The Lean Startup – A Systematic Literature Review

Seminar paper

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Abstract

One of the key trends and most popular concepts in entrepreneurship is the Lean Startup founded by Eric Ries. The Lean Startup method aims to reduce uncertainties for start-ups and established companies in product development and creating business models by linking the application of lean thinking to the process of innovation. Followed by an enormous amount of attention and the growing relevance in practice, the academic interest in the Lean Startup increased over the last years. This paper systematically reviews the current state of academic literature on The Lean Startup and selects 23 scientific papers and articles. The identified literature is categorized by underlying frameworks, the combination with other approaches and critical success factors for implementation. Furthermore, commonalities and differences in findings as well as implications and further research are discussed.

Keywords: lean startup, start-up, entrepreneurship, literature review

Table of Contents

1 Introduction

"As an entrepreneur nothing plagued me more than the question of whether my company was making progress toward creating a successful business." – Eric Ries

This quotation by Eric Ries relates to the fact that entrepreneurs face extreme uncertainty building their own company not knowing if they will succeed or fail. In his book "The Lean Startup", Ries gives a set of practices to support entrepreneurs creating a successful business.

The Lean Startup method aims to reduce market risks for start-ups and established companies in product development and creating business models by avoiding working for a wasteful long time on an idea and spending money where the outcome is uncertain. Instead of building a product nobody wants or needs, the Lean Startup adopts a combination of hypothesis-driven experimentation, iterative product development and validated learning (Ries, 2011). Central concepts contained in the Lean Startup method are the Minimum Viable Product (MVP) as a result of the Build-Measure-Learn feedback loop and pivoting which describes the substantial change of the business model.

Demonstrating the proof of the concept, in the book some well-known examples for former start-ups like IMVU, Wealthfront and Dropbox were given. Dropbox for example used the Lean Startup method by testing early and often, what their customers really wanted and grew from 100,000 registered users to over 4,000,000 in only 15 months. But also established companies like IBM, GE and Intuit take advantage of the Lean Startup, for example in their product development according to Ries (2011).

The book "The Lean Startup" became a New York Times Bestseller and the amount of attention was enormous as well as the relevance in practice was growing. Followed by this trend also the interest in this topic in academic literature increased. This paper systematically reviews the academic literature answering the research question:

What is the state of the art of academic literature for The Lean Startup?

To answer this question, this paper follows the method of a systematic literature review. First, an outline of the most important aspects of the Lean Startup method is given to get to know the key elements (2). Second, the research process and criteria are presented to identify the final selection of scientific papers and articles (3). In the result chapter (4) the identified literature is categorized by underlying frameworks, the combination with other approaches and critical success factors for implementation. In addition, commonalities and differences in findings as well as implications and further research are discussed (5). Closing this paper, a conclusion is given (6).

2 Background

Inspired by the idea of Lean Manufacturing Steve Blank and Eric Ries adapt and combine its principles creating Customer Development (Blank, 2007) methods and The Lean Startup (Ries, 2011). Lean manufacturing is related to the Toyota Production System where the methods, techniques, and tools were pioneered. Aiming waste minimization within the production process, Lean manufacturing "takes the position from the perspective of customers who use a product or service, and any activities that do not add value for customers are considered as waste" (Yamamoto, Milstead and Lloyd, 2019). This key element was transferred to the Lean Startup method by defining every activity or process which the customer does not want or does not ask for as waste (Ghezzi and Cavallo, 2018).

Blank (2013) outlines the differences between the Lean Startup and traditional approaches. The strategy includes a hypothesis-driven business model instead of a business plan which is driven by implementation. In comparison to traditional concepts following a linear product management, the Lean Startup

creates a new product process because it introduces customer development and hypothesis testing. Also, a deviation to failure can be identified: While failure is expected and handled by iterating ideas and pivoting in the Lean Startup, it should be the exception in traditional approaches (Blank, 2013).

Furthermore, Ries (2011) characterizes five essential principles regarding the Lean Startup method:

1. Entrepreneurs are everywhere
2. Entrepreneurship is management
3. Validated learning
4. Build-Measure-Learn
5. Innovation Accounting

The first principle emphasizes that everyone who is part of a start-up in the definition of Ries could be an entrepreneur including students, employee in an established firm and entrepreneurs without owning a business (Edison, Wang and Abrahamsson, 2015). According to Ries (2011) a start-up is a "human institution, designed to create a new product or service under conditions of extreme uncertainty" (1). Second, Ries points out that for start-ups new ways of management are necessary because they are facing extreme uncertainties and striving for innovation and future growth which differs from managing traditional companies (2).
Strongly connected with each other are the elements of Validated Learning and Build-Measure-Learn. Validated Learning means to garner knowledge on how to create a sustainable business by a hypothesis-driven and experimental approach (Ries, 2011). In the process of hypothesis testing a series of Minimum Viable Products (MVP) were built because they are the smallest set of activities needed to disprove a hypothesis (Eisenmann, Ries and Dillard, 2013; Euchner, 2013). The MVP should include the minimum features to go through the Build-Measure-Learn (BML) feedback loop (3).
The BML feedback loop proposes to turn ideas into products and measures customer feedback. The customers' feedback is collected with the aim to decide whether to persevere or pivot and to generate validated learning (Scheuenstuhl, Bican and Brem, 2020). The faster a product is running through the BML feedback loop, the better it is for the start-up because it speeds up the iteration process. Part of a start-up's key activity is on the one hand the BML feedback loop. On the other hand, the decision whether to pivot, persevere or perish because of the feedback loop is also central to the activities. Pivots are based on the customer reaction and can change the business model substantially (4).
Innovation Accounting completes the five principles by Ries (2011) and is about suitable accounting for startups focusing on measure progress, reach milestones and set priorities (5). Scheuenstuhl, Bican and Brem (2020) also mention these five key elements whereas Contigiani and Levinthal (2019) reduce the Lean Startup to only two central elements: the notions of the MVP and pivoting. Figure 1 presents an overview over the Lean Startup process including the BML feedback loop:

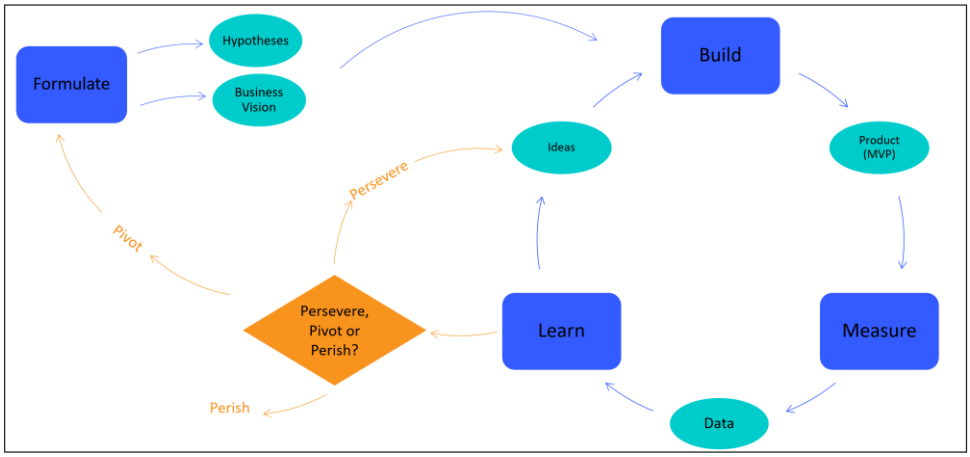

Figure 1: Lean Startup process adapted from Ries (2011) and Eisenmann, Ries and Dillard (2013)

3 Literature Review

3.1 Research process and criteria

In the following, the research process and criteria to identify the relevant literature are explained. To gain an overview of the topic, I have read the book "The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses" (Ries, 2011). Additionally, the Database "Google Scholar" was searched for the keywords "lean startup", generating more than 50,000 results. After getting a first impression I followed a research process of 5 steps to identify relevant literature.

As first step, I decided to define general research criteria and a suitable search string. For the criteria only literature in academic journals or at least peer-reviewed articles and English and German as the standard literary language have been selected. In general, I choose no time limitation as a research criterion. Owing to the book release of "The Lean Startup" in 2011, I expect most of the academic literature related to the topic were published afterwards. Starting off the keyword selection, I tried different search strings, e.g., "lean startup methodology" (lean AND startup AND methodology) and "lean startup approach" (lean AND startup AND approach). Mainly, the search in different databases results in only a small number of articles or the findings were not relevant. The final search strings to specify the results are composed as "lean AND startup" and "lean startup" OR ("lean-startup") OR ("lean start-up") OR "lean-start-up" (1).

Second, I chose different databases which I wanted to use for the final search strings. The databases were selected by the criteria of relevance, number of results, focus on economics and availability to access to the literature. Due to the criteria, I used the databases "EBSCOhost", "econbiz", "ScienceDirect" and "Google Scholar" for my further research process (2). Table 1 presents the number of results for the selected databases separated by the final search strings:

Database / search string	**"lean AND startup"**	**("lean startup") OR "lean-startup" OR ("lean start-up") OR "lean-start-up"**
EBSCOhost	36	44
econbiz	110	179
ScienceDirect	1,252	240
Google Scholar	17,200	16,600

Table 1: Number of database research results separated by search strings

And third, I searched for relevant literature through the different databases by reading the title and abstract of the scientific articles and papers. For ScienceDirect I focused on the category of research articles, but for most of the articles were not accessible. The database Google Scholar has the highest number of results, so I checked the first 100 of them by title and if necessary, by abstract as well. In addition, I considered the accessibility and I tried to get access by one of the other databases (3).

By filtering the title and abstract of the results over all databases, I could exclude the literature, which did not concern the subject of my research or focused on other not suitable aspects. Furthermore, duplicates were eliminated and in total 59 articles and papers were fully analysed. I also enclosed the journal ranking of VHB-JOURQUAL3 to validate the papers. If a paper had no ranking, I checked if it was cited by one of the ranked articles. Altogether, 21 articles and papers were selected of which 1 was rated with an A-ranking, 9 with a B, 5 with a C and 6 of them had no ranking (4). As last step of my research process, I used the backwards reference reviewing the citations of the identified literature and added 2 to my final selection of articles and papers as recommended by Webster and Watson (2002). Finally, the 23 articles and papers for my literature review were identified (5).

3.2 Identified literature

The following Table 2 presents the identified literature, which I will use for my systematic literature review. Analysing the scientific articles and papers, they are categorized in three main topics related to the Lean Startup. The first main category is underlying theoretical frameworks, followed by Lean Startup in combination with other approaches and tools. The third category relates to critical success factors for the implementation.

Author	Year	VHB-Ranking	Underlying theoretical frameworks	Combination with other approaches and tools	Critical success factors
Blank	2013	C	X	X	
Leatherbee and Katila	2020	A			X
Scheuenstuhl, Bican and Brem	2020	B			X
Welter et al.	2021	-		X	X
Giraldo-Diaz and Fuerst	2019	-			X
De Cock, Bruneel and Bobelyn	2019	B	X		X
Contiagani and Levinthal	2019	B	X		
Euchner	2013	C			X
Euchner and Blank	2021	C			X
Yang, Sun and Zhao	2018	B		X	X
Mansoori and Lackéus	2019	B	X	X	
Hwang and Shin	2019	C			X
Chesbrough and Tucci	2020	-	X	X	
Dobrigkeit, de Paula and Uflacker	2019	-		X	
Ghezzi	2018	B	X	X	X
Edison, Wang and Abramhamsson	2015	-			X
Frederiksen and Brem	2016	B	X		
Ghezzi and Cavallo	2018	B		X	
Shepherd and Gruber	2020	-		X	
Bortolini et al.	2021	C	X		
Bocken und Snihur	2019	B		X	
Felin et al.	2019	B		X	
Ximenes, Alves and Araujo	2015	-		X	

Table 2: Identified literature and categories

4 Results

4.1 Underlying theoretical frameworks

Most of the identified literature about the Lean Startup discuss underlying theoretical frameworks and approaches. Ries (2011) himself mentioned that the Lean Startup is originated in Lean manufacturing frameworks (Krafcik, 1988) by the aim of waste minimization without sacrificing productivity. The same objective of the Lean Startup and Lean manufacturing frameworks are confirmed by Chesbrough and Tucci (2020) and De Cock, Bruneel and Bobelyn (2019). Bortolini et al. (2021) specify that the Lean Startup method refers to Lean philosophy of management and Lean Manufacturing because a minimum prototype of functionalities of a product were created and customer feedback is relevant.

Additionally, Agile Development, Design Thinking and Customer Development could be identified as important underlying frameworks of the Lean Startup method. Agile Development (Inasiti and MacCormach ,1997) follows an iterative process by writing code in sprints and sharing the results immediately with users and customers for feedback. The feedback is the origin for refining the initial specification for another sprint which is close to the Lean Startup's iterative Build-Measure-Learn feedback loop (Chesbrough and Tucci, 2020). Also, the idea of building a minimum viable product and making pivot-decisions roots in the agile development movement which shifted away from the traditional waterfall model (De Cock, Bruneel and Bobelyn, 2019; Chesbrough and Tucci, 2020).

The similarities between the Lean Startup and Design Thinking refer to the user and customer centricity as well as to the relevance of the user and market knowledge to find out about the needs and wants of a user or customer. Design Thinking also includes continued learning and iterations to reduce risks and improves success which is closely to the main principle of validated learning of the Lean Startup method (Mansoori and Lackéus, 2019).

The approach of Customer Development founded by Steve Blank (2007) can be described as a process for testing hypotheses and a product development which underlies the knowledge and understanding of customer needs (De Cock, Bruneel and Bobelyn, 2019). Customer Development is one of the key elements of the Lean Startup because the formulation of testable hypotheses is crucial in triggering the Lean Startup process (Ghezzi, 2018). Especially the search phase of the Customer Development process which includes customer discovery and customer validation (Blank and Dorf, 2012), is part of the Lean Startup's search phase where the start-up must identify customers willing and able to buy its offering. The customer validation finally leads to customer creation and scale the business (De Cock, Bruneel and Bobelyn, 2019; Chesbrough and Tucci, 2020).

The Lean Startup can also be strongly associated to the principles of New Product Development. The design funnel by Wheelwright and Clark (1992) emphasizes on creating a product in iterative steps of defining and refining before moving to implementation which refers to the iterative development of the MVP in the Lean Startup method (Contigiani and Levinthal, 2019). Furthermore, Frederiksen and Brem (2016) see parallels in the user and customer involvement and especially between the Learning Cycle by Thomke (1998) and the Build-Measure-Learn feedback loop of Ries (2011). The Learning Cycle (Thomke, 1998) integrates the user feedback into New Product Development consisting of the four steps design (1), build (2), run (3) and analyze (4). Ries (2011) describes the Build-Measure-Learn feedback loop by ideas building products, which are measured by data and customer feedback to learn and generate new ideas. Whereas the Learning Cycle is an open cycle, which can come to an end, Ries (2011) invented a loop which aims to run faster and faster without an endpoint.

Also, Frederiksen and Brem (2016) discuss the Lean Startup referring to the approach of Effectuation. Key elements of Effectuation are the decision-making process under uncertainty and the interaction with stakeholders (De Cock, Bruneel and Bobelyn, 2019). Start-ups should follow experimentation instead of planning by using their limited resources to leverage their contingencies (Bortolini et al., 2021). The entrepreneur's behaviors applying the Lean Startup method includes an uncertain environment, hypothesis testing, experimentation and careful treatment of resources, which is also described by the theory

of Effectuation (Ghezzi, 2018). The approach of Entrepreneurial Bricolage is close to the approach of Effectuation and either related to the Lean Startup because it focuses on resource efficiency, iterative development, and stakeholder interaction (De Cock, Bruneel and Bobelyn, 2019). Ghezzi (2018) identifies Effectuation and Entrepreneurial Bricolage as underlying cognitive logic of the Lean Startup.

Although Contiagani and Levinthal (2019) noticed that Effectuation and Bricolage are important related theories to the Lean Startup, they identify a stronger reference to New Product Development, Organizational Learning, Real Options Theory and Technology Evolution in the broader and management technology strategy literature. Organizational Learning (Lynn et al., 1996) is defined by learning processes based on feedback and the learning of participants with every iteration which corresponds to the experimentation and scaling process of the Lean Startup.

The Real Options theory gives an answer on how to make decisions regarding investments when the future is uncertain and differs between a "go" or a "no-go" as response to feedback which also relates to experimentation and relevance of feedback in the Lean Startup method. According to Contiagani and Levinthal (2019) the concepts of experimental trials and market reaction are common between the Lean Startup and the approach of technological evolution.

Furthermore, the approach of Discovery-Driven Planning including experimentation and assumption testing has similarities to the Lean Startup according to De Cock, Bruneel, Bobelyn (2019) and Bortolini et al. (2021). Other than that, mentioned, Ghezzi (2018) considers the framework of Opportunity Creation, Bortolini et al. (2021) the principles of Learning School and Frederiksen and Brem (2016) the concept of Milestone Planning, will not discussed here further.

In conclusion, De Cock, Bruneel and Bobelyn (2019) summarize that the Lean Startup method "integrates principles from existing management theories with the object of allowing entrepreneurs to deal with uncertainty inherent starting a new venture". Worth mentioning at this point is the use of the Lean Startup method in practice. The Lean Startup is not only used as a single method rather than in combination with other approaches and tools.

4.2 Combination with other approaches and tools

According to Blank (2013), the combination of the Lean Startup with other business trends and approaches could be the beginning of a new entrepreneurial economy. In the identified scientific articles and papers the combination of the Lean Startup is well discussed.

As an contribute to the venturing process in established companies, Chesbrough and Tucci (2020) highlight the approach of open innovation. Arguing that it is necessary to overcome different challenges for the implementation of the Lean Startup in a large firm, open innovation can increase the success of implementation. In principle, open innovation is concerned with the allocation of resources, organisation and advantages in the marketplace. By contrast with the Lean Startup, open innovation does not only aim to reduce risk, but enables the sharing of risks by collaborations with i.e., universities or other external partners. The idea of collaboration also refers to the starting point of the innovating firm because with an external actor it can start in the middle rather than in the beginning. Another intention of open innovation is to search far more broadly than through the internal options and communication by using crowdsourcing, which focuses on the integration of an online community to solve problems (Chesbrough and Tucci, 2020).

A more traditional approach, which is used to complement the Lean Startup, is the Business Plan. In quantitative research of Ghezzi (2018), 91% of the surveyed founders indicated the use of business planning in addition to the Lean Startup. Business Planning assumes that future outcomes are predictable by analysing the trends and historical data carefully, although the future is unknown (Mansoori and Lackéus, 2019). Welter et al. (2021) argue that the combination of key activities of the Lean Startup method and writing a business plan increases the chance of success for a start-up. In comparison, Blank (2013) represents the opinion that "business plans rarely survive first contact with customers" and hardly anyone requires a five-years-plan to predict a complete unknown future. More important for him is the

question, how a start-up could create value for itself and its customers, which can be answered by using the Business Model Canvas (Osterwalder und Pigneur, 2010) instead of writing a business plan.

The Business Model Canvas is a tool for creating new business models and is structured by the four groups value proposition, value creation, value delivery and value capture in nine different building blocks (Osterwalder und Pigneur, 2010). The tool supports the Lean Startup by looking at a series of untested hypotheses on one page because each of the nine building blocks of the Business Model Canvas contains untested hypotheses (Blank, 2013). According to Felin et al. (2019), the use of the Lean Startup and the Business Model Canvas is criticized because the methods lack on specification to help entrepreneurs in hypotheses generating and testing and especially the Business Model Canvas as a practical, initial tool cannot comprise the complexity of business models. By contrast, Bocken and Snihur (2020) argue that the combination of the Lean Startup and the Business Model Canvas should be used in the phase of experiment, design and testing, where the iterative process from hypothesis generation to hypothesis testing takes place. In addition, the integration and combination of the Lean Startup with other approaches and tools can support start-ups to meet societal and environmental challenges, i.e., climate change (Bocken and Snihur, 2020).

As mentioned before, the methods Agile Development and Customer Development are amongst the underlying frameworks of the Lean Startup. Customer Development is suitable for testing hypotheses and is working hand in hand with Agile Development which aims the waste minimization of time and resources with an iterative product development (Blank, 2013). Ghezzi (2018) and Ghezzi and Cavallo (2018) define the combination of the Lean Startup, Business Model Canvas and Customer Development as the "Lean Startup Approaches". The advantages of the Lean Startup Approaches are the reduction of time and costs for start-up testing, the alignment of the business idea to customer needs and the verification and pivot of all business model parameters (Ghezzi, 2018). The Lean Startup Approaches are also examined by their relation to Business Model Innovation and Agile Development with the result that the Lean Startup Approaches represents an area of connection and overlapping between Business Model Innovation and Agile Development. In detail, the Lean Startup Approaches can be perceived as a form of Agile Development which operates at the higher level of strategy and business models (Ghezzi and Cavallo, 2018).

Shepherd and Gruber (2021) describe a combination of different methods with the Lean Startup as "Lean Startup Framework" which includes the five building blocks of the Lean Startup method and additionally the use of other frameworks during these building blocks. In the first building block of finding and prioritizing market opportunities, the market opportunity navigator (Gruber and Tal, 2017) should be used and in the second building block of designing business models, the Business Model Canvas can be combined with the Lean Startup. During the next steps of the Lean Startup process, Customer Development and Agile Development complete the Lean Startup in hypothesis testing (Shepherd and Gruber, 2021).

Beyond the combination of the Lean Startup with other approaches and tools, are also the Converge Model (Ximenes, Alves and Araujo, 2015) and the InnoDev approach (Dobrigkeit, de Paula and Uflacker, 2019). The Converge Model is introduced as a project management tool and a combination of the Lean Startup, Agile Development and Design Thinking with the focus to produce user-centered software and sustainable innovation through empathy with users (Ximenes, Alves and Araujo, 2015). The aim of the InnovDev approach also refers to software development by creating more innovating software products. InnoDev is composed by Design Thinking, Lean Startup and Scrum (Dobrigkeit, de Paula and Uflacker, 2019).

4.3 Critical success factors

For the implementation of the Lean Startup method in start-ups and established companies' critical success factors and requirements can be identified. Although Ries (2011) and Blank (2013) argue that the Lean Startup could also be adopted by large companies, they have different success factors and requirement for the implementation. Blank (2013) points out that start-ups are not a smaller version of large companies because start-ups are searching for an executive business model whereas established companies focus on the execution of their business model (Euchner and Blank, 2021).

According to Ries (2011) and mentioned by Yang, Sun and Zhao (2018), the Lean Startup method can also be separated in the two main activities search and execution. The search phase contains the exploration of a business model which is repeatable, scalable und profitable (Blank, 2006). After completing the search for a suitable business model, the execution of the business model including the scale-up follows. Whether a firm is in the search or execution phase, Yang, Sun and Zao (2018) argue that different cognition approaches are useful because companies in the search stage differ significantly from companies in the execution stage. For search activities the Effectuation cognition and for execution activities the Causation cognition are recommended based on the empirical evidence of 160 start-ups in China.

Also Welter et al. (2021) take a related approach into consideration comparing the Lean Startup and the more traditional Business Planning. In quantitative research with 120 start-ups in the US, they answer the question, which aspects of the methods are related to the success of a start-up. Especially, the Lean Startup activities talking to customers, collecting preorders and pivoting based on customer feedback correlate positively with a start-up's performance. The positive correlation of the following Lean startup activities, by contrast, were not confirmed: creating prototypes, showing prototypes to potential customers for feedback, conducting experiment to better understand a portion of the business, pivoting (in general).

The traditional approach of Business Planning includes writing a business plan, gathering secondary data on the industries and sharing the business plan to receive feedback or to obtain funding according to Welter et al. (2021). Only the key activity of writing a business plan increases the chance of success for a new venture. Ghezzi (2018) argues that the results of the Lean Startup experiment and tests should be use as an input to the planning operations in a well-structured business plan changing the argument of Blank (2007) to the following: "before writing a business plan, design a business model and apply customer development". Overall, Welter et al. (2021) identify the combination of writing a business plan and the Lean Startup activities talking with customers, collecting preorders and pivoting based on customer feedback as critical success factors.

The results of another quantitative study with 152 start-ups verify that customer interviews as part of the hypothesis probing are highly relevant for the implementation of the Lean Startup method. In contrast, the hypothesis formulation is not as important as expected (Leatherbee and Katila, 2020). Leatherbee and Katila (2020) also found out that the composition of the start-up team is a boundary condition for the success of the Lean Startup method. While the Lean Startup is a learning-by-doing-method, in business education the approaches of learning-by-thinking are more common and limit the spread of learning-by-doing-methods. The teams with a higher share of formal business educated team members (e.g., MBA graduates) "are the least likely to formulate hypotheses and to converge on a business idea" (Leatherbee and Katila, 2020). Although some of the MBA members resists the use of the Lean Startup method first, they have the potential for a leverage effect by more engagement in hypothesis probing, i.e., they formulate more hypotheses and related new business ideas and achieve idea convergence faster.

Furthermore, the success factor of the team composition is also highlighted by Giraldo-Diaz and Fuerst (2019). They carry out a single case study on the start-up "Shipstra", a digital marketplace for freight-forwarding and shipping sector founded in 2017. The two founders of Shipstra have had enough experience in the shipping industry and were also connected in the market. But for building the company's

first MVP, they had a lack of knowledge about software development, so the MVP was developed by an external software company in a 6-week project with weekly iterations. The customer feedback makes some changes necessary. For the second MVP a new internal CTO joined the start-up, and it was possible to internalize the software development. The new composition of the founding team was relevant to ensure rapid iterations between the MVP versions. If the team lack important knowledge and skills in critical areas, the Lean Startup process may take longer than expected and the chances of a successful implementation are lower. Additionally, Giraldo-Diaz and Fuerst (2019) mention that the work experience and network in the container shipping industry of the founders supports the detection of the initial business model.

The role of prior market knowledge for the success of the Lean Startup method is analysed by De Cock, Bruneel and Bobelyn (2019). In a longitudinal multiple case-study with four London-based, growth-oriented start-ups in the first 2 years of their existence, they found out that achieving the validation of a business model is not possible with a lack of prior knowledge. Prior market knowledge enables to interpret and act on acquired market knowledge and to learn from market innovation. In consequence, scanning the market and collecting market insights only leads to meaningful iterations of the business model and supporting resource portfolio, if the Lean Startup method is combined with prior market knowledge. It also increases the pace of learning and interpreting market knowledge which is also key to organizational learning. In conclusion, De Cock, Bruneel and Bobelyn (2019) highlight that the Lean Startup is not a one-size-fits-all solution for entrepreneurs.

Also, in the setting of established companies, the Lean Startup cannot just be dropped in the organization and is going to work. There are relevant requirements and key aspects to consider, like the whole transformation of the company (Euchner and Blank, 2021).

Scheuenstuhl, Bican and Brem (2020) show that the Lean Startup method can improve the innovation process in an established company, which focuses on executing a business model. Analysing and rating the innovation ideas from one group with a traditional approach and one group with the Lean Startup method (developing iterative innovation ideas and using customer feedback), the Lean Startup outperforms the traditional approach. Especially in early stage of the innovation process the Lean Startup method correlates positively with the new product process and financial dimension of a product (Scheuenstuhl, Bican and Brem, 2020). Furthermore, Edison, Wang and Abramhamsson (2015) argue that large companies should adopt the Lean Startup method to seek for radical innovation. In a single-case-study in a large software company, they compare the option of an internal start-up and external start-up in an established firm and identified some "leasson-learned" practising Lean Startup in a large company. In this case, the company chose the way of an internal start-up using the Lean Startup method to build a new product and business.

Already in 2013, Ries mentioned in an interview that there is a need for an organizational structure, which means there must be a real start-up inside the company (Euchner, 2013). Additionally, Euchner and Blank (2021) confirmed that disruption is not possible inside the same functional unit or division that is focused on execution. In the case of Edison, Wang and Abramhamsson (2015), the company build an internal start-up with an independent team and the Lean Startup supports building the right product and finding the right market segment faster. By iteration it was possible to identify a target group in a mass market. But they also defined two essential boundary conditions for the Lean Startup in an established company: The company does not want to attack their existing business and markets as well as the full commitment of the management is necessary for the successful implementation (Edison, Wang and Abramhamsson, 2015). Beyond the commitment to the Lean Startup method, Euchner and Blank (2021) recommend additional activities to overcome some of the corporate antibodies that practicing Lean Startup induces. They also give some examples of the successful transformation of a company by working with the Lean Startup principles and choosing the right composition of (management) teams.

For the transformation of Apple from a computer company to iPod, iPhone and iPad and pivoting again to become a service company with tools and apps, it was required to have a visionary like Steve Jobs

and a management team with execution experts. Otherwise, it is not possible to focus on the execution of a running business and to search for innovative and disruptive business models at the same time.

A famous example of using the Lean Startup to power organizational transformation is Samsung which is mentioned by Hwang and Shin (2019). In 2012 Samsung was firm with a hierarchical organization structure and the aim to become an entrepreneurial company. Adopting the Lean Startup method, Samsung launched C-Lab, an experimental organization inside the company searching for new business models and products. The experimentation result of the first launch were different problems which limited the use of the Lean Startup method. First, it had significant limitations for enhancing an entrepreneurial spirit because the people who joined from other business units did not know how to work independent. Second, the people were not motivated to create breakthrough products because a spin-off of the products was not allowed. Third, the business units did not want to lose their most talented employees to the C-Lab. Also, the environment of C-Lab was not exactly optimal because C-Lab must do reports, presentations and other paperwork like every other part of the organization.

After identifying the central problems of their first "MVP", new concepts and changes were proposed for the revision and relaunch of C-Lab. To support entrepreneurialism, a failure rate up to 90% were accepted, the principle of holacracy enabled more autonomy in project management and the despite of titles and hierarchy encouraged collaboration and communication. These principles were completed by a reward system and a budget for external resources. The relaunch of C-Lab was successful and by using the Lean Startup method the transformation of a whole organization was initialized because the business units adopted C-Lab methods and experiences. Since 2018, also external start-ups could join the C-Lab as incubator. In summary, Hwang and Shin (2019) point out that the Lean Startup method is suitable for implementing entrepreneurial thinking in a large company and minimize the risk and resistance from the company's existing organization. As a critical success factor, they describe the addition and combination with rules and principles from the company.

5 Discussion

After presenting my results of the literature review in detail, I now want to discuss some of these aspects. The discussion is structured by commonalities and differences in findings, implications and further research and limitations.

5.1 Commonalities and differences in findings

The Lean Startup method adopted the approach of Lean Manufacturing which is confirmed by Eric Ries (2011) himself and is also common to the opinion of other authors. Furthermore, the authors who analysed underlying frameworks of the Lean Startup identified Lean Manufacturing, Agile Development, New Product Development and Customer Development as the main concepts which inspired and influenced Ries founding the Lean Startup method. In addition, the concepts of Effectuation and Entrepreneurial Bricolage are also mentioned by several authors. It should be noted that there are differences in other methods described as underlying frameworks. Whereas Contiagani and Levinthal (2018) underline the relevance of Organizational Learning and the Real Options Theory, Ghezzi (2018) considers the framework of Opportunity Creation and Frederiksen and Brem (2016) the concept of Milestone Planning, for example. This clarifies that aside the main concepts as underlying frameworks of the Lean Startup, there are a lot of different methods in literature which can be referred to the Lean Startup, but no overall picture can be drawn.

Greater differences can be found in the combination of the Lean Startup and the more traditional approach of Business Planning because of the possibilities of the Business Model Canvas. According to Blank (2013) by using the Business Model Canvas, it is not necessary and required anymore to write a business plan. Arguments against are that Business Planning in addition to the Lean Startup method correlates positively to the chances of success and that a lot of start-ups declare it as a useful combination.

Also, the combination of the Lean Startup and the Business Model Canvas is well discussed. Felin et al. criticize the lack of specification to help entrepreneurs in hypotheses generating and testing. Other authors point out the good combination of both methods because the Business Model Canvas supports the Lean Startup in the phase of experiment, design, and testing.

Worth mentioning are also explanation and use of terms referring to the combination of Lean Startup and other approaches and tools. The use of the term "lean startup approach" which I tried as a search string in my research process is actually a combination of Lean Startup, Business Model Canvas and Customer Development named "Lean Startup Approaches" by Ghezzi (2018) and Ghezzi and Cavallo (2018). Another term introduced by Shepherd and Gruber (2021) is the "Lean Startup Framework" which adds concepts like the Market Opportunity Navigator, Business Model Canvas, Customer Development and Agile Development to the Lean Startup. So, it should be paid attention to the use of terms which are related to the Lean Startup.

According to the critical success factors for the implementation of the Lean Startup method, the importance of distinction between start-ups and established firms is a commonality in literature. While a start-up is searching for a business model, an established company focus on execution of a business model. Although this distinction implicates different success factors, they also have the success factor of team composition in common. For start-ups the role of prior market knowledge is crucial for a successful implementation of the Lean Startup method. In comparison, established firms need the right organisational structure, support of the management and entrepreneurial spirit in their company.

Summarizing, the authors are in common that using the Lean Startup method can increase the chance of success to launch a start-up with a validated business model and in large companies it has a positive impact to the innovation process. But for the successful implementation of the Lean Startup and the combination with other approaches and tools, the success factors in detail are highly individual and depend on many internal and external factors.

5.2 Implications and Further Research

The theoretical implication of this paper is to give an overview of the state-of-the-art literature on the Lean Startup and facilitate the search for underlying theoretical frameworks as well as related approaches and tool which could be combined with the Lean Startup.

My practical implications for the management use of the results relies on the general understanding of the Lean Startup method and its possibilities for start-ups and established companies. Based on the combination of the Lean Startup with other concepts and the identification of critical success factors for implementation, practical and individual guidelines for the implementation of the Lean Startup can be developed and greater mistakes can be avoided. It is also important to underline that the Lean Startup is not a one-size-fits-all solution but will create great opportunities by the right use.

For further research, I identified two main areas that can be conducted. Most of the analysed articles which refer to the combination of the Lean Startup with other approaches and tools are descriptive and in further research more empirical studies on the use of combinations should be done. Another area which is relevant for future research is the implementation of the Lean Startup in established companies. Although a few success factors and main points as well as positive examples like Samsung can be identified, the research through established companies is not specified for different sectors or markets yet.

5.3 Limitations

It is important to mention that this paper has several limitations. First, the selection of two search terms, four databases and 23 relevant articles and papers is limited to the selected quantity and my subjectivity of selection as an author. The identified literature from commonly used scientific databases in this paper also might miss some other relevant articles and papers in less-known literature or databases.

Second, the paper is also restricted to the quality of the used literature because eight of the identified literature have no ranking from VHB and only one article was published in an A-ranked journal.

Furthermore, a few papers, which probably could also have been reliant, were excluded because the access was not available. Another limitation is the searched language because the reviewed and selected articles were published in English which may exclude relevant literature in other languages.

6 Conclusion

This paper presents a systematic literature review on state-of-the-art articles and papers about the Lean Startup. The three main topics in literature refer to underlying theoretical frameworks, the Lean Startup in combination with other approaches and tools and critical success factors for the implementation of the method in start-ups and established companies.

The approaches of Lean Manufacturing, Agile Development, New Product Development and Customer Development could be identified as the main underlying frameworks of the Lean Startup method. But also, other approaches like Effectuation and Entrepreneurial Bricolage are related to the Lean Startup.

In practice, the combination of the Lean Startup with other approaches and tools is highly relevant because a combination could improve the Lean Startup and increase the chance of success. The use of the Business Model Canvas, Open Innovation or Business Planning combined with the Lean Startup can be recommended. Furthermore, the combination with Agile Development, Customer Development or/and Design Thinking is well qualified.

Identifying the critical success factors for the implementation of the Lean Startup method, the team composition is crucial for start-ups as well as for established companies. Although start-ups and established companies have this in common, it is important to differentiate whether a firm is in the search or in the execution phase of their business. Critical success factors for the implementation in start-ups are the necessity of prior market knowledge and the additional use of a business plan. In established companies the Lean Startup supports the early stage of innovation and could initialize organizational changes if the management team completely backs the use of the Lean Startup and establishes an entrepreneurial spirit in the internal start-up.

Further research can focus on the implementation of the Lean Startup in established firms and also on empirical evidence to the combination of the Lean Startup with other approaches and tools which includes the further development of the Lean Startup method.

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