vs. prediction

The first dimension in our causal model is (non-predictive) control or design, as opposed to prediction. Scholars have been having a hard time operationalizing non-predictive control or design, and that has resulted in inverse measures of prediction. For starters, Read, Dew, Sarasvathy, Song and Wiltbank (2009) successfully used (i.e. found significant differences with) the following operationalization of prediction for their think-aloud protocol analysis that, in my view, can apply to business plans as well: whether or not the person believed (and accepted) the numbers in the market research. Dew, Read, Sarasvathy and Wiltbank (2009) use an identical measure. Translated to business plans, we can measure whether market research is used at all, and how many pages are spent on discussing the market (both demand side and supply side, like competition). Both the mere use of market research and a large amount of pages spent on market analysis point to prediction, a causal logic, rather than effectuation.

Because experts use analogical reasoning according to Dew, Read, Sarasvathy and Wiltbank (2009), and experts are associated by them with more effectual reasoning, we will also include their measurement of analogical reasoning by the number of new markets identified. New markets are by definition more unpredictable than existing markets and are hence a good measure of control rather than prediction. In business plan terminology, this translates

to the identification of the target market as being new in the plan (e.g. by the absence of competition, or literally stating that the market does not yet exist). This should be enough, since we don't anticipate there will be many start-ups creating more than one new market.

Means vs. goals

The second dimension in the causal model is means-based action, rather than goals-based action, as effectual construct. Means focus around who I am, what I know and whom I know. Dew, Read, Sarasvathy and Wiltbank (2009) operationalized this by counting the number of times a subject drew on personal experience. This can be applied directly to business plans, although we prefer to do qualitative analysis rather than counting, so the measure of effectuation will be the extent to which the plan is based on experience. The more, the more effectual.

Read, Song and Smit (2009) operationalized the effectual constructs Means (subdivided in Who I am, What I know and Whom I know) using a host of variables in their meta-analysis. The ones that we can find in a business plan are the years of industry experience, previous start-up experience, initial capital and firm age. Firm age was considered by the authors to be irrelevant for effectuation, but we will include it as control variable nonetheless, because companies that have had more time to grow have had more chance to grow bigger, yet it may or may not be harder for them to sustain a high growth rate of personnel—no literature on this was found. This variable is especially useful for the regression analysis that will be used for H5. The others can be measured in the business plan, higher or more meaning more effectual.

Affordable loss vs. expected return

The third dimension is affordable loss, rather than expected return. This one has not been measured extensively in the past. The only operationalization I could find, was by Dew, Read, Sarasvathy and Wiltbank (2009), who count the number of segments chosen by a subject. Of course, Read, Dew, Sarasvathy, Song and Wiltbank (2009) used the same measure but categorized it under "channel". We can apply this directly to business plans, counting the number of market segments that are targeted in the plan. The more, the *less* effectual: it means trying to maximize expected returns rather than limiting possible losses.

Partnerships vs. competition

The last dimension is partnerships as opposed to competitive analysis. This is operationalized by Read, Dew, Sarasvathy, Song and Wiltbank (2009) by asking whether the person visualized partnering or building a relationship with someone, and by Dew, Read, Sarasvathy and Wiltbank (2009) by counting the number of times the subject mentioned partnership activities, as well as measuring if subjects that chose direct sales also mentioned personally approaching customers (rather than recruiting salespeople). That last one is also used by Read, Dew, Sarasvathy, Song and Wiltbank (2009), again, under "channel". Read, Song and Smit (2009) used two measures of partnerships that are useful to for business plans: the number of alliances/links and the number of cooperative partnerships.

We can apply all this to business plans by counting the number of pages spent on partnerships (more is more effectual), counting the number of pages spent on competition (less is more effectual), counting the total number of partners mentioned by name, judging the openness to new partners (e.g. mentioning an industry or group of companies that are candidates for partnerships later on), and counting the partnerships with competitors, which is a clear sign of effectual reasoning.

Control variables

Next to the firm age, as mentioned above, the growth intention will be rated, as the literature review indicated this as a predictor of performance, and one we can measure in a business plan.

The above operationalization resulted in a first coding scheme. Then, 6 or 7 plans, convenience-selected, were independently coded by both myself and the second coder, and compared afterwards for inter-rater reliability, where differences were often resolved by improving the question so that it was univocal. This process was repeated with the improved scheme a total of four times using 25 business plans in total. The result is the following scheme of variables and corresponding questions that forms the coding scheme. The 25 business plans used for consensus on the coding scheme were re-coded independently with this final scheme. (EFF) and (CAU) in the construct column indicate what the variable measures—effectuation or causation.

Table 2: The coding scheme

Construct	Variable	Question
Predictive control (CAU)	Market research present	Is market research present at all? (Yes/No)
Predictive control (CAU)	Market pages	How many pages are spent on the market? (round upward to .5 page)
Non-predictive control (EFF)	New market	Does the plan identify or plan on creating a new market? (Yes/No)
Means (EFF)	Start-up experience	Does one or more of the entrepreneurs have experience with starting a business? (Yes/No)
Means (EFF)	Years of industry experience	What is the total working experience of the entrepreneurs in the industry the company will enter? (round upward to 0.5 year)
Means (EFF)	Experience based	Is the plan based on previous experience? (5-level Likert item: 1:Strongly disagree, 2:Disagree, 3:Neither agree nor disagree, 4:Agree and 5:Strongly agree)
Expected return rather than affordable loss (CAU)	Segments	How many different market segments does the plan target? (None mentioned = 1)
Partnerships as opposed to competitive analysis (EFF)	Partnerships with competitors	How many partnerships with competitors does the plan mention?
Partnerships as opposed to competitive analysis (EFF)	Total number of partners	How many (realised or potential) partnerships does the plan mention, including those with competitors?
Partnerships as opposed to competitive analysis (EFF)	Openness to partners	Does the plan speak about being open to other potential partnerships? (Yes/No)
Partnerships as opposed to competitive analysis (EFF)	Partnerships pages	How many pages are spent on partnerships? (round upward to .5 page)
Competitive analysis as opposed to partnerships (CAU)	Competition pages	How many pages are spent on competition? (round upward to 0.5 page)

Construct	Variable	Question
Partnerships as opposed to competitive analysis (EFF)	Personal selling	In case of direct sales, does the plan mention personally approaching customers (as opposed to e.g. hiring salespeople)? (Yes/No)
Control	Growth intention	What growth intention is present in the plan? (1=No significant growth, 2=Small growth in terms of personnel or revenue, 3= Medium growth, 4=Heavy growth)
Control(/Means)	Company age	Years from foundation to year of last employee count (see dependent variable) (from KvK/CoC data)

In earlier versions of this coding scheme initial capital was also measured, but this measurement proved to be very unreliable and ambiguous due to the large differences in reporting and budgeting methods between the business plans.

3.3. The Secondary Data: Sampling of the Business Plans and Determining the Dependent Variable

The secondary data was gathered through public data, available from the Chamber of Commerce. Theoretical reasons for choosing personnel figures as measure for performance are given in section [2.3.5. Measuring and Interpreting Performance](#). On top of that, the last available employee count (total number of people employed in the company, which includes the owners) was determined to be the most reliable measure of firm growth in the secondary data set as well, for multiple reasons. Firstly, a practical reason: employee data is nearly always available, as opposed to financial data, which does not mandatorily have to be reported to the Chamber of Commerce for companies with a turnover of less than EUR 1M. Secondly, this variable can easily be recoded into the average employee growth per year—as also the start/foundation date, the initial team size and the year of the last available employee count are known.

Since I am researching employee growth, the 91 start-ups with the highest last known employee count were taken as a sample. These 91 were the start-ups, out of a database of 311 start-ups, that exhibited growth—the dependent variable we are interested in. The goal is to find differences in growth, not differences between those that grow and those that do not grow. Also, by defining this minimum growth criterion, we are only investigating firms that have really been active and are hence relevant for studying start-ups as they are likely to be more representative than firms that never really became active (Davidsson, 2004). Since the inter coder reliability was iteratively tested with a total of 25 business plans (see previous section), of whom 8 were also in the sample of 91 biggest, the total number of sampled businesses was 108 (91+25-8). Of those 108 businesses, 16 business plans (of 16 businesses) were not found in the record, for a resulting sample size of 92 business plans (of 92 businesses). Those 17 businesses not among the 91 largest make for a nearly random selection of zero growth businesses, so that these are also included in the sample, making any results stronger—but they may not be truly representative of a start-up as they may never really have been active (See [3.5.2. Internal Validity](#) as well.) All in all, there is a slight bias in the sample towards successful firms since the non-successful start-ups are limited to a maximum of 17 out of 92, but at the same time the survivor bias is not applicable as terminated start-ups are also part of the sample (Davidsson, 2004).

Because we have the last available employee count (which includes the owners), the year from which that count stemmed, the start/foundation date and the initial team size, we can use three separate dependent variables. The first is **the raw last available employee count**. The firm age in the sample was always a minimum of 3 years, unless the company was terminated before that period, to make the last available employee count somewhat comparable—and in the regression, this will be controlled for. The second is a dichotomous variable denoting whether this the **last available employee count is at least 10**, named **Small business**. Ten was chosen to separate the micro businesses from the small businesses (Chell & Baines, 2000; Davidsson, 2004; Mead & Liedholm, 1998), serving to indicate whether the start-up has outgrown the initial micro-business status. The last dependent variable is the average annual personnel growth. In formula form, the **average annual personnel growth** was defined as:

$$\text{Average annual personnel growth} = \frac{\text{Last employee count} - \text{Initial team size}}{\text{Year of last employee count} - \text{Starting year}}$$

Where the starting year is defined as the year of registration at the Chamber of Commerce.

The *coded* data (the independent variables and control variables) will be combined with this secondary data (the dependent variables) and statistically analyzed, including inter-rater reliability (see next section). The data will be explored by statistical methods such as significance tests, correlation and regression analysis, after which I will aim to reach statistically significant conclusions with regard to the (combination of) indicators that contribute or hinder personnel growth – thereby capturing the effect of effectual reasoning on performance.

3.4. Measurement and Inter-rater Agreement & Procedures

Of the 92 business plans in the sample, 75 were coded independently by both myself and a second rater, an Industrial Engineering and Management undergraduate student, including the 25 that were used for testing the coding scheme (they were coded again independently after the coding scheme was final). An inter-rater reliability analysis using Cohen's Kappa statistic was performed to determine consistency among the two raters. After 75 coded plans, inter-rater agreement was more than sufficient: most Kappa values could be classified as excellent agreement, being (far) above 0.75 (Fleiss, 1981). The only value under 0.75 was on the variable "Experience based", which is operationalized by a 5-point Likert scale. This variable had a Kappa value of 0.682, still good according to Fleiss, but lower than the rest since the raters' coding differed by one category (e.g. 4 and 5) relatively often. The Kappa values of the coding of these 75 business plans can be found in [Appendix A: Measurement of agreement](#). Due to time constraints, the remaining 17 business plans were coded only by one rater only.

Furthermore, both coders were blind to the dependent variables and any other information about the company other than the initial business plan. Also, they were not involved with any of the businesses or entrepreneurs.

3.5. Validity

Shadish, Cook and Campbell (2002) define validity as "the approximate truth of an inference" (p. 34). They suggest four types of validity: statistical conclusion validity, internal validity, construct validity and external validity. Below, each type is explained and the respective validity is assessed for this study.

3.5.1. Statistical Conclusion Validity

Statistical conclusion validity is defined by Shadish, Cook and Campbell (2002) as "the validity of inferences about the correlation (covariation) between treatment and outcome" (p. 38). In the context of this study, this can be interpreted as "the validity of inferences about the relationship between the independent variables and the dependent variables".

Threats to this are dealt with as follows (applicable threats from pp. 45-53 used):

- The threat of low statistical power: by using a large enough sample size, measuring and correcting for covariates (growth intention and firm age), ensuring that powerful statistical tests are used and their assumptions are met;
- The threat of violated assumptions of statistical tests: by ensuring the assumptions of each test are met;
- The threat of unreliability of measures: by using inter-rater reliability analysis;
- The threat of inaccurate effect size estimation: by using the right statistical tests. This will be elaborated on in chapter 4.

3.5.2. Internal Validity

Internal validity is defined by Shadish, Cook and Campbell (2002) as "the validity of inferences about whether observed covariation between A (the presumed treatment) and B (the presumed outcome) reflects a causal relationship from A to B as those variables were manipulated or measured" (p. 38). In the context of this study, this can be interpreted as "the validity of inferences about whether an observed relationship between the independent variables A and the dependent variables B reflect a causal relationship from A to B as those variables were measured".

Threats to this are dealt with as follows (applicable threats from pp. 55-61 used):

- The threat of ambiguous temporal precedence: not applicable, since the initial business plan is dated before the measurement of last employee count. In other words: since the object of study is the initial business plan, that precedes the actual performance of the firm, temporal precedence is guaranteed;
- The threat of selection: the 91 start-ups in the selection are the start-ups that exhibited *any growth at all*, so it cannot be qualified as purposive, criterion, or any other form of sampling, since these are the only ones in the database that were useful, ergo, they *are* the whole *population* and not a *sample* of this population. The folders, from which the 17 businesses not in the sample but used for iterative testing of the coding scheme were taken, were selected at random, and the only confounding variable these 17 businesses have in common is that they are close in founding date. The effect of this is unknown;
- The threat of history and maturation: what happens between the writing of the initial business plan and the measurement of the last available employee count is unknown, therefore we cannot address this threat to internal validity, only acknowledge it. The assumption here is that the initial business plan is a true representation of the effectual logic of the writer(s) of the business plan, and that this does not change over time;
- The threat of attrition: if the non-growth or non-survival of businesses is systematically correlated with one of the independent variables, this will give an artifactual effect on the dependent variable. But because in this case the employee

growth is a growth measure and related to survival, this is automatically accounted for.

3.5.3. Construct Validity

Construct validity is defined by Shadish, Cook and Campbell (2002) as "the validity of inferences about the higher order constructs that represent sampling particulars" (p. 38).

The constructs contained in this study, Non-predictive control, Means, Affordable loss and Partnerships are not constructs that have empirically been validated, even less so in the context of business plans. The variables used in the coding scheme are not empirically validated measures of the constructs, and are either new or aggregated from other studies. Time and resource constraints have not permitted proper factor analysis to see if all variables adequately covered the constructs, but for reasons mentioned above the chances of this are very small to start with, and the results of significance tests confirmed this. Hence, we will test the relationships variable-by-variable and seek for relationships, taking this into account when testing the hypotheses. Below, we will deal with the threats to construct validity, reckoning each variable as an actual construct.

Threats to this are dealt with as follows (applicable threats from pp. 73-81 used):

- The threat of inadequate explication of constructs: by iterative testing with the coding scheme, while taking inter-rater agreement into account;
- The threat of construct confounding: since the constructs are not empirically validated, this can be the case and we cannot avoid it;
- The threat of mono-operation bias: idem;
- The threat of mono-method bias: since we use business plans for all constructs, this is part of the construct;
- The threat of confounding constructs with levels of constructs: by describing the constructs as accurately as possible.

3.5.4. External Validity

External validity is defined by Shadish, Cook and Campbell (2002) as "the validity of inferences about whether the cause-effect relationship holds over variation in persons, settings, treatment variables, and measurement variables" (p. 38). In the context of this study, this can be interpreted as "the validity of inferences about whether the cause-effect relationship hold over variation in business plans, incubation programmes or even all businesses, and measurement variables".

Threats to this are dealt with as follows (applicable threats from pp. 87-90 used):

- The threat of interaction of the causal relationship with units: the unit is a business plan in this case. Consequences should be acknowledged in the conclusions;
- The threat of interaction of the causal relationship with outcomes: the outcomes are the dependent variables. Consequences should be acknowledged in the conclusions;
- The threat of interaction of the causal relationship with settings: the setting is the TOP incubation programme. Consequences should be acknowledged in the conclusions;
- The threat of context-dependent mediation: growth intention and firm age may not moderate or mediate the relationship between effectuation and performance in another context. Consequences should be acknowledged in the conclusions.

3.6. Ethical Considerations

Since business plans are a confidential matter, strict confidentiality was kept. The coded data can therefore in anonymized form be requested from the NIKOS institute, University of Twente. Chamber of Commerce data is public.

I can think of no other ethical considerations regarding either the study itself or the results thereof.

3.7. Conclusion

The purpose of this chapter was to answer the second research question, "*How can the amount of effectuation in a business plan be determined?*". This purpose was met by showing how the causal model and previous operationalizations by other authors led to an operationalization for business plans in the form of a coding scheme. After that, the dependent variables were operationalized and the measurement and analysis procedures were explained. Very importantly, the validity and reliability of this research was examined, and the implications of this analysis will be visible in the last chapter, when conclusions have to be drawn. Lastly, the ethical dimension of this research was shortly visited. The phase that followed next, was in reality the actual data collection: manual coding of the business plans. The reader can skip this phase and continue straight to the next chapter: the data and the results of the analysis on them.

Chapter 4: Analysis of Data

4.1. Introduction

This chapter is perhaps the most essential part of the thesis, containing the results from the data analysis. It is meant to answer the third and last research question: "*Is there a relationship between firm size and amount of effectuation present in the initial business plan of a start-up?*". This chapter will address that in the following sections: Section 4.2 gives an overview of general issues regarding the data and provides all valuable descriptives. Section 4.3 contains the actual statistical analysis, trying to find patterns in the data. Section 4.4 is the conclusion of this chapter.

4.2. Empirical Data: General Information and Descriptives

Table 3 first of all provides an overview of the number of valid cases per variable, their minimums, maximums, means, standard deviations and variances. In addition, skewness and kurtosis are displayed, with a Kolmogorov-Smirnov test of normality. Lastly the inter-rater agreement using Cohen's Kappa is given (the details of the Kappa measures can be found in [Appendix A: Measurement of agreement](#)).

The variables correspond directly to the ones shown in Table 2 (the coding scheme). As can be seen, the IVs Market research present, New market, Start-up experience, Openness to new partners and Personal selling are dummy variables (1=Yes, 0=No), as well as the DV *Small business*. The IVs Market pages, Years of industry experience, Segments, Partnerships with competitors, Total number of partners, Partnerships pages, Competition pages and Company age (control variable) are scaled, continuous measures, as well as the DVs *Average annual personnel growth* and Last available employee count. The IV Experience based is a Likert scale and hence ordinally measured, while the control variable Growth intention is also ordinally measured.

For several reasons, the data cannot be assumed to be normally distributed (Moore & MacCabe, 2007). First, the sample size is on the small side: under 100. Second, the measurements used are mostly of a subjective nature, which makes them less precise than objective measurement. Third, the underlying causes for the measured variables cannot be assumed to be similar, equal, equally likely or independent (e.g. the total amount of partners can depend upon a wide range of causes), nor are the variables determined by a large number of small, independent and additive effects (the central limit theorem makes no sense in the context of my variables). To be certain that the distributions of the variables are not normal, statistical tests were performed. Obvious are the large standard deviations of many variables. The skewness and kurtosis statistics do not bode well, as expected, for the normality of the distributions of the variables (Huizingh, 2008). Kolmogorov-Smirnov tests have been performed (missing cases pairwise removed) and these confirm that not one variable is normally distributed ($p > 0.05$) (Moore & MacCabe, 2007), as expected.

The lack of normality suggests, or even demands, the use of non-parametric tests rather than standard parametric tests—that have normal distribution of variables as an assumption (Moore & MacCabe, 2007). In terms of linearity, scatterplots on this data reveal that there are many relationships in the data set that are not particularly linear and have considerable outliers (Moore & MacCabe, 2007). Therefore, the tests of choice are:

- Non-parametric significance tests for independent samples, testing whether the distributions significantly differ between the IVs and the DVs;
- Non-parametric correlations for the interrelation between IVs and DVs;
- Binary logistic regression to test the predictive value of the measured DVs.

The samples are independent since the categories of *Small business* are not related to each other, the samples consist of different business plans from different companies (Huizingh, 2008; Moore & MacCabe, 2007). The significance test between two independent groups we would normally use is the parametric independent two-sample Student's t-test, but the assumption of normality is not met. The widely accepted non-parametric alternative is the Mann-Whitney U test (Huizingh, 2008; Moore & MacCabe, 2007).

The assumptions of the non-parametric Mann-Whitney U tests have been met in all such tests: the variables are at least ordinally scaled (the continuous IVs are not used), the continuous distributions of the non-group variable are the same for the two groups, the cases are randomly sampled from the two groups, and the values of the non-grouping variable are independent of each other, and the samples are mutually independent of each other (Moore & MacCabe, 2007).

Statistical dependence testing using Spearman's rho (Spearman's rank correlation coefficient) ranks the data first and can perfectly be used on the ordinal data, and as opposed to Pearson's correlation it does not assume normality, linearity or homoscedasticity—so it can safely be used on this data set (Moore & MacCabe, 2007).

The best regression analysis to use in this case is the binary logistic regression, since it does not assume a linear relationship between the IVs and DV, nor normality, homoscedasticity or continuous variables, like other forms of regression analysis may do—that is good, because our data set cannot meet the assumptions of normality and continuous variables to begin with (Moore & MacCabe, 2007). Binary logistic regression is meant to build a model that can predict the probability of a dichotomous dependent variable being 1 (Moore & MacCabe, 2007), so we can only use it to predict the probability of the IV ten employees or more. Our data meets the remaining assumption of exhibiting no multicollinearity and the observations being independent (Moore & MacCabe, 2007). Furthermore, The only downside is that our sample size is small, and literature suggests that the use of a sample size below 100 is risky because the odds ratios may be overestimated (Nemes, Jonasson, Genell, & Steineck, 2009), something we have to take into account when interpreting the results.

4.3. Patterns and Statistical Analysis of Data

4.3.1. Significance Tests and Correlations

Table 4 shows the correlations between all the variables, both IVs and DVs. The names of the columns are abbreviations of the variable names because of space limits—for clarity purposes, the variable names in the rows have been capitalized accordingly. Table 5 gives an overview of the significance testing between the groups *small business* and *micro business*.

Table 3: Descriptive statistics, normality and inter-rater agreement of all variables

	N	Minimum	Maximum	Mean	Std. deviation	Variance	Skewness	Kurtosis	Kolmogorov-Smirnov ^a Statistic	Sig.	Kappa
Market research present	91	0	1	.36	.483	.234	.581	-1.700	.411	.000	.845
Market pages	92	.5	12.5	2.30	2.350	5.522	2.321	5.689	.239	.000	¹
New market	89	0	1	.13	.343	.118	2.175	2.794	.518	.000	.801
Start-up experience	82	0	1	.21	.408	.166	1.471	.167	.487	.000	.957
Years of industry experience	74	0	30.0	7.90	7.369	54.301	.891	-.053	.170	.000	¹
Experience based	87	1	5	3.68	1.126	1.267	-.633	-.502	.268	.000	.682
Segments targeted	92	1	11	2.70	2.271	5.159	1.968	3.870	.229	.000	¹
Partnerships with competitors	92	0	3	.36	.779	.606	1.985	2.624	.482	.000	.926
Total number of partners	90	0	48	3.99	6.445	41.539	4.418	25.595	.268	.000	¹
Openness to new partners	91	0	1	.31	.464	.215	.847	-1.311	.439	.000	.940
Partnerships pages	91	0	3.0	.58	.528	.279	2.607	9.158	.397	.000	.920
Competition pages	91	0	4.0	.80	.633	.400	2.395	8.027	.318	.000	¹
Personal selling	92	0	1	.53	.502	.252	-.133	-2.027	.357	.000	.788
Growth intention	84	1	4	3.10	.754	.569	-.333	-.639	.235	.000	.787
Company age	92	0	22.00	7.05	5.407	29.239	.576	-.180	.096	.036	²
Avg. annual personnel growth	92	-1.00	21.00	1.61	2.577	6.642	4.964	35.026	.201	.000	²
Last available employee count	92	0	58	10.63	11.887	141.290	1.981	4.072	.196	.000	²
Small business	92	0	1	.36	.482	.233	.599	-1.678	.413	.000	²
Valid N (listwise)	66										

1. Kappa could not be determined because of asymmetry

2. Not applicable, variable was objectively measured

a. Lilliefors Significance Correction

Table 4: Spearman's rank correlation coefficients (rho)

	MRP	MP	NM	SE	YoIE	EB	ST	PwC	TNoP	OtNP	PP	CP	PS	GI	CA	AAPG	LAEC	SB
Market Research Present	1.000	.508**	.044	.121	-.144	-.238*	-.016	.030	.259**	.203*	.238*	.271**	.011	.328**	.107	.121	.174*	.192*
Market Pages		1.000	-.082	.061	.077	-.042	.177*	-.037	.205*	.079	.252**	.649**	.009	.226*	.190*	-.037	.068	.057
New Market			1.000	.073	-.202*	-.087	.042	-.017	.134	.106	.177*	-.184*	-.163	.183*	-.250**	-.010	-.205*	-.227*
Start-up Experience				1.000	.174	-.032	.191*	.133	.241*	.130	.180	.079	-.214*	.176	.018	.059	.135	.314**
Years of Industry Experience					1.000	.459**	.196*	.071	.108	-.047	.022	.035	.092	-.038	-.032	.027	-.043	.028
Experience Based						1.000	.076	.177	.114	-.026	.087	.020	-.038	-.166	.157	.222*	.263**	.241*
Segments Targeted							1.000	.114	.249**	.224*	.209*	.176*	.076	.072	-.140	-.044	-.137	-.004
Partnerships with Competitors								1.000	.558**	.353**	.282**	-.050	-.027	.239*	.143	.121	.232*	.314**
Total Number of Partners									1.000	.443**	.681**	.024	-.062	.204*	.079	.078	.156	.228*
Openness to New Partners										1.000	.256**	.073	-.004	.304**	-.013	.020	.061	.091
Partnerships Pages											1.000	.100	-.074	.261**	-.080	.140	.107	.122
Competition Pages												1.000	.047	.228*	.051	.196*	.210*	.203*
Personal Selling													1.000	-.161	-.245**	.145	-.019	-.072
Growth Intention														1.000	.163	.280**	.337**	.331**
Company Age															1.000	-.097	.493**	.438**
Avg. Annual Personnel Growth																1.000	.753**	.558**
Last Avail. Employee Count																	1.000	.833**
Small Business																		1.000

** Significant at the 0.01 level (one-tailed)

* Significant at the 0.05 level (one-tailed)

Table 5: Significance tests between Small businesses and Micro businesses

Variable	Small business		Micro business		P ¹
	N	Mean	N	Mean	
Market research present	33	.48	58	.29	.035*
Market pages	33	2.46	59	2.22	.295
New market	32	.03	57	.19	.017*
Start-up experience	29	.38	53	.11	.003**
Years of industry experience	26	8.60	48	7.52	.406
Experience based	32	4.06	55	3.45	.013*
Segments targeted	33	2.70	59	2.69	.485
Partnerships with competitors	33	.67	59	.19	.002**
Total number of partners	33	4.91	57	3.46	.016*
Openness to new partners	33	.36	58	.28	.193
Partnerships pages	33	.64	58	.55	.124
Competition pages	33	.94	58	.72	.027*
Personal selling	33	.48	59	.56	.248
Growth intention	30	3.43	54	2.91	.002**
Company age	33	9.91	59	5.46	.000**

1. Mann-Whitney U test

** Significant at the 0.01 level (one-tailed)

* Significant at the 0.05 level (one-tailed)

Control vs. prediction

This dimension encompasses three variables. First, on the use of market research, we see a rather positive relationship with performance. The mean value of market research present in the group *small business* was 0.48 compared to 0.29 in the group *micro business*; the distributions in the two groups differed significantly (Mann–Whitney $U = 773.5$, $z = -1.819$, $n_1 = 33$, $n_2 = 58$, $P < 0.05$ one-tailed). This means that on average, 48% of the start-ups with at least ten employees used market research in their initial business plans, against only 29% of start-ups smaller than ten employees. While there was no significant correlation between market research present and *average annual personnel growth*, market research present did have a weak positive correlation with both *last available employee count*, $\rho = 0.174$ (89 d.f.), $P < 0.05$ one-tailed and with *small business*, $\rho = 0.192$ (89), $P < 0.05$ one-tailed (which is, after all, derived from the *last available employee count* so no surprise there).

The second variable of the control vs. prediction dimension is the number of market pages. The mean number of market pages in the group of *small business* was 2.46 compared to 2.22 in the group *micro business*; but the distributions in the two groups did not differ significantly (Mann–Whitney $U = 908.5$, $z = -0.540$, $n_1 = 33$, $n_2 = 59$, $P = 0.295$ one-tailed). Also, there was no significant correlation between the number of market pages and any of the DVs.

Lastly, new market is the variable that determined whether the business plan pointed towards entering a new market. The mean value of new market in the group *small business* was 0.03 compared to 0.19 in the group *micro business*; the distributions in the two groups differed significantly (Mann–Whitney $U = 764.5$, $z = -2.132$, $n_1 = 32$, $n_2 = 57$, $P < 0.05$ one-tailed). In other words, on average, 19% of start-ups smaller than ten employees operate in a new market, as opposed to only 3% of the start-ups of at least ten employees. As for correlations, there was a weak negative correlation with the *last available employee count*, $\rho = -0.205$ (87), $P < 0.05$ one-tailed, and similarly weak for *small business*, $\rho = -0.227$ (87), $P < 0.05$ one-tailed, and no significant correlation with *average annual personnel growth*.

Concluding, we have to strongly reject H1a, "start-ups whose initial business plan focuses on control grow more than start-ups whose initial business plan focuses on prediction" for all three DVs. We reject H1b, "start-ups whose initial business plan focuses on prediction grow more than start-ups whose initial business plan focuses on control" only for one out of three IVs, namely the number of market pages, as the other two IVs show a strong relationship in this direction with two out of three DVs.

Means vs. goals

The first out of three variables for this construct is the presence of start-up experience. Interestingly, the mean value of start-up experience in the group *small business* was 0.38 compared to 0.11 in the group *micro business*; the distributions in the two groups differed significantly (Mann–Whitney $U = 564.0$, $z = -2.825$, $n_1 = 29$, $n_2 = 53$, $P < 0.01$ one-tailed). So, on average, 38% of the start-ups of at least ten employees had a founding team with start-up experience, while only 11% of the start-ups of less than ten employees did. There was no correlation between start-up experience and both the *average annual personnel growth* and *last available employee count*, but there was a fairly weak positive correlation with the DV *small business*: $\rho = 0.314$ (80), $P < 0.01$ one-tailed.

The second variable is the years of industry experience. While the mean amount of industry experience in the group *small business* was 8.60 years compared to 7.52 years in the group *micro business*, the distributions in the two groups did not differ significantly (Mann–Whitney $U = 603.0$, $z = -0.238$, $n_1 = 26$, $n_2 = 48$, $P = 0.406$ one-tailed). Also, there were no significant correlations with the DVs.

The last variable is the degree to which the plan is experience based. The mean value of experience based in the group *small business* was 4.06 compared to 3.45 in the group *micro business*; the distributions in the two groups differed significantly (Mann–Whitney $U = 638.0$, $z = -2.231$, $n_1 = 32$, $n_2 = 55$, $P < 0.05$ one-tailed). There is a significant correlation between this DV and all three IVs: for *average annual personnel growth* $\rho = 0.222$ (85), $P < 0.05$ one-tailed, for *last available employee count* $\rho = 0.263$ (85), $P < 0.01$ one-tailed, and for *small business* $\rho = 0.241$ (85), $P < 0.05$. It is the first correlation with the growth rate, which is interesting.

Because of these results, we must reject H2a, "start-ups whose initial business plan focuses on means grow more than start-ups whose initial business plan focuses on goals" but it is not a strong rejection as two out of three variables show a significant relationship with respectively one and three of the DVs in this direction. H2b, "start-ups whose initial business plan focuses on goals grow more than start-ups whose initial business plan focuses on means", is strongly rejected without any significant results in this direction.

Affordable loss vs. expected returns

This construct only has one variable. The mean number of segments targeted in the group *small business* was 2.70 compared to 2.69 in the group *micro business*; but the distributions in the two groups did not differ significantly (Mann–Whitney $U = 969.0$, $z = -0.038$, $n_1 = 33$, $n_2 = 59$, $P = 0.485$ one-tailed). In addition, this variable had no significant correlation with any of the DVs.

Because of these insignificant results, both H3a, "start-ups whose initial business plan focuses on affordable loss grow more than start-ups whose initial business plan focuses on expected return" and H3b, "start-ups whose initial business plan focuses on expected return grow more than start-ups whose initial business plan focuses on affordable loss" are both rejected.

Partnerships vs. competition

This construct consists of the most independent variables compared to the other constructs. The mean number of partnerships with competitors in the group *small business* was 0.67 compared to 0.19 in the group *micro business*; the distributions in the two groups differed significantly (Mann–Whitney $U = 719.5$, $z = -2.991$, $n_1 = 33$, $n_2 = 59$, $P < 0.01$ one-tailed). This IV was not significantly correlated with the *average annual personnel growth*, but it was, however weakly, significantly correlated with *last available employee count*, $\rho = 0.232$ (90), $P < 0.05$ one-tailed, as well as, still fairly weakly, with *small business*, $\rho = 0.314$ (90), $P < 0.01$ one-tailed.

Proceeding to the second IV, the mean total number of partners in the group *small business* was 4.91 compared to 3.46 in the group *micro business*; the distributions in the two groups differed significantly (Mann–Whitney $U = 687.0$, $z = -2.153$, $n_1 = 33$, $n_2 = 57$, $P < 0.05$ one-tailed). This DV was only significantly correlated with the DV *small business*, $\rho = 0.228$ (88), $P < 0.05$ one-tailed.

The third IV did not yield significant results. The mean openness to new partners in the group *small business* was 0.36 compared to 0.28 in the group *micro business*; but the distributions in the two groups did not differ significantly (Mann–Whitney $U = 873.0$, $z = -0.867$, $n_1 = 33$, $n_2 = 58$, $P = 0.193$ one-tailed). When looking at correlations with the DVs, we also get insignificant results.

Also without result, the mean number of partnership pages in the group *small business* was 0.64 compared to 0.55 in the group *micro business*; but the distributions in the two groups did not differ significantly (Mann–Whitney $U = 840.5$, $z = -1.155$, $n_1 = 33$, $n_2 = 58$, $P = 0.124$ one-tailed)—and there were no significant correlations with the DVs.

Interestingly, the mean number of competition pages in the group *small business* was 0.94 compared to 0.72 in the group *micro business* and the distributions in the two groups differed significantly (Mann–Whitney $U = 747.0$, $z = -1.923$, $n_1 = 33$, $n_2 = 58$, $P < 0.05$ one-tailed). Also, it had a significant correlation with all three DVs, albeit weak: with *average annual personnel growth* $\rho = 0.196$ (89), $P < 0.05$, with *last available employee count* $\rho = 0.210$ (89), $P < 0.05$ one-tailed, and with *small business* $\rho = 0.203$ (89), $P < 0.05$ one-tailed. This is only the second correlation of an IV with the growth rate.

Finally, the mean value of personal selling in the group *small business* was 0.48 compared to 0.56 in the group *micro business*; but the distributions in the two groups did not differ

significantly (Mann–Whitney $U = 901.0$, $z = -0.683$, $n_1 = 33$, $n_2 = 59$, $P = 0.248$ one-tailed). Additionally, there was no significant correlation with any of the three DVs.

These results indicate that H4a, "start-ups whose initial business plan focuses on partnerships grow more than start-ups whose initial business plan focuses on competition" is rejected with of the notion that two out of the three variables that had significant results supported this hypothesis. Hypothesis H4b, "start-ups whose initial business plan focuses on competition grow more than start-ups whose initial business plan focuses on partnerships" is more strongly rejected as only one out of three significant variables supported this hypothesis.

Controls

Two control variables were employed, but it was only possible to control for them in the binary logistic regression described in the next section, because of sample size and distribution constraints when applying them to significance testing. However, their effect on the DVs is given in this section because it yields some interesting insights.

The first, the growth intention, is significantly related to all three DVs. The mean value of growth intention in the group *small business* was 3.43 compared to 2.91 in the group *micro business*; the distributions in the two groups differed significantly (Mann–Whitney $U = 511.0$, $z = -3.012$, $n_1 = 30$, $n_2 = 54$, $P < 0.01$ one-tailed). Growth intention was significantly, but rather weakly, correlated with all three IVs: with *average annual personnel growth* $\rho = 0.280$ (82), $P < 0.01$ one-tailed, with *last available employee count* $\rho = 0.337$ (82), $P < 0.01$ one-tailed, and with *small business* $\rho = 0.331$ (82), $P < 0.01$ one-tailed. Interestingly, growth intention was also correlated significantly and positively but weakly with nearly all variables of both prediction and partnerships ($\rho = 0.328$ (81), $P < 0.01$ for market research present, $\rho = 0.226$ (82), $P < 0.05$ for number of market pages, $\rho = 0.183$ (81), $P < 0.05$ for new market, $\rho = 0.239$ (82), $P < 0.05$ for partnerships with competitors, $\rho = 0.204$ (81), $P < 0.05$ for total number of partners, $\rho = 0.304$ (81), $P < 0.01$ for openness to new partners, $\rho = 0.261$ (81), $P < 0.01$ for number of partnership pages, and $\rho = 0.228$ (82), $P < 0.05$ for number of competition pages). So, the more the growth intention, the more the initial plan focused on prediction and on partnerships, but whether there is a causal relationship between these we cannot tell from correlation. Still, it is a very interesting result.

The second control variable was the company age. The mean company age in the group *small business* was 9.91 years compared to 5.46 years in the group *micro business*; the distributions in the two groups differed significantly (Mann–Whitney $U = 462.0$, $z = -4.181$, $n_1 = 33$, $n_2 = 59$, $P < 0.01$ one-tailed). It was not significantly correlated to the *average annual personnel growth*, but significantly to the other two DVs: $\rho = 0.493$ (90), $P < 0.01$ for the *last available employee count*, and $\rho = 0.438$ (90), $P < 0.01$ for *small business*, both moderately strong correlations. Also, the higher the company age, the higher the number of market pages ($\rho = 0.190$ (90), $P < 0.05$), the lower the value of new market ($\rho = -0.250$ (87), $P < 0.01$), and the lower the value of personal selling ($\rho = -0.245$ (90), $P < 0.01$), but there is no clear interpretation of these results: the company age is not the age at which the company was terminated, so nothing can be implied other than that the older start-ups in the sample exhibit different values on average for these variables—but some of these are terminated some years ago so this is all we can conclude.

4.3.2. Binary Logistic Regression

To test whether it is possible to *predict* whether start-ups that focus more on effectuation grow more than those who focus on causation, or vice-versa, a binary logistic regression was employed. This is an additional test of all four pairs of hypotheses.

In the full model, thus with all IVs, all 15 predictor variables were not significant. Because theory did not provide a ranking order to use for adding predictor variables to the model one-by-one, forward and backward methods were applied to find the best fitting solution with as many significant predictor variables as possible.

A test of the fitted model versus a model only containing the intercept was statistically significant, $\chi^2(4 \text{ d.f.}, N = 75) = 36.949, p < 0.01$. This model was able to correctly classify 85.7% of the companies that did not grow to ten employees or more (micro businesses), and 73.1% of those who did grow to ten employees or more (small businesses), for an overall success rate of 81.3% compared to the empty model's 65.3% (since 49/75 did not grow to ten employees or more).

The fitted model is as follows:

$$\text{LN(ODDS)} = -12.196 + 1.658 * \text{StartupExperience} + 0.902 * \text{ExperienceBased} + 1.882 * \text{GrowthIntention} + 0.228 * \text{CompanyAge}$$

The resulting chance of growing to at least 10 employees is therefore:

P(Small business) =

$$\frac{e^{-12.196 + 1.658 * \text{StartupExperience} + 0.902 * \text{ExperienceBased} + 1.882 * \text{GrowthIntention} + 0.228 * \text{CompanyAge}}}{1 + e^{-12.196 + 1.658 * \text{StartupExperience} + 0.902 * \text{ExperienceBased} + 1.882 * \text{GrowthIntention} + 0.228 * \text{CompanyAge}}}$$

The Hosmer-Lemeshow test of model fit (Hosmer & Lemeshow, 2000) revealed that the data fit the model well ($\chi^2(7 \text{ d.f.}, N = 75) = 4.135, P = 0.764$). The Nagelkerke R² was 0.537, which is pretty good. Collinearity statistics showed a tolerance level of about 0.95 for each variable with a VIF of around 1.05, hence showing no signs of multicollinearity (Moore & MacCabe, 2007).

Table 6 shows the logistic regression coefficient, Wald test, and odds ratio for each of the predictors. Using a $p < 0.05$ criterion of statistical significance, start-up experience, experience based, growth intention and company age had significant partial effects.

The odds ratios give us interesting results. All else kept constant, a business whose business plan shows evidence of the founding team having start-up experience is 5.25 times more five-item Likert scale Experience based plan, the odds of being bigger than 10 employees likely to be bigger than 10 employees than one who doesn't. For every point higher on the grow 2.47 times larger. A much bigger effect, every point more on the four-point growth intention scale results in a 6.57 times higher chance of employing 10 employees or more. Finally, every year the company is older results in the odds of being bigger than 10 employees are 1.26 times bigger. We have to note however, that the 95% confidence intervals for these odds ratios are rather big, as can be seen in the table, so these odds ratios may not be very precise.

Table 6: Predictor statistics of the binary regression model

Predictor	B	Wald χ^2	P	Odds ratio	95% CI for the odds ratio
Start-up experience	1.658	5.050	0.025	5.249	1.236 - 22.292
Experience based	0.902	5.392	0.020	2.466	1.151 - 5.282
Growth intention	1.882	8.923	0.003	6.567	1.910 - 22.579
Company age	0.228	9.478	0.002	1.256	1.086 - 1.453
Constant	-12.196	13.108	0.000	0.000	

Rather disappointing, only two out of 13 effectual variables had significant predictive value, and both are measures of means-based rather than goals-based action. This provides some extra support not to strongly reject H2a, “start-ups whose initial business plan focuses on means grow more than start-ups whose initial business plan focuses on goals”, but that is all we can conclude from the regression analysis.

4.4. Conclusion

This chapter set out to answer the third and final research question, "*Is there a relationship between firm size and amount of effectuation present in the initial business plan of a start-up?*". This was achieved through explaining and defending the chosen statistical analyses first: the chosen analyses were Mann Whitney U significance test, Spearman’s rank correlation coefficient, and binary logistic regression, mainly because the data was not normally distributed.

After providing descriptives, the correlations and significance tests were presented to find interrelations and significant differences between the distributions of IVs and DVs in order to test the four sets of hypotheses, yielding interesting results. First, prediction, a causational trait, seems to have a positive influence on performance. Second, means-based action, an effectual trait, seems to have a positive influence on performance. Third, affordable loss versus expected return did not yield results. Fourth, partnerships, another effectual trait, seem to have a positive influence on performance. Finally, the control variable growth intention was significantly related to performance as well as to most of the prediction and partnerships measures, and company age had a profound influence on performance as well.

Finally, a binary logistic regression was presented to test the predictive qualities of the data. Unfortunately, the only significant model that could be calculated contained only two effectual measures next to the two control variables.

Armed with these results, the next chapter will draw conclusions and discuss these.

Chapter 5: Conclusions and Discussion, Limitations, Implications and Reflection

5.1. Introduction

This thesis set out to answer the central research question, " *To what extent do start-ups of different performance show differences in the amount of effectuation versus causation in their initial business plans?*". It attempted to do this, using three research questions:

1. *What is currently known, in terms of literature, about the relationship between planning and performance, in specific effectuation and performance?*
2. *How can the amount of effectuation in a business plan be determined?*
3. *Is there a relationship between firm size and amount of effectuation present in the initial business plan of a start-up?*

Research question 1 was answered in Chapter 2, research question 2 in Chapter 3, and finally research question 3 in Chapter 4. This last chapter draws conclusions from and discusses the results from Chapter 4 in Section 5.2, it explores the limitations of this study in Section 5.3, and it discusses the implications for practice in Section 5.4 and for research in Section 5.5. Section 5.6 reflects on the personal learning objectives set forth in the first chapter.

5.2. Conclusions and discussion

The conclusions about the results and the discussion will be focused around our causal model. Because all hypotheses have been rejected to a lesser or higher degree, the conclusions will be drawn on variable level. The conclusions about the coding scheme are interwoven.

Control as opposed to prediction

The first finding is that small businesses have significantly more often market research in their initial business plan than micro businesses: on average, 48% of the start-ups with at least ten employees used market research in their initial business plans, against only 29% of start-ups smaller than ten employees. At the same time, the presence of market research did not significantly correlate with the growth rate (*average annual personnel growth*) but it did, positively, to the absolute number of employees (*last available employee count*) and the derived cut-off measure of *small business* (ten or more employees). That is curious. First, it means that market research is obviously a solid basis to start a company from since they who do seem to end up with more employees, although they do not necessarily grow quicker than companies who did not perform market research. This is not what effectuation theory predicts: effectual logic favours control over prediction and so discourages doing market research. The conclusion is thus that better performing firms in terms of employee count (but not growth rate) more often use causal market research.

The amount of pages spent on the market did not differ significantly between small and micro businesses. In addition, there was no correlation with any measure of growth. This means that the presence or absence of market research says more about subsequent performance than the amount of pages spent, which could be due to several reasons. For instance, the amount of pages spent on the market should perhaps be viewed in the context of the whole plan, as a relative rather than an absolute measure. Furthermore, giving more attention to the market may not necessarily mean less effectual reasoning, in fact, it can be filled with attempts to envision and design a possible market (future).

Whether or not a company wants to create a new market, is classified by the literature as analogical reasoning, a quality attributed to experts (Dew, et al., 2009), and shows an intent to design, rather than predict. But, my findings indicate that those who did not enter a new market had more employees and were more likely to be in the category of small business: on average, 19% of start-ups smaller than ten employees operate in a new market, as opposed to only 3% of the start-ups of at least ten employees. The variable furthermore negatively correlated with the absolute number of employees and whether or not the start-up was a small rather than micro business, but again not with the growth rate. Hence, all in all, this contradicts the findings of Dew, Read, Sarasvathy and Wiltbank (2009): apparently, either entering a new market is not necessarily an aspect of an expert, or experts do not perform better. We will see soon that the latter is probably not the case. One explanation for the performance difference would be that it is safer to enter a known, existing market, and hence is a better basis for growth (but not growth rate).

Concluding, the effectual process of control seems to be performing less in terms of absolute employee growth than the causal process of prediction, providing a case for causal reasoning performing better—at least in this area. For the growth rate, it does not seem to matter.

Means-based action as opposed to goals-based action

The three means measures provide interesting insights. Small businesses have on average significantly more often start-up experience than micro businesses: on average, 38% of the small businesses had a founding team with start-up experience, while only 11% of the micro businesses did. Yet there was no correlation between start-up experience and both growth rate and absolute number of employees, but only, positively, with small vs. micro business. The latter also held in the regression analysis. This could be an indicator that experienced entrepreneurs take it slowly, but know how to transform a micro-business into a small business.

Curiously, the industry experience present was not significantly higher between start-ups of ten employees and more or those with micro business, and there were no correlations with any growth measure. That is an unexpected finding, since that is a large part of the means (“what I know”).

Yet the degree to which the business plan was based on experience, was on average higher for small businesses, and also positively correlated with all measures of growth, rate as well as absolute number of employees. So, the more based on experience, the more potential to transform into a small business (also confirmed in the regression analysis), grow larger and faster—the first relation with growth rate so far—but the mere years of experience in the industry does not matter significantly—perhaps it is more about the quality of that experience.

These findings are largely pointing to effectual logic, means-based reasoning rather than goals-based reasoning, being an indicator of higher growth potential (and growth rate to a lesser degree) than causal reasoning. In specific, basing your business plan on experience and having previous start-up experience, which can very well be related, are more important than the insignificant years of industry experience.

Affordable loss as opposed to expected return

As the only measure of affordable loss versus expected return, the number of market segments targeted did not differ significantly between small and micro businesses, and showed no correlations with any of the growth measures. Hence, this measure of expected return and hence causality, and so inversely measuring effectuation, does not significantly matter for growth potential. We need better measures of affordable loss, like equity and debt measures, to really capture all aspects of this construct.

Partnerships as opposed to competition

This construct encompasses a large part of the variables. Perhaps it is even slightly overrepresented.

The first interesting finding is that small businesses had significantly more partners and significantly more partnerships with competitors than micro businesses, but those with more partners and/or partnerships with competitors did not grow faster. This as a whole is direct evidence of effectual reasoning: seeking partnerships to build a market together—co-creation and design. Apparently, this results in more growth (but not growth rate).

The openness to new partnerships did not have a significant effect on any of the three DVs. This measure of effectuation is rather contradictory to the previous finding, and may be due to the subjectivity of judging this openness as opposed to the more objective partner counts.

The number of pages spent on partnerships was not significantly different between micro and small businesses and was not correlated with any growth measure, yet the number of pages spent on competition was, positively, in all these respects—growth rate as well. The small businesses spent more pages on competition, on average, which is a sign of causation. This causal approach hence performs better. But why the effectual measure of partnership pages does not perform better or worse, is unknown—maybe the quality matters more than the quantity. Again, these findings must be viewed in the light that these are absolute, rather than relative counts.

Finally, there is the personal selling strategy. It did not significantly separate small from micro businesses, nor was it correlated with any measure of growth. Hence, this measure of effectuation as proposed by Dew, Read, Sarasvathy and Wiltbank (2009) and Read, Dew, Sarasvathy, Song and Wiltbank (2009) is either not really effectual, or simply isn't related to performance.

Overlooking all partnership vs. competition variables, we can conclude that these measures are not covering the whole construct, or, that partnership is not always the most important predictor of growth. A certain effort spent on analyzing the competition may be predictive as well—even for the growth rate that does not seem to be dependent upon many of the other measures of effectuation.

Controls: growth intention and company age

Growth intention was positively related to all measures of growth. Those who intended to grow more, those with more motivation, did grow more and faster. Curiously, many measures of prediction (causation) and partnerships (effectuation) correlated positively with growth intention, which could be linked: those who want to grow more may try to predict better and build more partnerships, in itself a blend of causal and effectual reasoning.

The age of the start-up was significantly different between small and micro firms, and correlated also with a higher absolute number of employees but not, again, with the growth rate. So, rather logically, it follows that the more time a start-up has had, the more likely it is to break the small business barrier, but it has no effect on the growth rate.

Predicting the odds of becoming a small rather than micro-business

The regression analysis pointed towards only two effectual variables of one effectual construct being significant predictors of overcoming the threshold of ten employees: start-up experience and experience based business planning. Together with the controls growth intention and company age, the model predicted 81.3% of the sample correctly. Because the odds ratios of every predictor keep the other predictors constant, it is possible to draw *ceteris paribus* conclusion. *Ceteris paribus*, having start-up experience five-folded the odds of becoming a small business—a very impressive amount. Moving up one level on the five-level experience based planning scale meant improving the odds nearly 2.5 times, *ceteris paribus*, a very stark effect as well. *Ceteris paribus*, moving up one level on the four-level growth intention scale was even more important, giving 6.5 times more chance, and a business improved its odds of reaching the threshold every year by nearly 26%, which is also very steep.

This indicates that, as far as the measurements of this study go, means in the form of start-up experience and basing the business plan on experience, are the most important predictor of transitioning from micro to small business, together with the growth intention and company age. While non-parametric tests and correlations found important relations with partnerships as well as predictive control, they do sadly not seem to be significant predictors. Why not is an interesting topic for further research—one explanation could be that not all effectual constructs are equally as important for growth.

In summary

Initial business plans seem to be able to predict subsequent job creation—at the very least there is a strong relation between the two. The relation between logic present in an initial business plan and subsequent performance in personnel growth are impressive: there are many significant differences between effectual and causational measures in terms of job creation. It proves that the logic behind planning is of influence on subsequent performance, even if the act of planning itself may have an effect of its own.

Causational prediction rather than control (when defined as the absence of prediction) seems to be a better predictor of growth, while means-based action as opposed to goals-based action did strongly confirm the effectual approach to be a better predictor of growth. And even though no significant affect for the affordable loss construct was found, most of the partnership measures seem to point to a higher employment performance, confirming again that the effectual approach predicts higher growth. But when putting all these variables into a regression analysis, just a few seem to actually have true predictive value—something that warrants more research.

Interestingly, not many variables were significantly correlated to the growth rate—just the amount of experience based reasoning, the number of pages spent on competition, and the growth intention. This is, given the many correlations with the absolute number of employees, rather strange: one would think that a high absolute performance is often accompanied by a higher relative performance. But apparently, the effectual and causational

variables that cause companies to grow bigger, do not necessarily cause them to grow faster, they just hold out longer it seems.

This points to the possibility that effectuation is not one consistent block of constructs, but rather an inconsistent collection of behaviours that do not necessarily all have to be related to employment performance.

5.3. Limitations

As with all studies, this study has limitations because of design choices and circumstances, apart from the unavoidable time and resource constraints.

First of all, there are limits to the method of operationalization. Because of the few empirical papers that operationalize effectuation, and none that code business plans, it is clear that the coding scheme does not perfectly measure the theoretical constructs that effectuation is made of. This thus weakens the construct validity. As I found out, it is not even sure that these constructs form a consistent set of measures of effectuation. This had severe consequences for hypothesis testing on the construct level, and I had to resort to variable level testing. Also, growth intention and firm age may not be the only influences, so measured effects can also be attributed to other causes—though that is always the case in social science.

Secondly, by taking only the initial business plan, we only have a snapshot of the level of effectual reasoning of the entrepreneur. This may not be an accurate reflection of the thought process of the entrepreneur, and hence may not be a fair measure of effectuation. This is a threat to construct validity, but one deliberately taken.

The sample size of 92 business plans imposes limits on the statistical validity of this research. Although the sample size is decent and appropriate analyses have been selected in my opinion, it still remains possible that effects have been overestimated or random sampling error has led to erroneous conclusions.

The last limitation is the generalizability of the research. Because the sample, or rather population, is not a random nor representative representation of all businesses but rather those in a specific incubation programme, the conclusions can only be generalized to this group. These selected start-ups may differ significantly from the majority of other businesses, by for instance focusing on high-tech industries or having ties with the university, not to mention the effect of being in the incubation programme itself. Furthermore, the findings are only generalizable to the three employment measures of performance, and may not hold for other, e.g. financial, measures of performance.

5.4. Implications for and Contribution to Policy and Practice

The findings of this study suggest several important things for practice. Most importantly, it shows that the logic of an entrepreneur, as evident in the initial business plan, can help predicting subsequent performance in terms of job creation, at least within the context of this incubation programme but probably not confined to it. All of this means that a link between the *way* of planning and performance has been established. This logic, this way, is something that can be learnt—a point Sarasvathy often makes.

If entrepreneurs can be thought to think and plan in ways that improve job creation, the impact on the economic and social levels of society can be substantial. This study suggest that this is a possibility well within reach—and can have far-reaching implications for the future of

micro and small businesses. This is something that is meaningful to policymakers that want to improve job creation/employment or the development of bigger businesses in a certain region.

Though most of the predictors of employment growth were effectual, not all of them were. This means that entrepreneurs should be aware of this when they aim for growth. In specific, for optimal personnel growth they should focus on working from their experience rather than goals, and focus on acquiring partnerships, while at the same time putting at least some effort into market research, even if it is deemed causal. They might also aim for an existing market if they want to take a safer path to growth, another very interesting finding of this research.

These findings also have much relevance for entrepreneurship teachers and incubators, when teaching about the relationship between effectuation, causation and performance and teaching about how to plan. The idea of Wiltbank et al. (2009), that entrepreneurs may benefit from learning effectual strategies, is largely supported by my findings: a focus on means rather than goals, and on partnerships rather than competition, is beneficial for personnel growth performance, overcoming that small business barrier. Yet the traditional market research, including competitive analysis, has also proven to be beneficial, so my findings call for a more balanced approach to business planning: aspects of both effectuation and causation logic can be beneficial to a firm in the planning stage—and beyond.

Finally, these findings as well as the coding scheme can be applied by venture capitalists, business angels and incubator programme managers in predicting the performance of applicants based on effectual and causal measures in their business plan. The measures in the coding scheme are rather easy and quick to measure in a univocal way and can form a welcome addition or first screening for these professionals working with business plans on a regular basis.

5.5. Implications for and Contribution to Theory and Research

5.5.1. Contribution to Research

This study contributes to entrepreneurship research in several ways. It has interesting findings for both the planning-performance relationship but even more so for the theory of effectuation, and in a larger perspective, creation theory.

By empirically establishing a link between effectuation, causation and performance in terms of job creation, it fills part of the big gap that was present at these crossroads, moreover because of my operationalization of measuring effectuation in business plans, something that has not been done before. By developing a coding scheme for effectuation in business plans, it offers the literature an operationalization that can be used for future research.

This thesis studies the planning aspect of the process of design and relates it successfully to performance, in line with Sarasvathy's (2004) suggestions. It also provides a way to separate potential successes and failures, an avenue of research already proposed by Sarasvathy (2001a) but never, to my knowledge, realized before but hugely important, also for practice.

It assesses the amount of effort spent on the market as well as the presence of market research to start-up success, as proposed by Read et al. (2009).

The findings suggest a balanced view of effectuation and causation as determinants of venture performance: neither one is beneficial in every dimension, nor can effectuation be treated as one coherent set of constructs, my results suggest. My study points out weaknesses in the operationalization of effectual measures such as the affordable loss construct as well as the measurement of performance. But the simple fact alone that differences in entrepreneurial logic present in an initial plan are so clearly related to subsequent performance already warrants a whole new take on the planning-performance relationship and in specific the role of effectuation therein.

Altogether, it provides an excellent starting point for investigating the role of effectuation in business planning and the subsequent relationship between effectuation and performance. In doing that, it fills this gap in the literature and opens new avenues of research, which will be touched upon in the next section.

5.5.2. Further Research

As this study has found, more empirical work has to be done on effectuation from different angles.

Most importantly, this study has to be replicated to validate the findings, an aspect often overlooked and underestimated (Davidsson, 2004). It should also be replicated with a different sample (e.g. outside of in incubation programme) and different DVs to make the results more generalizable.

Secondly, effectuation measures have to be operationalized and validated for a broad array of measurement possibilities. So far, only think-aloud protocols, meta-analyses and business plans have been covered, and even those very incompletely. This last point became evident with the affordable loss construct of this study. The validating should also converge into a coherent, consistent set of effectual constructs, in order for effectuation to become that sole second mainstream paradigm next to Discovery Theory.

Thirdly, further research should aim to find out the best ways to measure start-up performance. The literature review indicates that this varies broadly, making results hard to compare across studies.

Finally, it would be very interesting to research effectuation in non-business settings. For instance in psychology: what is the effect of effectual reasoning for e.g. health, happiness and wealth? Do people that live their life effectually become happier, live longer or earn more than people who live their life causationally?

5.6. Reflection on the Personal Learning Objectives

In the beginning of this research, I set six personal goals. In this section, I will reflect on the degree to which I feel I have reached them.

Improve my literature research skills

This goal has definitely been reached. I have learnt how to search more effectively, efficiently and thoroughly. I have learnt much more about the possibilities of the databases I used and how to search for new keywords. I have also improved upon my ability to search for the most relevant and fundamental papers in an area of research. Finally, I have significantly improved upon my skills of integrating different disciplines and building a theoretical framework from them.

Improve my scientific research abilities

This is the first time I have performed relatively proper scientific research, and it has honed my abilities a lot I feel. I now know what it takes to formulate an interesting study goal, build a theoretical framework and operationalization from literature research, perform data collection and analysis as validly and reliably as possible while acknowledging the methodological weaknesses, and draw conclusions in light of the theoretical framework and discuss them, as well as the implications for theory and practice while suggesting further research options. I now feel that I have a solid basis—but just the basis of course, this is not comparable to PhD level—of understanding and skills to base future research on, be it academic or non-academic.

Specifically, I have learnt the most in the areas of operationalization and statistical data analysis, as well as the organizing and writing of a thesis.

Improve my academic writing skills

Although I have often written papers for courses, the demands of a thesis are higher, and the writing is fully independent. Especially the fact that everything you are claiming needs to be based on science, is more difficult on this scale compared to a normal paper for a postgraduate course. By doing that, I feel I have improved significantly in my ability to write academically.

Understand effectuation and its effects better

By performing an extensive literature review, I have gotten to learn "all" the ins and outs of this new stream of entrepreneurship research. I learnt that it is has not yet been solidly operationalized for empirical research, that it is not a black-and-white contrast with causation but that there is overlap in the real world, and that although it has gained an increasing amount of research interest, it is not yet widely accepted as a leading paradigm, perhaps because of the reasons stated above. That being said, there is a lot of promise in this theory and I can certainly apply it in my future private and professional life, for which I am grateful.

Improve my understanding of business plans and business planning (the process itself and the various approaches)

The reading and coding of all those business plans made me aware of the diversity of ways to approach a business plan and the diversity of their quality. Many of them contained language errors and a very low amount of argumentation and support of the actual plan, but there were also very high quality, well-thought out ones. With this experience I will be much better capable of writing a good business plan myself, and I have drawn inspiration from the various approaches. This will also come in handy if I one day have to judge business plans myself.

Learn from ideas and opportunities in the coded business plans (only as inspiration)

Because of the age of the business plans coded as well as the common theme of software engineering and/or consultancy, the inspiration I have gotten is limited, and not concrete. Nevertheless, I am grateful for the inspiration that I have gotten.

Learn to work and plan autonomously and independent

Perhaps, this is the biggest area that I had to and have improved in, but I had to learn the hard way. I have severely underestimated the activities involved in writing a master's thesis and the amount of time the various steps take. Having no experience with theses before,

during December through April I constantly had the feeling I had plenty of time left, seeing as I wanted to graduate in the summer. But the amount of work that still had to be done, which mainly entailed the data analysis and writing, was much more than I anticipated. Especially since we only had one, undergraduate, course on statistics I had to learn most of it from scratch—a major flaw in the curriculum, I feel. Hence, I spent all summer working on my thesis, even on my California vacation, and I have finished it only just in time to start studying for a second Master's degree in London from September on. I have learnt that starting early and sticking to a realistic planning that has room for error are of paramount importance. In all my previous undergraduate and postgraduate courses, doing the majority of work close to the deadline has worked perfectly, but in this case it has not—even though I finished in time, the sacrifices I had to make, and the stress it has imposed on me and others around me has not been worth it, and I will be very sure to learn from these experiences and to not make the same mistakes again.

The second thing I have learnt, is that I have to put aside my pride and perfectionism more, so that I can get more feedback from, in this case, supervisors. Because I only want to deliver top-notch pieces that are up to my standards, I have long been silently refusing to offer them my work for feedback, and consequently, had to make more changes down the end of the road. I need to accept that it is not always possible to deliver something perfect the first time.

Last but not least, I have learnt that I am very capable of working autonomously and independent. Although I have always enjoyed teamwork, being independent gives me more control over the outcome and I really enjoy that. Therefore, I am proud of the fruits of my own, independent labour and I am grateful for all the learning experiences the process has given me.

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Appendix I: Measurements of inter-rater agreement

Table 7: Inter-rater agreement analysis using Cohen's Kappa

Variable	N	Kappa	Asymp.SE	Approx. sig.
Market research present	75	0.845	0.067	0.000
New market	72	0.801	0.110	0.000
Start-up experience	70	0.957	0.043	0.000
Experience based	73	0.682	0.069	0.000
Partnerships with competitors	75	0.926	0.052	0.000
Openness to new partners	74	0.940	0.042	0.000
Partnership pages	74	0.920	0.045	0.000
Personal selling	75	0.788	0.070	0.000
Growth intention	71	0.787	0.061	0.000

For the variables *Market pages*, *Years of industry experience*, *Segments*, *Total number of partners* and *Competition pages*, Cohen's kappa could not be determined because a symmetric 2-way table with matching values could not be created. The reason for this is that for these variables, one coder used a number that was not used by the other coder, a situation that has a large chance of occurring in scale-type measurements.