Module 2. Validation tests and experiments

Unit 2.1 Key hypothesis for startup validation

In previous modules, we empathized with the customer, we imagined and observed a day in their life and we obtained a lot of information to understand their problems and needs. Now it is time to validate all assumptions we have been working on and, for that purpose, it is necessary to deal with the development of the problem hypothesis, the customer, and the solution.

Define customer´s hypothesis

Taking results obtained from using tools like the empathy map and the observation of one day in the life of a customer, the customer´s hypothesis is formulated. Descriptions should be short and precise; when defining the customer hypothetically, we should think about the early adopters, and not on the market, the final pursued goal. This is mainly because the first ones to use and validate the product or service will be more open and predisposed people, customers who are already aware of the problem they have and want to solve it. First buyers or early adopters must then be found.

By defining customers hypothetically, we should think about early buyers.

At this stage, it is essential to define a customer hypothesis and do the exercises corresponding to its definition, since any product or service quality, value, or benefit will be directly linked with the type of customer and with their lifestyle, their needs, etc. and every time we think about a characteristic of the solution, we will be referring to the typical customer. Therefore, if this typical customer is not well defined and validated, mistakes will be made in each step. Each hypothesis must be a declaration about the customer. For example:

- Customers are men that are between 30 and 40 years old, who live in Barcelona and have an active and healthy life.
- Customers are sports clubs´ legal departments with a great need to protect inadequate uses of their main brand assets.

- Targeted sports institutions have numerous customers' data sources, but they have difficulties to integrate and manage all of them.

In some cases, it is possible to use experiments, minimum viable product (MVP), or interviews and conversations with customers, to validate several hypotheses at once. In other cases, it is feasible to validate one hypothesis only. For the sample to be representative in the problem-solution fit stage, it should include at least 12 customers that prove positive to the hypothesis validation, that is, they meet the conditions that have been set. Otherwise, the hypothesis will not be valid. It may sound like a random number, but it is the parameter used as a reference criterion in the startup world.

Define the hypothesis of the problem

In most cases, it is advisable to formulate the problem hypothesis after defining the customer´s hypothesis, since they are the ones suffering from the problem and, consequently, they should be placed at the center of the process. Problems do not exist by themselves, they are experienced by a person. It is important to highlight that hypotheses must be defined in the following order: first customers´ hypothesis and then the problem´s hypothesis. This does not mean that only the customers´ hypothesis should be validated so, afterwards, we would do the same with the problem´s hypothesis It is feasible to do both things at the same time, once both hypotheses have been defined. Anyway, it is important to bear in mind that if the validation, the interview, or the survey become too complex, it is better to validate only one hypothesis each time. Information should be registered, to make consequent decisions. Therefore, order and simplicity are a priority in the process.

It is important to formulate in a clear and articulated way the customer´s problem we want to solve and said formulation should be easily understood by any person who is not in the project. This is a key definition since it is the basis from which we will validate if such a problem exists if it is worth to develop a product to solve it, if customers recognize it as something important and if they are willing to buy or use a product or service to solve it.

It is crucial not to confuse the problem with the solution, since a good solution (product/service) can add value to customers, but not necessarily solve serious problems or pain points.

Commonly, entrepreneurs make mistakes when they want to jump into the creation of the solution without having the problem correctly defined and framed. Often, entrepreneurs quickly "fall in love" with their idea and forget about customers and their needs and leaving hypothesis validation aside. But this step is important since a well-

defined problem is already a solution for half of the situation and it facilitates the design of the best solution.

> *When the problem hypothesis is defined, it is crucial not to confuse it with the solution.*

Once the problem is identified, the next step is to pose these five key questions:

1) Does the potential market have the problem currently?
2) Does the customer recognize he/she has the problem?
3) Is he/she looking for a solution currently?
4) Is already solving the problem? In which way?
5) Does the customer set aside a budget to solve the problem?

It is a differentiation to detect a problem that, for the potential customer, might be essential to solving and that its solution might be crucial, instead of a problem that might only be "nice" to solve. Customers´ budget and time are limited and, as a result, a person will set them both aside for solving the problem that bothers him/her the most, and then a priority order will follow.

It is essential to identify the main customer´s "pain" cause, which is what will lead them to acquire said solutions. This way, it is possible to develop a solution (a product or service) that is not the same or similar to the competence´s one and is rather a radical differentiation since its conception.

Define solution hypothesis

Now it is time to define as a hypothesis, what is the product or service that emerges as a response to the hypothetical problem that was presented to the hypothetical customer. It is possible to appreciate, in this stage, how important is to have defined customers and problem hypotheses before defining a solution. This is called the cascade hypothesis or validation.

Cascade allows defining, in the first place, customers´ profile and then, the problem they have before defining the solution, since otherwise, solutions are defined and created without thinking about the target customer or about the problem to be solved and that is a mistake. This mental schema facilitates the process not only in the hypothesis formulation but also in its validation.

Anyway, we have to think that it is about a constant learning process. This cascade constantly feeds back. The conceptualization made by Eric Ries (2013) about the build-

measure-learn loop promotes the iteration as there is an evolution on learning about the customer segment, the problem, and the solution and, based on this, it allows to develop of a product or service, measure results, learn again and develop again.

Since the startup process is not linear, it is very important to be organized and register the information completely. This will prevent intuitive decisions.

This process repeats several times during validation, through minimum viable products or experiments. The entrepreneur way or process is not linear and it goes back and forth. That is why it is important to be organized and register the information completely. It is otherwise easy to get lost in the process, abandon the way in the middle and start making purely intuitive decisions and definitions, which increases the risk of startup failure.

Tools for problem validation

This exercise helps to complement information obtained in previous stages with the customer, to end up validating the problem that the startup will solve. Ash Maurya (2014) suggests a plan to validate the problem hypothesis after resorting to 20 people or customers. In his book Running Lean, Maurya (2014) recommends starting problem validation by asking customers their opinion about the problem that is being solved and asking them if they agree with its description. That is, tell them about the problem that is being solved and consult them if it sounds familiar, if they consider it is correct. Maurya (2014) also suggests that, for each problem, we should take the following steps:

- **Describe the problem.** For example: “In my experience working with X, Y, Z, I have observed that there is a regular struggle with ‘problem description’”.
- **Ask customers**: “Do you think it makes sense?”
- Listen, write, and take notes. Observe customers´ body language to evaluate the level of difficulty for the problem in question. Pay attention to specific words customers use to describe it.
- **Ask again**: "Why is this problem difficult to solve? What is the difficulty in this problem for you?" The goal is to get to the causes, to the roots. In general, people provide descriptions without any type of context. Context is necessary to deeply understand the issue: which are the circumstances in which something happens, who is involved, which are the factors that influence the most. It is necessary to understand the problem from the customers´ point of view. To be in their shoes.
- **Evaluate**. Ask customers to put the problem on a scale of 1 to 5 in which 1 is "irrelevant" and 5 "very important". This will allow putting problems in order and on a list (Maurya,2014)

Then, it is important to take the time to describe the two or three most important problems from the customers' perspective. It is necessary to understand how customers work, which tools they use, how they solve their problems, and how they move in their everyday life.

Unit 2.2 Validation tests and experiments

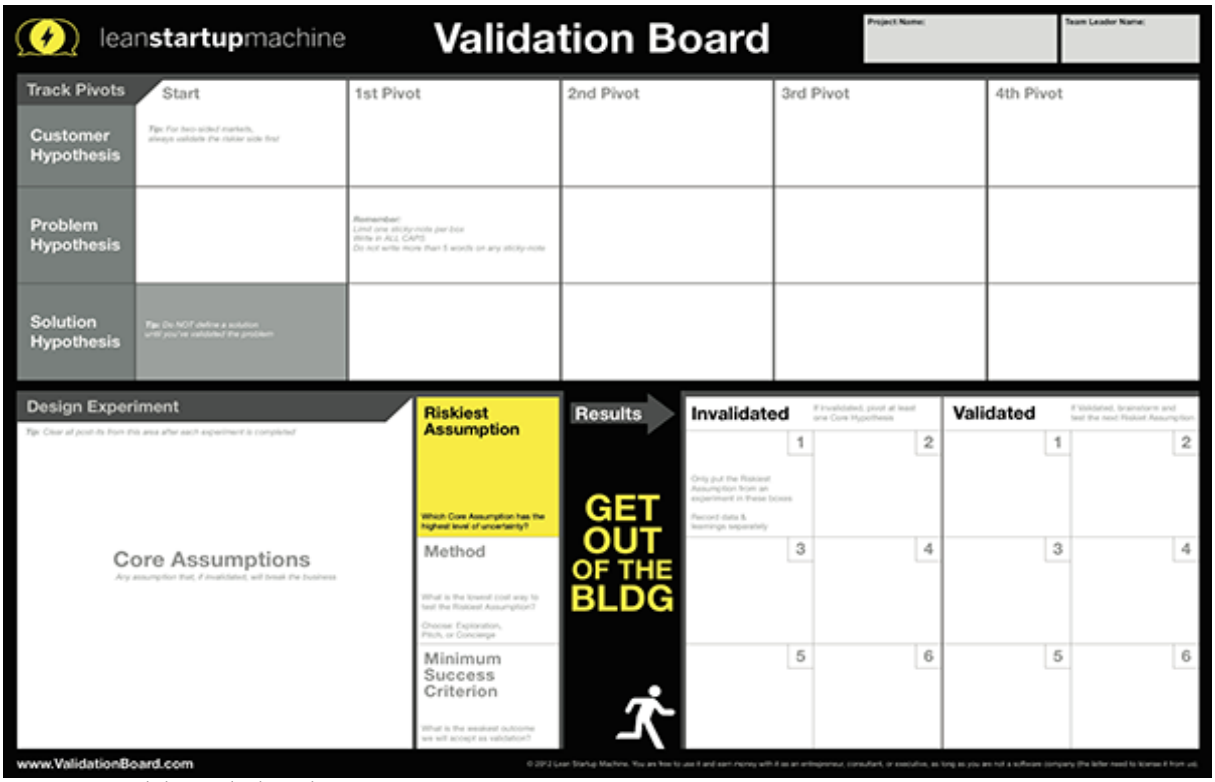
Once we have defined business hypotheses, we should start to validate the riskiest and most critical, the ones that go against the project's success. For example:

- Does the problem solved is perceived by the market as a problem?
- Would customers pay the monthly estimated price for the service?
- About the solution in mind, does it solve the problem?

Using the *workshop* Lean Startup Machine (https://bit.ly/3ah50u4) as a base, the goal is focused on validating hypotheses as quickly as possible (in three days), under the concept of **getting out of the building.** This workshop is known worldwide and it integrates Lean Startup concepts with the customers' development methodology.

This tool is very helpful to validate all hypotheses that are generated from new ideas and opportunities. In order to start with the validation process, in Lean Startup Machine, they developed a board that organizes work to be done and put to disposition.

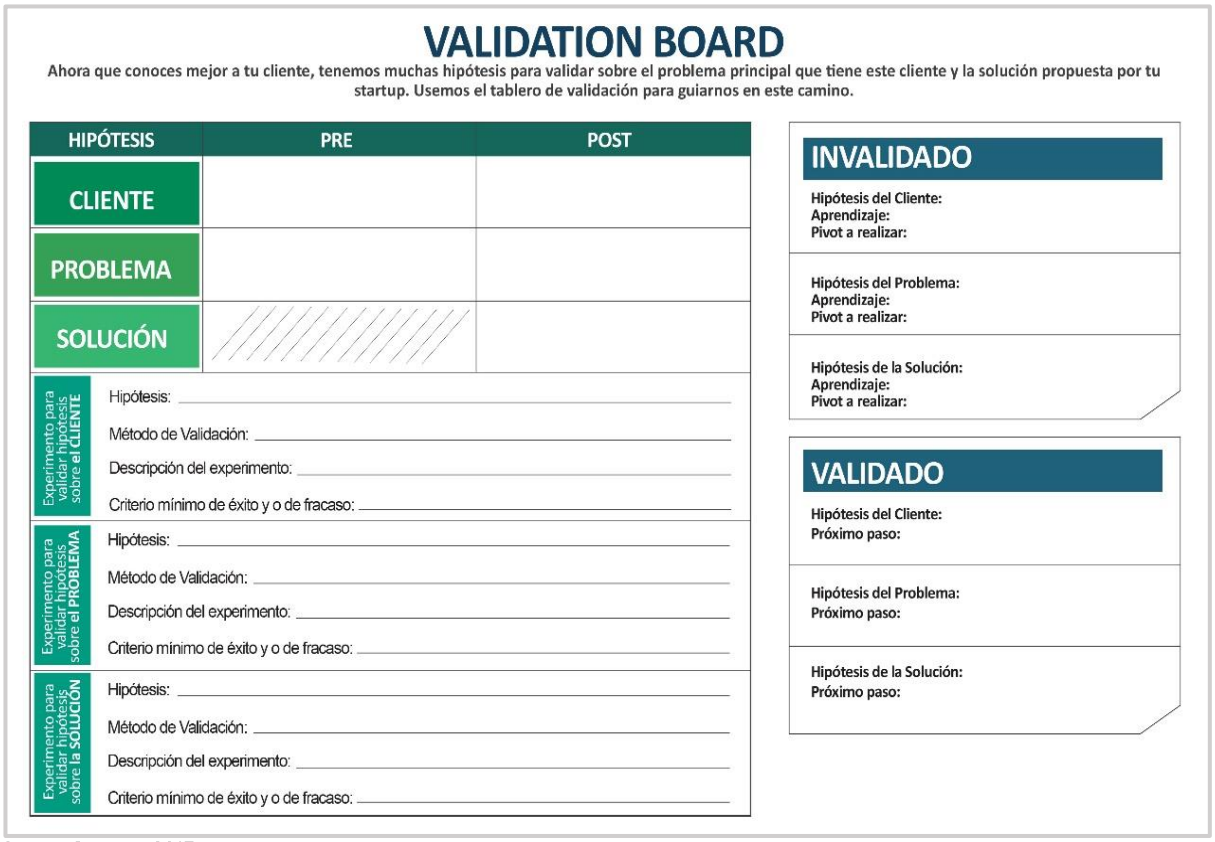
Figure 1: Lean Startup Machine validation board



Source: Ries, n.d., https://bit.ly/31JhmqD

Below, we can appreciate an adaptation to a simpler and clearer version of the board; this one's goal is to work as a guide in the hypothesis validation process.

Figure 2: Own validation board



Source: Incutex, 2017.

Translation of the figure

VALIDATION BOARD Ahora que conoces mejor a tu cliente, tenemos muchas hipótesis para validar sobre el problema principal que tiene el cliente y la solución propuesta por tu startup. Usemos el tablero de validación para guiarnos en este camino.	VALIDATION BOARD Now that we better know our customer, we have many hypotheses to validate the main problem the customer has and about the solution proposed by our startup. Let´s use the validation board as a guide in this way.
HIPÓTESIS	HYPOTHESIS
PRE	PRE
POST	POST
CLIENTE	CUSTOMER
PROBLEMA	PROBLEM
SOLUCIÓN	SOLUTION
Experimento para validar hipótesis sobre el CLIENTE Hipótesis: Método de Validación: Descripción del experimento: Criterio mínimo de éxito o de fracaso:	Experiment to validate hypothesis about the CUSTOMER: Hypothesis: Validation method: Experiment description: Minimum success or failure criterion:
Experimento para validar hipótesis	Experiment to validate hypothesis about the

sobre el PROBLEMA Hipótesis: Método de Validación: Descripción del experimento: Criterio mínimo de éxito o de fracaso:	PROBLEM: Hypothesis: Validation method: Experiment description: Minimum success or failure criterion:
Experimento para validar hipótesis sobre la SOLUCIÓN Hipótesis: Método de Validación: Descripción del experimento: Criterio mínimo de éxito o de fracaso:	Experiment to validate hypothesis about the SOLUTION: Hypothesis: Validation method: Experiment description: Minimum success or failure criterion:
INVALIDADO Hipótesis del Cliente: Aprendizaje: Pivot a realizar: Hipótesis del Problema: Aprendizaje: Pivot a realizar: Hipótesis de la Solución: Aprendizaje: Pivot a realizar:	INVALIDATED Customer's hypothesis: Learning: To do pivot: Problem hypothesis: Learning: To do pivot: Solution hypothesis: Learning: To do pivot:
VALIDADO Hipótesis del Cliente: Póximo paso: Hipótesis del Problema: Póximo paso: Hipótesis de la Solución: Póximo paso:	VALIDATED Customer's hypothesis: Next step: Problem hypothesis: Next step: Solution hypothesis: Next step:

Below, we will explain how to use the validation board for conducting experiments, defining hypotheses and parameters, and validating hypotheses more simply and quickly. It is important to bear in mind that we should eliminate a variable each time, starting with the riskiest.

Table 1: "Hypothesis" block on the validation board

HIPÓTESIS	PRE	POST
CLIENTE		
PROBLEMA		
SOLUCIÓN		

Source: Incutex, 2017.

Translation of the figure

HIPÓTESIS	HYPOTHESIS
PRE	PRE
POST	POST
CLIENTE	CUSTOMER
PROBLEMA	PROBLEM
SOLUCIÓN	SOLUTION

On rows, we present three of the most important hypotheses in a business model, which are the first ones to be defined beforehand.

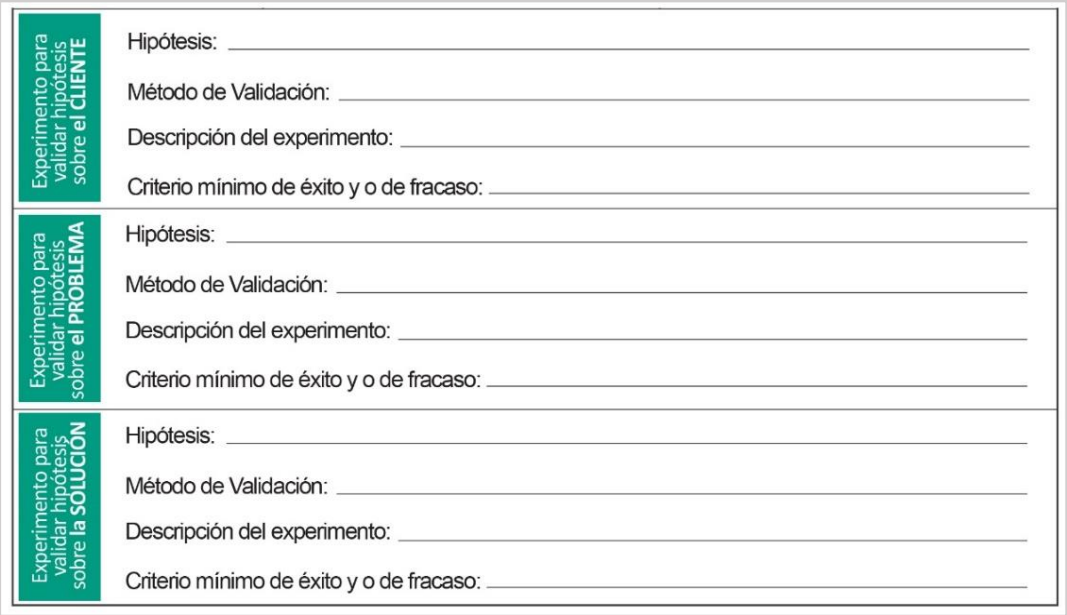
- **Customer´s hypothesis:** customer segment definition, focused on early adopters, rather than the mass market.
- **Problem hypothesis**: a clear definition of the problem to be solved, with a focus on customers.
- **Solution hypothesis**: product or service to be developed to meet customers´ needs. Even though this is clear from the beginning, it is advisable to leave it out from the first experiment or iteration, in order not to bias when validating with customers.

In order to adequately formulate a hypothesis, they should be written as statements and you should make it clear that said affirmation, in your view, is correct, but you put it in doubt until validation. For example:

- The main problem to solve for customers is that we have real-time data to make decisions.
- Customers are football clubs in Europe that want to open new digital services for their fans.
- The product should be a smart ball that can be monitored.
- The customer is ready to pay a monthly fee of 100 euros for the service.

In the upper part of the board (columns "pre" and "post"), we can find the consecutive pivots that clearly show the product or service evolution. We call pivot to changes in the business model.

Table 2: "Experiment design" block in the validation board



Source: Incutex, 2017.

Translation of the figure

Experimento para validar hipótesis sobre el CLIENTE Hipótesis: Método de Validación: Descripción del experimento: Criterio mínimo de éxito o de fracaso:	Experiment to validate hypothesis about the CUSTOMER: Hypothesis: Validation method: Experiment description: Minimum success or failure criterion:
Experimento para validar hipótesis sobre el PROBLEMA Hipótesis: Método de Validación: Descripción del experimento: Criterio mínimo de éxito o de fracaso:	Experiment to validate hypothesis about the PROBLEM: Hypothesis: Validation method: Experiment description: Minimum success or failure criterion:
Experimento para validar hipótesis sobre la SOLUCIÓN Hipótesis: Método de Validación: Descripción del experimento: Criterio mínimo de éxito o de fracaso:	Experiment to validate hypothesis about the SOLUTION: Hypothesis: Validation method: Experiment description: Minimum success or failure criterion:

In the next step, we locate the "experiment design" block Here, we should define the riskiest hypotheses in the business model, taking hypotheses designed in the previous step as a base and we should conduct "pass/not pass" experiments clearly and simply to validate these hypotheses. These experiments are the MVP that are designed to validate

hypotheses. The key hypotheses are those that define the business model, those whose invalidation would imply a change in the model or a pivot.

After that, it is precise to wonder which of the key hypotheses have the biggest amount of uncertainty. This will lead to a definition of the method that will be used to conduct the experiment to be validated. The Lean Startup Machine model suggests to do it with the following methods:

- **Exploration**: this tool is very useful to validate customers´ and solution hypotheses. It consists of talking to market participants targeted by the customer segment with open questions that allow for a better understanding of the situation, customers´ context, and their everyday life. It is possible to validate the hypotheses set on the empathy map seen in the previous course. Customers who provide the most valuable information and answers in exploration will be the ones that are already conscious that they have a problem and are actively looking for a solution.
  Important! Try not to get distracted when obtaining information, since you will not be able to solve ten customer´s problems at once, but the one that causes them the strongest "pain" or "inconvenience". It is also very important to hold short meetings, we should not waste customers´ time and go straight to the point, at least customers show predisposition and willingness to it. The goal is to learn as much as possible about customers and build a relationship that enables keeping a learning flux. Once the meeting is finished, we would make a specific offer for working together, so that customers try the tool when they already have a beta version or demo.

- **Concierge**: This tool includes different techniques.

  - Unique use case: to eliminate 95% of the development and develop a product to be used in a unique case.
  - Real-life simulation: try to simulate the product in real life, in a manual and handmade way.
  - Goal: to put customers to design a first version of the product or service with all characteristics they would like it to have.
  - Crowdfunding: to present a product to potential customers through a video, in a crowdfunding campaign. If you do not know what crowdfunding means, so far, you should know that it is a collective and supportive method for financing startups. This way, two goals are met simultaneously: validation and financing.

- ***Pitch***: it consists of presenting the solution to customers so that we can get their feedback. However, in this step, it is important to highlight first that we should validate the problem and customers, to focus on solution validation. Otherwise, we will be "burning" potential customers to get feedback about their problems. It is

essential to focus on customers that recognize the problem and might be looking for a solution (Ries, n.d.).

Finally, it is very important to define the minimum success criteria to avoid bias and subjectivities generated by optimism from the first results. That is why, it would be convenient to define which is going to be the threshold to decide whether a hypothesis is correct, before conducting out experiments and validations. To be precise about the amount of exploratory interviews, pitches, concierges, or other tools that are going to be used and which is considered to be the success factor for each case.

It is necessary to bear in mind that, to define the criteria, we should firstly pose the following questions:

- What is that we pretend to learn?
- What is the simpler way to do a learning test?
- How can we design a pass/not pass experiment for this test?

Below, there is an example to clear doubts:

Channel hypothesis: if we conduct interviews with 10 people to find out if the best channel to get information about sports news is the television or the newspaper and 4 out of the 10 answers that it is television, the next step is to take a bigger sample of 40 people and see if 10 people answer the same, that is if the ratio is the same. This way then, we can define that the test was passed.

The important thing is to transform questions into statements that could be assessed, which will enable us to define test goals. Consequently, taking these statements as a base, we can define true or false parameters, or pass/not pass parameters to conduct experiments. For example: "By publishing a startup in an "X" web site, we expect to get 100 visits per hour, because it is considered that this site is the best channel to get to customers. This is the test that must be passed. If the number of visits received is smaller than 100, then it does not pass the test."

Success and failure criteria must be defined before conducting experiments, to avoid bias in the validation process.

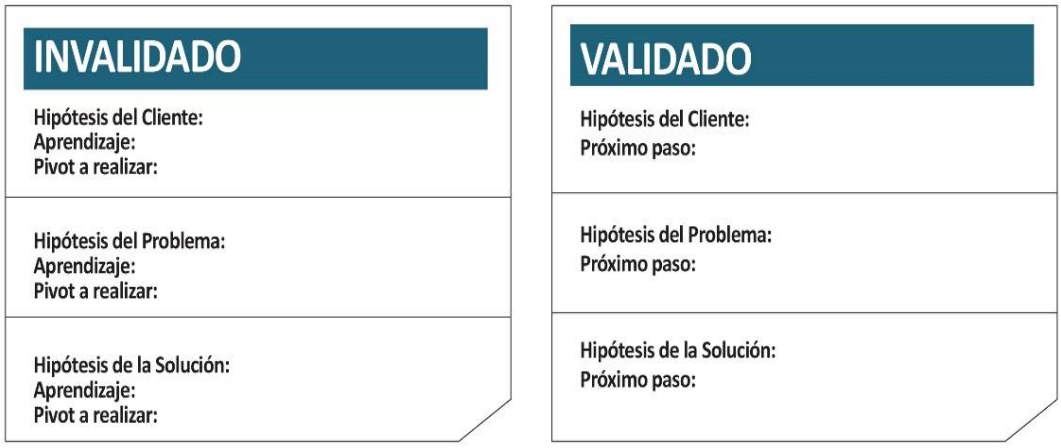
It is valid to be emphatic about the need to define criteria before conducting experiments, to avoid bias. You should define criteria, according to your experience, but it is important to avoid defining these criteria when tests are over since there is a big temptation in accepting tests as passed tests and there is a loss in critical judgment.

In order to design good experiments, we should take into account that the essential thing is to learn quickly. Due to this reason, experiments must be conducted simply. For example: if we send emails to 50 contacts (potential customers) and it is expected that 50% of them answer that they are interested in the proposal and want more information, then the test is passed and the result is positive. We suggest doing the test through different channels to confirm that results remain or to verify if they vary according to channels. Another useful suggestion is to compare test results with conversations with customers since the focus is not on the test, but on the possibility of acquiring validated knowledge that would enable us to develop a product or service the customer would want to buy.

Compare test results with conversations with the customer.

Finally, the results block must be completed. Once experiments are defined, the most important step is to carry them out and to see which are the results they generate in the customers´ real world. These results should be expressed on the chart, to register which are the validated ones and the ones that are not.

Figure 3: Results block



Source: Incutex, 2017.

Translation of the figure

INVALIDADO	INVALIDATED
Hipótesis del Cliente:	Customer´s hypothesis:
Aprendizaje:	Learning:
Pivot a realizar:	To do pivot:
Hipótesis del Problema:	Problem hypothesis:
Aprendizaje:	Learning:
Pivot a realizar:	To do pivot:
Hipótesis de la Solución:	Solution hypothesis:
Aprendizaje:	Learning:

Pivot a realizar:	To do pivot:
VALIDADO Hipótesis del Cliente: Próximo paso: Hipótesis del Problema: Próximo paso: Hipótesis de la Solución: Próximo paso:	VALIDATED Customer's hypothesis: Next step: Problem hypothesis: Next step: Solution hypothesis: Next step:

If the hypothesis has been validated, this means it has passed the success criterion and that, consequently, it is registered as validated and the experiment goes on with riskier hypotheses that follow on the ranking Instead, the hypotheses that did not pass the defined success threshold should be registered in the invalidated hypotheses area, in the pivot area or the change customer area, the problem or solution area (for key hypotheses) and we should set experimentation criteria again, to go for validation again until finding validation and success. The goal is to have 100% hypotheses validated. An important remark is that data and other learning material acquired in the process must be registered outside the board. In this supplementary board, which can be used for each validation, we complete with the necessary information for each case, so that the register is simpler and more precise.

Figure 4: Supplementary board for each case

Validation board	
Done by:	
Made on:	
The number of iteration:	

Experiment to validate HYPOTHESIS	
The hypothesis to validate:	
Validation method:	
Experiment description:	
Minimum failure criterion:	
Minimum success criterion:	
Result:	
Learning:	
To do pivot:	
Next steps:	

Source: own creation

Below there is an example of the use of a validation board:

Table 3: Example of a validation board

Validation Board	
Done by	**(Daniel, Agustín, Carolina, Leticia)**
Made on	**July 6th, 2020**
Iteration Number	**1**

Experiment to validate hypothesis about customers	
Hypothesis to validate	Customers who buy at home spinning classes are between 25 and 40 years old (man or woman).
Validation method	Virtual interview
Experiment description	A random people sample is taken and they are asked about their interest to do physical activity at home, mainly spinning. Their age will be estimated.
Minimum failure criterion	If ← 40 % of people interviewed are between 25 and 40 years old, the hypothesis is invalidated.
Minimum success criterion	If ← 70 % of people interviewed are between 25 and 40 years old, the hypothesis is confirmed.
Result	Of 100% of people that bought at home spinning classes, 50% is older than 40 years old. 80% is between 20 and 50 years old.
Learning	**Age ranges differ from what it was supposed.** **There were no upper-class people.**
To do pivot/ iteration	Modify the customer segment adjusting their age and social class (verify with set customer archetype)
Next steps	Readjust the Canvas considering middle-class women and men between 20 and 45 years old.

Experiment to validate HYPOTHESIS about the PROBLEM	
Hypothesis to validate	Customers do not find a service where spinning classes and good quality spinning bicycles are offered.
Validation method	Virtual interview
Experiment description	Ask about which are the fears and difficulties when acquiring service for at-home spinning classes.
Minimum failure criterion	If ← 40 % of people consulted say they fear or have difficulties at the moment of purchase, this invalidates the hypothesis.
Minimum	If ← 70 % of people consulted say they fear or have difficulties at the

success criterion	moment of purchase, this confirms the hypothesis.
Result	85% percent of people consulted expressed having difficulties in finding good quality spinning classes and bicycles habitually. They mention they fear the classes are not dynamic and motivating and that, due to bad quality bicycles, they can harm their knees.
Learning	**Hypothesis is confirmed**
To do pivot	It is not necessary to make changes on pains.
Next steps	-

Experiment to validate hypothesis about solution	
Hypothesis to validate	Customers are willing to try spinning classes and bicycles service at home.
Validation method	Virtual interview
Experiment description	Ask how much they would pay for a monthly plan for eight months.
Minimum failure criterion	If← 40 % of people consulted say they are willing to pay, this invalidates the hypothesis.
Minimum success criterion	If← 70 % of people consulted say they are willing to pay, this confirms the hypothesis.
Result	80% of people consulted are willing to pay for at-home spinning classes.
Learning	**Price is not a problem. It was known about average prices that customers are willing to pay.**
To do pivot/ iteration	Average prices are used to estimate the useful attainable market.
Next steps	To add to the Canvas that there is a margin to move among prices.
Done by	**Startup team (Daniel, Agustín, Carolina, Leticia)**
Made on	**July 6th, 2020**
Iteration Number	**2**

Source: own creation

Solution validation

At the moment of validating a solution through an MVP, we should not only show how the product or service would look like but also we should tell a story with it, build an experience. How customers' life will be different with this product or service? How customers will solve their problems that are an obstacle today? It is likely that, besides

the whole effort, customers cannot completely understand the formulation. That is why Ash Maurya (2014) suggests asking customers the following questions:

If the product or service would be available now for free:

- Would customers buy it and use it?
- Is there something that is not considered and is important?
- Which of all aspects have called most of the customers´ attention?
- Which of the aspects would customers manage without?
- Is it possible to do a pilot test on their company? (Maurya, 2014).

This technique enables the entrepreneur to save time and money and avoid developing a product that maybe nobody would use. We should pay attention to this issue: to validate the problem with customers, it is not necessary (and it is even discouraged in general) to try to talk to the owner of the company or industry since that opportunity should be taken when the MVP is already built. In the beginning, to validate the problem, and from there on, to build a solution, we should take advantage of all conversations with people from the area or industry we are targeting, since they can give us enough feedback to validate. From employees that are at the end of the chain upwards, conversations that would provide valuable information could be initiated, to validate the problem and find a fit with customers.

Building your MVP, as a salable product

Paying attention to Blank and Dorf's (2013) definition for a minimum viable product, in this instance we state the beginning of developing a product or service with minimum characteristics to solve the smallest customers problem, but for which they should be willing to pay. We should start by imagining which would be those characteristics, that is, how would the product or service look like.

According to Advenio Strategy & Business Design creators (http://advenio.es), it is necessary to search for a balance between minimum characteristics that an MVP should have and what customers want. In order to find this midpoint, they propose to ask the following questions, always focused on customers or customers segments:

- Taking customers´ needs as a base, which are the minimum requirements that a solution should have?
- Which are the functionalities or characteristics that should be developed onwards?
- Which functionalities or characteristics should be present in the mid-term, taking your customers´ needs into account?

- Which solution elements used currently by customers to solve their problems should the product or service have?
- Which other ideas or alternatives appear, which should be applied in the long term? This question is useful to unleash creativity and not to waste it. Many times, entrepreneurs get lost in an ocean of alternatives and they do not materialize their ideas (Advenio, n.d.).

In order not to lose the focus, nor waste creativity, a good option is to have ideas about the product or service stored, ideas which cannot be o should not be applied at this moment.

In the next reading, we will deal with details on how to build an MVP.

References

Advenio (s. f.). Cómo validar tu Producto Mínimo Viable (PMV). Retrieved from http://advenio.es/como-validar-tu-producto-minimo-viable-pmv/

Blank, S. and Dorf, B. (2013). El manual del emprendedor: La guía paso a paso para crear una gran empresa. Barcelona, ES: Centro Libros PAPF.

Maurya, A. (2014). *Running Lean*. La Rioja, España: Unir.

Ries, E. (2013). *El método Lean startup: Cómo crear empresas de éxito utilizando la innovación continua.* Barcelona, España: Deusto.

Ries, E. (s. f.). *Workshop Lean startup machine*. Retrieved from https://www.leanstartupmachine.com/