Challenges of the Lean Startup Method: Entrepreneurial Knowledge Management during the BML-Loop

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Abstract: The Lean Startup methodology represents a new way of guiding startups. The therefore by Eric Ries developed Build-Measure-Learn loop should speed up the learning and development of Lean Startups through a validated learning process. This paper examines the different knowledge management aspects that are implied within the different stages of the circle and evaluates whether they are applicable in regard to the capabilities of independent startups. Four different stages, namely preparation, execution, evaluation and external knowledge have been identified from a knowledge perspective. The analysis of multiple, independent startups has shown that most ventures possess the correct infrastructure, can develop appropriate metrics, assign clear responsibilities and are capable of partial validity tests for the evaluation of qualitative data measurement. Contrary, the findings indicated that the requirements of Lean Startups in terms of the frequency for evaluation and the qualification needed for measurement significantly differed from the capabilities of the independent ventures. Further, the interviews indicated that many independent startups executed quantitative data measurement with no clear validation structure.

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Key concepts: Lean Startup, BML-Loop, Knowledge Management

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1. INTRODUCTION

1.1 Background

The creation of a new venture always involves uncertainty. One of those uncertainties, is the hazard of producing a product or service that customers don't want. Trying to minimize that hazard, Eric Ries' (2011) Lean Startup movement addressed a fundamentally new way of founding and guiding startup creation. Rather than bringing a finalized version of an organizations' product to the market, the Lean Startup method endorses the creation of an early version and its constant improvement through direct customer feedback. Ries' (2011) method convinced large amounts of entrepreneurs during the recent years, extending its initial geographical and industrial field from Silicon Valley to an international, cross-industrial level (Roush, 2011). In his opinion the key to entrepreneurial success is related to the learning progress an organization undertakes, a process that he describes as validated learning. Ries (2011) therefore presents a feedback loop (Figure 1) that should guide and facilitate the desired learning progress. Speeding up the time required to go through the different stages would therefore also accelerate the process of making the product more applicable to customer needs.

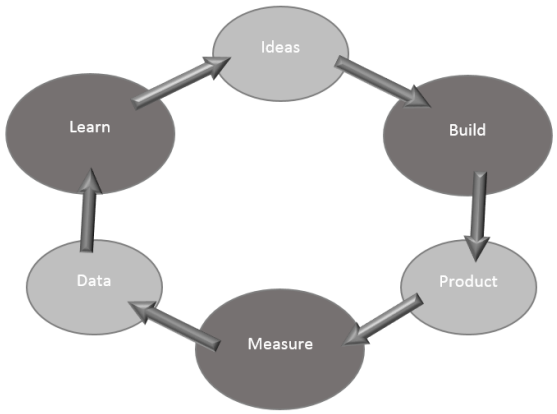

Figure 1. Eric Ries' (2011) BML-Loop

1.2 Statement of problem

"The Lean Startup is not a collection of individual tactics. It is a principled approach to new product development." (Ries, 2011, p. 55)

Ries indicated that his methodology would generate a fundamentally new view upon venture creation rather than a completed, pursuable guide for entrepreneurs. Therefore, *startups* are left with the task of assigning their *capabilities* to the different *knowledge management* functions themselves. Leaving individuals with the task of finding their own way is, however, not always uncritical. Kirschner, Sweller and Clark (2004) identified that unguided learning approaches are less effective if the individuals had no high prior knowledge in the area. This concludes that unexperienced entrepreneurs should receive more information about the capabilities that are required for implementing Ries' (2011) Lean Startup method to decrease the risk of inefficient implementation. Those information are currently not provided by Ries' (2011) general methodology.

1.3 Scope

This thesis will focus on the BML-loop provided by Ries (2011) to identify the different knowledge management aspects implied within his framework. The thereby provided, new framework for startups will clarify the applicability of Ries' (2011) BML-loop in regard to organizational capabilities of new ventures. Limiting the scope, this study focuses on independent venture creation only, which excludes intrapreneurial ventures of established organizations, as their capabilities are likely to significantly differ. Therefore, after showing the practical and scientific relevance of this paper, the next section will give a short definition of the key terms including *organizational capabilities*, *startup* and *knowledge management*. Afterwards an initial framework for knowledge management during the BML-loop will be presented. Next, the empirical section will examine the integrity of the framework by judging it based on startup capabilities within the discussion part. The final section includes the limitations of this study and incentives for future research.

1.4 Scientific Relevance

In the recent years, Ries' (2011) methodology was hardly scientifically criticised. Even though, several authors (Blomberg, 2012; Nirwan & Dhewanto, 2014) pointed out the limitations of using the Lean Startup method out of its initial context, the Silicon Valley, literature building on Ries' frameworks can barely be found. This paper's provided framework should help to combine the increasing demand for knowledge management (Malhotra, 2001) with Ries' instructions for validated learning. Building on the previous literature of renowned researchers does not only enable the creation of in-depth knowledge, but might support the motivation of further researcher's to work on Ries' (2011) concepts. Moreover, next to the scientific relevance of this paper several practical implications can be identified.

1.5 Practical Relevance

In addition to the decreased risk of inefficiency during the implementation of the Lean Startup method, the provided framework for knowledge management enables further practical benefits. Successful knowledge management does not only represent a key driver of competitive advantage, but helps to create, develop, maintain and replicate organisational capabilities (Prusak & Matson, 2006). The implementation of this paper's findings would therefore help independent startups to improve their current organisational capabilities while simultaneously inspiring the reconsideration of established knowledge management structures.

2. THEORY

2.1 Definitions

Organizational capabilities received diverse definitions within scientific literature in the previous years. Researchers like Anderson and Anderson (2010) claim that time is a crucial component to create organizational capability, which raises the question whether they can be found within independent startups. However, different scientific sources (Wu, 2007; Lee, Lee & Pennings, 2001) claim that even though startups might have a scarce access to resources, they already possess organizational capabilities to a certain extent. Using the terminology in the context of independent startups is therefore valid.

Helfat and Peteraf (2003) defined organizational capability as "the ability of an organization to perform a coordinated set of

tasks, utilizing organizational resources, for the purpose of achieving a particular end result" (p. 999). This definition implies that organizational resources are not included within organizational capabilities. Helfat and Peteraf (2009) clarified in a later paper that organizational resources actually enable the creation of capabilities. This chronology is, however, not consistent within the literature. Karra, Philips and Tracey (2008) defined capabilities as the ability to identify and acquire the necessary resources to act upon opportunities identified in the market. For this definition, organizational capabilities represent the prior factor that support the creation of resources – a fundamentally opposing view. Nevertheless, this paper seeks a definition that includes resources within organizational capabilities. Therefore, this study refers to organizational capabilities as the ability and capacity of an organization expressed in terms of its human resources, physical and material resources, financial resources, information resources and intellectual resources (Organizational capability, n.d.). This definition ignores the question of chronology, while still explaining the relationship between capabilities and resources. Furthermore, this definition already gives a first impression of the diversity of resources possibly inherited within independent startups.

The term *startup* has received many diverse definitions over the years. Most researchers, however, agree that one of the key attributes of a startup is the ability to grow (Robehemed, 2013). Nonetheless, for a scientific context this description remains too inaccurate. Ries (2010) defined a startup as a human institution designed to deliver a new product or service under the conditions of extreme uncertainty. Even though, choosing Ries definition for the content of this paper may seem like a reasonable choice, the broadness of "conditions of extreme uncertainty" are difficult to operationalize during the search for appropriate startups. Therefore, for the purpose of this study we will define the term startup based on the description of Steve Blank (2010) who defines a startup as an organization formed to search for a repeatable and scalable business model. This definition enables us to look upon each independent startup that seeks to adjust their product or service to customer needs. Blank's (2010) definition does therefore include a broader amount of startups, while it still supports Ries' (2011) idea of constant improvement.

Knowledge management is in regard to Chen and Fong (2015) concerned with the creation of knowledge management capability. This capability would be used to align firm's knowledge resources with the needs of changing markets. Even though, this reveals the importance of knowledge management for the creation of organizational capabilities, the description gives no clear overview over other functions. Fidel, Schlesinger and Cervera (2015) choose a more detailed interpretation of the concept. Regarding the authors, knowledge management comprises those organizational practices related to knowledge creation, preservation and transfer. This definition clearly defines the tasks of knowledge management while identifying its core composition as a set of practices.

2.2 Research Question

Based on the before defined key words of this study, this paper's guiding research question can be formulated:

Are the knowledge management practices as suggested by Ries' (2011) BML-loop within the borders of independent startups' capabilities?

This question requires the solving of a few sub-questions in advance.

1.1. Which organizational capabilities do independent startups possess in regard to knowledge management?

Solving this questions will require the analysis of different, independent startups to identify similarities within their capabilities in regard to knowledge management.

1.2 Which knowledge management aspects are implied within Ries' (2011) BML-loop?

The second sub-question will be answered through a closer look, upon the different aspects named within Ries' (2011) book, to identify the underlying knowledge management aspects that are required for the successful implementation of the Lean Startup method. Solving this question, will enable the creation of an initial framework that can then be tested on the capabilities of independent startups within the empirical part of this paper.

2.3 Build, Measure, Learn

Firstly, the elaboration on Ries' (2011) framework requires a detailed understanding of the three different stages described by him in his book. The build stage is mostly concerned with the creation of a minimum viable product (MVP) and the implementation of earlier learned results into the product or service. Ries (2009) defined the MVP as the version of a new product which allows a team to collect the maximum amount of validated learning about customers with the least effort. Therefore, only the core aspects necessary to get customer feedback are build, e.g. a front page web-design for a new product. After each round through the loop new features are created for the product, which again have to be tested and learned from. The measure section should then identify, if the newly added feature led to improved customer value creation by the usage of accurate metrics. Ries' (2011) developed innovation accounting method tries to measure the validated learning progress an organization undertakes. This accounting method should enable investors and founders to judge the company's progress based on their achieved learning. Therefore, metrics should be actionable, accessible and auditable. Actionable metrics identify a clear cause and effect relationship between the new feature and impact it caused. "Accessible" describes the need to report measurements as simply and unambiguous as possible. The third point, "auditable", refers to the credibility of data for employees. Decision making during the Lean Startup method often leads to changes that will kill current operations. Therefore, the credibility of the data is necessary to ensure the acceptance of the on it based decision (Ries, 2011). The final stage, learn, requires the evaluation of the measured data and the choice whether to pivot (change aspects of the current strategy) or persevere (continue with the current strategy). The learned insights are then implemented as new features to complete the loop.

2.4 Conceptual Framework

The three stages of the BML-Loop (Ries, 2011), *Build*, *Measure* and *Learn* can for knowledge management purposes be associated with the preparation, execution and the evaluation of knowledge measurement. Closing the loop, prior, evaluated measurements are used as inspiration for future knowledge management preparations. A critical reflection of Ries (2011) model, reveals that unlike suggested by the author this circle does not resemble a closed feedback loop if considered from a knowledge perspective (Figure 2). Knowledge can be both internal and external (Prusak & Matson, 2006). Internal knowledge is located within individual employees, procedures, behaviours, software or structure. Those forms of inspiration

would resemble according to Ries (2011) the inspiration for future measurement processes, hence the step from evaluation to preparation. However, individuals might also acquire knowledge from sources outside the organization to get inspiration for future features. Regarding, Prusak and Matson (2006) such external sources might be publications, universities, government agencies, professional associations, personal relations, consultants, vendors, knowledge brokers and inter-organizational alliances. Those sources represent a possible external input into the before closed loop.

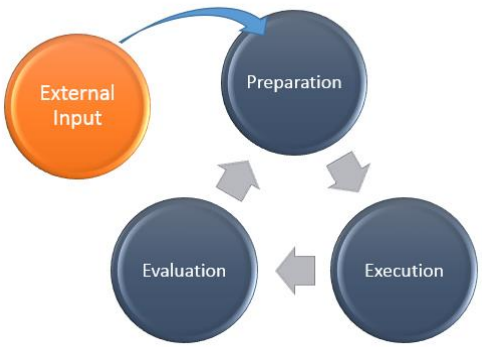

Figure 2. The influence of external knowledge

During each of the three stages of the conceptual framework different aspects have to be considered for the successful knowledge management during the feature testing process. The *preparation* stage enables the pre-conditions for successful measurement. Here, a good *infrastructure* improves the extent of knowledge sharing within the organization to enable better knowledge management performance (Jie & Zhengang, 2010). Shrivastava, Huff, Dutton and Walsh (1997) suggested a non-hierarchical, self-organizing structure, which works as a tandem with its hierarchical formal structure. This structure combines the benefits of common bureaucracy with free working project groups. This advice shows clear similarities to Ries' (2011) suggested Sandbox structure for Lean Startups. Ries (2011) suggested that cross-functional teams are responsible for testing features based on the same metrics multiple times and to report their findings based on innovation accounting to their superiors. However, infrastructure is not only related to hierarchical specifications. Also, the actual measurement tools or platforms must prepared. Those could be targeting quantitative data, e.g. in the form of software related measurement tools or qualitative data, e.g. in the form of prepared customer interview guides.

The preparation of successful data measurement will therefore also require the determination of clear *metrics* to measure. As named before, Ries (2011) suggested those metrics to be actionable, auditable and accessible. He gave special attention to avoid the sole measurement of total numbers that hide the actual impact of new features. Therefore, metrics should always enable a cohort analysis, an overview over all behaviours different customer groups showed over a certain time period (Cohort analysis, n.d.). Contrary to total numbers a cohort analysis would identify the real impact on customer satisfaction regarding new features. Startups should therefore determine such metrics to enable the successful evaluation of knowledge from the measurement processes.

Coaching represents the last point during the preparation stage of the knowledge management framework. Individuals that execute the measurement must be qualified enough to successfully execute their task. Coaching becomes significantly more important for tacit knowledge (Prusak & Matson, 2006). As an example, measuring the impact of friendly customer service requires employees to know how to be friendly to customers in the first place. How to be friendly, however, represents tacit knowledge that, in contrast to explicit knowledge, cannot easily be transferred to another individual (Al-Qdah & Salim, 2013). Teaching the individual employee methods for good customer interaction will support him to develop the necessary qualifications. Therefore, coaching helps to enable the pre-conditions for successful knowledge measurement.

During the *execution* stage, knowledge management is mostly concerned with the validity of the measurement, hence the question whether the measured results where the ones that were intended to be measured. Firstly, this implies that the measured data was correctly reported, and that there were measures taken to prevent measurement bias. Secondly, the measurement must be clearly related to the impact of the new feature. Ries (2011) therefore suggested to make use of the kanban diagram (Table 1), an overview chart of different feature tests and their current status. The kanban diagram allows only a limited amount of features in each status box to enable an almost chronological validation of features. Even though this diagram enables the

Backlog	In Progress	Built	Validated
A B C	D E	F	

Table 1. Kanban diagram of work as it progresses (Ries 2011)

constant improvement of the organization's product or service, it should be noted that it does not identify individual features true impact in relation to each other. As an example imagine a blue website background as feature A, a yellow headline banner on top of the page as feature B, and a blue font colour as feature C (Figure 3). Tests of feature A, both individually and together with feature B showed a positive impact on customer satisfaction. Including feature C, customer satisfaction decreases as users are not possible to read blue font on a blue background. According, to the Kanban diagram this feature would therefore not be validated and would be removed. However, the tests didn't necessarily show that a blue font leads to customer dissatisfaction, only that a blue font combined with prior features tested would do. Imagine removing feature A, the blue background, and solely testing feature B and C together. This might enable an even higher customer satisfaction, as the one achieved through the combination of feature A and B. Even though, the problem of this cause-effect relationship cannot be solved within the scope of this paper, entrepreneurs should be aware that negatively impacting features should not always be abandoned right away. Striving for general product improvements, the kanban method would nevertheless represent a good tool for startups to increase feature testing validation during the execution stage. Even though, individual startups are not required to make use of the diagram specifically, the validity of their measurements should be secured in certain ways. The analyses will show if or which validity tests startups are using.

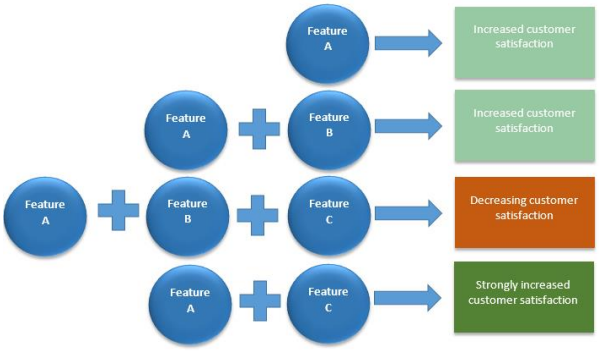

Figure 3. Illustration of the limitations of the kanban diagram as suggested by Ries (2011)

The last point, *evaluation*, refers to the analysis of gathered data and the transformation into information that can be used as inspiration for future feature tests. Ries' (2011) Lean Startup methodology suggests that startups evaluate their performance after each new feature test, hence with a relative high *frequency*. This instant evaluation of past tests should enable a faster adjustment of the product's features to customer's needs. Questionable is however, if startups possess the capabilities for evaluation with such a high frequency. Also, Ries' (2011) implies that the evaluation of measurement is done by the same team that executed the measurement. The *responsibility* does therefore lie with the same individuals. The analysis will show, if this structure is also applicable for independent startups, as their hierarchy might be different.

The before named knowledge management aspects implied within Ries' (2011) BML-loop enabled the creation of an initial framework for the empirical section of this paper (Figure 4). The organizational capabilities of independent startups limit the preparation, execution and evaluation of new feature tests and their respective aspects. However, the empirical part will identify which knowledge management aspects do lie outside the current organizational capabilities.

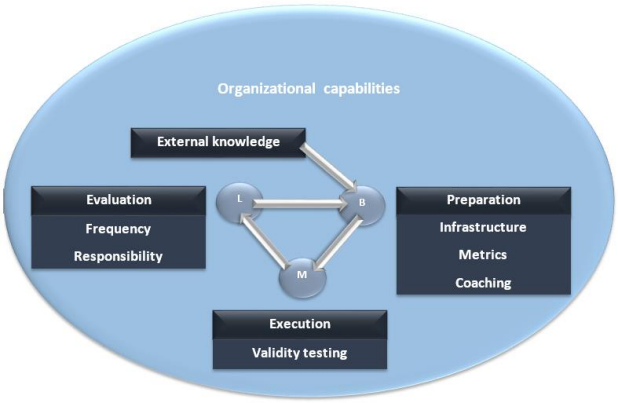

Figure 4. Ries' (2011) BML-loop from a knowledge management perspective, positioned within the limitations of organizational capabilities

3. METHODOLOGY

For the empirical part of this paper six founders of independent, German startups that fit into the borders of this paper's definition, were interviewed. The interviews were semi-structured and based on an initially prepared interview guide. This structure allowed the discussion of emerging findings and new annotations, while following a general outline. Further, the preparation of an initial interview guide outline (see Appendix), should help to decrease the founder's mistrust towards the questioning of sensitive information. The interviews were executed online through video chats to avoid the difficulty of geographical differences, while maintaining both, the benefits of face-to-face communication and time effectiveness. The individual interviews took around 20 to 30 minutes each and were introduced through a few minutes of small talk to establish an initial rapport, aiming to increase the quality of acquired data during the rest of the conference. Two founders that were located in foreign countries and were unable to communicate through video chats received a specific open questionnaire, relating to their organizations characteristics and detailed, supportive instructions for the separate questions.

The prepared interview guide was based on the prior constructed framework. The open questions were therefore closely related to the organizational capabilities and the preparation, execution, evaluation and external knowledge stages. Here, the created questions should provide enough qualitative data to answer the initial research question, while remaining open enough to include new comments and suggestions made by the interviewees. Therefore, the initial interview guide was tested on a single founder to try its effectiveness. The initial pre-test revealed that closed questions were only partially applicable for the startups, as many of them could be answered through "Yes/No"-replies, leaving the alternative solutions found and applied by the startups hidden. Therefore, the second questionnaire was designed in a less structured way and was orally supplied through many "Why?" questions to identify underlying assumptions and to enable a more in depth acquisition of qualitative data.

The six independent startups were chosen from diverse industry sectors to test the initial framework on a general, industry-crossing level. Three startups were focused on the creation of online applications for different market segments, ranging from music, over healthcare, to information systems. Another startup created an online platform targeting the job market and therefore both B2B and B2C clients. The remaining two startups, working mostly offline, were located within the food and energy industries. In general, the startups organizational ages ranged from two weeks up to two and a half years since their foundation. The organizational founders were both masculine and feminine. The participants of the interviews and open questions were promised to be kept anonymous.

The evaluation of the received data was done through the visualization within a matrix. The individual interviews or questionnaires were evaluated based on the headlines general, preparation, execution, evaluation. The first column included general information about age, industry, employees, resource dedication to feature testing and sources of inspiration. The remaining three columns, included the answers and annotations to the respective knowledge management aspects. The established matrix then enabled a more precise analyses of similarities and patterns within the data, to find the answers to our prior established research question.

4. ANALYSIS

The analysis of the interviews showed several regularities between the different startups. All startups named multiple knowledge sources as an inspiration for new product features. Here, not only employees' ideas and customer feedback were mentioned, but also competitor analysis. Universities,

knowledge brokers, government agencies, consultants, professional associations, alliances or scientific literature as an inspiration for new product features were, however, not mentioned by any organization. In total, most startups spend most of their resources, both time and finances, on the preparation stage. Unfortunately, those efforts were mainly based on the preparation of the prototyped or actual new feature, rather than the preparation of measurement tools. The preparation of questionnaires or monitoring software was for most startups a unique, non-recurring task that required only a partial amount of organizational resources. Only two startups claimed to adjust their measurement tools for new product features. The actual measurement took the least effort, as most startups stated to use quantitative measurement tools that worked without any human interaction. Nevertheless, also startups that prepared customer interviews, hence qualitative measurement methods, were convinced that the actual measurement process required only very little effort. Further, only a small amount of organizational resources was spend on the evaluation of information. In conclusion, most startups prepared the actual product- or service feature extensively, dedicating many resources to it, while leaving less capabilities left for the preparation, execution and evaluation of measuring its impact.

Most of the individuals responsible for the preparation and execution of measurements were co-founders off the organization and therefore positioned in an equal hierarchical situation compared to most of their co-workers. However, all individuals responsible were neither solely focused on the preparation, execution or evaluation of the measurement, hence had other organizational tasks to fulfil, nor had any prior coaching in regard to knowledge management or feature testing. Most individuals claimed to follow a learning-by-doing approach. Nevertheless, each of the interviewed startups thought about reasonable metrics before testing new service features. Here, the focus upon total numbers and percentage numbers was equally spread among the startups. While the motivation for percentual metrics was often to identify customer's reactions and behaviour in regard to the new feature, two newly found startups explained their choice for total numbers differently. In their opinion, during the early stages of the foundation, friends, family and acquaintances in addition to initial public attention sophisticate the early data. Metrics based on percentages would therefore not represent the desired future customer, while total numbers would at least give a few indications about the product's or service's appeal.

The execution of measurement was diverse for quantitative and qualitative data. Organizations that measured quantitative data were mostly focused on the evaluation of online content and used external programmes to measure the impact of new features. On the contrary, the measurement of qualitative data was based on direct customer interviews or questionnaires. Different startups claimed that the structure of the questionnaire had to be adjusted several times to fit both organizational and customer needs. Also, one startup admitted, that their company would not have the experience to judge whether a measurement was biased or unbiased through external influences. Applied models like the kanban diagram to guarantee the validity of the feature tests where not named by any startup.

In all startups the evaluation of data was done by the same individuals that prepared and measured the data beforehand. Often, those individuals then reported the results of their evaluation to the rest of the team in a meeting. The frequency of evaluation was quite diverse. While some startups evaluated their new data every 3 days, others did so twice a year. However, the underlying regularity seemed to be similar. Most startups measured and evaluated information, whenever, as perceived by them, major product or service changes were done. Also, founders using quantitative measurement tools claimed to regularly look at the overall data, especially after the execution of specific marketing activities. Comparing the different organizational life times in regard to the frequency of evaluation of data, the interviews have shown a clear tendency for more evaluation during the early months after the foundation and a more regular, less often evaluation for startups with a longer lifetime.

5. DISCUSSION

Regarding the question, whether the knowledge management practices as suggested by Ries' (2011) BML-loop are positioned within the borders of independent startup's capabilities, the analysis of the independent startups enabled the examination of our initial framework. Based on the empirical research, we can identify which of the knowledge management practices lie within the capabilities of independent startups (Figure 5). The illustration shows that many capabilities of independent startups comply with the requirements of the Lean Startup methodology. On the other hand, two aspects required could not be identified during the analyses of the independent ventures.

The provided framework suggested an extension to include the aspect of external knowledge input. This contradicts with Ries' (2011) BML-circle, which indicates a closed loop that motivates new changes based on prior tests. Analysis has shown, that individuals in organizations receive their inspiration for new feature tests from a wider diversity of both internal and external sources. The suggested extension is therefore validated through the analysis. The internal sources, which Ries (2011) already described are based on employees knowledge and prior product tests. External sources named, where competitor analyses and customer opinions. Those customer opinions were received outside the scope of product tests, e.g. on a company's feedback page. Startups that want to apply a Lean Startup approach should therefore consider including external knowledge sources as an inspiration for new product features, to avoid limiting their own scope by strictly following Ries' (2011) model.

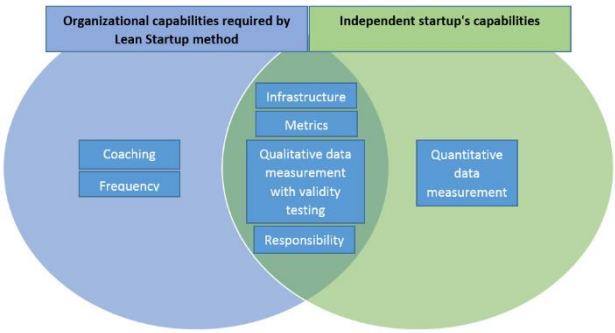

Figure 5. Illustrated intersection of independent startup's capabilities and Lean Startup method's requirements

The by Ries (2011) suggested structure of cross-functional teams were almost everywhere available in a limited form. Due to a small amount of employees, founders were often responsible for multiple departmental functions at once. However, the evaluation of data was mostly done by multiple individuals together. This enabled the exchange of different perspectives on the measurement process. Therefore, Ries' (2011) sandbox structure could be applied in a minimalistic version within the capabilities of the analysed independent startups. Less sufficient was the qualification of the responsible individuals. None of the interviewed founders had any prior education in regard to the measurement or evaluation of data. Even though, most founders

claimed to have learned important information through learning-by-doing, implementers of the Lean Startup approach should be aware that having no prior education can lead to significant mistakes during the preparation, measurement and evaluation of data. Nevertheless, all individuals responsible clarified beforehand which metrics they wanted to measure. Even though, Ries' (2011) idea of cohort metrics wasn't implemented in all independent startups interviewed, applying them, would not extent their organizational capabilities. We can therefore conclude, that both, the preparation of metrics and infrastructure as indicated by the Lean startup method, can be fulfilled within the capabilities of independent startups. However, measuring new product features under a Lean Startup structure would require startups to significantly increase their investment into employee coaching to avoid future problems.

The execution part showed crucial differences between qualitative and quantitative measurements for the interviewed startups. Startups that focused on quantitative data outsourced all responsibilities for the measurement of validated and unbiased data to third party programmes. The measurement process was often done by Google Analytics. Here, the researcher himself got little control over the correctness of the received numbers. Contrary, most qualitative researchers made use of interviews. Here, several organizations adjusted their questionnaires during the process, to fit them to their customer needs and the measured feature. Thereby, the startups had the possibility to avoid receiving biased data for the costs of more effort. The qualitative analysis furthermore enables a clear inspection of the impact of the new feature on customer satisfaction, giving a better understanding of the cause-effect relationship. Anyhow, not all independent startups had the capabilities to make qualitative interviews or questionnaires. This indicates that organizations should consider beforehand if their resources are sufficient to enable qualitative measurements to prove the validity of their measurements, before they decide to follow a Lean Startup approach.

For all interviewed startups the responsibility for evaluating data lies within the same individuals that also executed the prior measurement. Often, as suggested by Ries' (2011) the results of the evaluation were then reported to other employees within the organization to achieve organizational learning. Therefore, individual startups seem to be capable of assigning responsibilities during the evaluation process, as needed for a Lean Startup approach. However, the frequency of evaluation significantly differ from Ries' (2011) suggestions. While Ries' (2011) Lean Startup method evaluates every new feature right away, the interviewed startups showed considerably distinctive regularities for evaluation. The time between evaluations ranging from 3 days to 6 month can be explained through the diverse nature of the products. While some products, were often and rapidly adjusted to fit a fast changing competitive environment, others were delivered only once or twice a year to the customer. Yet, as stated before, all independent startups evaluated their data mostly after major product changes or specific marketing campaigns. Also, multiple startups named, that the overall amount of data evaluation was higher during the early months after the foundation. This information contradicts with Ries' (2011) general idea of the BML-loop. As stated by him, the main goal of an organization is to speed up the time necessary to go through the different stages of the circle. However, as the analysis has shown, many startups appear to accelerate faster during the early stages of the foundation, while slowing down after a few months. Based on this findings, independent startups, that want to follow a Lean Startup approach, should clarify whether they are capable of frequent evaluation of new product features and adjust their rhythm for evaluation accordingly. Further, the analysis of the independent startups has shown, that the capabilities for such regular evaluation is not common within independent startups.

This paper's findings indicated that not all capabilities that are implied within Ries' (2011) Lean Startup methodology are inherited in independent startups. Based on the delivered framework, Lean Startup interested organizations can identify, which organizational capabilities they need to develop to increase their chances on successful knowledge management during the implementation of the new methodology.

6. LIMITATIONS AND FURTHER RESEARCH

The proposed framework of knowledge management aspects that are implied within Ries' (2011) BML-loop gives an overview over important criteria that must be met to follow his Lean Startup method. However, the scope of this research cannot evaluate the impact of missing aspects on the overall success of the feature test. The relative importance of the different aspects is therefore not clarified. Based on this limitation, further research would enable clear insights into the relative importance of the different aspects which would enable a more precise allocation and focus of organizational capabilities.

Furthermore, the scope of this research was based on the capabilities of independent startups. This paper does therefore not examine whether Ries' (2011) Lean Startup method fits the capabilities of company founded new ventures. Additional research could empirically identify the capabilities of company founded startups in regard to the different knowledge management aspects. The comparison of independent and spin-off companies in regard to their fit to Ries' (2011) Lean Startup method could reveal important information on which organizations should apply the lean principles.

Even though, this study shows capabilities that must be developed to implement a Lean Startup method, it leaves the evaluation of own capabilities to the startup itself. A comparison of current and required capabilities must therefore be executed by the organization itself as this is not included within the scope of this paper.

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APPENDIX

OPEN INTERVIEW GUIDE

1. General information: Startup life-span, amount of employees, industry
2. Which amount of your resources do you dedicate to testing and evaluating new product or service features? Which proportion do the preparation, execution and evaluation respectively have?
3. During the development of new product or service features, do you prepare the measurement of data? How do you determine metrics?
4. Which kind of data is measured? Is the measurement related to qualitative or quantitative data?
5. Who is responsible for the measurement of data in your organization? In which hierarchical position does this person stand within the company?
6. Which qualifications does the person have, that prepares the data measurement? Was the person coached for the data measurement?
7. Are there security measures to guarantee unbiased measurement? If so, which?
8. Is the validity of measurement secured? Is there a security, that measurements are directly related to the impact of the tested feature?
9. Who is evaluating data in your organization?
10. How often is data evaluated in your organization and with which frequency?
11. Where do you receive inspiration for new product or service features from?