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SMART PLATFORM EXPERIMENT CYCLE (SPEC): A VALIDATION PROCESS FOR DIGITAL PLATFORMS

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ABSTRACT

Digital platform business models are radically changing industries and are altering the way value is created. Current validation processes for business models are solely designed for pipeline business models, and do not incorporate the digital platform logic. Therefore, a new process for an early market validation of digital platform business models has been developed, following a Design Science Research methodology. The designed process, called Smart Platform Experiment Cycle (SPEC), increases the success rate and limits the risk of building something the market might not need. SPEC is based on the combination of the Four-Step Iterative Cycle of business experiments, the Customer Development Process and the Build-Measure-Learn feedback loop of the Lean Startup approach, enriched with digital platform knowledge. It consists of five steps: (1) design the platform business model, (2) design experiments for consumers and producers, (3) build experiments including a Minimal Viable Product (MVP) and implement a Measuring Metric, (4) run the experiments and measure the outcome, and (5) analyze and learn from the results. In order to validate the process, it was applied within a real German startup called GassiAlarm, which is based on a digital platform business model. The application of SPEC within this real use-case shows an example of how to prevent high expenditure and futile time intensive developments.

KEYWORDS

Validation Process, Platform Business Experiments, Customer Development Process, Lean Startup, Four-Step Iterative Cycle, Digital Platform

1. INTRODUCTION

Nowadays the world's top five brands (Apple, Google, Microsoft, Amazon and Facebook) are based on a digital platform business model [1]. "A [digital] platform is a business based on enabling value-creating interactions between external producers and consumers" [2]. This pattern of a business model is radically changing the world in terms of how demand (consumers) and supply (producers) interacts with each other, especially in comparison to traditional pipeline businesses, which are also known as linear business models. A pipeline business is a business that takes in components, combines these components to products or services and sells these goods/services to customers [3]. A digital platform, however, serves as a virtual marketplace, where producers and consumers meet and exchange goods or services. Therefore, it has to be able to serve two sides of the market appropriately. In order to be successful, the digital platform business needs to be able to attract producer and consumers to the digital platform, offer an suitable environment for an exchange between the two parties and guarantee the return of the parties for future exchanges [2].

In the age of digital transformation, digital platform business models are not only realized by large corporates but also increasingly by startups. Blank and Dorf [4] define a startup as "a temporary organization in search of a scalable, repeatable, profitable business model". A characteristic for startups is their operation on a low budget, which makes time and money crucial factors during the development of their business model [5].

The use of business experiments is a common way in the corporate world to know how well a new product

or service will be accepted by customers. Here, managers rely on data, their intuition and experience when launching new products. Practice has shown, however, that data that captures past events is an unreliable measure to predict customer behavior, when it comes to innovations. Thus, current research suggests that startups as well as corporates test their innovative products with the help of business experiments and to start the experimenting from day one [5, 6].

Existing validation processes for new as well as consistent business models are generic for all kind of enterprises. Validation through business experiments proves, if the business model is repeatable and scalable. It enables startups and incumbents to gain a new level of understanding regarding their strategy execution. However, current validation processes for business models are all solely designed for pipeline business models, and do not incorporate the digital platform logic.[4, 5] If startups and corporates validate their digital platform business ideas with validation processes for pipeline business models, the validation does not fulfill its purpose, or may provide wrong insides due to the differences between pipeline and digital platform business models.

As a result, the purpose of this paper is to come up with a validation process for digital platform business models in order to increase the success rate and to limit the risk of building something the market might not need. To do so, the authors follow the Design Science Research methodology that targets limitations of current literature and serves as a mental model to design solutions of relevant identified problems. Currently, no validation process exist which focuses on digital platform business models, such as the consumers and the producers side. Design science research allows us to make use of prior research and enrich it with current knowledge of digital platform logic in order to design a validation model that is applicable for digital platform business models. Furthermore, it enables us to fill the gap in existing literature and to create a new validation process that serves as a tool for startups and corporates with a digital platform business model. Therefore, this paper answers the following research questions:

RQI: How can startups and corporates validate their digital platform business model using business experiments?

RQ2: How can the validation process be executed with limited investments available, precisely time and money?

To answer these research questions current validation processes for business models were analyzed. Next, similarities between pipeline business models and digital platform business models were identified and revealed which elements of the current validation process are also applicable for digital platforms. Based on this information the *Smart Platform Experiment Cycle (SPEC)* was designed. In a consecutive step, the efficacy of SPEC was demonstrated by applying it in a startup with a digital platform business model.

This paper is structured as follows; first, the theoretical framework regarding validation and relevant validation processes for innovative business models are presented, and pipeline as well as digital platform business models more precisely explained. Secondly, the research design is described and how it was applied to design the SPEC, which is presented in the results chapter. Next, the new validation process is externally validated by a startup that applied the SPEC to demonstrate if it fulfills its purpose. This work ends with a discussion and suggestions for future implication for researchers, practitioners and corporates/startups dealing with innovations.

2. THEORETICAL FRAMEWORK

2.1. Validation

Validation answers the question of "was the right product built" and thereby shows, if "the product does what it is supposed to do in the intended operational environment" [7]. Validation involves a process which assures that the product, service or system fulfills the stakeholder's need, and therefore sheds light on its acceptance and suitability, for instance, with customers. It is done "either during or at the end of the development process" [7]. Hence, it can be seen as a "continuous and systematic comparison" of the present state with the defined objectives [8]. According to Albers et al. [9], validation activities reveal, if customer needs are met and technical requirements are followed. In this regard, the term verification is often named as well, since they are correlated. Generally, verification indicates an internal process that evaluates, if a product, service or system meets the agreed requirements and specifications or complies with regulations or defined conditions that were set at the beginning of product development. Essentially, verifying a product or service intents to answer the questions "was the product built (written, built, coded, assembled and integrated) correctly". Consequently, these two aspects point out, that the internal and external

perspectives in the development of products, services or systems need to be considered [4].

2.2. Business Experiments

Experiments are a specific form of survey or observation under controlled conditions (environmental factors are excluded). The aim of experiments is to "measure the effect that an action has on a situation by demonstrating a causal relationship or determining conclusively that one thing is the result of another" [10]. More precisely, "[i]n an ideal experiment the tester separates an independent variable (the presumed cause) from a dependent variable (the observed effect) while holding all other potential cause constant, and then manipulates the former to study changes in the latter" [6]. Depending on the way, in which the results are determined, a distinction is made between a survey experiment (e.g. price of a product and purchase intent) and an observation experiment (e.g. in the case of comparable customers, prices are lowered in a company and the changes in turnover are observed) [11].

Through experiments, businesses are able to gain a new level of understanding regarding strategy execution, since it reveals the "potential impact and the value of tactical changes" [12]. Blank and Dorf [4] integrated business experiments in their work as well and developed the Customer Development Process; a process that utilizes the traditional cycle of experimenting as a foundation to validate empirically each component of the Business Model Canvas (BMC), which is formulated as testable hypotheses [4]. Ultimately, a business model is created with the help of the customers. Ries [5] called this method Lean Startup, since it keeps all processes as lean as possible, including all experiments, in order to find out how to build a viable business model. Unlike in traditional strategic planning, the Lean Startup method makes use of experiments from the first day on and includes real products, tested on real customers, instead of developing them in Research and Development departments. [5]

Despite the early experiments, a certain degree of uncertainty still surrounds the results of experiments. To diminish the uncertainty, business experimentation undergoes a Four-Step Iterative Cycle that tests an array of solution concepts repetitively [13].

2.3. Four-Step Iterative Cycle

Business experimentation is a useful way of identifying better ways of doing business [6]. According to Thomke [13], it is normal that the direction of the results is not obvious in general. Therefore, business experimentation is seen as a Four-Step Iterative Cycle, in which several solution concepts are generated and consecutively tested "against an array of requirements and constraints" [13]. The Four-Step Iterative Cycle consists of (1) design, (2) build, (3) run and (4) analyze, is repeatable many times and might involve "multiple individuals, groups or departments" [13].

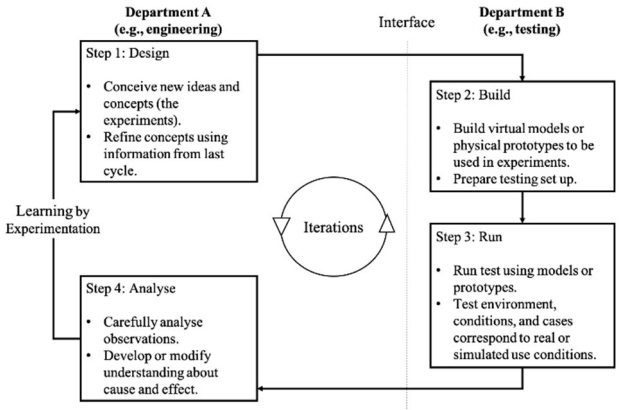

Figure 1: Four-Step Iterative Cycle (own presentation based on [13])

Figure 1 shows the Four-Step Iterative Cycle. In step (1) design, the tester defines the learning goals for the experiments. To do so, "existing data, observations, and prior experiments are reviewed". In addition, through creative methods such as brainstorming, concepts are drawn and hypotheses are formulated [13, 5]. Afterwards different experiments are chosen which run in parallel and are analyzed simultaneously. The tester usually brainstorms about different designs, which hold compared to the existing design, radical changes [13]. However, practice has shown that minor changes are sufficient to reach the set of goals [6]. In step (2) *build*, necessary prototypes to conduct the experiments, are built either virtually or physically. In step (3) *run* the experiments, either a real setting or an artificial environment at the laboratory is chosen. When choosing the laboratory setting, it should be kept in mind that potential errors might remain undetected, since real circumstances cannot be replicated thoroughly. In step (4) *analyze*, the results of the experiments are analyzed by comparing them to the expectations. The findings are used to adjust the understanding of the experimented object. As a result, the analyze step is seen as the step which generates the greatest learning effects about the cause and effect relationship. By using the Four-Step Iterative Cycle, the tester is able to get new insights and learn about

possible solutions but also errors, which have not been considered before. The new findings guide the tester to "revise and refine the solutions" until "an acceptable result" is found by repeating the cycle many times [13]. As soon as the hypotheses can be validated sufficiently, the experiments can be stopped, otherwise the findings are used as a basis for adjusting the experiment accordingly and start the cycle anew [13].

2.4. Lean Startup

According to the Lean Startup methodology, finding the right business model for a startup is the outcome of experiments, while finding the right product are the steps of business experimenting [5]. Similar to traditional business experimentation, the Lean Startup methodology also uses an iterative cycle to learn about the product that fits the customer the most. Additionally, customer feedback is used to identify the product that provides the highest benefit. Based on business experiments, Ries created the Build-Measure-Learn (BML) feedback loop that serves as the core of the Lean Startup method. Here, customers generate feedback and data after interacting with products. Qualitative feedback reflects how satisfied customers are with the performance or the service.

Quantitative feedback shows how many customers have used the product. Regarding the BML feedback loop, entrepreneurs are aiming to reduce the overall lead-time of the feedback loop. The goal is to obtain the greatest possible feedback with minimal efforts by building a product for a certain target group, such as investors or early adopters with certain characteristics in the shortest possible time and by minimizing waste [5]. Figure 2 shows the Build-Measure-Learn Feedback Loop. Only the interplay of all activities ensures entrepreneurial thinking. The BML feedback loop consists of three phases, (1) build, (2) measure and (3) learn. Unlike in business experiments, where hypotheses are built on observation, data and previous experiments, startups build their hypotheses based on assumptions. Thereby concentrating on a value hypothesis and a growth hypothesis.

In the (1) build phase, it is important to come up fast with the Minimum Viable Product (MVP). The MVP represents a product that features the smallest possible set of functions desired by the customers [5, 4]. Since startups have limited resources, it would be a waste to build a detailed product on the base of the first vision, since it is not clear which functions the customer would use most or would be willing to pay for later

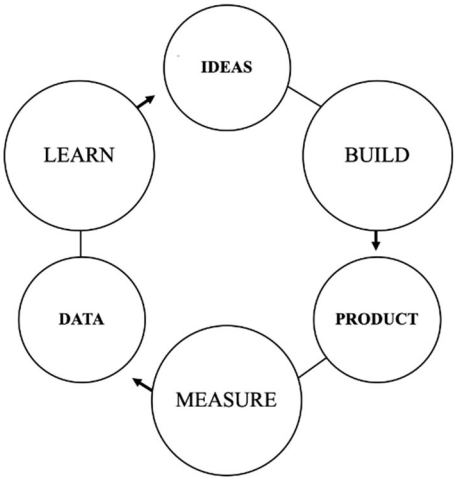

Figure 2: Build-Measure-Learn Feedback Loop (own presentation based on [5])

[5]. The aim of the MVP is to find out whether the proposed product offers a solution for the customer and if the customer is willing to pay for this solution; it reveals the customer's wishes. The MVP is considered the fastest way to go through the BML feedback loop [5].

The aim of the (2) measure phase is to test the hypotheses made about quality, price and costs of the product. In this state, a quantitative approach called innovation accounting should be applied, which reveals, if the "engine-tuning efforts" made, come to fruition and is desired by the customer [5]. Every step in the experiment is considered a learning milestone that shows the progress the startup makes in an accurate and objective way. The (3) learning phase is similar to step four of the Four-Step Iterative Cycle and reveals, whether the formulated hypotheses can be verified or not. It also indicates, if the strategy of the startup realized by the MVP, fulfills the customer's needs or if a change of the strategy is necessary [5]. Since the likelihood exists, that the strategy needs to be reformulated, it is important to go through the BML feedback loop fast and to invest in the MVP.

2.5. Customer Development Process

The *Customer Development Process* is a tool that organizes the search for a business model (phase one) and the execution of the business model (phase two) with a scalable product. The Customer Development Process consists of four steps: step (1) customer discovery, and step (2) customer validation, both representing the search of the business model. Step (3) customer creation, and step (4) company building, represent the execution of the business model that has

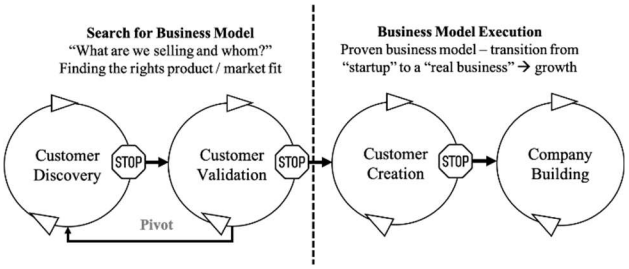

Figure 3: Customer Development Process (own presentation based on [4])

been developed, tested and verified in the previous steps [4].

The customer discovery and the customer validation are especially important for startups, because both phases deal with the MVP and the early adopters [5]. The combination of the two steps "refine[s], corroborate[s], and test[s] a startup's business model". Upon their completion, the verification of "the product's core features, [and] the market's existence" is finalized. Additionally, customers are located, "the product's perceived value and demand" tested, "the economic buyer" identified, "pricing and channel strategies" established, and "the proposed sales cycle and process" checked. The Business Model Execution phase is only entered, when a respectable sized customer group with repeated sales and a profitable business model is validated [4]. The customer creation step stimulates "end-user demand" and thereby scales the business. The last step, company building, turns the startup into a company [4]. The following Figure 3 shows the Customer Development Process.

The Customer Development Process is illustrated "as a circular track with recursive arrows", signaling the iterative nature of startups, since several adjustments are made until the right business model is found. The result of the iterative process extracts a factual business model for the startup and ensures its success as a profitable and growing business [4]. The customer discovery is the first step and turns each section of the BMC into testable hypotheses. Experiments are developed for each hypothesis in order to validate or falsify the existing business model.

The customer discovery and the customer validation are steps that test the business model of the startup and determine, if there is a market for the product and if the customers are willing to pay for it. It happens, however, quite often in the customer discovery and customer validation step that some hypothesis turns out to be pivots. It is important to note that a pivot is not considered a failure [4]. Pivots are major changes to the components of the BMC due to customer feedback. [4, 5] Adapting the BMC and changing course throughout the development of the most valued product, is a significant part of a startup. It is, in fact, better to pivot along the way, instead of designing and producing a detailed product and afterwards being faced with the fact that the customer does not need the product nor is willing to pay for it. If so, it would have been a waste of resources (money and time) what startups have to avoid [5, 14, 15]. Thus, startups go through these two process steps several times until the educated guesses are proven facts and are scalable. After these two phases, there is no possibility to pivot.

2.6. Digital Platform

"A [digital] platform is a business based on enabling value-creating interactions between external producers and consumers" [2]. It is not merely a mobile app, website or, as often falsely believed, only a technology. A [digital] platform is considered a business model [16] that "enabl[es] efficient social and business interactions" which are consolidated by software [17]. The value creation of a digital platform is based on the exchange of information, goods or services and any type of currency between the users (producer and consumer) on the platform [2]. Digital platforms bring together two interdependent groups of

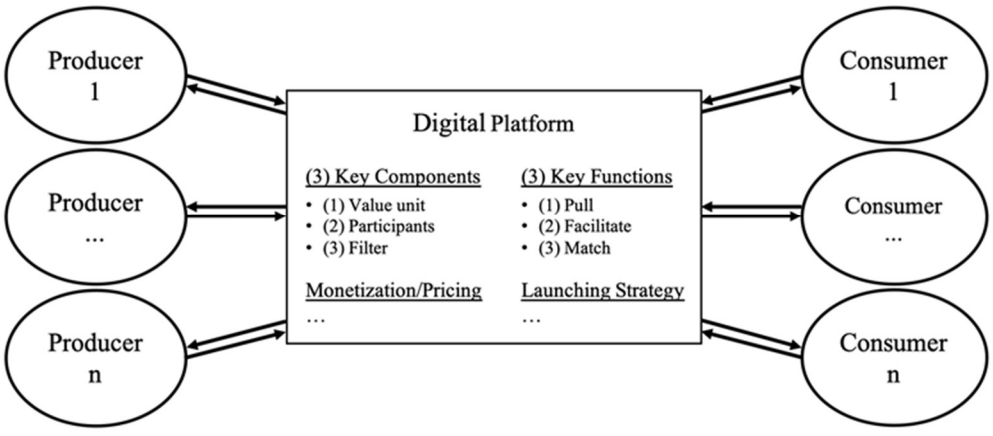

Figure 4: Structure of a Digital Platform

users and influences the amount of the participating group by charging one group less to an equal proportion than the other group for the services it provides.

Thus, the market is two-sided, when the platform is able to influence the volume of transaction through a pricing strategy [18]. In this paper, the term platform is a synonym for digital platform. For a digital platform, it is important to serve the groups simultaneously and to solve the chicken- and-egg dilemma. The dilemma describes the issues that the success of a platform depends on the presence of both producer and consumer; however, the likelihood of joining the platform depends on the other party being present [19, 2]. Although there are different platform businesses, the systems follow a similar architecture. Figure 4 shows the structure of a digital platform. A digital platform starts with one core interaction that aims to make the exchange "as easy, attractive and valuable […] as possible" for users [2].

"Platform design isn't just about creating the underlying technology. It's about understanding and creating the whole business and how it will create value and build a network" [16]. Every platform starts with one core interaction which aims to make the exchange "as easy, attractive and valuable […] as possible" for the users [2]. It is fundamental for a successful platform to facilitate the core interaction by regarding the following three key components, (1) value unit, (2) participants and (3) filter: The core interaction is the reason why the platform exists. Over time, it is possible for the platform to come up with more core interactions and integrate them on the platform. Moazed [16] mentions the existence of four core function that should be given to ensure a good performance and avoid a failure: to *attract* and *match* a group of users, *offer* an infrastructure for the exchange and *manage* it.

Further research has shown, that economists, such as Choudary [17] and Parker et al. [2] summarize the last two functions as a key function for *facilitate*. Concluding, the literature talks about *three* key functions, which are namely, to (1) *pull* the participants to the platform, (2) *facilitate* the interaction with tools and rules and (3) *match* the producers with the right consumers by sharing the right information. Furthermore, a successful digital platform must have more factors of success like *modularity*, *governance* and *openness*, but the focus in this paper lies on the factors mentioned above.

With the help of the network effect, which is seen as a market-/growth building tool, the value creation and competitive advantage of a digital platform is promoted. The network effect describes how the value of a product to a user depends on the number of other users using it [20, 21, 2]. Here, early adopters are able to attract other users to the platform through positive feedback and facilitate reaching the critical mass, which is crucial for a platform to avoid the chicken- and egg dilemma and ignites the network effect [20, 21]. Literature has identified several strategies to circumvent the chicken- and egg-dilemma, which occurs in the launching stage of a digital platform [16, 2, 19]. A key to success is to focus on user commitment which is gained, when the user has the possibility to test the platform, then realizes its value and uses it regularly [2].

3. METHODOLOGY

The authors employ the Design Science Research methodology by Peffers et al. [22] and apply the first four activities of this process model. Compared to traditional, description-oriented research, which discovers and justifies unexplained phenomena, design-oriented research designs and evaluates solutions for relevant problems [23].

Following this design-oriented research approach researchers, external startup and corporates who are already exploiting digital platform business models, came together in workshops to design and evaluate a new validation process. Following the first activity of design science research, *problem identification and motivation*, the researcher examined current state-of-the-art approaches to validate business models. It was found that current approaches are all designed for pipeline business models, which follow an input-throughput-output-logic. Validation processes for the orchestration of markets (digital platforms) were not found. Entering the second activity, *Objectives of a solution*, the participants set the objective to design a validation process that is applicable to digital platform business models.

For the *design and development* activity, the participants first examined pipeline business models and digital platform business models and extracted similarities between the models. With the similarities between pipeline and digital platform in mind, the researchers looked at the elements in the validation processes that validate the similarities in the business models and extracted these as element for the new validation process. Doing so, the participants are able

to remain consistent with current literature and are more likely to be complete and robust with their modelling [23]. Next, the participants identified differences and used current literature to point out, what elements and factors need to be considered and added to validate a digital platform business model. In the case of startups, for instance, the factors time and money are crucial. In case of platform business models, the two sides of the market have to be included as well.

In summary, the researches extracted elements of existing validation processes and added important components that are based on the knowledge of digital platforms and startups and created an early market validation process for digital platform business models. Regarding the fourth activity, demonstration, the method was applied within the validation of a real German startup to demonstrate its efficacy and furthermore to externally validate the process within this real use case.

4. RESULTS

Based on the state of the art of existing validation processes, combined with knowledge, design and architecture of digital platforms, a new process called *Smart Platform Experiment Cycle (SPEC)* was designed. Following the fourth step of the Design Science Research methodology, the solution will be demonstrated and thereby revealed, if it is able to solve the identified problem. It is done by involving it "in experimentation, simulation, a case study, proof, or other appropriate activity" [23]. In this case, it will be applied in the startup GassiAlarm.

4.1. Smart Platform Experiment Cycle

The *Smart Platform Experiment Cycle (SPEC)* consists of five steps: (1) design the digital platform business model, (2) design experiments for consumers and producers, (3) build experiments including a Minimal Viable Product (MVP) and implement a Measuring Metric, (4) run the experiments and measure the outcome, as well as (5) analyze and learn from the results. In more detail, the first step is to *(1) Design the digital platform business model.* The startup proves if the developed and verified business model, which might be structured in a Business Model Canvas (BMC), includes the three key components of a platform business model: value unit, participants and filter. Additionally, the three key functions pull, facilitate and match are proven and (re)designed. Furthermore, pricing and launching strategies are defined. Finally, the Platform Business Model (PBM) is structured and visualized in a platform canvas, for example in the platform business canvas of Choudary [17]. It is worth mentioning that the designed digital platform business model in this step is only based on verified assumptions the startup has made.

In the second step *(2) Design experiments for consumers and producer*, experiments regarding *customer segments*, *sales channels, customer relationships* and *pricing models* are designed for both sides of the platform: producers and consumers. It also needs to be decided which building block of the designed platform business model is the most relevant to validate first and therefore to set up a strategic roadmap or timeline for the forthcoming experiments. For instance, designing the right pricing strategy for the platform is a very complex and difficult task. Charging the user at the wrong stage might cause friction upon entry and counteract the benefits of the network effect. A pricing strategy imposed at deal completion could avoid friction and encourage value creation. Additionally, it is crucial for the platform to decide whom to charge for the service, since the users can take on many roles and ultimately, have an impact on the network effect.

However, in order to design the pricing strategy, it needs to be clear who the customers of the digital platform are. To structure all experiments. the template *"Hypothesis-MVP-Duration-Currency-Threshold-Experiment"* based on MIT Global Entrepreneurship Bootcamp is used [24]. According to Thomke and Manzi [6] several questions need to be answered to make the business experiment worth the time and effort: "*Does the experiment have a clear purpose?"* Thus, the learning goals, which should be achieved, should be defined first. If a hypothesis that needs to be tested, is not well defined and stated, the test might be ineffective and cause additional costs with no helpful results. According to Yoskovitz [25] the following template is used to define a well-structured hypothesis: "I believe [target market] will [do this action/ use this solution] for [this reason]".

Once a hypothesis is defined, it needs to be clarified which method and environment is used to validate the MVP. Also, the duration of the experiment needs to be defined. Based on the hypothesis, the experimenting environment and the duration, a currency and respective thresholds need to be determined. It is crucial to define how the hypothesis will be tested and how the outcome will be measured. Pre-defined thresholds help to decide whether an experiment was

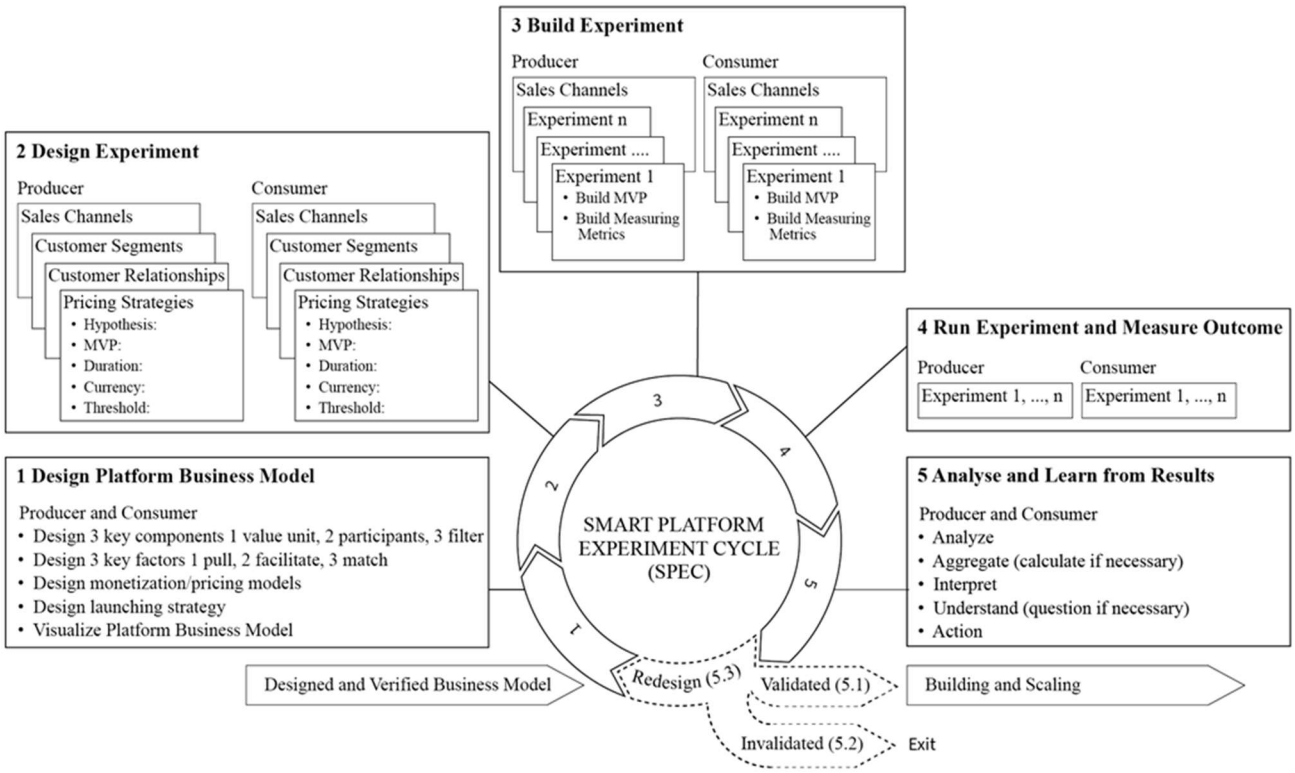

Figure 5: Smart Platform Experiment Cycle (SPEC)

successful or not. In addition, it helps the experimenting team to remain impartial when it comes to the results.

Step *(3) is about building the experiments including a Minimal Viable Product (MVP) and implementing a Measuring Metric.* For each element, for instance, *customer segments*, *sales channels, customer relationships* and *pricing models* different experiments must be built. A landing page or mockup (MVP) is designed and is presented to the customer or more precisely, to the early adopters, as soon as possible. The early adopters are presented with a *High-Fidelity MVP* with more functions. The focus does still not lie on developing a high-end product and spending a lot of time in the development, only to realize later, that the product will not be used or purchased by the customer.

The MVP is developed fast and represents the solution to the perceived problem. By utilizing Call-To-Action (CTA), which is an invitation to the user, the user is motivated to be active on the website, whereas by the implementation of buttons the user is connected to the page. The two distinguished groups, the producers and consumers, are separated at registration on the webpage/mockup due to the different needs that need to be met. Moreover, a survey, as an independent variable is implemented to control the answers at registration. A measuring metric tracks and monitors all steps of the experiment. The traffic on the webpage, for example, can be tracked and analyzed by Google Analytics.

In the step *(4) run experiments and measure the outcome,* the startup should keep an eye on the test environment and the costs. If it is necessary, an adjustment of the experiments (1…n) must be made.

In the step *(5) Analyze and learn from the results* the startup must analyze the given data, calculate key performance indicators (KPIs) and learn from the qualitative and quantitative results. Experimentation means building, learning, and continuous improvement. *SPEC* is an iterative validation cycle, since it indicates three possible steps, with can be taken, after concluding step (5) of the cycle. One result (5.1) might be a validated hypothesis based on real data, which leads either to the next iteration of SPEC or to the customer creation phase in the Customer Development Process [4]. Another possible result (5.2) might be an invalidated hypothesis, which signals a stop to all startup activities before more time and money is wasted. A third result (5.3) might be an invalidated hypothesis as well, but with data leading

to new findings, which point out a possible redesign of the business model.

4.2. Application in a Real Startup Case

To validate the created *Smart Platform Experiment Cycle (SPEC)*, which is specialised for digital platform business models, a real startup case was used. The startup GassiAlarm applied the new validation process, in compliance with a given low budget of 1000 Euros. The objective was to validate if the considered digital platform business model is successful or not. In the case of GassiAlarm, two prototypes (websites) were developed and tested on 111 customers, who represent producers (dog owners) and consumers (dog sitters). Before using the *SPEC,* the founder-team developed a customer-oriented business model for dog care services according to Lean-Startup and the Customer Development Process. A dog owner might not able to take care of his or her dog 365 days a year due to vacation or illnesses. In those cases, the dog owner needs a reliable person who is able to take care of the dog during his or her absence.

In most German households, dogs are not merely seen as pets who protect the house; dogs are considered a permanent family member. In contrast, there are people who love dogs, but do not own a dog. Among these people, there is a subgroup, especially students, which likes to go out with dogs and would like to have a part time job with the fun factor "dog". A digital platform business model might be able to match these two distinct group of users, the dog owners (producers) and the dog sitters (consumers). Hypothetically, the digital platform would pay itself through a service commission fee. GassiAlarm used *SPEC* to provide evidence that back up the business idea and prevents it from failing without wasting money and time.

In the step (1) *Design, the digital platform business model,* GassiAlarm, implemented three *key components:* the value unit, the participants and the filter. The *first value unit* for dog sitters is produced by dog owners, offering a dog care service for a certain period. In general, a dog owner can produce more value units, when he or she needs another dog sitter at another time. The *second value unit* or more precisely value units are produced by the dog sitter, when sharing activities and photos with the caring dog. This value unit shows the well-being of the dog during dog care and are not only for the specific dog owner. Doing a good job could result in a recommendation of the sitter to other owners. As part of the *participants*, the producer is the dog owner who creates a value unit by offering a dog for care taking on the platform. The consumer side is represented by the dog sitter who is looking for a part time job, enjoys being with a dog and wants to do sports. Their motivation for participating can either be through a monetary currency, actual money so to speak, since they are being paid for their service or through the social currency, attention, since they are, for instance, able to share the activities with the dog. The *filter* is an algorithm that sends dog owners a fitting profile of dog sitters for their inquiry and also dog sitters a fitting profile of a dog (dog owner). By setting the right main filter categories, for instance, walking for an hour or caring 24hrs, the match will be created, if the producer and the consumer confirm the inquiry.

The three *key functions*, pull, facilitate and match, guarantee that the platform will be active and successful on the long term. Dog sitters and dog owners must be pulled to the platform. To solve the chicken- and egg-dilemma four of the eight elaborated strategies of Parker et al. [2] were chosen. GassiAlarm implemented the big-bang adoption strategy (Business Cards, Flyers, Facebook Advertisement, etc.), the micro-market strategy (targeting inhabitants in one city), the producer evangelism strategy (offer producers of goods and services the infrastructure to attract their consumers) and the marque strategy (incentives for active members which for example create content like newsfeed posts). The matching algorithm focuses on different categories. Setting the main categories will filter the type of service, distance, location (ZIP Code), dates, price and activity. Sub filter settings are experience, gender of the dog and size of the dog. Prices will be displayed on a range according to the expectations of the dog owner and the dog sitter. Designing the monetization model and the launching strategy for digital platforms lead towards the network effect. The product benefit to a user depends on the total number of other users using it. For GassiAlarm it means, that the cost of an additional user profile is growing linearly, but the value of all users is growing exponentially at the same time. A positive network effect is given by a growing amount of dog owners. The more dog owners participate in the platform, the more likely a dog sitter will find a suitable dog for dog sitting and thereby will earn money. The platform canvas summarizes and visualizes all aspects of the platform architecture and is shown in figure 6.

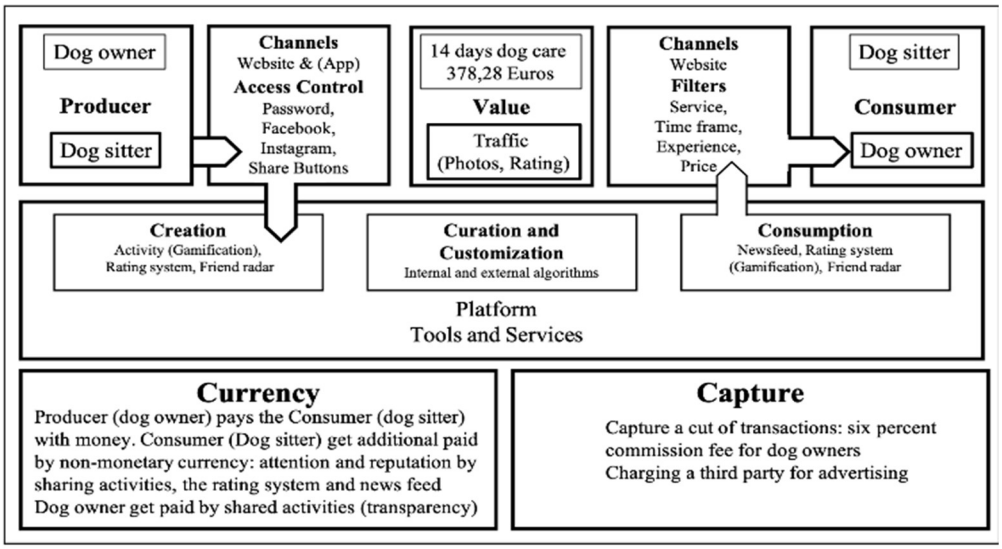

Figure 4: Platform Canvas for a Dog Care Service (own presentation based on [17])

In step *2 of the SPEC Cycle, Design experiments for consumers and producers,* different experiments in the *customer segments, customer relationships* and *sales channels* were designed. Exemplary, the experiment regarding the sales channel is described in greater detail. Sales channels have to be proven in respect to the special number of users in the micro-market. Depending on the performance, there is only the possibility of a pass or a failure for the channel. If the sales channel works in one city, it probably will work in another city as well. Facebook has been chosen as an example for a sales experiment.

Hypothesis: *Facebook is a digital channel, which pulls potential customers to GassiAlarm.*
MVP: Webpage GassiAlarm
Duration: 15th November - 3rd December 2017.
Currency: Email addresses (leads)
Threshold: Clicks on webpage: 40 percent of the people who visit the landing page will sign up as a potential user.

As step *(3) build experiments including a Minimal Viable Product (MVP) and implement a Measuring Metric,* a first MVP (website) was designed as a *frontend* MVP. The two distinguished groups, the producers and consumers, were clearly separated by registration buttons. A dog owner can choose between five different types of dog care, needs to indicate a maximum price for the dog care and disclose the name, breed, age, size and activity of the dog. If there is a direct inquiry for dog care, a calendar for check-in and check-out displays it. Finally, a fixed commission fee of six percent for the platform is shown. Concerning the dog sitters, the registration asks several questions, for instance, the minimum price for hourly dog caring and the minimum price for a whole day. Registration does not automatically create a value unit, but a lead. A value unit will be created, when a dog owner sends a request for a special period, where he or she needs someone to take care of his or her dog. A sale will be generated, if there is a successful match. To measure all online activities, Google Analytics was implemented.

In step *(4) run experiments and measure the outcome,* different Facebook campaigns were run to determine how high the cost per lead and the cost per sales are. Traffic was generated on the GassiAlarm webpage by users who clicked on the link and passed through to GassiAlarm.

Step *(5) analyze and learn from the results.* The total number of participants, which signed up, were 157 dog owners and dog sitters. Due to incomplete profiles during registration, datasets were not completed, which led to a final number of 111 participants. Out of this number, 57 were dog sitters and 54 were dog owners. The experiments have been performed between 1st of November 2017 and 31st of January 2018. An independent survey confirmed that only people, who are interested in dog care, visited the website. Learnings from the sales experiments showed that 98.2 percent of dog owners require someone for dog walking approximately for one hour; only 1.8 percent expressed no demand for that service. Only 3.5 percent of dog owners need someone to take care of the dog for a full day, while caring for more than one day was indicated by 8.7 percent. 91.2 percent prefer dog care at the sitter's home for one day and

93.0 percent prefer dog care at the dog sitter's home for more than one day.

In contrast, 100 percent of the dog sitters, are searching for the demand of dog walking. 68.5 percent of all dog sitters would like to do dog care at the dog owners house for one day, while 50 percent would do dog caring at the sitter's house for more than one day. 51.8 percent are willing to do dog caring at their own home. Furthermore, 38.6 percent indicated to prefer caring for more than one day. It is worth noticing, that the cost per click for dog owners lay at 0.35 Euro and for dog sitters at 0.53 Euro.

Table 1: Learnings from Sales Experiments

Service	Dog owner (Demand)	Dog sitter (Demand)
Dog walking	98.20%	100.00%
Dog care for one day (dog owner´s home)	3.50%	68.50%
Dog care for a period of days (dog owner´s home)	8.70%	50.00%
Dog care for one day (dog sitter´s home)	91.20%	51.80%
Dog care for a period of days (dog sitter´s home)	93.00%	38.60%

Recalling the results, 308 persons visited the landing page. Keeping that number in mind, it leads to a ratio of 64.9 percent (200/ 308* 100 percent) of people who have been directed to GassiAlarm by Facebook. The threshold was defined as 40 percent of the people, who visited the landing page, would sign up as a potential lead. For that reason, this hypothesis is confirmed. GassiAlarm was also able to create learnings concerning the pricing strategies. While being fixed (six percent of transaction) at the beginning and with no service fee for dog sitters, an iteration of the SPEC was executed with a redesigned pricing strategy. Based on the learnings of the first iteration, the commission fee was set to a variable fee, holding all other potential cause constant. In this experiment, the commission fee was set variable from zero to ten percent of the transaction value. Now, dog owners and dog sitters were able to set an individual range. As a result, the average commission fee of dog owners was 4.0 percent, while the average commission fee of the dog sitters was 5.1 percent. Ultimately, the commission fee is added and totaled up to 9.1 percent.

5. DISCUSSION

This research was set out to create a validation process for startups and corporates with a digital platform business model by using business experiments. Unlike existing validation processes that are solely designed for pipeline business models, the new validation process needed to incorporate the logic of digital platforms, which is, for instance, "enabling value-creating interactions between external producers and consumers"[2]. Furthermore, this research aimed at creating a validation process that includes the attribute of saving time and money. This aspect was included, since it is a decisive factor of whether or not to pursue a digital platform business model for startups or in some instances also for corporates[4]. The solution to this research was gained by extensively analyzing current validation processes, namely the Four-Step Iterative Cycle, the Build-Measure-Learn feedback loop, and the Customer Development Process. By following step one to four of the Design Science Research methodology, the Smart Platform Experiment Cycle (SPEC), a validation process for digital platform business models was built.

The SPEC takes the startup through the steps (1) design the digital platform business model, (2) design experiments for consumers and producers, (3) build experiments including a Minimal Viable Product (MVP) and implement a Measuring Metric, (4) run the experiments and measure the outcome, as well as (5) analyze and learn from the results. The SPEC was created by regarding the differences and similarities between pipeline and digital business models. In this regard, those elements were extracted that create a product or service that is repeatedly used or purchased by the customers. Therefore, the SPEC incorporates, for instance, the philosophy of involving the two customer groups early on by obtaining customer feedback repeatedly and using those insights to adjust the business models accordingly. Furthermore, the SPEC also points out how appropriate the hypothesis or assumptions are that were formulated for the digital platform business model and directs the user towards three possible outcomes after step 5 of the process is reached. Thus, the SPEC is considered an iterative validation cycle for an early market validation.

The SPEC keeps all processes as lean as possible, including the experiments in order to validate a digital platform business model. In the case of GassiAlarm, experiments in the area of *sales channels, customer segments, customer relations* and *pricing strategies* prevented the waste of time and money and validated the digital platform business model successfully. The application of SPEC within GassiAlarm showed that the business is not repeatable, which was confirmed by 85.5 percent of dog owners and dog sitters. It was revealed that GassiAlarm is not able to bind both sides of the market to the platform and generate repeatable transactions between them on the platform [18].

What is more, the SPEC helped the startup to structure and target their experiments correctly, which involves validating the digital platform business model with the

customer. The application of SPEC limited the waste of time and money and made it possible that GassiAlarm stays within the set budget of 1000 Euros. Due to the low budget available, network effects could not be proven, which are essential as a market-/growth building tool for digital platforms [20, 21]. It requires a higher budget to develop a functioning backend with user profiles and a matching algorithm which gives insights to potential network effects. Moreover, the iterative approach of SPEC has shown that the initial pricing strategy of GassiAlarm was not welcomed by the users. Only when the pricing strategy was redesigned, GassiAlarm was able to define the willingness of producers as well as consumers to pay for their service. All in all, GassiAlarm received helpful revelations by applying SPEC. They could make improvements in their predefined rules and learned when to exit and redesign the digital platform business model.

At this point, the authors would like to briefly elaborate on the validity of the SPEC itself. To recall, validation points out if the right product was built and reveals if "the product does what it is supposed to do in the intended operational environment" [7]. According to Andrade [26] empirical application of SPEC within a real startup created first insights and hints towards a positive external validation. Further research is needed, however, that scientifically validates the SPEC approach by applying it in other startups and corporate projects to increase external validity. [26]

Furthermore, the question arises, where the verified business models, which are used as the starting point of SPEC, are coming from. The business model ideas need to be generated and verified first in order to start with the SPEC. Additionally, the exploitation and scaling of validated business models should be subject of further research. As platform-based ideas often bring a radical change in their respective markets, the authors are working on a more general framework of how to create, verify, validate (SPEC) and scale these business model innovations, also known as Radical Innovation Engineering (RIE). The current relevance of digital platforms and their power to penetrate the market, such as Airbnb and Uber, brings business ideas into another dimension. The area of digital platform continues to generate extensive research in the future and therefore, research in their early market validation is indispensable.

6. CONCLUSION

The Smart Platform Experiment Cycle (SPEC) can be used as an early market validation process for digital platform business models. The focus of the SPEC is on validating the building blocks channels, customer segments, value proposition, customer relationships and the revenue streams of a digital platform business model. The new validation approach of SPEC, which follows the process of Lean Startup in combination with the Four-Step Iterative Cycle and the Customer Development Process, prevents waste of money and time and creates a basis of whether or not to pursue a digital platform business model.

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