Lean Product and Customer Development

Alan S. Gutterman
Founding Director, Sustainable Entrepreneurship Project

§1 Introduction

While the world is full of stories about innovative products with features that dazzled consumers and solved challenging problems for their users, little attention is paid to how often companies overestimate the value of the ideas generated by their product "experts". Reports indicate that the success rates of ideas in the software industry are below 50%, and a product architect at Microsoft has admitted that only about a third of the ideas at the company improve the metrics they were designed to improve.[1] Companies, large and small and new and mature, eventually learn the hard way that it doesn't matter how good or innovative or beautiful or reasonably priced a product is, it will fail unless there are customers willing to buy it. The response has been a growing interest in a new form of product development that explicitly incorporates customer development methodology that seeks to ensure that time, effort and capital are not invested in product development unless companies have an understanding, based on rigorous hypothesis-driven tests with real customers, of fundamental questions such as who are the customers, what problems and needs do they have, how are they currently behaving, which solutions are customers willing to pay for and how can those solutions be provided to in ways that work for how customers decide, procure, buy and use.[2]

Steve Blank began writing about the power and importance of "customer development" for startups in the early 2000s in an effort to improve the focus of their product development efforts and change their approach to sales and marketing. Blank observed that the traditional formula used by entrepreneurs looking to launch a new business had been write a business plan, pitch it to investors, assemble a team, introduce a product, and start selling as hard as you can.[3] While this sequence makes some sense in theory, the reality has been that 75% of all startups eventually fail, leading to the conclusion that perhaps the traditional formula is not the best path. According to Blank, one of the fundamental truths that founders need to accept is that "no business plan survives first contact with customers" and that they really do not have a good idea about whether they are right or wrong about their vision of what customers want until they have built and shipped the product and customers give feedback and let the founders know if they are willing to pay for the propose solutions embedded in the product. Blank suggested that a new methodology, referred to as the "lean startup", was the better alternative for many

[1] C. Alvarez, Lean Customer Development: Building Products Your Customers Will Buy (Sebastopol CA: O'Reilly, 2014), 1 (quoting Ronny Kohavi, a Partner Architect at Microsoft).
[2] Id. at 3.
[3] The discussion in these opening paragraphs is adapted from S. Blank, "Why the Lean Start-Up Changes Everything", Harvard Business Review (May 2013).

startups.[4] At the highest level, the lean startup avoids elaborate advance planning, hunches about customer problems and solutions and traditional "big design up front" development in favor of experimentation, customer feedback and iterative design.

References and Resources

References and resources relating to "lean startups" and the "lean method" are available for viewing and download on the "Entrepreneurship" page of the website of the Sustainable Entrepreneurship Project (www.seproject.org).

Lean startups apply the "lean method", which Blank described as based on the following key principles:

- Rather than engaging in months of planning and research, entrepreneurs accept that all they have on day one is a "vison" and a series of related, but untested, hypotheses (i.e., their own educated guesses about how their new company will be able to create value for itself and its customers). Realizing this, the entrepreneur sees the futility of wasting valuable time writing an elaborate business plan and instead opts to summarize and organize his or her hypotheses in a framework Blank called a "business model canvass".
- In order to test the hypotheses on the business model canvass, the founders need to practice "customer development" and "get out of the building" to test their hypotheses by asking potential users, purchasers, and partners for feedback on all elements of the evolving business model: product features, pricing, distribution channels, and affordable customer acquisition strategies. Collecting feedback must be done with nimbleness and speed and should be based on rapidly assembling a series of "minimum viable products" that customers can quickly opine on and then using that feedback to revise assumptions, execute iterations or pivots, and continue the process again and again to weed out ideas that are not working.
- Customer development should be conducted with the support of "agile development", based on lean production principles, which eliminates wasted time and resources by creating minimum viable products suitable for testing quickly and then continuing product development based on iteration and incremental changes and enhancements.

According to Blank, the lean startup method differed from the traditional approach in several important areas:

- ***Strategy:*** Lean startup focuses on generating and testing hypotheses to design a viable business model while the traditional approach is based on a formal business plan followed by a focus on implementing the plan as written.

[4] Notice should be taken of some of the criticism of the universal applicability of the lean startup method, particularly the potential for failing to maintain balanced focus on developing sales and marketing capabilities and wear and tear on morale that can result from too much "failure" and "pivoting". See, e.g., http://blogs.anderson.ucla.edu/gap/2013/05/marc-andreessen-not-every-startup-should-be-a-lean-startup-or-embrace-the-pivot.html

- ***New Product Process:*** Lean startup focuses on customer development by "getting out of the office" and testing hypotheses with real customers while the traditional approach focuses on "product management" and preparation of the new product for marketing using a linear, step-by-step plan.
- ***Engineering:*** Lean startup relies on "agile development" and building the product iteratively and incrementally while the traditional approach relies more on "waterfall development" and fully specifying the product before building it.
- ***Organization:*** Lean startup begins with customer and agile development teams with members hired based on learning, nimbleness and speed while the traditional approach organizes using functional departments with members hired based on experience and ability to execute.
- ***Financing*** Reporting: Startups focus on pragmatic metrics such as customer acquisition cost, lifetime customer value, churn and viralness while the traditional approach tracks numbers on income statements, balance sheets and cash flow statements.
- ***Failure:*** Startups expect one or more failures along the way and are prepared to makes fixes through iteration on ideas and pivoting away from ideas that don't work while the traditional approach treats failure as an unwanted exception that often leads to shakes ups among the executive team.
- ***Speed:*** Lean startups move rapidly based on "good enough" data while the traditional approach moves at a measured pace based on not making decisions unless and until "complete" data is available and analyzed.

Blank's Startup Checklist

Steve Blank why new product methodologies sometimes worked, yet sometimes failed, and speculated that the reason that no single method seems to work for every startup is that perhaps there are different "types" of startups and that the path to successful execution of strategy depends on making the decisions that are correct for the particular "startup type".

Blank proposed a "Startup Checklist" that began with identifying which vertical market the startup would be operating in. He listed a number of choices such as Web 2.0, enterprise software, enterprise hardware, communications hardware, communications software, consumer electronics, game software, semiconductors, electronic design automation, Cleantech, medical devices and health care, life sciences and biotech and personalized medicine. Accordingly to Blank, each of these potential markets could be distinguished by their relative levels of market and invention (technical risk). In fact, the list of vertical markets above is organized by beginning with the industries that have the highest level of market risk and the lowest level of invention risk (e.g., Web 2.0 and enterprise software and hardware) and ending with the industries that have the highest level of invention (technical) risk and the lowest level of market risk (e.g., life sciences and biotech). Industries in the middle of the list, such as consumer electronics and game software, typically have relatively similar levels of both market and invention (technical) risk. Blank's argument was that his methodologies for "customer development" were particularly important for startups in vertical markets with the highest levels of market risk. In contrast, startups developing a new cure for cancer could generally be less concerned about whether there would be patients eager to use the solution once it was available, given the "life or death" nature of the problem, but would almost certainly be confronted with significant technical challenges and risks in successfully developing the product.

The second part of the Startup Checklist focused on "execution" and emphasized that the answers to a series of important questions differed depending o the specific vertical market. These questions included

the following:

- ***Opportunity:*** Where does the idea come from? Potential sources include "ideas and insights", customer needs, technology, entertainment and scientific advances.
- ***Innovation:*** What is the innovation? Startups may seeking to exploit business model, technological or scientific innovations.
- ***Customer:*** Who is the user/payer and what are the payment methods? For Web 2.0 the user/payer are usually the same. For consumer electronics the user can be anyone but there payers are usually adults. For medical devices the users are doctors but the payers can be insurance, government, doctors and/or hospitals. Payment methods for certain verticals can include credit cards, EFT and/or Paypal.
- ***Competition:*** Who is the competitor/complementor? For Web 2.0 there is no "first mover" for customers; however, first mover is important for commercial hardware and software and life sciences/biotech.
- ***Sales:*** What is the channel to reach the customer? Choices vary by vertical and can include Web, direct, telesales, OEMs, VARs, retail, distributors and licensing.
- ***Marketing:*** How do you create end user demand and "brand" the product or service? As with sales, choice vary by vertical and can include SEO, SEM, banner ads, public relations, blogs, reviews and viral for Web 2.0; trade shows, public relations, tech and business press, presales, seminars and webinars for software and hardware, electornic design automation and semiconductors; and reviews, ads, public relations, blogs, "buzz" and promotions for consumer electronics and games.
- ***What does business development need to do?*** Deals, partnerships and alliances, licensing and sales.
- ***Business/Revenue Model(s):*** How do we organize to make money? Web 2.0 startups must choose among a number of potential revenue models such as advertising, infomediary, brokerage, merchant direct, affiliate, community and subscription. Hardware and software companies, and consumer electronics companies, can be direct or EOM, and medical device/health care companies can license and/or sell direct or indirect through sales reps.
- ***Intellectual Property/Patents/Regulatory Issues:*** How and how long? Patent protection may be optional for software, hardware and consumer electronics companies, but very important for medical device, health care, and life sciences companies.
- ***Time to Market:*** How long does it take to get to market?
- ***Product Development Model:*** How do we engineer it?
- ***Seed Financing:*** How much and when?
- ***Follow-On Financing:*** How much and when?
- ***Liquidity:*** How, how much and when?

Source: S. Blank, The Customer Development Methodology (Stanford Roundtable on Entrepreneurship Education, 2008).

In a similar vein, Cowan cautioned startups against trying to act like a big established company from the very beginning before they have done the hard work necessary to identify a product/market fit and fine tune the elements of their business model.[5] Cowan pointed out that startups that are fortunate enough to receive significant funding from investors at an early stage often try to build their businesses too quickly, relying on traditional management ideas and practices, only to find that discovery of a viable business model is hindered by clinging to unproven assumptions in the original business plan that attracted investors in the first place. Cowan plotted this scenario out as follows:

[5] A. Cowan, Five Tips for Operating a "Lean" Team (August 6, 2012), http://www.alexandercowan.com/five-tips-for-operating-a-lean-team/

- The founders identify an "awesome new idea" and use it to create a business plan based on a chain of unproven assumptions that includes a five year plan to interest and excite investors about the opportunity to earn back 10 times their investment.
- The investors buy into the business plan and provide funding; however, since they need to show results for their own investors they demand that the company put the capital to work immediately on building the specific product or service outlined in the business plan.
- Concerned that the founders do not have the experience to manage the money they have received, the investors bring in a menagerie of new executives and senior managers with execution experience at bigger companies (or more mature emerging growth companies).
- The new hires do have experience in applying established recipes to the work process; however, they lack experience and/or interest in hands-on discovery and managing uncertainty. They also are more averse to engaging directly with elements of the business model and prefer to do so through specialists that cause payroll to balloon before a single product has been sold.
- The expanded team focuses its efforts on confirming the five year plan in the original business plan and when actual results conflict with the plan the team concocts new theories to tie those results to the plan rather than seriously considering that there may be defects in the plan and the plan should be changed or even abandoned.
- As the launch date included in the original business plan approaches, last minute revisions are made to the plan and slippage becomes obvious. As the money evaporates, board members become edgy and the entire organization is stressed. In the worst cases, layoffs begin and the original investors look for new ways to assert more control over the company. As Cowan says: "not much fun or profit" for anyone.

The solution, according to Cowan, is the "lean pattern", similar to the "lean startup" methods, that also begins with an "awesome new idea" from the founders but then proceeds down a very different path:

- The founders identify an "awesome new idea", but realize that they need to lay out all of the assumptions underlying the idea and design and implement simple experiments to validate those assumptions using "hands on" interaction with real potential customers.
- Experimentation and validation reduces the initial capital requirements, which means opening up possibilities for non-traditional funding strategies, and the risks associated with the business model.
- Founders and advisors do most of the work related to the validated learning activities ("hands on validation") against the assumptions, but focused hiring may be done to bring specific skills and roles to the customer development process.
- Progress is measured not against some "pie in the sky" business plan but against clear metrics that drive "pivot or persevere" decisions.

- All members of the customer development team are provided with access to information from the learning process and the opportunity to participate in decisions as to whether it's working or not. In Cowan's view: "fun and profit" for everyone.

The term "lean startup" became even more popular with the publication of *The Lean Startup* by Eric Ries. Ries, who had been a student of Blank, was interested in explaining how the customer development methodology could be integrated with the principles of agile product development and argued that the startups that succeeded were those that managed to iterate enough times before running out of resources.[6] *The Lean Startup* came out at the same time that Blank was updating his original ideas to address effective collaboration between the engineering and customer development teams and the fundamental message from both Blank and Ries has become that engineers and marketers working at startups must accept that they are often working on unknown problems and unknown solutions and that the best way to approach each of them is iteratively acting upon feedback from the parties who will actually be buying and using the products. This chapter begins with a discussion of the "lean startup method", focusing on key principles defined by Ries such as validated learning, the "build-measure-learn" feedback loop, innovation accounting and the minimum viable product. The chapter then goes on to discuss the principles of customer development popularized by Blank and the thoughts of others on the importance of investing in customer relationships from the very beginning of the startup's adventure.

§2 Lean startup method

Understanding the lean startup methodology begins with knowing exactly what a startup is: a human institution organized to create a new product or service under conditions of extreme uncertainty. The lean startup is based on the proposition that entrepreneurs need to avoid getting caught in the trap of trying to make their original idea for a product or service succeed at all costs and instead focus on what really matters: building a sustainable business. The first and most important step in building a sustainable business is for the startup to figure out the right thing to build, which needs to be something that customers want and will pay for, as quickly as possible. It does no good to develop a product or service on time and on budget if ultimately there is no interest among customers for the product or service. Knowing who the customers will be and what they will value is difficult and creates uncertainty for the startup and the lean startup methodology is intended as a path to help the startup move in the right direction quickly through a series of systematic experiments.

[6] The following description of "agile development" is useful: "Agile development methodology provides opportunities to assess the direction of a project throughout the development lifecycle. This is achieved through regular cadences of work, known as sprints or iterations, at the end of which teams must present a potentially shippable product increment. By focusing on the repetition of abbreviated work cycles as well as the functional product they yield, agile methodology is described as "iterative" and "incremental." In waterfall, development teams only have one chance to get each aspect of a project right. In an agile paradigm, every aspect of development — requirements, design, etc. — is continually revisited throughout the lifecycle. When a team stops and re-evaluates the direction of a project every two weeks, there's always time to steer it in another direction." See http://agilemethodology.org/

The lean startup process has been described as an approach to business development based in part on the application of "lean thinking" and "lean production" techniques to innovation, which means drawing on the knowledge and creativity of individual workers and building a business using strategies such as, or similar to, "know your customer", "eliminate waste", shrink batch sizes, "just-in-time production" and inventory control and accelerating cycle times. Lean startup represents a different way of measuring progress: rather than the traditional practice of tracking the production of high quality goods, progress for a startup should be based on successfully achieving validated learning and quickly discovering the right to build for customers (i.e., products and services that customers want and are willing to pay for).

According to Ries, several myths about the lean startup need to be dispelled. First, the lean startup is not about cost or spending as little money as possible, it is about speed. Second, the lean startup is not just about startup companies, it applies to all companies that face uncertainty about what customers want. Large global organizations, such as General Electric, have deployed lean startup methods in an effort to improve their capacities for innovation. Lean startups are not just small bootstrapped startups but are ambitious and able to deploy large amounts of capital once the appropriate business model and the target customers have been identified and validated. Finally, lean startups do not simply replace vision with data or customer feedback but instead are driven by a compelling vision and are rigorous about testing each element of that vision.

The role and task of the startup is to identify its vision and then engage in the hard work of developing a strategy to figure out the right questions to ask in order to effectively and successfully develop the startup's first product or service. Strategy includes identifying and collecting the resources necessary to conduct the necessary experiments including the appropriate team members. Strategy also includes formulating and embracing key "leap-of-faith" assumptions regarding the startup's value hypothesis and growth hypothesis. In order to be successful with its strategy, the startup must be able to identify and eliminate waste, which allows it to work both hard and smart and quickly discard what does not create value for customers in their eyes. Major areas of waste to be avoided during the lean startup process include waiting, defects, overproduction and improper use of skills.

§3 --Guiding principles of the lean startup method

Much has been written about the lean startup methodology and Ries has acknowledged and cautioned that the lean startup was a framework, not a defined set of steps or tactics that will inevitably lead to success. Ries stressed the importance of understanding basic lean startup principles such as "validated learning", experimentation, metrics, the "build-measure-learn" feedback loop, "innovation accounting" and "pivoting". Entrepreneurs need to adapt the lean startup method to the specific conditions confronting their particular startup and use the various tools within the framework to build a product, service, business or overall process that is uniquely suited to the startup and not simply copied from others. Applying the techniques of lean startup can be difficult and will certainly bring about significant changes within the startup team; however, proponents

argue that the end result will be better products and services, growth and more satisfied team members.

Lean Startup Principles

In his book *The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses*, Ries explained that all aspects of the execution of the lean startup framework are grounded in the following five fundamental "lean startup principles":

- Entrepreneurs are everywhere: A startup is a human institution designed to deliver a new product or service under conditions of extreme uncertainty. It has nothing to do with size of company, sector of the economy, or industry, and it's not just "two guys in a garage".
- Entrepreneurship is management: A startup is an experiment and, like many experiments, most startups fail because they follow traditional management principles (i.e., "general management" as taught to MBAs) that are not geared to the startup context of extreme uncertainty. The goal of the startup team is to create an institution, not just a product, and this can be done through pivoting.
- Validated learning: Traditional product development focused on moving sequentially through a series of steps in which both the problem and solution were known: requirements to specifications to design to implementation to verification to maintenance. The unit of progress was advancing to the next stage. However, if the startup is not building something that somebody wants, it does not matter whether the product is built on time, on budget, with high quality design or with beautiful design. Successfully executing a bad plan is achieving failure. In the lean startup, the unit of progress is validated learning which assumes that both the problem and the solution are unknown at the start. Lean startup involves hypotheses and experiments that lead to data and feedback used to develop insights regarding the customers and products that can be further tested. The goal of the process is customer development: customer discovery, customer validation, customer creation and scaling in the form of customer growth and stronger customer engagement.
- Build-measure-learn: "Build-measure-learn" is the roadmap for steering the lean startup and is based on several fundamental propositions including minimizing the total time to go through feedback loops, entering the build phase with a minimum viable product in mind and using innovation accounting to evaluate progress and select changes in direction. The loop is based on concrete and empirical steps and starts with ideas that are used to build a product, continues with measurement to elicit data that can be used for validated learning, and then repeats by using the learning to come up with new and/or additional ideas that are applied to the ongoing process of building the product. While the loop is similar in many ways to other popular management processes, the distinguishing factor is speed and emphasis on minimizing total time through the loop
- Innovation accounting: The lean startup is based on three learning milestones: establish the baseline by building a minimum viable product and measuring how customers behave right now; tune the engine by experimenting to see if we can improve metrics from the baseline towards the ideal; and pivot or persevere, understanding that when experiments reach diminishing returns it is time to pivot. The key questions include: How do you know when to pivot?; Vision or Strategy or Product?; What should we measure?; How do products grow?; Are we creating value?; What's in the MVP?; Can we go faster?

§4 ----Validated learning

While many believe that entrepreneurship is all about thinking up ideas for new products and services, in fact it is far more than that. Ries argued that successful entrepreneurship requires attention to the management practices necessary in order to build a sustainable business and, according to Ries, the primary goal for startups is not to make money or serve customers, although each of those is obviously important, but to learn how to build a sustainable business. Building a sustainable business is hard and may take a long time;

however, entrepreneurs generally do not have the luxury of waiting and it is therefore important for them to understand and apply the tools for what Ries called "validated learning" to quickly learn what the marketplace values enough to pay for and then build their businesses around it.

In the lean startup model, everything that the startup does (i.e., every product or service, every feature and every marketing campaign) needs to be understood as an experiment calculated to achieve validated learning and any effort by the startup that is not focused on validated learning is considered to be "waste" and must be eliminated. The lean startup is based on a different conceptualization of "value", with value referring not to the creation of "stuff" but rather to successful and efficient accumulation of validated learning necessary for learning how to build a sustainable business. Validated learning answers several fundamental questions: What products do customers really want? How will the business of the startup grow? Who are the startups customers? Which customers should the startup listen to and which should the startup ignore?

According to Ries, startups need to move beyond their obsession with the question of whether or not the product it originally envisioned can be built to the more critical issues of "can this product be built?" and "can we build a sustainable business around this set of products and services?". Startups should, of course, pursue their vision; however, experimentation leading to validated learning should be used to find a synthesis between that vision and what real customers will accept. In other words, startups should not impose their will on customers and tell what they want, nor should they turn their backs on the vision completely and simply built what customers thought they wanted.

Ries argued that validated learning was more concrete, more accurate, and faster than market forecasting or traditional business planning and product development. Traditional product development focused on moving sequentially through a series of steps in which both the problem and solution were known: requirements to specifications to design to implementation to verification to maintenance. The unit of progress was advancing to the next stage. However, if the startup is not building something that somebody wants, it does not matter whether the product is built on time, on budget, with high quality design or with beautiful design. Successfully executing a bad plan is achieving failure.

The Lean Revolution was based on the customer being the most important part of the production line, according to Deming, and agile product development identified a problem but made no initial assumptions regarding the solution. The unit of progress was a "line of working code". User stories were used to determine requirements for the product, which went through several iterations to gather more information and fix bugs until the product was "accepted" through testing and then available for release in small batches. The lean startup embraces the principles of the Lean Revolution by making validated learning the unit of progress, since the lean startup assumes that both the problem and the solution are unknown at the start. Lean startup involves hypotheses and experiments that lead to data and feedback used to develop insights regarding the customers and products that can be further tested. The goal of the process is customer

development: customer discovery, customer validation, customer creation and scaling in the form of customer growth and stronger customer engagement.

Startups often use the term "learning"; however, it generally is offered as an after-the-fact rationalization for failing to execute on some aspect of the product or service development process ("yes, that was surprising ... but we learned a good lesson"). In that situation, it is not always clear that the startup emerged smarter from the experience. In contrast, "validated learning" makes learning the primary focus of the activity, which is the deliberate process of demonstrating empirically that the startup team has identified and understood valuable truths about the present and future business prospects of the startup. Validated learning involves a continuous loop of building, measuring and learning, with the important thing being that the entrepreneur needs to get back to building and refining the product or service quickly after collecting feedback from potential customers and identifying what needs to be done to adapt the original concept and business model and move the startup forward toward sustainability. Speed in the validated learning phase is a fundamental driver of the "lean startup" process.

§5 ----Experimentation

Lean startups are admonished to use "experiments" as their first products, a process which involves defining clear and reasonable hypotheses regarding both the value and growth potential of a proposed product or service suitable for testing; based on the principle of "genchi genbutsu" ("Go and see for yourself") in the Toyota production system, committing to early engagement with potential customers to develop deep firsthand knowledge about them and identify and understand the issues, challenges and unexpected events relating to the proposed product or service; looking for analogs and antilogs in order to sketch out a potential business model; building and testing a "minimum viable product"; and identifying and eliminating waste (e.g., waiting, defects, overproduction and improper use of skills).

Ries counseled that in order to successfully engage in the experimentation associated with validated learning, it is necessary for the startup to formulate clear hypotheses that makes educated assumptions and predictions about what customers will think and do and allows for testing of those assumptions and predictions. There are two important assumptions for the startup, each of which is the basis for a hypothesis: value and growth. The value hypothesis tests whether a proposed product or service actually delivers value to customers once they are using it (value is a fundamental to acceptance of a product or service—customers will not pay for something unless they value it). The growth hypothesis focuses on how new customers will discover a product or service and thus cause the startup to grow (in order to become a sustainable business, the startup must be able to grow its customer base while attaining and maintaining profitability). While a clear and reasonable hypothesis is necessary for formulating the experiment, it is understood that the startup is operating in an uncertain environment in which outcomes cannot be proven or known in advance. Ries counsels that the startup must be willing to make a "leap of faith" in moving forward with the experiment and be prepared to modify

beliefs and assumptions underlying its hypotheses as information is collected during the experimentation process.

Lean startups see experiments as being their first products. A mindset for experimentation leads to different approaches to the product development process. Traditionally, product development was driven by a product manager who said "I want this" and an engineer who responds with "OK, I will build that". The result is often a very high quality product; however, the product will not be successful unless it actually solves something that customers themselves recognize as being a problem. Ries calls for startups to ask and answer, through experimentation, the following questions: (1) Do consumers actually recognize that they have the problem you are trying to solve?; (2) If there was a solution, would they buy it?; (3) Would they buy it from us?; and (4) Can we build a solution for that problem? Ries advocated, and discussed, a wide range of experiments such as "split tests", which save time by eliminating work that will likely not matter to customers and provide the startup with valuation information about what customers want and don't want; and "user stories", which involves writing a story that described the feature from the point of view of the customer as opposed to writing a specification for the feature that described it in technical terms.

§6 ----Metrics

Startups need to select the right metrics to evaluate their progress. Developing and using metrics to track performance during the launch stage is not a new concept; however, many startups select and rely on "vanity metrics", such as the number of visitors to their website, that are not strongly related to long-term success and which may lead to taking actions that are not necessary and which divert scarce resources toward goals that are not important for building a sustainable business. Ries advises that entrepreneurs must be sure that their metrics meet what he referred to as the "3 A's test", meaning they were:

- Actionable: The metrics must be usable in order for the startup to judge its business and its learning milestones and must clearly demonstrate cause and effect so that the startup can take definitive action in response to them. Metrics that do not aid understanding of cause and effect are "vanity metrics" and are useless as tools for helping people learn from their actions.
- Accessible: The metrics must be easily understood and accessible to everyone within the startup in order for the data to be able to be used as genuine feedback to guide their future action. The urge within groups or teams to use data to get resources that they want or push a particular agenda should be resisted.
- Auditable: The performance metrics should be auditable and transparent so that everyone can understand how the metrics were computed and reach their own conclusions regarding credibility based on their ability to test the data independently. In other words, the startup must be able to go back to the source of the data to prove that the metrics were truthful and telling the entire story.

A simple illustration of this process was provided based on metrics that Ries' company has used during its startup phase to track its efforts to build sustainable interest among

visitors to its website. By investing a small amount in pay-per-click advertising, he was able to get about 100 visitors a day to his website to test their proposed product. They were not that interested in the number of visitors at that point, they just wanted to be sure they had an adequate sample size. The metrics they tracked were aligned with the 3A's: registration (i.e., how many of the visitors took the time to sign up for the site); activation (i.e., how many of the registrants took the additional step of actually logging in); and retention, which was measured using different levels such as how many visitors had one chat, how many had five chats and how many actually became paying customers. Other metrics, such as referrals, could be added; however, the key is to keep the process manageable and meaningful so that "next steps" can be taken quickly.

It is important for the startup to understand that the metrics must be the sole arbiter of whether or not an "improvement" to a product or service should be considered "successful". At the very early stages of developing a new product or service ideas for improvements and changes can come from a number of sources that are unrelated to direct and clear feedback from customers. For example, members of the startup team will invariably have suggestions for improvements and many of these should be taken seriously as they are based on an in-depth understanding of the product or service; however, before they are permanently integrated into the product or service they must be subjected to rigorous testing against the baseline metrics in new experiments involving actual customers. The startup may find, often to its surprise, that an improvement that sounds great to all members of the internal team does not resonate with customers and has no significant impact on their behavior or on the baseline metrics.

Startups can use a variety of tools for testing their hypotheses and conducting their experiments. For example, "split tests" involve offering different versions of the product or service to potential customers simultaneously and is a good method for assessing smaller changes. Another testing tool is cohort analysis, which focuses on the activities of a group of people, referred to as a "cohort", who share a common characteristic over a certain period of time. Cohort analysis is a way to identify relationship between the characteristics of a population and the behaviors of members of that population. For the lean startup, cohort analysis may be used to identify groups of customers based on how they were referred to the business and then track their spending over time to determine which of the referral methods provide the best support for building a sustainable business. For example, the four main referral methods for a startup may be direct, Facebook, Google and the startups blogging activities and customers from each of those methods fall into a distinctive cohort. The startup can collect and compare data for each of these four cohorts over a specified period of time, such as four quarters, and may find, for example, that while customers referred by the blog delivered strong and consistent long-term spending, spending by members of the other cohorts declined as time went by.[7]

Management and investors must agree on a set of metrics that truly matter. These should track the results of pass/fail testing of hypotheses and the resulting iterations and should include key questions such as the following:

[7] For further information, see http://www.cohortanalysis.com/

- Have the customer problem and product features been validated?
- Does the minimum feature set resonate with customers?
- Who, in fact, is the customer and have hypotheses on the value proposition, customer segments, and channels been validated through face-to-face customer interaction?

Given the importance of customer validation, the following metrics should be tracked: average order size, customer lifetime value, average time to first order, rate of sale pipeline growth, improvement in close rate and revenue per salesperson. However, startups should not abandon financial metrics completely and it essential that everyone have an accurate understanding of cash-burn rate, number of months' worth of cash left, short-term hiring plans, and the projected amount of time until the company reaches cash-flow break even.

§7 ----Build-measure-learn

"Build-measure-learn" is the roadmap for steering the lean startup and is based on several fundamental propositions including minimizing the total time to go through feedback loops, entering the build phase with a minimum viable product ("MVP") in mind and using innovation accounting to evaluate progress and select changes in direction. The loop is based on concrete and empirical steps and starts with ideas that are used to build a product, continues with measurement to elicit data that can be used for validated learning, and then repeats by using the learning to come up with new and/or additional ideas that are applied to the ongoing process of building the product. The loop can be visualized as beginning with learning that transitions to ideas which are used to build an MVP and then deploying the MVP to collect and measure data which represents learning to be used to start the loop all over again (i.e., ideas > build > product > measure > data > learn > ideas > and so on in a continuous circle). While the loop is similar in many ways to other popular management processes, the distinguishing factor is speed and emphasis on minimizing total time through the loop. In fact, each of the steps of the loop involves a range of important management practices designed to increase speed. In addition, the loop is used to achieve learning milestones, which are alternatives to traditional business and product milestones and which can be used by entrepreneurs to assess progress toward customer acceptance accurately and objectively.

The "build" step involves building a prototype (i.e., an MVP) that can be used to test hypotheses (i.e., ideas). Key questions include:

- What kind of ideas should be tested?
- What kind of MVPs can be built and which one is the best at this point in time?
- What technology should be used to build the MVP?
- Does the startup have the right leaders (e.g., chief technology officer) and team members to execute the MVP?
- What are the risks that defects with the MVP will tarnish the startup's efforts to begin building a trusted brand?

The "measure" step involves exposing the MVP to customers and then tracking the behavior of those customers to generate actionable data. Key questions include:

- What should be tracked?
- How should tracking be set up?
- How often should the startup review and analyze the data?
- How does the startup know when it has enough data to make decisions?
- What should be done if the data collected does not make sense?
- What steps need to be taken to drive traffic to the MVP in order to have an adequate sample size?

The "learn" step involves transforming the data collected during the measurement stage into new hypotheses (i.e., new ideas) so that the feedback loop can begin once again. Key questions include:

- How should knowledge be tracked and recorded?
- Does the startup really understand the reasons for anything unexpected that happened during the deployment of the MVP (i.e., has a Five Whys analysis been conducted)?
- How should knowledge be shared with the rest of the startup team?
- How should the next iteration of the MVP and related feedback loop be prepared?
- How should the roadmap for the next iteration of the MVP be developed and how should the next features for the MVP be prioritized for inclusion in a build and testing?
- What additional resources will be needed to build the next iteration and should steps be taken to secure those resources (e.g., raising additional capital and/or expanding the team to bring in new skills and expertise)?

Central to the "learn" step is the concept of continuous deployment, which involves minimizing the time between making a "fix" to the MVP, such as writing a new line of code to address a bug discovered during an earlier experiment, and have the fix integrated into an undated version of the product or service that is available for live use by users. Efficiency in this area facilitates earlier and quicker feedback and detection of problems. When making fixes, care should be taken to do one thing at a time so that the impact of the fix can be clearly measured. In other words, attempting to make too many changes increases the difficulty of testing and validating new hypotheses.

Even though the loop is described as "build-measure-learn", the process actually works in reverse order and begins with figuring out what the startup needs to learn and then determining what minimum viable product needs to be built in order to conduct the experiment that is best suited to achieve the necessary learning. Conceived in this way, it is the customer, or rather the need to know more about the customer through learning, that drives or pulls the work of the product development team and other functions within the startup. The product development team and other functions should not be doing

anything other than working to test hypotheses about the customer and if they are it is likely to be waste that dilutes and weakens the energies of the organization.

§8 ----Innovation accounting

The lean startup must always be aware of where it is at the present moment, based on clear and sometimes devastatingly truthful feedback and other information from the potential marketplace, and be ready and able to design experiments with its product, service or business model to move the metrics closer to where they need to be in order for the startup to remain on track for becoming a sustainable business. In order to answer the important question of "where are we?", Ries proposed that lean startups engage in "innovation accounting", which he described as a disciplined, systematic approach to figuring out if the startup is making progress toward actually achieving "validated learning". Innovation accounting involves three steps: (1) using a minimum viable product ("MVP") to establish a baseline on the current position of the startup using real data; (2) selecting, implementing and testing the changes (i.e., micro changes and product optimizations based on results of the experimentation) needed to "tune the engine" and move the real data on the MVP from the baseline toward the ideal state included in the startup's strategy and business plan; and (3) after all the tuning that can be done to move from the baseline toward the ideal, making the decision about whether to "stay the course" or persevere, with the present course or pivot in another direction.

Innovation accounting is proposed as an alternative to traditional business and product milestones and requires startups to evaluate and improve outcomes, determine the best ways to measure progress, establish milestones and prioritize work and use of scarce resources. Ries believed that while much of the commentary and bluster regarding startups focuses on "big ideas", business model, whiteboard strategizing and arguing about how the rewards that will inevitably appears will be split up, the reality is that the biggest part of entrepreneurship, perhaps as much as 95%, is the nitty gritty work associated with innovation accounting: prioritizing decisions about what features to include in each iteration of the minimum viable product; deciding which customers to target or listen to and figure out the best way to collect data from those customers; and having the courage to subject a vision to which the startup is intellectually and emotionally attached to constant testing and often critical feedback.

§9 ----Pivoting

The goal of the experimentation process and implementation of the innovation accounting framework is to help the startup determine if it should keep moving forward with its current strategy (i.e., "persevere") or concede that it has gotten to the point where it is clear that it can make no further progress down the current path and must make a decision about whether to change direction (i.e., "pivot") and, if so, what direction should be taken. Knowing when to pivot is difficult; however, it is noteworthy that most entrepreneurs have admitted in hindsight that they should have pivoted sooner than they actually did. Startups should expect that many attempts will be required and that the goal

is to get to the point where the crucial persevere or pivot decision can be made on the made of real data.

If the development of the new product or service is moving along nicely and producing steady improvements in the baseline metrics, it is generally a sign that the startup should persevere with its strategy and continue working with the existing idea for the business and its initial product or service. However, before opting to persevere, the startup needs to step back and make sure that it is really making decisions based on cold hard facts and not on an emotional attachment to something that customers do not really want or would not be willing to pay for. The startup will never have all of the facts needed to predict the future with certainty, but it must have enough tangible and reliable information to ascertain whether its current strategy has a reasonable chance of success. The "persevere or pivot" decision must be made whenever the startup has completed a build-measure-learn feedback loop.

In many cases, the startup determines that a "pivot", which is a fundamental change in its business strategy (i.e., a structured course correction designed to test a new fundamental hypothesis about the product, business model, and engine of growth), is necessary since the metrics for the existing strategy signal that it is not likely to succeed.[8] Pivoting does not ignore or discard what has been learned so far, instead it is a change in strategy calculated to seek and achieve even greater validated learning. The startup admits "failure"; however, the admission is to be framed in a positive light as an opportunity to create the motivation, context, and space for more qualitative research. While progress down the old path has stalled, the experimentation produces new ideas, and new hypotheses, that can be tested once the appropriate pivot has been selected. Pivoting involves a restart of the validated learning process with a new baseline, tuning the engine activities and, ultimately, another "persevere or pivot" decision.

Pivoting, which has been described as the heart of the lean startup method, is usually a tough decision since it requires recognition of that something is not working and that long-held visions of a product or service need to be abandoned; however, the startup needs to act dispassionately and remember that the goal is to build a sustainable business and not just make any particular product or service successful. The separation of heart and brain is facilitated by knowing that the data from a comprehensive validated learning process is available as a foundation for the decision. If a startup is unable to make a change in direction in response to feedback from the marketplace, it will get "stuck" on a place where it continues to consume resources and commitment from employees and other stakeholders without growing and evolving toward the ultimate goal of becoming a sustainable business. This situation eventually takes a terrible physical and emotional toll on everyone involved with the startup. Viewed from this perspective, a pivot is not a "failure", but rather an opportunity to start down a new path toward creating what will hopefully become a sustainable business model.

[8] A pivot is generally a substantive change to one or more of the business model canvas components. Minor changes, are not pivots, but instead are considered to be iterations.

A pivot leads to a new strategic hypothesis that will require a new minimum viable product to test; however, the pivoting process is complicated because there are a number of different paths that a startup may take. The following general categories of potential pivots are illustrative:

- Zoom-In: A single feature of the current product becomes the entire product (e.g., Flickr)
- Zoom-Out: A choice is made to pursue a broader product (i.e., the current product becomes a feature of a broader product) since the current product is too narrow to support a sustainable business (e.g., Facebook)
- Customer Segment: The current product addresses and solves a real problem for real customers; however, the customer segment is different than the segment that the startup originally planned to serve (e.g., Wealthfront)
- Customer Need: The intimate knowledge of prospective customers gathered during the early experimentation stage has led to the conclusion that the need the startup was addressing was not that important to the customers; however, the process has uncovered new needs among that same target group of customers that the startup may be able to solve (e.g., Starbucks)
- Platform: A change from an application to a platform or vice versa.
- Business Architecture: A shift from a high margin/low volume solution (primarily B2B) to a low margin/high volume solution (primarily B2C)
- Value Capture: A change in the way that the startup captures value, such as changes to its monetization or revenue models
- Engine of Growth: A change in the startup's growth strategy (e.g. the viral, sticky and paid growth models) in order to accelerate growth and/or profitability
- Channel Pivot: A change in sales or distribution channels (e.g. from dealership sales to direct sales) when the data from the feedback process indicates that the same basic solution could be delivered through a different channel with greater effectiveness (a channel changes the competitive landscape and often requires simultaneous changes to features and pricing)
- Technology: The problem to be solved remains the same; however, the startup realizes that it can develop the solution using a new and completely different, and usually less expensive, technology that provides superior price and/or performance compared with existing technology (a technology pivot is frequently employed by established businesses also)

This is not an all-inclusive list of potential pivots; however, it does provide a startup with a menu of ideas to think about.[9] The key points to remember about any pivot is that it should be based on hard data obtained from prior experiments and should be recognized as nothing more than a new starting point for generating the next fundamental hypothesis about the product, business model and engine of growth that must be subjected to rigorous testing against appropriate baseline metrics.

[9] Examples of pivots including Twitch.tv, Slack, Instagram, Pinterest and YouTube are discussed in detail at http://labs.openviewpartners.com/3-successful-startup-pivot-examples/#.WRHfD-XyvIU

A pivot is obviously a major decision and requires courage among the leaders of the startup. Most startups go through a number of pivots during the earliest stage of their evolution and the "runway" for any startup, often described by reference to the amount of cash still available to the startup at any point in time, is actually the number of pivots it can still make before its resources dry up. Speed is important for the lean startup, including the ability to make pivots quickly while remaining grounded in what they have learned. However, the "persevere or pivot" decision should not be made impetuously, instead it is best to convene a meeting among all of the parties who should be involved in the decision to deliberately and dispassionately go through the data that has been collected. Pivoting does not end when the startup has settled on its initial product, business model and engine of growth, all companies, regardless of size and experience, must continuously make "persevere or pivot" decisions in response to changing business conditions. Ries' goal was to encourage startups to build pivoting decisions into their methodology and processes from the beginning.

§10 --Applying the lean startup method

The lean startup has been conceptualized as a three level pyramid: the bottom level is referred to as the startup's "vision", the middle level is the startup's strategy, and the top level of the pyramid is the startup's product or service. The goal of the startup is to operationalize its vision by creating and executing a strategy and business model that will lead to a product or service that supports a sustainable business. In order to do that, the entrepreneur must have a vision for the business, an idea about the destination at which the startup will eventually arrive. In order to achieve that vision, a strategy must be developed based on rigorous testing, which means asking tough questions such as "should this product be built". The brutal truth of the lean startup standard is that while an entrepreneur may fervently believe that the answer to that question has to be "yes", he or she must be prepared to abandon the product as first conceived when it becomes clear, based on objective information obtained from smart experimentation, that it cannot serve as a foundation for a sustainable business.

The lean startup process is designed to help entrepreneurs test their vision by breaking it down into small experiments to gather customer responses and keep entrepreneurs focused on what needs to be done to drive the new product or service forward and measuring progress. While the entrepreneur's vision generally includes a large and dynamic organization to support the product or service, the lean startup process is about simplicity and avoiding diversion toward formulating complex plans. From this process, the startup can develop and employ a strategy that includes a business model, a product roadmap, a point of view about partners and customers and an accurate profile of who the customers are and what they value enough to pay for. Throughout the process the vision generally does not change; however, strategies often do have to be changed, a decision Ries refers to as a "pivot", based on feedback from customers. As for the startup's product or service, it will change continuously as information necessary for optimization is collected.

The Lean Startup book was divided into three parts, each of which incorporated the fundamental principles described above. The first part, called "Vision", discussed the new discipline of entrepreneurial management, defined what a "startup" is and introduced the concept of "validated learning" as a condition to building a sustainable business. The second part, called "Steer", illustrated how the "build-measure-learn" feedback loop worked and the role of the minimum viable product, innovation accounting and the "pivot or persevere" decision making process. The final part, called "Accelerate", provided insights for startups on how they could accelerate the steering process using techniques borrowed from "agile development", growth engine strategies and laying the foundation for designing sustainable, adaptive and innovative companies.[10]

Lean Leadership

Jagyasi argued that in order to use the lean startup process effectively, and put startups on a path of sustainable growth that can be maintained, it is necessary to have "lean leadership with a futuristic vision and well defined strategies". According to Jagyasi, lean leadership was based on five basic principles:

- **Identify the core performers:** Lean leaders must be able to quickly identify those core members of the team with the ability to get things done in the system and fetch unexpected rewards and nurture them properly along with timely rewards and incentives.
- **Learning from the data:** Smart lean leaders have the ability to use the data collected from the lean startup process intelligently to plan for new innovations in the market, study a market segment, improve and accelerate the decision making process and enhance the learning capacity of the organization.
- **Maintain a trimmed management system:** A lean management team fosters learning and growth and lean leaders should avoid creating an overcrowded management system that tends to restrict innovation and create conflicts of interest that decrease the productivity level of the organization. Before adding to the management team, a clear case must be made that the new addition will create real value.
- **Incentivizing the innovations:** Lean leaders must be able to properly align incentives and rewards to the startup's strategic goals and should also create incentives and key performance indicators that encourage and motivate the most innovative members of the team.
- **Directing the route:** The lean leader must be an efficient driver of the "startup vehicle", which means being able to detect the points to slow down, shift gears, change the course (i.e., "pivot") or persevere.

In addition to the principles and action items associated with lean leadership mentioned above, Jagyasi suggested the following list of desirable traits of a lean leader:

- Learning attitude: Willing to learn and not only command
- Good understanding level: Good listener and willing to understand.
- Believes in evidence based practice
- Maintaining a continuous and sustainable lean thinking
- Always open to communication
- Displays strong commitment towards consistency, discipline and outcome
- Advocate cause-effect relationship
- Possess a high leadership personality

[10] Portions of the summary of The Lean Startup in the following sections are adapted from P. Minors, The Lean Startup by Eric Ries: Book Summary, https://paulminors.com/the-lean-startup-eric-ries-book-summary-pdf/

Source: P. Jagyasi, "Lean leadership for startup companies" (August 14, 2017), https://www.linkedin.com/pulse/lean-leadership-startup-companies-dr-prem-jagyasi-drprem-com

§11 ----Vision

The first part of *The Lean Startup* addressed the topic of "vision", including definitions of an "entrepreneur" and a "startup" and the introduction of the new path for startups to measure their progress based on validated learning. Ries explained that the "lean startup" takes its name from lean manufacturing and adapts the innovative ideas of lean manufacturing, such as just-in-time inventory management, small batch sizes and accelerated cycle times, to the context of entrepreneurship and startups.[11] Ries argued that it was important to conceive of a startup as being a human institution designed to create a new product or service under conditions of extreme uncertainty. The goal of the entrepreneur is to build a sustainable organization in the midst of these uncertain conditions and an essential tool for being successful is "learning", particularly learning about which elements of the startup's strategy are working to realize the startup's vision and which elements are simply wrong and will fail to create value.

Lean startups embrace "validated learning", which is the process of demonstrating empirically that a team has discovered valuable truths about a startup's present and future business prospects. Validated learning occurs through a series of experiments that the startup uses to test the viability of its strategy. Following traditional scientific method, the startup develops a series of initial hypotheses that include predictions about what is supposed to happen and then tests these predictions empirically through interactions with real customers that produce data that is analyzed using key metrics that will allow the startup to determine whether a hypothesis is true or false and what iterations to the startups strategy, products and services are needed. Two key hypotheses that must be rigorously tested out of the box are the "value" hypothesis, which tests whether a product or service really delivers value to customers once they are using it, and the "growth" hypothesis, which tests how new customers will discover a product or service.

Lean Manufacturing

Lean manufacturing, often referred to simply as "Lean", has been described as a business model focused on efficiently delivering high-quality products or services to customers in a manner that ensures value by identifying waste within the value stream and eliminating it whenever possible. While practitioners of lean manufacturing have developed a set of tactics that can be implemented to improve the workplace, lean is also a way of thinking about work that is based on continuously seeking ways to proactively make improvements. While lean ideas have been employed for centuries, it is generally recognized that Japan's Toyota Motor Company was among the first to bring many of the ideas associated with lean manufacturing together into a coherent methodology that became known as the "Toyota Production System", or "TPS". Since the emergence of the TPS in the 1980s, lean manufacturing principles have been implemented in businesses and organizations across many industries and work settings.

[11] For further discussion of "lean manufacturing", see "Product Development and Commercialization: A Library of Resources for Sustainable Entrepreneurs" prepared and distributed by the Sustainable Entrepreneurship Project (www.seproject.org)..

It has been explained that the key goals of the TPS were to streamline processes, increase efficiency, improve productivity, respect people and please the customer. TPS was based on the understanding that businesses are engaged in three types of activities: value-added, non-value-added and waste. In order for an activity to be value-added, it must satisfy several criteria: customers will pay for the activity, the product changes in some way and the work is done correctly without defects. The non-value-added activities must be performed, but aren't readily recognized by customer as adding value to the actual product (e.g., complying with governmental safety regulations during the manufacturing process). Finally, the most problematic activity is waste. Since waste does not add value for the customer, and does not need to be done in order to complete a product or service, efforts should be taken to eliminate it. In Japanese the word for waste is "muda" and in the TPS there were a number of main types of muda: defects, waiting, extra motion, excess inventory, over-production, extra processing, unnecessary transportation and unutilized talent or skills. In addition, lean manufacturing attempted to eliminate mura, which referred to unevenness in production, and muri, which meant overburdening people or equipment.

The critical guiding principals for effectively deploying lean manufacturing techniques have been summarized as follows:

- ***Elimination of Waste:*** Businesses need to identify non-value-added work and eliminate it in order to remove the following types of unnecessary wastes from the manufacturing process: overproduction; unnecessary motion; wasted inventory; production defects; unnecessary waiting time; wasted transportation and over-processing.
- ***Continuous Improvement:*** Commonly referred to using the Japanese word "kaizen", continuous improvement is about promoting constant, necessary changes, both large and small, toward the achievement of a desired state. Continuous improvement begins with establishing and maintaining standardized work and level production and moves forward as a continual mindset throughout the organization based on the premise that there is always room for improvement.
- ***Respect for Humanity:*** Companies should understand that the people that work for them are their most valuable resources and that they must be respected and kept in high regard as lean manufacturing principles are implemented. Among other things, this means listening to the ideas of workers and providing them with help when necessary for them to fulfill their roles. Respect for humanity builds loyalty among workers and their sense of personal worth.
- ***Levelized and "Just in Time" Production:*** Levelized production refers to the aspiration to establish and maintain the work load at the same level every day. This requires striking the right balance between traditional forecasting, which often leads to excess inventories that are not needed for customer orders, and the "pull system", which waits for customer orders but must be primed sufficiently to avoid delays in deliveries to customers. The key to achieving levelized production is "just in time" production, which is based on the principle that companies must be focused on avoiding waste by building only what is require, when it is required and in the quantities required.
- ***Quality Built In:*** Lean manufacturing seeks to build quality into the manufacturing process, the product design, the parts in the product and the finished product itself, including the packaging of the finished product and the manner in which it is shipped. The continuous improvement efforts mentioned above are heavily focused on quality issues and generating and implementing ideas for improving quality.

Sources: Certain portions of the description of lean manufacturing in this section are adapted from "Lean Manufacturing" (June 15, 2016), https://www.creativesafetysupply.com/articles/lean-manufacturing/. See also http://www.lean-manufacturing-junction.com/lean-manufacturing-principles.html.

§12 ----Steer

While the startup is obviously working to develop a successful product or service, the actual "products" of the startup at the very beginning are "experiments" that are necessary in order for the startup to learn how to build a sustainable business. The second part of *The Lean Startup* is a detailed discussion of the experimentation and learning process, particularly the "build-measure-learn" feedback loop that Ries referred to as being the core of the lean startup model. Starting with the value and growth hypotheses mentioned above, the startup moves forward on a path of testing, measuring and, if necessary, pivoting in order to arrive at validated hypotheses that can serve as the foundation for a viable business model. The vehicle for completing the "build-measure-learn" loop is the "minimum viable product", or "MVP", which lacks many of the features of the eventual finished product but which is sufficiently robust to complete experimentation with a minimum amount of effort and without gobbling up too much development time. The startup must rigorously measure its progress through the experimentation stage and use "innovation accounting" to understand whether the progress that is being made is related to changes being made in the MVP and whether the startup is drawing the right lessons from those changes. Innovation accounting pushes startups to establish and use actionable, accessible and auditable metrics.

Ultimately, the key question that needs to be answer during this stage is whether the startup is making sufficient progress to continue to believe that it original strategic hypothesis is correct (i.e., "persevere" with the current strategy) or should the startup make a major change in the form of a "pivot"? An important distinction between the traditional product development model and the formal business planning method that accompanies it is that while the "runway" to launch for traditional startups is the originally projected amount of time to first product introduction in the business plan, the runway for the lean startup is the number of pivots it can still make (i.e., the number of opportunities the startup has to make and test a fundamental change in its business strategy). Ries advised startups to conduct regular "pivot or persevere" meetings to ensure that they are get to each required pivot quickly and to remember that a pivot is more than just a commitment to "change" and involves developing and rigorously testing a new set of hypotheses regarding the product, the business model and growth engines.

§13 ----Accelerate

Given that one of the fundamental premises of the lean startup method is speed, it is not surprising that Ries devoted much of the third part of *The Lean Startup* to the techniques borrowed from "agile development" that startups can use to speed up the steer process and growth methods. Ries argued that startups should embrace the small-batch approach to product creation, which allows the startup to pivot quickly if customers do not like particular features and also makes it easier to identify quality problems quickly. Ries also introduced several different engines of growth from which startups can choose in order to drive sustainable growth: sticky, viral and paid. It is also important for the startup to seek and achieve "adaptability", which means that it has created an organization that can automatically adjust its processes and performances to current conditions. However, Ries cautioned that adaptability does not mean going faster than is practical and introduced the technique of "The Five Whys" (see box below) as a natural

speed regulator to ensure that startups take the time to get to the real cause of problems that may arise on the path toward a sustainable business. Finally, the lean startup is all about innovation and Ries provided guidelines on structuring successful innovation teams and creating an "innovation sandbox" where changes and experiments only affect one set of features or customers at a time.

The Innovation Sandbox

Ries argued that a startup requires three structural attributes: (1) scarce but secure resources, (2) independent authority to develop their business, and (3) a personal stake in the outcome, which need not be financial but instead can be personal or professional recognition for success. According to Ries, managing using the lean startup approach means being able to manage a portfolio of innovation that is both sustainable and disruptive. Ries conceptualized the goal for startups as building an "innovation factory" that uses lean startup techniques to create disruptive innovations on a continuous basis that leads to long-term economic growth. In order to be successful, there must be a culture and systems in place that allows teams to move and innovate at the speed of the experimentation system.

Ries called on startups to create an "innovation sandbox" that would empower innovation teams by allowing them to operate without constraints on their methods while containing the impact of the new innovation until it reached the appropriate point of development. Innovation teams must be structured correctly in order to succeed, and guidelines for teams working in the innovation sandbox included the following:

- The team should be cross-functional and have a clear tem leader.
- The team should be interacting with real customers, although the number of customers should be limited given the focus on gaining experience for team members who may be new to lean startup techniques. The team should be allowed to attempt to establish long-term relationship with the customers and should carefully monitor the customer experience and feedback.
- The team should be given complete autonomy to develop and market new products within their limited mandate, which means it should be given the freedom to conceive and execute experiments without having to secure an excessive number of approvals and should be able to build and ship actual functioning products and services and not just prototypes.
- One team goes through the entire experiment, which should be conducted under a pre-designated time limit. Time spent on approvals and handing projects over to other teams slows innovation. Moreover, having one group that sees a project all the way through, working with small batches and collecting and analyzing actionable metrics, accelerates the learning process for everyone involved.
- The team should be required to report on the success or failure of its efforts by using standard actionable metrics, which should be consistent throughout the experimentation, and innovation accounting. This formalizes the learning process and makes the team accountable to its learning milestones.

For a startup, the whole team is operating in an innovation sandbox. For larger companies, the sandbox concept is an opportunity to develop "startup muscles" and lay the foundation for growing the sandbox and introducing lean startup techniques into the company's standard routines.

§14 Customer development

According to Blank, the long-standing reference point for bringing a new product to market has been some form of the "Product Development Model", which he explained as a product-centric model that evolved in manufacturing industries in the early twentieth

century and eventually spread first to the consumer packaged goods industry in the 1950s and then to the technology business in the last quarter of the twentieth century.[12] In its simplest depiction, the product development model moves sequentially through four stages: concept, product development, alpha and beta testing and launch/first shipment. Blank conceded that the model works fairly well when launching a new product into an established, well-defined market where the basis of competition is understood, and its customers are well known. The model itself is grounded in the assumption that both customer problems and the product features necessary to solve those problems are known from the beginning and that all that is necessary for success is for the company to execute the development process in a timely fashion following a pre-determined business plan and launch/scaling schedule. In other words, it is safe and logical to proceed on the premise of "build it and they will come".

Blank argued that the traditional product development model only worked with "life and death products" such as biotech cancer cures where the issues are development risks and distribution and not customer acceptance and simply did not make sense for most startups, given that few of them really knew what there market was and could not possibly make a reasonable prediction of customer acceptance and market adoption. Based on his experience, too many startups persisted in using the product development model to manage product development, finding customers and time their sales launch and revenue plan, only to find that they were mistaken about their assumptions about customer needs and had wasted valuable human and financial resources executing a plan that had been set without adequate experimentation and validation in advance. Too often the result is premature scaling (i.e., creating and staffing formal marketing, sales and business development functions, creating Marcom materials, hiring public relations agencies etc.), expanding overhead costs at the same time that evidence from the field indicates that the product as originally conceived is not working in the marketplace, rushing to close deals on dubious terms in order to hit the launch date in the business plan, and agitated investors questioning the judgment of the founders who put together the plan upon which they committed their capital.

Blank identified a number of "deadly sins" of the traditional new product introduction model (see the box called "The 9 Deadly Sins of the New Product Introduction Model" below); however, he particularly emphasized three unrealistic expectations: that the sequential product development path could be relied upon to guide activities that had nothing to do with product development (i.e., finding customers, a market, and a viable business model), that customer development would move on the same schedule as product development, and that all types of startups and all new products would achieve acceptance and deployment at the same rate (i.e., starting at the time of the first customer ship). Another set of unrealistic expectations comes from the rosy predictions the founders made in the original business plan regarding market size and growth that

[12] The discussion in this section of Blank's views on the traditional product development model is adapted from S. Blank, The Four Steps to the Epiphany: Successful Strategies for Products that Win (2006), Chapter 1 ("The Path to Disaster: The Product Development Model") and S. Blank and B. Dorf, The Startup Owner's Manual Volume 1: The Step-by-Step Guide for Building a Great Company (K&S Ranch Publishing Divisions, March 2012).

became the plan of record in the eyes of investors and forced the founders to execute towards unrealistic and unachievable goals.

The 9 Deadly Sins of the New Product Introduction Model

In the informative guide, *The Startup Owner's Manual Volume 1: The Step-by-Step Guide for Building a Great Company*, Blank and Dorf presented and discussed their list of "The 9 Deadly Sins of The New Product Introduction Model" that the customer development process integrated in the lean startup approach was intended to avoid:

- **Don't assume you know what the customer wants–start with guesses and hypotheses.** These become facts only after they have been validated with customers willing to pay for the product.
- **Don't assume you know what features to build**–this follows directly from the preceding lesson, avoid building features nobody cares about by first testing your assumptions about them with customers willing to pay for them.
- **Don't focus on a launch date – instead focus on building a product that customers want to pay to use.** Focusing on a launch date can cause the team to place an emphasis on the wrong things, causing the startup to hurtle towards the launch date even if it does not yet know its customers, or how to educate them about its product. Also, this becomes a milestone by which the startup's investors will judge the performance of their investment.
- **Don't emphasize execution.** Rather emphasize developing and testing hypotheses, learning, and iteration – the emphasis on getting things done at a startup can lead employees to focus on execution rather than searching for answers to the guesses that the startup is operating under. Hypotheses have to be tested, and tested again. Executing on untested hypotheses is a "going-out-of-business strategy."
- **Don't focus on a business plan, instead search for a business model** – A business plan offers the great comfort of presumed certainty. The reality of a startup's existence is one of acute uncertainty. That can be very unsettling. A startup's founders, investors, employees, and board of directors must avoid the seduction that accompanies reliance on business plans, and the management tools that characterize the experience of large companies with known customers and well-established business models. Results of experimentation and validation tests should matter more than milestones.
- **Don't confuse traditional job titles with what a startup needs to accomplish** – the traits that an individual needs in order to succeed in the environment of a startup differ significantly from those that lead to success in a large company with a known business model, a fixed business plan, known customers, and a known market. In contrast, to succeed in the startup environment an individual needs to be comfortable with chaos, flux, and "operating without a map". The worst thing that could happen for a startup is for employees to default to behaving as they would if they were working in a large company.
- **Do not execute a "Sales and Marketing" plan too early** – sales and marketing can become too focused on executing to a seemingly great plan rather than learning the identity of a startup's most profitable customers and gaining knowledge about what will spur those customers to engage in behavior that enables the startup generate revenues and profits. Consider a scenario in which a startup has gained hundreds of customers but only a tiny fraction of those customers actually make a purchase, and to make things worse a vast majority of completed purchases are made by a an even smaller number of repeat buyers. A focus on the "number of customers" might camouflage the startup's dire need to determine what steps it needs to take in order to dramatically increase the number of paying customers.
- **Don't presume success prematurely**–executing to a business plan often leads to premature scaling, even when the reality might call for the startup to hit the brakes. Expanding overhead costs before the revenue to support such costs materializes is the shortest path to disaster for a startup. Hiring, and infrastructure expansion should only happen after sales and marketing have become predictable, repeatable, and scalable processes. Moreover, startups need to be impatient for profits but patient for growth. A startup that knows how to earn a profit can survive indefinitely. A startup that does not know how to earn a profit, but instead is focused on other measures of growth is playing a dangerous

game of Russian roulette.

- **Don't manage by crises, it just leads to a death spiral.** The accumulation of all these mistakes leads to the inevitable demise of the startup that makes the mistake of operating as if it is merely a small version of a big company.

Source: Adapted from a description in B. Aoaeh, "The Path to Disaster: A Startup Is Not A Small Version of A Big Company – The Office Hours Remix" (November 14, 2015), http://innovationfootprints.com/the-path-to-disaster-a-startup-is-not-a-small-version-of-a-big-company-the-office-hours-remix/. See also S. Blank and B. Dorf, The Startup Owner's Manual Volume 1: The Step-by-Step Guide for Building a Great Company (K&S Ranch Publishing Divisions, March 2012), Chapter 2 ("The Path to the Epiphany: The Customer Development Model)".

Believing that the intense focus on execution invariably places the survival of startups at risk, Blank argued that startups need to engage in a "learning and discovery" process to get them to the point where they know what needs to be executed, a parallel process to product development that is customer-and market-centric and which Blank referred to as "Customer Development". Blank argued for startups engaging in "quick, responsive development" that proceeds as follows: initial planning generates requirements that are then analyzed and incorporated into the design of a minimum viable product that is then implemented through the testing of the product with customers that provides feedback that is then evaluated for data that can be used for the next iteration of planning, design, implementation and testing.

Blank explained that during the customer development process the startup is searching for a business model that will work and does so through an iterative process that collects and analyzes customer feedback and uses that feedback to validate or invalidate business hypotheses and make necessary changes, or "pivots". Once the startup has identified a provable model, it turns to executing the model through the creation of a formal business organization. According to Blank, the "big ideas" associated with the customer development process included moving in parallel with product development, which should be conducted using "agile development" principles and techniques; measurable checkpoints; measuring progress by reference to customer milestones, not first customer ship date; applying the appropriate marketing tactics for the specific type of market that the startup is pursuing (i.e., new market, existing market or re-segmented market) and emphasis on learning and discovery before execution.

Blank broke down the customer development process into four stages, each with a distinct purpose and set of processes, and cautioned that startups generally fail several times before finding the approach that will put them on the path toward a sustainable business. The first two steps are primarily concerned with facilitating the "search" for a sustainable business model and the last two steps are concerned with "executing" the business model once it has been developed, tested and validated:

- Customer Discovery: The founders translate their vision and ideas regarding the startup into business model hypotheses, test assumptions about customers' needs by "going outside the building", and then create a "minimum viable product" to try out their proposed solution on real customers.

- Customer Validation: The startup continues to test all of its other hypotheses and attempts to validate customers' interest through early orders or product usage. If the startup finds insufficient interest to support a sustainable business, it can "pivot" by changing one or more hypotheses and testing them in the same way as the prior ones.
- Customer Creation: Once the product is refined enough to sell, the startup uses its proven hypotheses to select and execute strategies for ramping up marketing and sales spending to build demand and scale up the business.
- Company Building: The business transitions from "startup mode" and a focus on searching for answer through its customer development team to a more traditional organization composed of functional departments executing on the business model.

The customer development model seeks to address and overcome the main problems associated with the traditional product development model, particularly the failure to gather customer feedback until the point where significant investments have already been made and changes will be costly and demoralizing. Each of the steps in the model is iterative, which means that failures are expected and that startups can anticipate going backward several times (i.e., pivoting) before finally breaking through and "exiting" one step to move on to the next. In contrast, the traditional product development model makes no provision for moving backward and unexpected failures are usually rewarded with personnel shakeups at the top of the hierarchy imposed by impatient investors. Certain of the steps overlap—for example, taken together, the customer discovery and validation steps are focused on verifying the potential market, locating customers, testing the perceived value of the product, identifying the economic buyer (i.e., the customer or a third party such as an advertiser), developing a pricing and channel strategy and understanding the sales cycle and process.

It is important to note, however, that the customer development process is not a full substitute for the activities occurring among startup team members focused on product development, including engineering specialists. As such, coordination and synchronization between the customer development and product development groups is essential to success and realizing the benefits of the customer development process. Blank offered the following suggestions to make sure that product development and customer development is synchronized throughout the four stages of the customer development process:

- In each of the stages in the customer development process the product development and customer development teams meet in a series of formal "synchronization" meetings and the startup cannot proceed to the stage unless both groups agree.
- During the discovery stage, members of the customer development team should focus their efforts on validating the product specifications and not on trying to come up with new features. Only if customers say that there is not a problem to be solved, any problems that do exist are not that painful or the existing specifications do not solve the problem should the product development and customer development teams get together to try and come up with new features for testing.

- Before any new features are added in response to customer input during the discovery stage, the leader of the product development team should join the customer development team's meetings to get feedback directly from customers.
- During the validation stage, meetings with customers should be staffed by both the pre-sales support team and key members of the product development team.
- During company building stage, installation and support for the initial product is handled by the product development team, which also has responsibility for training the support and service staff.

Customer discovery and validation should be done with minimal waste of cash and time using the tools of validated learning and agile engineering, thus allowing the startup to stockpile the resources it will need to push aggressively into customer creation and company building. The customer development process preserves cash by deferring the need to hire sales and marketing staff until the founders and other members of the customer development team have successfully turned hypotheses into facts and identified and confirmed a viable product/market fit. When management and the board agree that a repeatable and scalable sales model has been identified and validated it is then time to invest heavily in creating end-user demand and driving those customers into the sale channel that will generate revenues for the company.

Blank and Dorf's "Customer Development Manifesto"

The foundational principles of the customer development process for startups championed by Blank and Dorf were summed up by them in their "Customer Development Manifesto", which is explained in more detail in *The Startup Owner's Manual Volume 1: The Step-by-Step Guide for Building a Great Company*.

Rule No. 1: There are no facts inside your building, so get outside.

A startup is a faith-based enterprise, built on its founders' vision and a notable absence of facts. The founders' job is to translate this vision and these hypotheses into facts. Facts live outside the building, where prospective customers live and work, so that's where you need to go.

Rule No. 2: Pair customer development with agile development.

Customer Development is useless unless the product development organization can iterate the product with speed and agility using an agile methodology designed to continually take customer input and deliver a product that iterates readily around a "minimum value product" ("MVP") or its minimum feature set.

Rule No. 3: Failure is an integral part of the search.

Existing companies have learned what works and what doesn't work, and failures in an existing company are the exception and happen when someone screws up. In contrast, "startups go from failure to failure" because they are searching, and NOT executing, and the only way to find the right path is to try lots of experiments and take a lot of wrong turns. Failure is an integral part of the startup learning process.

Rule No. 4: Make continuous iterations and pivots.

Embracing failure in Customer Development demands frequent, agile iteration and pivots. A pivot is a substantive change in one or more of the nine boxes of the Business Model Canvas (for example, a pricing change from freemium to subscription, or a customer segment shift from boys to women). Iterations are

minor changes to business model components (e.g., changing pricing from $99 to $79).

Rule No. 5: No business plan survives first contact with customers so use a business model canvas.

There's only one reason for a business plan: some investor who went to business school doesn't know any better and wants to see one. But once it has delivered financing, the business plan is fundamentally useless. Entrepreneurs often mistake their business plan as a cookbook for execution, failing to recognize that it is only a collection of unproven assumptions. Startups should dump the business *plan* and adopt the flexible business *model* developed using the business model canvass approach.

Rule No. 6: Design experiments and test to validate your hypotheses.

Initially, hypothesis is just a fancy word for "guess". To turn hypotheses into facts, founders need to get out of the building and test them in front of customers. How do you test? And what do you want to learn? Testing and learning require you to be thoughtful on constructing and designing your tests. Start by asking yourself, "What insight do I need to move forward?" Then ask "what is the simplest test I can run to get it?" Finally, think about, "how do I design an experiment to run this simple test?"

Rule No. 7: Agree on market type. It changes everything.

Not all startups are alike, particularly when it comes to the relationship between its new product and its market (options include introducing a new product into an existing market, bringing a new product into a new market and bringing a new product into an existing market with the intent to re-segment the market by creating a new niche or competing as a low-cost entrant). Strategy and tactics that work for one market type seldom work for another. Market type determines the startup's customer feedback and acquisition activities and spending. It changes customer needs, adoption rates, product features and position as well as its launch strategies, channels and activities.

Rule No. 8: Startup metrics differ from those in existing companies.

Existing business have established tools for measuring performance – P&Ls, balance sheets, cash flow forecasts, etc. However, startup metrics should focus on tracking the startups progress converting hypotheses into incontrovertible facts rather than measuring the execution of a static plan.

Rule No. 9: Fast decision-making, cycle time, speed and tempo.

Speed matters at startups where the only absolute certainty is that the bank balance declines every day. Pivots and iterations should happen the faster the better. The faster these cycles happen, the greater the odds of finding a scalable business model with the cash on hand. If cycles happen too slowly, the startup runs out of cash and dies. Speed also matters inside the building and the company needs to develop the ability to make quick decisions consistently and at all levels in the company.

Rule No. 10: It's all about passion.

A startup without driven, passionate people is dead the day it opens. "Startup people" are different: they think differently and their brains are wired for chaos, uncertainty, and blinding speed. They're irrationally focused on customer needs and delivering great products. Their job is their life.

Rule No. 11: Startup job titles are very different from a large company's.

In an existing company, job titles reflect the way tasks are organized to execute a known business model. Startups demand executives who are comfortable with uncertainty, chaos and change, and the soundest approach is to begin by having everyone, including the founders, be members of the Customer Development team.

Rule No. 12: Preserve all cash until needed. Then spend.

The goal of Customer Development is not to avoid spending money, but to preserve cash while searching for the repeatable and scalable business model. Once found, then spend like there's no tomorrow.

Rule No. 13: Communicate and share learning.

Share everything that's learned outside the building with employees, co-founders and investors. The best way to do this is via a blog or a Customer Relationship Management tool that allows outsiders to see the company's progress and offer suggestions and course corrections.

Rule No. 14: Customer development success begins with buy-in.

For Customer Development to succeed, *everyone* on the team –founders, investors, engineers, marketers, accountants – needs to realize that this process is vastly different from *executing a plan*, all the way to its core. Everyone must accept the process, recognizing that this is a fluid, nonlinear *search for a business model* that sometimes can last for years. Founders need to have the commitment of the team *and* board before embarking on this process.

Source: Adapted from "The Startup Owner's Manual Vol. 1™" by Steve Blank and Bob Dorf, © 2012 K and S Ranch, Inc. 5.

§15 --Customer discovery

Customer discovery involves capturing the founders' vision and translating it into a series of hypotheses regarding customer needs and the startup's business model. Blank emphasized that "there are no facts inside your building, so you're going to get the heck outside" for customer reactions using various experiments that provide the startup with facts and validated learning. The first experiments test customers' perceptions of the problem and how strongly they crave a solution for the problem. The next experiments involve showing real customers a "minimum viable product" ("MVP") to see whether the proposed solution would actually generate revenues for the company. Feedback from the experiments is used to identify necessary pivots (i.e., major changes in the business model hypotheses).

During the customer discovery phase the founders are asking, and seeking answers for, a series of questions: Who is the customer? What problems do these customers have? What potential solutions can the startup provide for these problems? Customer discovery begins with a whole series of conversations with potential customers which are calculated to help the founders generate hypotheses and design experiments that can be used to quickly test those hypotheses. Blank is very clear that the founders cannot delegate these conversations to others, such as a vice president of sales, but must get out and engage with prospective customers directly since they are the ones with vision and the authority to make iterations and pivots on the spot. Once the founders have done the hard work necessary to test and refine their vision, they add members to a customer development team and, if all goes well, expand the startup to include functional departments that can execute on the validated vision. Customer discovery requires humility from the founders

and a clear realization and acceptance that they are not smarter than the collective intelligence of their potential customers.

When collecting feedback from customers and analyzing the data from customer communications it is important to avoid applying traditional accounting measures and remain mindful of nuggets of information that may come from reactions and ideas provided by customers. Blank provided an illustration of a survey in which 47 of 50 potential customers confirmed that they would willingly pay $9.99 for a product that included certain features. If the customer discovery process was only about getting the highest rate of potential interest the startup might feel that it had gotten to the point where it could shift to execution on the $9.99 product. However, Blank asked the team that conducted the survey to share the reactions of the other three people. After first hearing that those people obviously were outliers given the overwhelming support among the other 47 respondents, Blank was able to find out that the three of them would be willing to pay $10,000 for a product that included two additional features. With this information, Blank was able to convince the team that perhaps it was worth taking a little time to see if the three "outliers" had friends or partners who might be also be interested in the higher value solution.

Product Hypotheses: Developing and Testing

Customer discovery begins with stating a set of hypotheses regarding the product, the customer and the customer's problems, distribution and pricing and positioning and differentiation. The hypotheses should cover the following topics:

- Product: Features, dependency analysis, benefits, product delivery schedule, intellectual property and total cost of ownership
- Customer/Problem: Types of customers, magnitude of the problem, customer problem, a "day in the life of a customer", organizational impact, return on investment justification, problem recognition and minimum feature set
- Distribution/Pricing: Distribution model, revenue model, sales cycle/ramp, channel strategy, pricing, customer organization map and demand creation
- Positioning and Differentiation: Existing market, new market or redefining existing market

Accordingly to Blank, the flow of activities during the customer discovery stage begins with testing the "problem" hypothesis with "friendly" first contacts during the "problem" is presented and the startup gains an understanding of the customer and knowledge of the market. The next step is to test the "product" hypothesis by presenting the "product" through continuous customer visits which lead to reality checks for the startup that trigger changes until the point where the startup is able to verify the product, the problem and the business model and exit to the customer validation stage.

Cowan provided an interesting illustration of how to develop and test a product hypothesis, which can often be constructed based on some variation of the following template: "A certain [Persona] exists and they have certain [Problems] where they are currently using certain [Alternatives] and we have a [Value Proposition] that better enough than the current alternatives that the persons will [Become Customers] and buy/use our product." What the startup needs to do is develop a set of questions, and related experiments, around each of the bracketed concepts, which are really assumptions made by the startup that need to be tested and validated:

- *Persona:* In general, the goal of experimentation for this assumption is to learn as much as possible

about what persons think, see, feel and do in the startup's area of interest. Questions to be asked include: Does this persona exist? Can the startup name or find five or ten examples? Can the persona be identified in the real world? Does the startup have a full understanding of the persona? Does the startup really understand how the persona relates to the startup's area of interest?

- *Problems:* The startup only creates value for customers if it is able to address something that the customer perceives as being a problem that is not yet effectively resolved by other solutions. Questions for this assumption include: Do the problems that the startup is attempting to solve really exist? Is it more of a "job to be done" or a need or desire? How important is the problem?
- *Alternatives:* Many problems are being addressed by current solutions and the goal of the startup is to demonstrate that it has a better answer. In order to do that, the startup needs to identify and understanding the alternatives that customers may currently be using to solve their problems. The startup then needs to test the ways in which its solution might be better than the best alternative and understand why it is better and how this can be demonstrated to the customer.
- *Value Proposition:* The startup needs a value proposition to motivate customers to change their usage patterns and move away from existing alternatives. The goal is to determine how best to create a perception of value and/or create experiences relating to the product that the customer will find valuable and which are easy for the customer to access. The startup needs to discover how it will deliver value and relief to customers with respect to their problems.
- *Customer Creation:* Even with a validated value proposition, the startup cannot be guaranteed that customers will be attentive and interested enough to buy the product. Startups need to ask questions like: How can we capture the attention and interest of customers? How can we connect with a fundamental desire of the customers? What actions can we take to make it easy for customers to find and buy our product? How can we maintain the relationship with the customer and get the customer to tell others about the product so that they might also become customers?

Source: S. Blank, Customer Development: How Your Customers Will Teach You How to Get It Right (2003). The discussion above regarding the illustration of the product hypothesis development and testing process was adapted from materials available at Alex Cowan's "Venture Design" website at http://www.alexandercowan.com/creating-a-lean-startup-style-assumption-set/, which is highly recommended as a rich resource base for practical tools that can be used to implement the lean startup process.

Blank explained that startups should not consider exiting the customer discovery stage unless and until they are able to describe the top problems of their prospective customers and have a good understanding of how much the customers will pay in order to solve those problems; are confident that their product concept will solve customers' problems and that customers agree; understand how much customers are willing to pay for the startup's proposed solution; are able to draw a "day-in-the-life" of a customer, both before and after the startup's product concept is introduced; and are able to draw an organizational chart of users and buyers.

§16 ----Business model design

Blank explained that the traditional path for a startup began with the creation of a business plan, which Blank described as a static document that described the size of an opportunity, the problem to be solved, and the solution that the new venture would provide (and which typically included a five-year forecast for income, profits, and cash flow). The business plan was used to convince investors to hand over their money to the business so that the startup could spend time and capital developing the product to hit a pre-determined launch date and hire sales and marketing teams to get ready for the big push once the product was ready. Noticeably missing from all this was any serious

attempt to get substantial feedback from customers before the product was well on its way to finished development. As a result, many startups were crushed to find that after their enormous investment of human and financial resources the sales team came back with the disappointing news that the market did not need or want most of the features in the product that was developed to conform to the initial vision of the founders.

According to Blank, entrepreneurs are inevitably destined to discover that business plans rarely survive first contact with customers and that dreaming them up is almost always a waste of time and a future attempt to forecast complete unknowns. Venture capitalists and other investors still cling to business plans as requirements for funding; however, in doing so they fail to recognize that startups are not smaller versions of larger companies with a track record that enables them to make a reasonable attempt at a master plan. Instead, startups are not yet ready to execute a business model, which is the primary job of existing companies, but are about to engage in challenging process of searching for a repeatable and scalable business model. In order to do this, Blank suggested that startups use the "business model canvass" created by Alexander Osterwalder that consisted of nine building blocks, each with their own set of hypotheses that needed to be tested:

- Value proposition, which the startup offers (i.e., product/service, benefits)
- Customer segments, such as users, payers, parents or teenagers
- Distribution channels to reach customer segments and offer them the value proposition
- Customer relationship to create demand
- Revenue streams generated by the value proposition
- Resources needed to make the business model possible
- Activities necessary to implement the business model
- Partners who participate in the business and their motivations for doing so
- Cost structure associated with the business model

The business model canvass helps the startup to generate hypotheses that are not tested randomly, but rather are tested using the customer development process developed by Blank. The value of the business model canvass is that it focuses the founders on the most basic and important questions surrounding their search for a viable business model: Are we on the right track? What's the right track? Do we have the right customers for the right features (i.e., product market fit)? Do we have the right distribution channel? Do we have the right revenue model? Are we pricing the product or service correctly? Do we really understand our cost structures? Do we have access to the partnering arrangement we will need to be successful? The business model canvass should be used as a scorecard that begins with the initial hypotheses and then is revised as those hypotheses are tested and necessary changes are identified. Hopefully the startup will eventually get to the point where the each box contains only hypotheses that have been approved by customers. As changes are made a new canvass can be drawn and a record

of all the canvasses can be maintained to document how the business model evolved during the discovery and validation steps.[13]

The founders may have problems with identifying the initial hypotheses for their business model canvass. Ries urged startups to use what was described as "analog/antilog", with the goal being to get a better understanding of the risks involved in developing the specific product or service and the challenges and questions that will almost certainly have to be overcome. The "analog" part of the tool involves looking at other companies and industries to learn from their successes to that the startup can build that into its own assumptions about what customers are likely to accept or expect. For example, the ability of Apple to look to the success of the Sony Walkman allowed it to make a reasonable assumption that people would enjoy a product or service that made it easier and more enjoyable to listen to music in public places. However, what Apple did not know when it embarked on the development of what ultimately became the iPod was whether people would pay for their music and Apple also had the example of Napster in front of it as a cautionary tale of how quickly people would flock to free alternatives, even breaking the law to do it. The bottom line was that Apple knew that there was a market, but also understood that they would have to grapple with the Napster problem and figure out a solution that was not obvious to Apple when it started down the development path. The process of identifying analogs and antilogs assists the startup in prioritizing its development efforts to focus on coming up with alternatives to antilogs that present the high risk to the proposed product or service.

§17 ----Customer archetype

Ries recommended that before the startup gets too far along with adding details to its proposed product or service it must have a good understanding of who the potential customers for the product or service will be. It almost goes without saying that the goal of the startup should be to build and market "quality" products and services; however, the startup cannot really understand what the appropriate parameters of quality will be until it the customers tell the startup what they want and expect for the price they will be asked to pay. In order to facilitate the process of learning about the customer, Ries suggested that startups create a "customer archetype" that includes information and answers that bring the market and potential customers to life and makes it easier for the startup to make decisions about the development of the new product or service and how scarce resources should be allocated during the crucial early phases of the business.

Blank described the customer archetype as the "lot to know stuff" about potential customers, all of which will be in order for the startup to figure out how to start creating demand. Blank counseled founders that in order to create demand they need to understand the "day in the life of the customer": when they get up, when they go to sleep, where they are living, where and how do they work, what they are driving, what they

[13] For further discussion of the "business model canvass", see "Strategic Planning: A Library of Resources for Sustainable Entrepreneurs" prepared and distributed by the Sustainable Entrepreneurship Project (www.seproject.org).

read, what the listen to, what they watch, how do they use their computers and mobile devices, what apps do they prefer, what do they buy and who are they influenced by. A robust customer archetype is essential to identifying opportunities for connecting with customers and distinguishing the startup from competitors. Blank thought customer understanding was so important that founders should expect not to get the nod from investors unless they are able to go to a white board and lay out in the detail the lives of the customers they expect to purchase their product.

The customer archetype is one of several key hypotheses that need to be tested and refined during the business model design process. Once the customer archetype has evolved sufficiently, the next step is to tie it to the hypotheses for customer acquisition programs by running a series of experiments. Blank explained that if the startup believed that its customers were between 15 and 25 and lived in urban areas than it might try and acquire some of those customers using key words targeted to urban youth and/or run advertisements in places where the startup reasonably anticipates, based on its then-current archetype hypothesis, that they might be reading, watching or living. If all goes well, the startup may begin acquiring and activating customers and consider further investment in the current customer archetype; however, if the experiment fails the startup can use the information to revise the experiment and/or modify its customer archetype.

§18 ----Minimum viable product

Ries observed that products are built for a number of reasons: to delight customers; get lots of customers to sign up; make a lot of money; realize a big vision and change the world; and to learn to predict the future. The crucial question for the startup, as well as for larger and more experienced businesses, is how to go about developing the product, which Ries described as being anything that a customer experiences as part of the customer's interaction with the startup. One possible approach to building a product is to try and "maximize the chances of success" by building a great product with enough features that increase the odds that customers will want it and which is beautiful, easy to use, scalable and safe; however, the problem with this approach is that there is generally not enough feedback until the end and at that point it may be too late to make adjustments. Another approach is "release early, release often" to get as much feedback as possible and get that feedback quickly and sell the vision for the product to early adapters even if features are still missing and/or clearly in need of further development; however, this approach often causes startups to run around in circles continuously chasing what customers think they want.

One of the most elements of the lean startup, something which has attracted a good deal of attention and commentary, is a different approach to product development called the "minimum viable product" ("MVP"), which has been described as the smallest product or service which the startup can rapidly create and deploy to begin the process of generating knowledge. The MVP is distinguishable from the traditional prototype or concept test in that it goes beyond answering product design and technical questions to include testing fundamental business hypotheses relating to value and growth. Ries referred to the earliest days of Zappos, the online shopping portal, to illustrate how simple the MVP

might be and the important information that could be generated. In that case, the founder wanted to find out whether consumers would buy shoes online. He went out to local shoe stores and took pictures of the inventory and posted them on his website. When he began to people to come to the site and they actually purchased the shoes, he would "fulfill" the orders by returning to the stores, buying the shoes and sending them off to his new customers. While he wasn't making any money at that point, he was able to validate that shoes could be sold online without investing more than his own time and energy on building a simple website and traveling back and forth to the stores.

The MVP is the first version of the product that is sufficient to enable a full circle of the feedback loop with minimum amount of effort and the least amount of development time. The goal of the MVP is to start the validated learning process as quickly as possible and the important thing to remember about the MVP is that the startup should not spend time and effort beyond what is absolutely necessary to get the new product or service to prospective early adopters—anything extra is "waste" that a startup cannot afford. The MVP allows the startup to achieve a big vision in small increments without going in circles and build its product while continuously testing ideas. The MVP should be used to measure the current state of the startup's process and uncover opportunities and weaknesses that can be used to conduct further experiments that will hopefully begin to steadily push the data from customer feedback closer to the numbers in the startup's business plan.

The MVP requires a commitment to iteration. Obviously, entrepreneurs welcome guidelines on developing their initial MVP. Ries attempted to reduce the anxieties of entrepreneurs by pointing out that a good MVP was probably much more "minimum" than they might have thought, and really comes from serious consideration of the following key questions:

- What problem is the MVP attempting to solve for customers?
- What features should be included in the MVP and which features can be set aside for the time being as potential distractions to the immediate learning process?
- What should be measured with respect to the MVP and why, and what measurement methods should be used?
- How can ideas be transformed into a prototype that will serve as the MVP to be presented to prospective customers?
- How can a prototype be transformed into actionable insights and how can those insights be monetized?

The MVP should be robust enough to enable a full turn of the "build-measure-learn" cycle that is at the center of the lean startup process and should have the core features necessary for the product or service to be deployed. It is essential to remove any feature, process or effort from the minimum viable product that does not contribute to current learning. This often means sacrificing elements that the startup perceives as being necessary to provide "high quality"; however, the startup needs to have faith that its primary initial target in the marketplace, so-called "early adopters", will accept and often

prefer an "80% solution" because their main interest is being among the first to use or adopt a new product or technology. While the MVP must include testable features, the startup must go into the process with an open mind and not presuppose the attributes of the product or service that customers will find to be valuable. The MVP is an important learning tool and the startup must be prepared to remove any feature, process or effort related to the MVP that does not contribute to the learning process.

Proponents of the lean startup argue that the early adopters will expect and accept "bugs" at this point and will realize that one of the objectives of the MVP is to elicit feedback from customers as to what they want and don't need from the product. Visionary customers can "fill in the gaps" on missing features, if the product solves a real problem. However, even those early adopters who develop a passion for the new product, service or technology will have limited patience and will only support the startup if they feel it is committed to ending up with a quality offering at the end of the iterations in the recommended development process. The startup will obviously need to expand its customer base beyond the early adopters to capture mainstream customers and it will eventually be necessary for the startup to fill out the MVP by incorporating features that meet the requirements of those customers.

The "learning" that comes from the MVP comes in a number of different forms. For example, the data can and should be used to fill in the gaps in the startup's initial assumptions regarding its growth model (i.e., conversion rates, registration rates, trial rates and customer life value). The startup should not assume and demand that data will be in line with its initial "hunches" and should instead be prepared for harsh feedback and bad news in terms of market excitement for what the start originally had in mind. Completion of the feedback loop for a version of the MVP should be celebrated and welcomed as a "learning milestone" that establishes a baseline for each of the key hypotheses (i.e. value and growth). Once the learning milestone has been established, the startup can "tune the engine" to work toward the next learning milestone by selecting and testing the appropriate product development or marketing initiative in order to target and improve the metrics for one of the drivers of the value or growth models. Achieving learning milestones will not necessarily make the ultimate "persevere or pivot" decision any easier; however, it will ensure the startup has the data needed for a good decision.

The MVP approach is based on identifying the minimum set of features needed to learn from visionary early adopters of the product, thus avoid building products that nobody wants and maximizing the amount of learning per dollar spent. Done well, the MVP process will lead to the creation of validated ideas that will ultimately increase the value of the startup, which is essentially a product or service that customers want and are willing to pay for, while reducing the risks and uncertainties that are the very nature of the startup's world. However, startups must acknowledge and overcome several potential problems in building, testing and modifying an MVP including legal issues, fear of competition, branding risks and fear of failure. Ries acknowledged several fears about the MVP approach: false negative: "customers would have liked the full product, but the MVP sucks, so we abandoned the vision"; visionary complex ("but customers don't know what they want!"; and too busy to learn: "it would be faster to just build it right, all

this measuring distracts from delighting customers". Ries also noted that the MVP approach should be reserved for "big vision" products and is generally not necessary for minimal products.

The MVP principle also flies in the face of accepted practice that pushes companies to produce high-quality experiences and argues the companies that take that path do so based on the misguided and arrogant assumption that they already know what customers will value. While making these sorts of high risk investments may be fine for larger companies, startups do not have the necessary time, resources or goodwill and must instead invest their scarce resources in getting know their customers. This means abandoning secretive development processes during which startups operate in stealth mode and getting out into the market and in front of customers. While this approach arguably denies the startup the alleged advantages of a "head start" and certainly increases the chances that someone else will start developing a similar product or service, the lean startup principles are based on the belief that head starts without validated learning rarely matter and that the successful and sustainable startups are the ones who can learn faster than others and build a capacity for learning that can be tapped into as a competitive advantage beyond the first product or service.

Relying on the MVP allows startups to build and test pieces of their product incrementally and iteratively rather than investing enormous amounts of time and capital in building a complete product that will likely need substantial changes once it is finally exposed to customers. The MVP helps startups answer two general questions: The first one is whether or not the problem we think customers have or the need they have actually shared by anybody other than the founders? The second one is whether the class of solution the startup is building, not the specific product, but whether the thing the startup is building in general solves the problem that has been validated?

Startups need to get over the assumption that the MVP needs to be bug free and complete before it is exposed to customers. This is particularly challenging when the founders have a technical background; however, in general sufficient information can be quickly and easily collected using mockups, wire frames, clay prototypes or a PowerPoint slide. Blank made it clear that founders should not think that the MVP had a strong connection with the finished product, but instead should see the MVP as an essential and powerful tool for maximizing and accelerating validated learning that would eventually lead to the most effective finished product.

§19 --Customer validation

Customer validation focuses on determining whether the business model that emerges from customer discovery is repeatable and scalable. During the validation stage, the startup tests its ability to scale (i.e., product, customer acquisition, pricing and channel activities) against a larger number of customers using larger tests that are more rigorous and quantitative and attempts to validate customers' interest through early orders or product usage. The goal is to determine whether or not customers would be willing to become actively engaged with the product, such as by handing over money to the startup

in order to use the product. In some cases, depending on the business model, success is measured not by payments from customers but by the willingness of advertisers to pay the startup to get their own products and services in front of the community of customers that the startup has engaged.

Customer acquisition is the "front end" of getting customers and involves identifying and implementing strategies for first creating demand among potential customers (i.e., paid media, conferences, word of mouth etc.) and then activating customers once they have been initially acquired by getting them to type in an e-mail address, use the product, download a demo and/or actually buy the product immediately on the company's website. As the validation phase goes on, the startup is in a better position to chart an effective sales roadmap and begin planning for the hiring and deployment of members of sales and marketing teams. The goal of customer validation is to validate the existence of an adequately sized group of customers and a repeatable sales process that will yield a profitable business model. When this occurs, the startup has achieved "escape velocity" and is ready to move on scaling up during the customer creation step.

Limits of the Lean Startup Method

Research conducted by Ladd focusing on 250 teams that participated in a Clean Tech accelerator program over a ten year period confirmed the effectiveness of the lean startup approach. Specifically, Ladd found that terms that elucidated and then tested their hypotheses about the proposed venture did three times better in pitch competitions than teams that has not invested time and effort in testing their hypotheses. However, the research also uncovered cautionary input on a key question for entrepreneurs practicing the lean startup method: how much time should be spent on collecting validated learning? Interestingly, Ladd found that there was no linear relationship between the number of validated hypotheses and a team's subsequent success, meaning that "more validation is not better". Ladd offered several possible explanation of what is clearly an important constraint on the application of the lean startup approach: erosion of confidence among entrepreneurs if they feel a need to change their ideas too often in response to every piece of customer feedback and a loss of patience among managers eager to move beyond testing to building and executing. Another important finding about the validation process disclosed by Ladd was that teams that conducted both open-ended conversations and more formalized experiments actually performed worse in the pitch competition than teams that concentrated on just one of those methods as they collected information during the early stages of designing their business model.

Ladd emphasized that one of the shortcomings of the lean startup method was a lack of a clear rule as to when it was time to declare victory, stop testing and begin scaling production. Ladd and Collis, a professor at Harvard Business School, provided several solutions and recommendations to entrepreneurs on how to manage the validation process:

- Lean startups should consciously and clearly constrain which markets and methods should be considered while testing and refining their business model, an approach that Collis described as the "lean strategy" process.
- Entrepreneurs should establish thresholds for making "go/no-go decisions" in advance so that they have clear and objective guidelines on when to "stop" and either begin scaling or identify an appropriate pivot. Ladd explained that, for example, the entrepreneur may decide that the startup will have reached the point where its business model was solid enough to proceed if and when at least 50% of the customers in the target segment were paying for an early prototype or testing was producing only minor alterations to an already granular and specific business model.
- Business model design in the lean startup process calls for development and testing of hypotheses in as many as nine different areas and while each of them is important entrepreneurs need to be smart about

which of them are considered first. The research conducted by Ladd indicated that teams that focused their testing on target customer segment, value proposition and channel performed twice as well as teams that did not investment much attention on those areas.

Source: T. Ladd, "The Limits of the Lean Startup Method", Harvard Business Review (March 7, 2016).

Part of the process and challenge for the startup during the customer validation phase is beginning to carefully yet aggressively accelerate the engineering process; however, acceleration must be done using the tools of "agile development" including small batching, following the "single-piece flow strategy", practicing continuous deployment, with a lazar-like focus on sustainable growth, small batching, with rigorous examination of "cause-and-effect" using "The Five Whys" method, and with and through investment in continuous innovation. The "single-piece flow strategy" popularized by Toyota in the mid-2000s accelerates the production of finished products, makes it easier to identify and fix quality issues and reduces overhead. Reliance on small batches allows startups to move quickly and identify and fix quality problems much sooner and thus work more efficiently. Small batches are more efficient and require relatively little in terms of time, money and effort, which means that unnecessary "waste" is avoided if the activities are ultimately not successful. Small batches also allow startups to learn the truth quicker since they can get through the build-measure-learn loop more rapidly than their competitors, thus giving them a competitive advantage in the crucial dimension of learning from customers and building value through validated learning. Small batching is the best way for the product development team to quickly design and implement an MVP that can be deployed to begin the experimentation necessary to test a hypothesis. Blank described the process to be followed by startups as "customer development engineering" with an emphasis on incremental changes, speed, minimum features and revenue/customer validation. Specific engineering tactics would include split-test (A/B) experimentation, extremely rapid and continuous deployment, and just-in-time architecture and infrastructure.

The Five Whys

The Five Whys is an iterative question-asking technique that startups should use in order to isolate and explore cause-and-effect relationships associated with a specific problem in the development of a new product or service. By using this simple process, which does not require complex statistical analysis, startups can achieve better quality and build a more adaptive organization. The Five Whys also acts as an automatic or natural "speed regulator" for the development process: initially, progress will be slow, since the team will need to invest time in resolving infrastructure and process problems; however, as the team learns more using The Five Whys and reduces the severity and number of problems it will be able to accelerate the development process. The Five Whys are part of the bigger goal of making the startup an adaptive organization that continuous adjusts its processes and capabilities to address current conditions.

The Five Whys is based on asking "why" five times when something unexpected happens in order to get beyond the symptoms of a problem to identify and address the root cause. The following illustration of The Five Whys demonstrates how the technique can work:

- Question 1: A new release disabled a feature for customers. Why did that happen? It happened because a particular server failed.

- Question 2: Why did the server fail? It failed because an obscure subsystem was used in the wrong way.
- Question 3: What was the subsystem used in the wrong way? It was used in the wrong way because the engineer who used it did not know how to use it properly.
- Question 4: Why didn't the engineer know how to use the subsystem properly? He didn't know because he was not properly trained.
- Question 5: Why wasn't the engineer trained? He was not trained because his manager didn't believe in training new engineers because she and her team were "too busy".

This illustration highlights how The Five Whys can illuminate several levels of potential remediation, each of which may require some amount of investment in prevention by the startup. Consideration should certainly be given to technical fixes to the failed server; however, it should also become apparent that attention to human resources (i.e., training engineers and reducing the load of managers) is required.

Another example of using The Five Whys is as follows:

- Question 1: Why did the machine stop? There was an overload and the fuse blew.
- Question 2: Why was there an overload? The bearing was not sufficiently lubricated.
- Question 3: Why was it not lubricated sufficiently? The lubrication pump was not pumping sufficiently.
- Question 4: Why was it not pumping sufficiently? The shaft of the pump was worn and rattling.
- Question 5: Why was the shaft worn out? There was no strainer attached and metal scrap got in.

If the startup didn't go through the process of asking a continuous stream of questions to get to the bottom of the problem, it may have simply decided to replace the fuse or the pump shaft only to find that the problem resurfaced a few months later. In many cases, a problem that at first seems "technical" will be unmasked as being a human problem and this knowledge allows the startup to take appropriate actions with respect to the people involved. However, when the problem is traced to someone at the middle or bottom of the organizational hierarchy, the leaders need to take responsibility for allowing or creating a situation where a mistake could be made.

Blank described the customer validation process as beginning with "getting ready to sell" and then moving to selling to "EarlyVangelists", developing positioning and, finally, verification.[14] The steps involved in "getting ready to sell" include articulating a value proposition, creating taking some of the initial steps toward a more formalized sales and marketing process including preparing preliminary sales and collateral materials, creating a preliminary distribution channel plan and preliminary sales roadmap, hiring a "sales closer", aligning the startups executive team and formalizing an advisory board. The next activities focus on selling to "EarlyVangelists", which begins with contacting and selling to visionary customers and continues with refining the sales roadmap, selling to channel partners and refining the channel roadmap. Once these early sales have been made, the startup should develop its product and company positioning and present it to analysts and influencers for input. Exit from the customer validation stage should occur when the startup has verified the product; the sales roadmap, including an organizational chart for users and buyers and an influence map; the channel roadmap and the business model. The startup also needs to understand the sales cycle and have a set of orders that validates the roadmap.

[14] S. Blank, Customer Development: How Your Customers Will Teach You How to Get It Right (2003).

§20 --Customer creation

Once the product is refined enough to see, and the startup has proven that the product can be sold, it is time to use the proven hypotheses to select strategies for actually executing on the business model and building end-user demand and driving it into the sales channel to scale the startup's business. Blank referred to customer creation as the point where the startup "crosses the chasm". Customer creation is the stage where the startup begins investing large amounts of money on marketing and sales to drive demand toward the appropriate sales channel, the specific strategy and process will vary depending on the particular market type. All types of startups are looking to grow from a few customers to many customers and their universal focus during customer creation should be setting and achieving first year objectives, positioning, launch and demand creation. However, the strategies with respect to sales, marketing and business development will vary depending on "market type". Blank and Dorf explained that there are several different types of markets that startups might consider, each of which has its own different set of requirements for successful new product introduction:

- New product in an existing market: Startups that are entering an existing market with a new product face a relatively straightforward marketing challenge since customers can easily describe the market and the solutions and features that are most important to them. Since the product features of incumbent firms are well-defined, competition involves focusing on how the startup's product or service compares to those of competitors (i.e., it's faster, better, cheaper etc.)
- New product in a new market: Startups that are creating an entirely new market with a new product need to understand whether there is a large potential customer base and whether those customers can be convinced that the startup is offering a solution that has value to them. Since there are many "unknowns" in this situation, including no existing products or competitors, carefully collecting and analyzing feedback is essential. Many startups make the mistake of committing funds to sales and marketing too quickly, which makes no sense until there is clarity as to whether a market even exists.
- Low-cost re-segmentation of an existing market: Startups that are entering an existing market with a new product and seeking to re-segment that market as a low-cost entrant begins with understanding the customers in the market and determining if there are enough customers at the lower end of the market who would be willing to purchase a less expensive product that offers "good enough" performance.
- Niche re-segmentation of an existing market: Startups that are entering an existing market with a new product and seeking to re-segment that market as a niche player also need to understand the needs of the customers in the market to determine if enough of them would be interested in buying a new product that is designed to meet their specific needs.
- Cloning an existing business model: Startups that are cloning a business model that has been successful in another country can do so by making modifications to accommodate local language and buying preferences.

The startup reaches the customer creation stage by using the MVP and the build-measure-learn process to test and fine tune the startup's value hypotheses. However, once the startup has figured out the parameters of the specific product or service that will help it create a sustainable business, the strategies that will allow the startup to achieve sustainable growth must be identified. A fundamental premise in this area is that the only way that the startup can reliability build a sustainable business is to have new customers coming from the actions of old customers. Ries argued that there are four primary ways that past customers can and do contribute to sustainable growth:

- Word of mouth: The satisfaction of past customers generally leads to some level of natural growth through their actions in conveying enthusiasm for the product or service to others who eventually become customers on their own..
- Side effects of product usage: Products that are perceived as fashionable or which become associated with a certain level of status (e.g., luxury goods) drive awareness of themselves whenever they are used by customers in public, thus making them more desirable to new customers.
- Funded advertising: If the startup is able to reach the point where the cost of acquiring a new customer (i.e., the marginal cost) is less than the revenue that the new customer generates (i.e., the marginal revenue), the marginal profit can be used to acquire more new customers. The faster the startup is able to grow marginal profit the faster it can grow in terms of new customers.
- Repeat purchase or use: Subscriptions and voluntary repurchases can maintain the size of the customer base and if they can be made predictable the startup can evolve toward stability and sustainability.

The startup must develop and test growth hypotheses to determine the optimal engine of growth. Without include and testing a growth hypothesis in its strategy, the startup runs the risk of settling on being a small, yet profitable, business when it is likely that a pivot based on real data could reasonably lead to higher growth. Identifying and understanding the engine of growth is important for creating focus for the startup's activities and resources and each engine has its own unique set of metrics that should be tracked through appropriate experiments. Ries suggested the following three prototypes for "growth engines":

- Creating a "sticky" growth engine, which depends on having a product or service customers will continue to pay for repeatedly over time. Growth will come if the startup is able to bring in new customers faster than old customers leave and the most important metrics to watch will be the new customer acquisition and retention rates. The key metric for the sticky engine of growth is the attrition, or "churn", rate, which is defined as the fraction of customers in any period who fail to remain engaged with the company´s product. In order to keep growing, the rate of new customer acquisition needs to exceed the churn rate, and the speed of growth is driven by what is referred to as "churn rate compounding" (i.e., the natural growth rate minus the churn rate).

- Creating a "viral" growth engine based on current customers bringing in new customers, which requires finding an easy way for current customers to invite others to sign up for the service and motivating current customers to "spread the word". Viral growth depends on person-to-person transmission as a necessary consequence of normal product use. Evangelism by current customers (i.e., "word of mouth") is nice; however, their mere use of, and satisfaction with, the products is the most important contributor to growth. The metric for this growth engine is referred to as the "viral loop" and the speed of growth associated with the viral engine is determined by the "viral coefficient", which measures how many new customers will use a product as a consequence of each new customer who signs up. The higher the viral coefficient the more quickly the product or service will grow. The viral coefficient can be increased if customers are incentivized to bring new customers with them.
- Creating a sustainable "paid" model based on taking the profits that have been earned from old customers and investing them in advertising and/or other business development methods in order to attract new customers. The relevant metrics for this growth engine are "Lifetime Customer Value" ("LCV"), which is the amount of profits the startup will make off of each customer over the lifetime of the business relationship with that customer, and "Customer Acquisition Cost" ("CAC"). Growth will come as long as the startup's LCV is greater than its CAC. For example, if the startup spends $100 on an ad and recruits 50 new customers as a result, the CAC for each of those customers is $2.00. In order for this to lead to growth, the LCV for each new customer needs to be more than $2.00. The larger the margin between the LCV and CAC, the faster the rate of growth.

Ries acknowledged that due to constraints on bandwidth, most startups can only employ one of the growth engines at any time since the time and effort required to test and tweak an engine is too great for the startup to try and split its focus. It is essential that the startup become an expert in everything that is necessary in order for the chosen growth engine to work in its specific situation. Recognizing and understanding an engine of growth allows the startup to focus its efforts on a relatively small set of metrics, the ones that really matter in the context of the experiments it is undertaking. This means that the choice of growth engine is crucial and must be done carefully; however, if the startup finds that a specific growth engine is not working it can go a "growth engine" pivot and try one of the other methods. The scenarios above are not the only ways that past customers can drive sustainable growth and the startup may find that new customers appear as a side effect of the usage of the product or service by existing customers. The moment that the startup is finally able to put together a widespread set of customers that resonate with its product or service is the point where the startup has achieved the holy grail of "product/market fit".

Blank noted that startups generally focus most of their attention on customer acquisition and activation. This obviously makes sense during the early stages of development since there is no business if there are no customers. However, the founders must not lose sight of the need to eventually invest time and effort in keeping and growing customers once they have been activated. A number of strategies can and should be used for keeping

customers including loyalty programs, newsletters and high quality customer support. In addition, however, startups need to look beyond revenues from the initial sale of their product to a customer to increasing the LCV of the customer. Additional revenue may be generated from cross-selling other products and/or up-selling them to higher end versions of the initial product. The concept of LCV is essential to make decisions that impact customer acquisition and activation costs and the certain costs associated with "keeping" customers apart from trying to generate additional revenues from them. Blank counseled that startups should continue to experiment until they find something repeatable in acquisition programs and become extremely confident in their understanding of the customer archetype. Until the archetype is solid, the startup is still guessing about how best to acquire and maintain its customers; however, once the archetype is developed the startup can move forward with pouring money into its acquisition programs.

According to Blank, the four major activities during the customer creation stage include choosing the first year objectives, positioning, launch and demand creation.[15] Creation activities depend on the "market type" selected by the startup (i.e., existing, re-segmented or new), and first year objectives should be established with respect to the specific distribution model, revenue model, channel model, launch model and sales model verified during the discovery and validation stages. The startup will have already completed preliminary positioning activities during the validation stage and the creation stage brings in input from a public relations agency that conducts a position audit in order to match the startups positioning to the market type. The launch strategy tested with early adapters during the validation stage is enhanced through selection of launch type, customer audiences and messengers. The startups message needs to be crafted with understanding of context and media and metrics for measuring success should be developed. Finally, the startup needs to select and implement a demand creation strategy and agree on metrics for measuring the success of the strategy.

§21 --Company building

Company building includes the steps that will need to be taken to transition the business from "startup mode" and a focus on searching for answer through its customer development team to a more traditional organization composed of functional departments executing on its sustainable business model. The informal, learning and discovery-oriented customer development team gives way to formal departments for sales, marketing and business development, all with their own leaders, hierarchies and processes. Exploitation of the business model developed during the earlier steps is the focal point and many founders, with their keen customer understanding, find themselves replaced by experienced executives thought to have the operational skills that have now become most important, at least in the eyes of investors. This transition in leadership is delicate and treacherous and often overwhelms and squelches the entrepreneurial vision upon which the company was established. However, management needs to change as they company grows in order for it to become a sustainable business. Key criteria for the company building step include making sure that the sales growth plan matches market

[15] S. Blank, Customer Development: How Your Customers Will Teach You How to Get It Right (2003).

type; the spending plan matches market type; board members are in agreement regarding strategy; the management team includes all the skills and personality traits necessary for the company's current stage; and the company has built a mission-oriented culture. One size does not fit all, however, and management of sales and establishment of department roles should be aligned with the company's specific market type.

§22 Traction

Weinberg and Mares argued that startups, even lean startups, fail because they do not invest sufficient time and effort in researching, choosing and developing "traction channels", which are the pathways that a startup selects to attract the customers that it needs in order to grow.[16] While startups are generally successful, often after many iterations and pivots, at settling on a product and business model, most are left confused and dispirited when customers fails to flock to them after the product is launched. In order to avoid this scenario, Weinberg and Mares advise founders to follow their "50% Rule": spend 50% of the time developing the product and 50% of the time on testing traction channels.

Startups have a number of traction channels to choose from:

- Viral Marketing
- Public Relations
- Unconventional Public Relations
- Search Engine Marketing
- Social and Display Ads
- Offline Ads
- Search Engine Optimization
- Content Marketing
- Email Marketing
- Engineering as Marketing
- Targeting Blogs
- Business Development
- Sales
- Affiliate Programs
- Existing Platforms
- Tradeshows
- Offline Events
- Speaking Engagements
- Community Building

In order to find and prioritize the most appropriate traction channels, founders are admonished to follow a five step process:

[16] The discussion of "traction" in this section is adapted from G. Weinberg and J. Mares, Traction: How Any Startup Can Achieve Explosive Customer Growth (New York: Penguin Group (USA), 2015).

- *Brainstorm*: Scan each of the traction channels to come up with reasonable ways that the startup might use that channel. Ask questions such as: Where would be the best place to advertise? Who is the startup's ideal audience? What are the marketing strategies that have worked in the industry? How have similar companies acquired customers over time? How have unsuccessful companies wasted money in their marketing efforts? The goal is to think of at least one idea for every traction channel.
- *Rank*: Group all of the traction channels into three segments based on how well it can be expected that they will perform for the startup. The channels with the most compelling ideas should go into Group 1, channels with plausible ideas should be into Group 2 and the channels with the least compelling ideas should go into Group 3.
- *Prioritize*: Select the top three traction channels that are the most promising and compelling.
- *Test*: Test each of the three prioritized channels, one at a time, using inexpensive yet specific tests to determine if it's a channel that could work for the startup and what marketing ideas would work best within that channel.
- *Focus*: Assuming one, if not more, of the tested channels provide promising results, start directing the startup's traction efforts and resources towards the most promising channel.

As is the case with product development and business model design through the lean startup process, the traction channel process is met to be repetitive and should be continued until the best channel is identified. In addition, the process should be ongoing through the startup stage of the business since the best channel will vary depending on where the startup stands in terms of its progress toward identifying the elements for a sustainable business. For example, in the earliest phases of development the startup will be focusing on validating its product and trying to gain initial traction and the emphasis at this point will be on activities that gain attention but are not really scalable: giving speeches, writing guest posts on relevant blogs, e-mailing potential customers and partners and attending conferences and trade shows. Once the product is validated and the startup has accumulated some initial traction, traction channels should be selected and tested based on their potential for positioning, branding and marketing. Finally, once the business model design process has been completed, traction channel investments should be made based on scaling and profitability. New traction channels need to be introduced whenever the startup reaches a plateau in its growth path.

As with the lean startup, generating and testing hypotheses using simple and quick to execute experiments is paramount to the traction process. When designing the tests, the startup should be sure they are suited for answering important questions such as the cost of acquiring customers, the number of available customers, their conversion rates, the time it takes to convert a customer and the most effective copy and content. When analyzing a prospective traction channel, and the actually investing in that channel if it is selected, the startup should set clear goals in advance as to what it wishes to achieve (e.g., reaching a certain number of paying customers and/or new users in a specified period). The goals should be meaningful and measurable and directly related to the startups

current strategy and attainment of its vision. In other words, goals based on "vanity metrics" should be avoided.

The traction process seems to work well alongside the lean startup methodology and both provide similar important benefits to the startup. For example, the testing required during the traction process will provide the startup with additional feedback that can be incorporated into its knowledge base of validated learning and used to help refine its minimum viable product. Exploring different traction channels before the product is launched allows the startup to know exactly where and how it should start when the times to invest substantial dollars in growth and scaling. Finally, startups that use traction channel analysis to plot and execute a strategy for achieving and maintaining a sustainable customer growth rate are more likely to attract the interest of investors.

§23 Startup roles and titles

Cowan recommends that founders stretch themselves to become a broad-based contributor to the lean startup process, which means developing a progressive foundation of knowledge in key technical areas such as software fundamentals, architecture fundamentals, roles and systems in a technical team, design thinking, iterative management, customer development and agile development. Founders do not need to learn to be coders unless they want to; however, they should educate themselves enough to know when it makes sense to spend money on outsider developers and how to direct and access the work product of those developers.[17]

Blank argued that the founders and early employees of a startup should not concern themselves with titles but rather see themselves as members of the Customer Development team. In order to be successful in the roles on such a team, each of them must be comfortable with uncertainty, chaos and change and:

- Open to learning and discovery–highly curious, inquisitive, and creative;
- Eager to search for a repeatable and scalable business model;
- Agile and confident enough to deal with daily change, and operating "without a map";
- Readily able to wear multiple hats, often on the same day; and
- Comfortable celebrating failure when it leads to learning and iteration.

At some point, attention turns to "sealing the deal" with initial customers and team members must have the ability to listen to customer objections and determine whether they are issues about the product, the presentation, the pricing, or something else (or if they are the wrong type of customer); experience in talking to and moving between customers and engineers; and the ability to walk in their customers' shoes, understanding how they work and the problems they face.

[17] A. Cowan, Five Tips for Operating a "Lean" Team (August 6, 2012), http://www.alexandercowan.com/five-tips-for-operating-a-lean-team/

About the Author

Dr. Alan S. Gutterman is the Founding Director of the Sustainable Entrepreneurship Project (www.seproject.org). In addition, Alan's prolific output of practical guidance and tools for legal and financial professionals, managers, entrepreneurs and investors has made him one of the best-selling individual authors in the global legal publishing marketplace. His cornerstone work, *Business Transactions Solution*, is on online-only product available and featured on Thomson Reuters' Westlaw, the world's largest legal content platform, which includes almost 200 book-length modules covering the entire lifecycle of a business. Alan has also authored or edited over 40 books on sustainable entrepreneurship, management, business law and transactions, international law business and technology management for a number of publishers including Thomson Reuters, Kluwer, Aspatore, Oxford, Quorum, ABA Press, Aspen, Sweet & Maxwell, Euromoney, CCH and BNA. Alan has over three decades of experience as a partner and senior counsel with internationally recognized law firms counseling small and large business enterprises in the areas of general corporate and securities matters, venture capital, mergers and acquisitions, international law and transactions, strategic business alliances, technology transfers and intellectual property, and has also held senior management positions with several technology-based businesses including service as the chief legal officer of a leading international distributor of IT products headquartered in Silicon Valley and as the chief operating officer of an emerging broadband media company. He has been an adjunct faculty member at several colleges and universities, including Boalt Hall, Golden Gate University, Hastings College of Law, Santa Clara University and the University of San Francisco, teaching classes on a diverse range of topics including corporate finance, venture capital, corporate law, Japanese business law and law and economic development, He received his A.B., M.B.A., and J.D. from the University of California at Berkeley, a D.B.A. from Golden Gate University, and a Ph. D. from the University of Cambridge. For more information about Alan, his publications or the Sustainable Entrepreneurship Project, please contact him directly at alangutterman@gmail.com, and follow him on LinkedIn (https://www.linkedin.com/in/alangutterman/).

About the Project

The Sustainable Entrepreneurship Project (www.seproject.org) engages in and promotes research, education and training activities relating to entrepreneurial ventures launched with the aspiration to create sustainable enterprises that achieve significant growth in scale and value creation through the development of innovative products or services which form the basis for a successful international business. In furtherance of its mission the Project is involved in the preparation and distribution of Libraries of Resources for Sustainable Entrepreneurs covering Entrepreneurship, Leadership, Management, Organizational Design, Organizational Culture, Strategic Planning, Governance, Corporate Social Responsibility, Compliance and Risk Management, Finance, Human Resources, Product Development and Commercialization, Technology Management, Globalization, and Managing Growth and Change. Each of the Libraries include various Project publications such as handbooks, guides, briefings, articles, checklists, forms, forms, videos and audio works and other resources; management tools such as checklists and questionnaires, forms and training materials; books; chapters or articles in books; articles in journals, newspapers and magazines; theses and dissertations; papers; government and other public domain publications; online articles and databases; blogs; websites; and webinars and podcasts.

Copyright Matters and Permitted Uses of Work