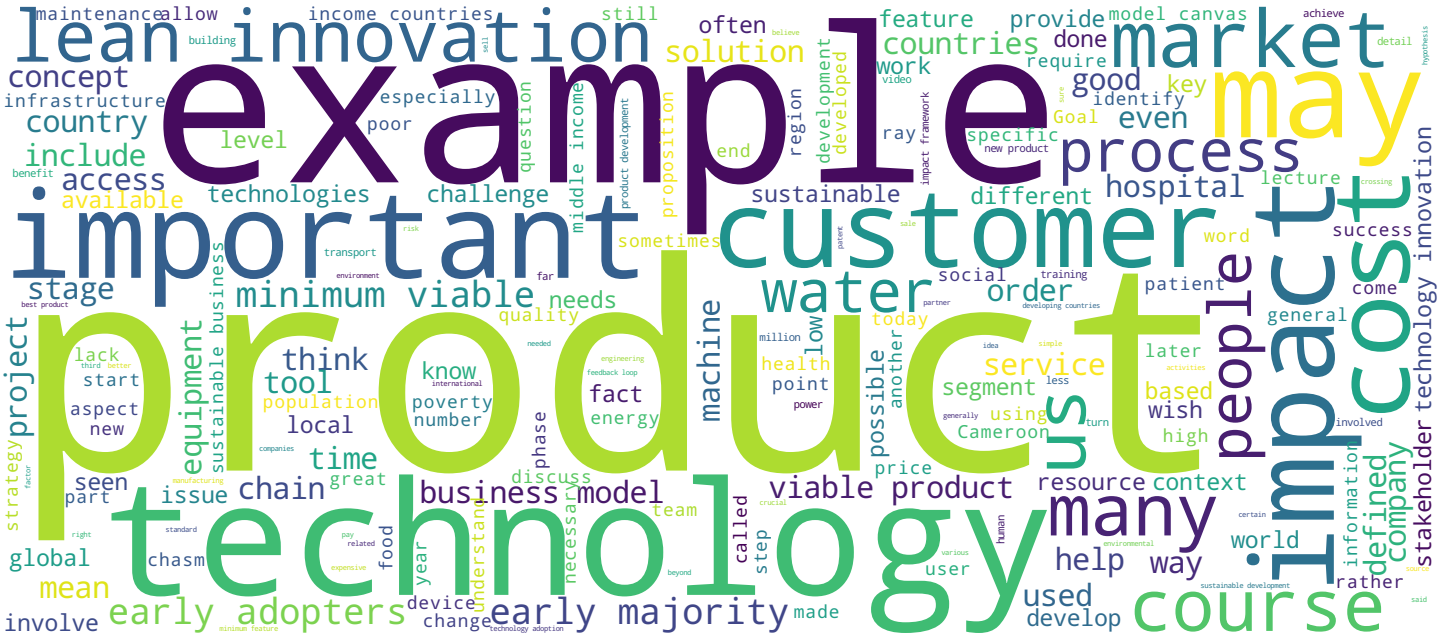
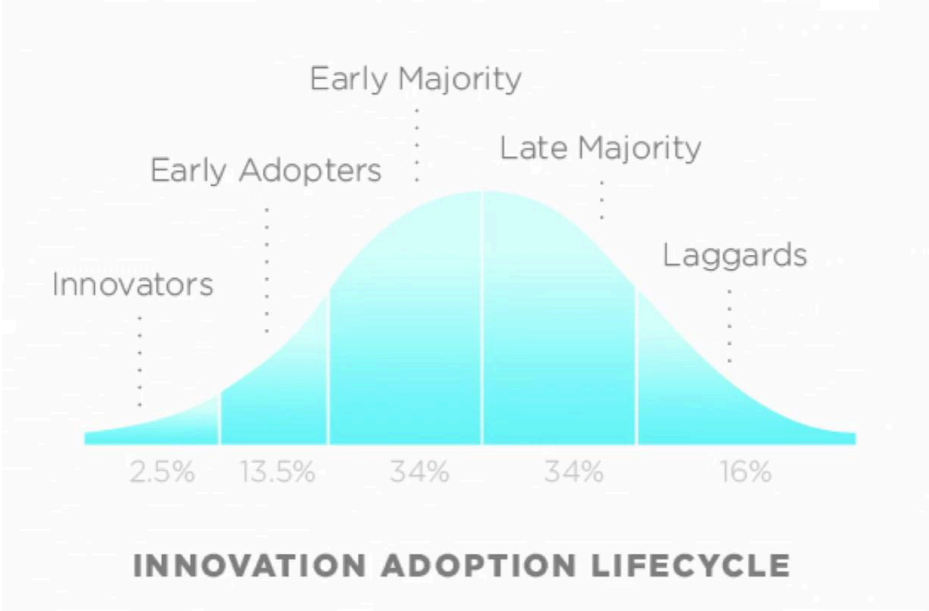

Technology Innovation for Sustainable Development
Technology Innovation Process:
Implementation
Dr. Klaus Schönenberger
Dr. Solomzi Makohliso
Cooperation & Development Center
EssentialTech
EPFL
ÉCOLE POLYTECHNIQUE
FÉDÉRALE DE LAUSANNE


example
product
technology
important
customer
lean
innovation
market
may
process
impact
cost
course
many
water
minimum viable
stage
project
equipment
business
model
chain
issue
early adopters
early majority
chasm
global
mean
involve
concept
infrastructure
country
include
access
available
technologies
challenge
level
poor
especially
income countries
maintenance
allow
building
solution
often
still
question
middle income
proposition
region
development
developed
end
sometimes
sustainable
work
countries
feature
provide
done
require
model canvas
good
key
identify
even
Goal
ray
specific
new product
different
hospital
lecture
word
success
social
order
patient
come
general
people
machine
low
health
point
fact
energy
phase
discuss
team
viable product
price
possible
another
today
service
segment
using
Cameroon
high
wish
based
later
resource
context
defined
company
stakeholder
information
technology innovation
rather
world
way
help
user
used
develop
made
called
step
understand
necessary
device
change
food
year
great
time
tool
think
know
poverty
number
population
local
lack
start
aspect
new
seen
part
strategy
factor
sustainable
transport
environment
quality
needs
minimum feature
technology adoption
crucial
beyond
expensive
companies
manufacturing
engineering
feedback loop
product development
impact framework
benefit
best product
risk
patent
sale
video
partner
developing countries
training
idea
simple
activities
environmental
sustainable development
achieve
detail
hypothesis
crossing
involved
certain
human
various
less
turn
generally
pay
related
standard
right
third
better
international
million
power
Search MOOC
Video
EPFL

Technology Adoption Life Cycle



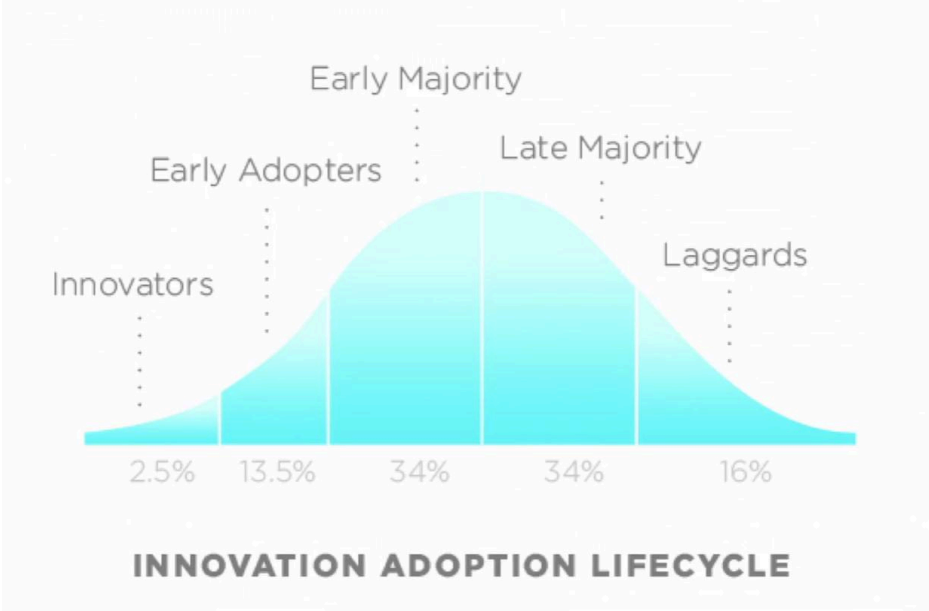
Now you've reached the point where you've completed your developments and must now launch a product. You must now find a mechanism to deploy your innovation which is effective as much as possible. How do you go about that? Well that's the million dollar question. Or rather shall I say, the billion dollar question. Remember, poverty affects well over 2 billion people. Therefore, you have to keep in mind that whatever innovation you develop has to have the ambition and capacity to reach millions of the affected people, if you wish to achieve any appreciable impact. Now this lecture is not intended to be a comprehensive tutorial on how to carry out this process; That's beyond our scope with the timeframe we have. What we wish to do, instead, is to orient you and equip you with the right mindset on what to consider when planning for this stage. Let's first look at the notion of life-cycle of technology adoption. Rogers attempted to describe this via a theory termed, "The Diffusion of Innovations." Diffusion of Innovations is a theory that seeks to explain how, why and at what rate new ideas and technology spread? This theory was popularized by Prof.

Notes

Summary

0m 15s

Technology Adoption Life Cycle

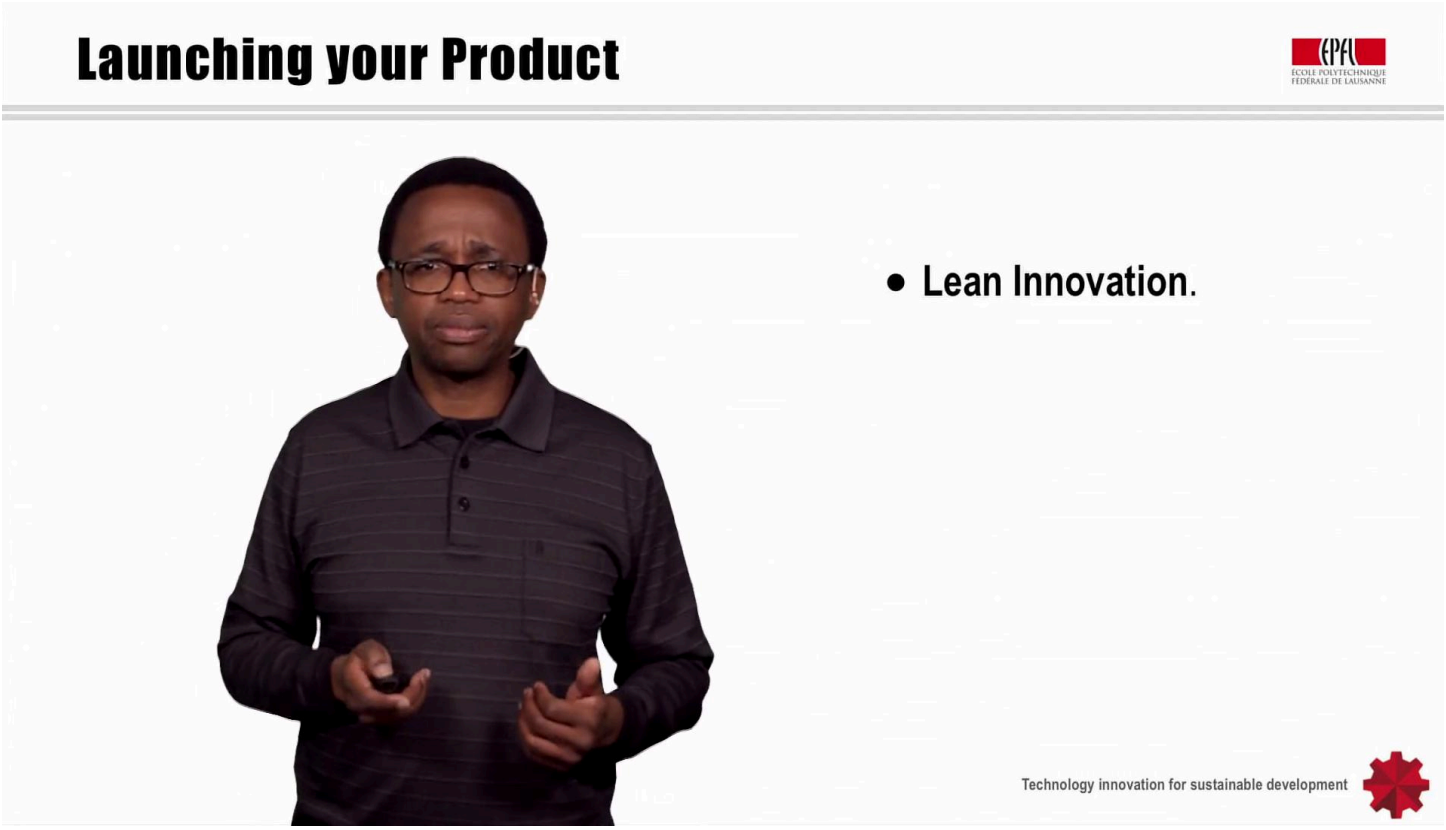


Everett Rogers in his book that was first published in 1962, and is now in its fifth edition and beyond. The process of adoption over time is typically illustrated as a classical, normal distribution or "bell curve". The model indicates that the first group of people to use a new product are called Innovators, which you see on the left. Followed by Early Adopters. Next come the Early Majority, and Late Majority, and the last group to eventually adopt a product are called Laggards. Unfortunately, in reality, the majority of innovations never make it past the early adopters stage! So what can you possibly do to enhance the chances of success beyond this stage for your innovation? There are various strategies and concepts being proposed, but we will discuss two main compelling and enduring schools of thought.

Notes

Summary

1m 32s



As we said before, at this stage, you have developed the proof of concept for your innovation. And you now wish to deploy a product in the market. This is generally a very tricky step for technologists and scientists, because typically technology innovations can seemingly have endless interesting features or applications in principle. But in reality, probably only 20% of those features or potential applications really matter in the market. So what that means is that rather than spending your time and resources over-engineering your product with unnecessary features, you should rather focus on the features that really matter. That is the philosophy underlining the increasingly popular approach in technology innovations, especially. This is the Principle of Lean Innovation. Lean innovation embraces a philosophy of not letting perfection get in the way of progress, as Tom Agan puts it. Lean innovation contrasts conventional approaches to product development, where R&D teams expend enormous effort trying to create a perfected multi-featured product over an extended period, without any sufficient actual market customer or feedback.

Notes

Summary

2m 24s

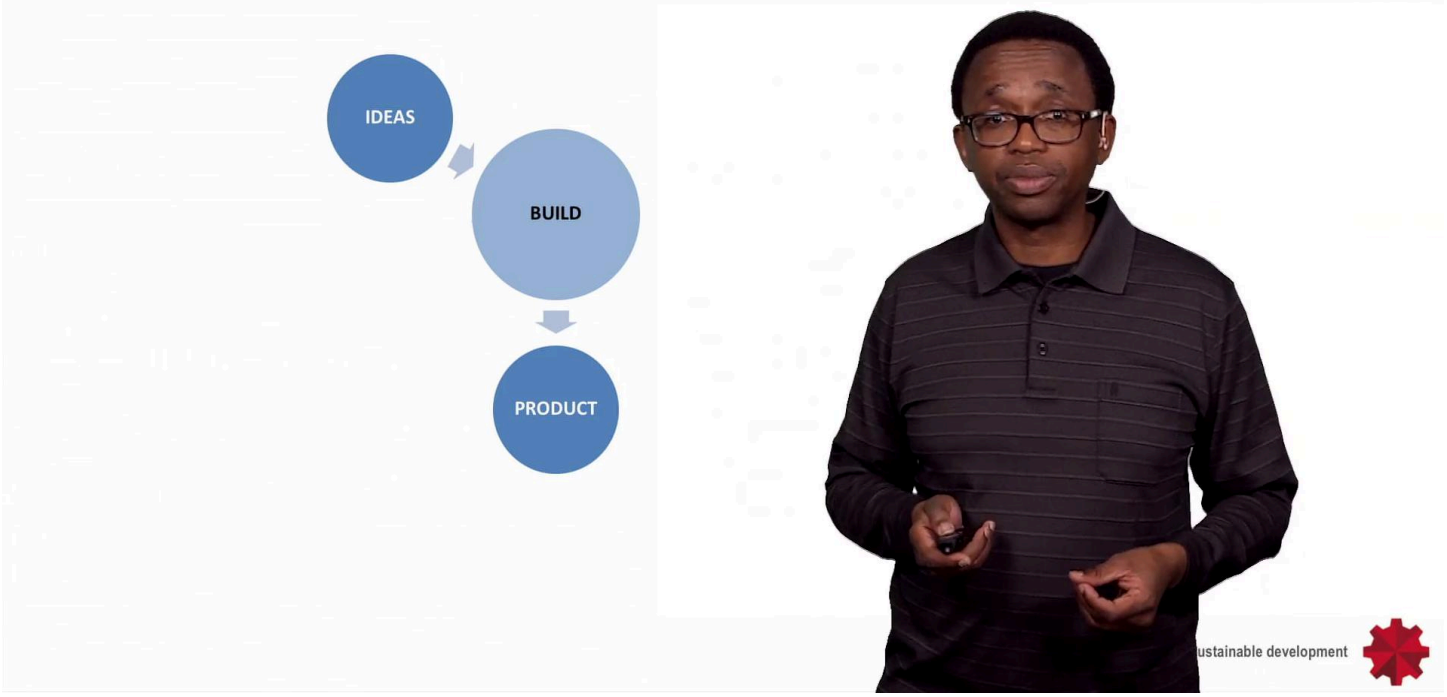
The resulting products are often too expensive, too complicated, too different from what customers want, and worst of all, too late to market. When thinking about lean innovation, it is perhaps useful to take into consideration something I just alluded to. The Pareto principle. Which states that, 20% of the invested inputs are responsible for 80% of the results obtained. This is also referred to as the 80:20 rule. What does that mean for your product? It means that potentially 20% of the product's features may most likely deliver 80% of the benefits sought by customers. So your first crucial challenge is to spend time identifying which 20% of your product's features can fulfill this criterion? Once you have done that you will have defined what could be termed the Minimum Viable Product, and we'll call it MVP, for short.

Notes

Summary

3m 44s

Lean Innovaton: MVP



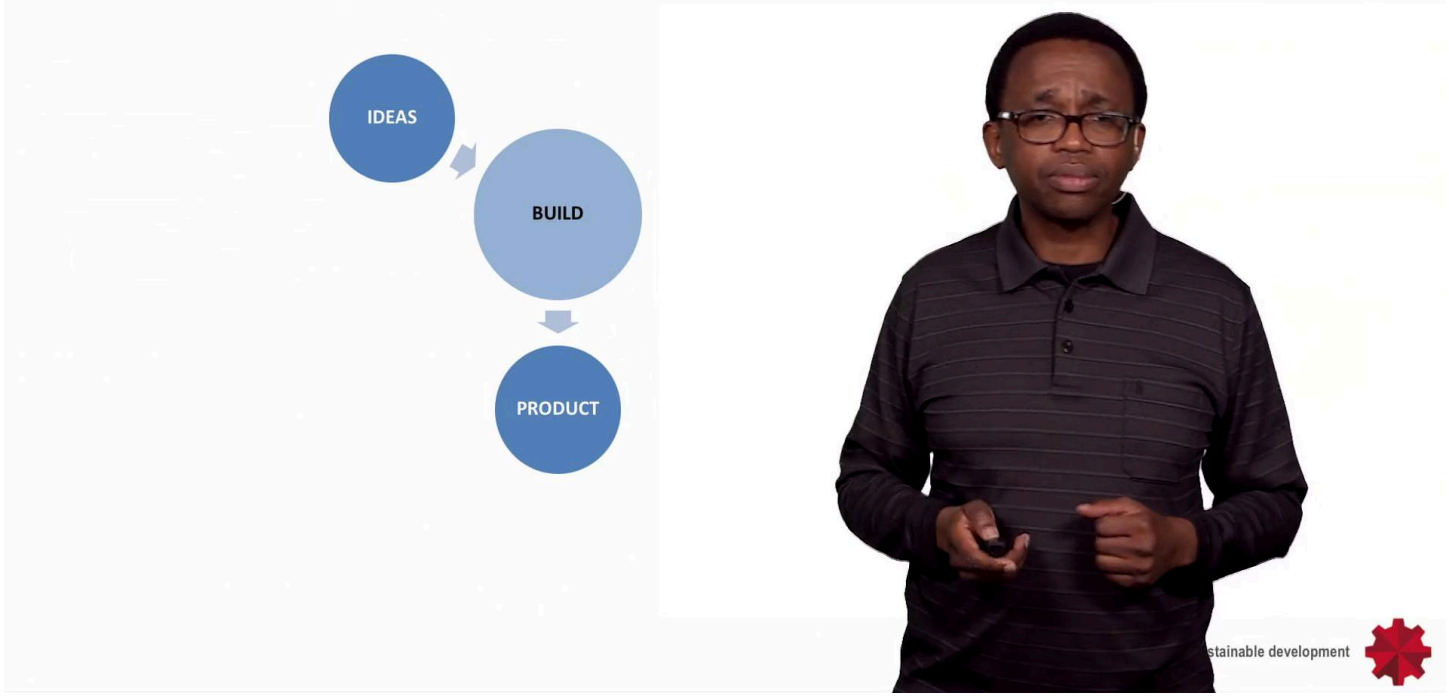
We now look at the concept of the Minimum Viable Product in a more holistic perspective. Essentially, what you have had until now is rather an idea or hypothesis. Which is in fact based on the analysis you carried out with the Product Value Chain and Sustainable Business Model Canvas early on. So a minimum viable product is actually that version of your new product that you utilize in the process of collecting a maximum of information about your hypothesis, but using a minimum of resources. The process itself is actually a build, measure and learn, feedback loop. The build part of the feedback loop, involves a process of building a product with only the core features or minimum feature set. For example, you can do this by first listing and ranking all the features that you really believe your product should have. And then simply apply the Pareto rule, and select the top 20 percentile of that list, to become the minimum feature set of your minimum viable product. You then have to identify a sub-segment of your market, the visionaries or early adopters, that you will sell your minimum viable products to. And that information may or should be obtainable from the analysis that you carried out with your sustainable business model canvas tool before.

Notes

Summary

4m 54s

Lean Innovaton: MVP

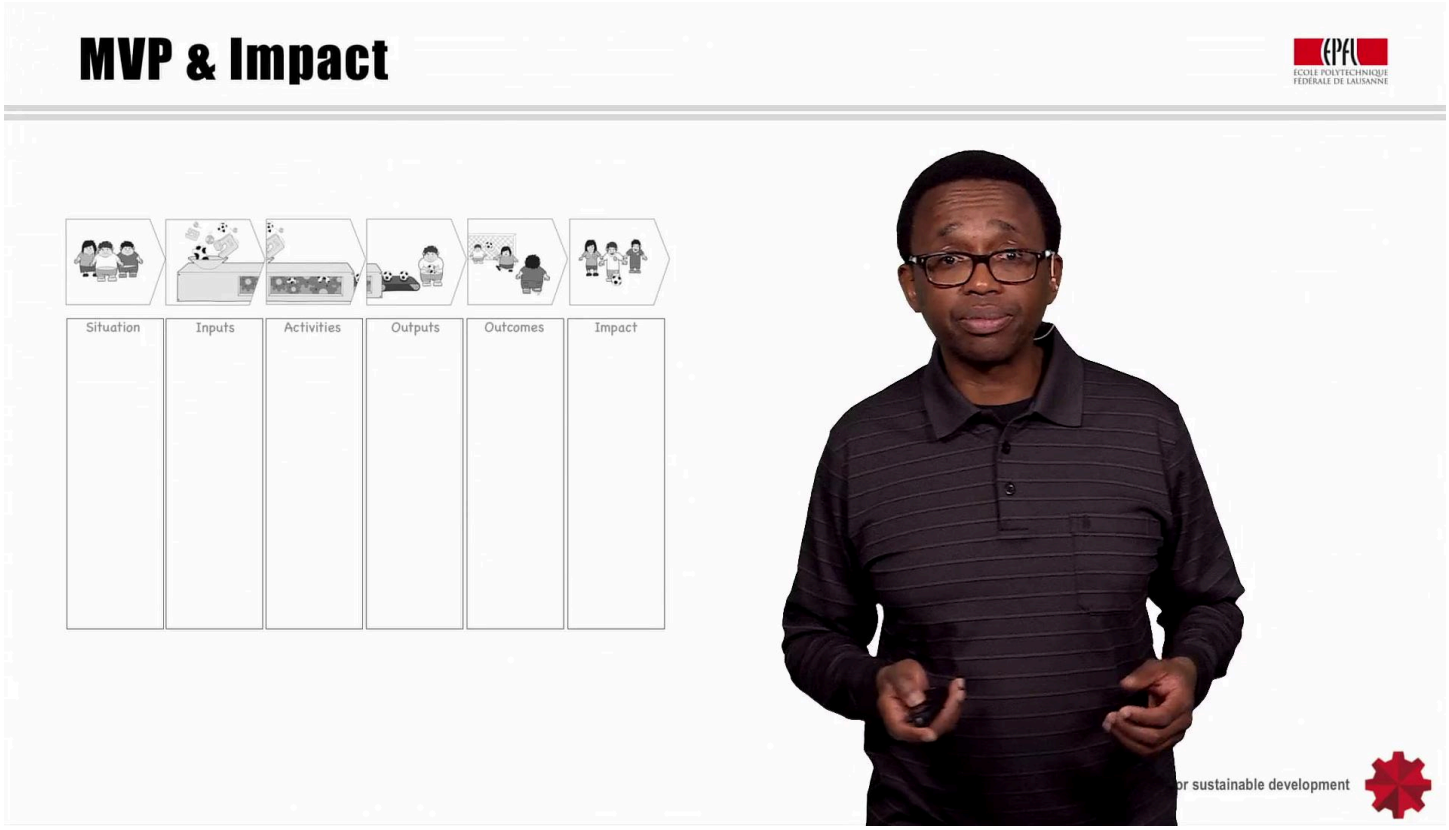


And this sub-segment could include some of the stakeholders and key opinion leaders who actually helped you define your product, for example. And when selling the product to them, you may still want to make them aware of all the other features your product may have later on. Therefore, you'd be doing what one of the well-known proponents of lean innovations, Steve Blank, calls "Perfection by Subtraction". You'd be selling the vision and delivering the minimum feature set to visionaries and not everyone.

Notes

Summary

6m 27s



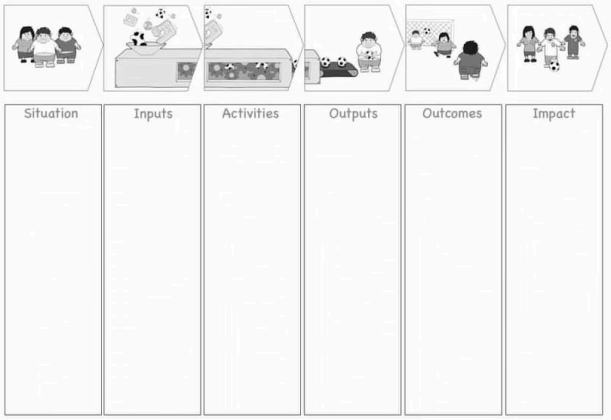
An important point to remember in our case is that we are also after impact. So you also need to ask yourself, are the features of your minimum viable product also relevant and core to your impact objectives? However, based on the manner you defined your Product Specs when applying the sustainable business model canvas tool, there is a high likelihood that your minimum viable product will also match your impact objectives anyway.

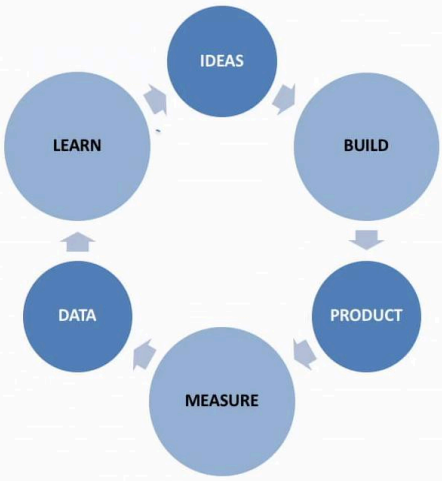
Notes

Summary

7m 04s

MVP & Impact





Technology innovation for sustainable development

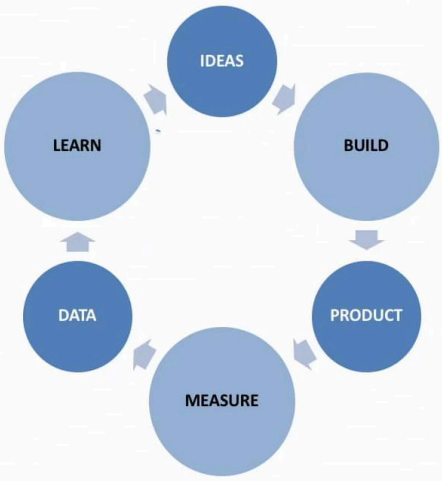
The next phase is the Measure phase, whose aim is to validate that our product development activities thus far are indeed inline with our hypothesis of what we believe the target customer group wants. And the other task you have, includes measuring your indicators from your impact framework, in order to verify if, indeed, you're obtaining the results you hypothesized. And here, there are various feedback points we can receive or learn from. Which brings us to the important or critical phase of Learning. Remember, bringing in a new innovation to the market is actually an experiment. Albeit a marketplace experiment, rather than a laboratory one.

Notes

Summary

7m 30s

MVP & Impact



Technology innovation for sustainable development

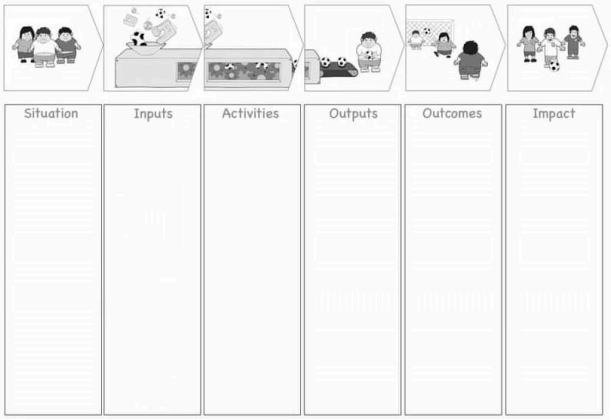
So, learning from the first phase of your experiments provides you the necessary knowledge that brings you closer to your ultimate hypothesis. Or in this case, the final product. So one of the key questions here, is to really determine even with this subset customer segment that somebody actually wants what we are building. As well as what other features should be added. How product development should continue? And if it turns out that no one wants this, then no amount of continued and over-engineering down this path will help.

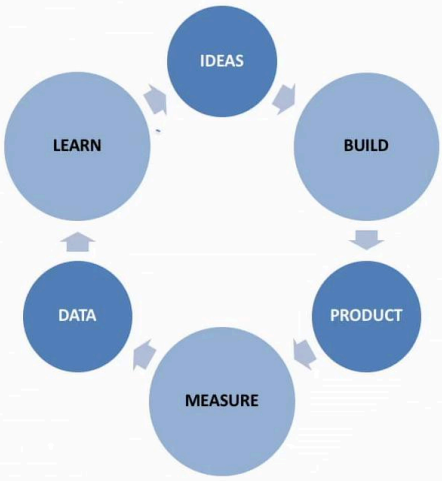
Notes

Summary

8m 17s

MVP & Impact





Technology innovation for sustainable development

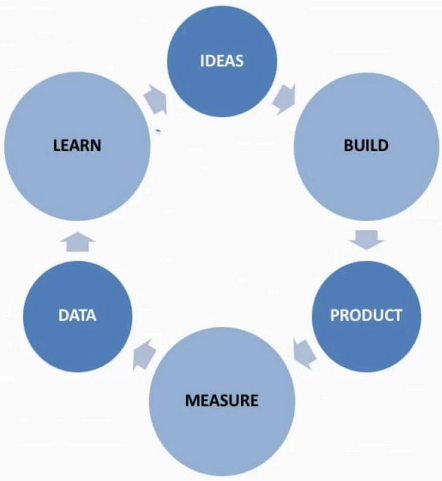
And this is a very important point to learn. And in that case, we should pivot. In other words, abandon this path, and take a different direction. Without expending generally scarce resources. And as was mentioned earlier on, rather fail them early, and fail them cheap!

Notes

Summary

8m 55s

MVP & Impact



Technology innovation for sustainable development

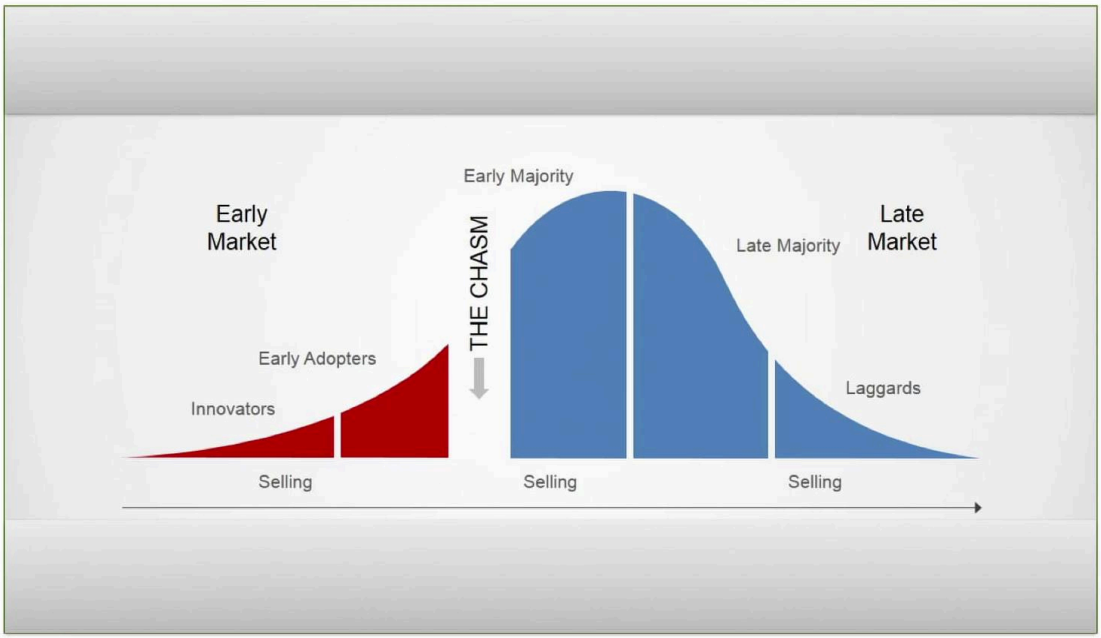
Therefore, by applying the necessary iterations of the build, measure & learn feedback loop on your minimum viable product, you should eventually optimize and refine your final product offering, as well as fine-tune your impact framework or impact value chain, if necessary.

Notes

Summary

9m 15s

Scaling Up



Technology innovation for sustainable development

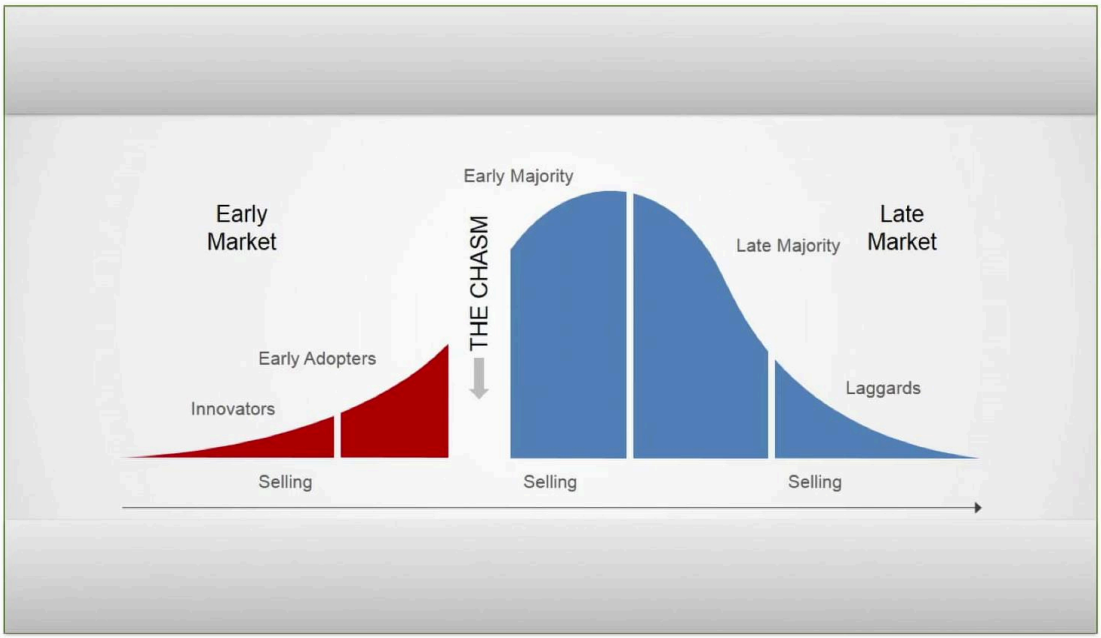
Now you have finally defined your best products. And you have actually managed to get some sales traction with a handful, or even hundreds of customers. So, if we look at the technology adoption curve, you have what we call, early adopters, which are indicated in red on the curve on the screen. But remember, as we said earlier, most innovation products never make it past this stage of early adopters. Why? Well, it turns out that in practice it is so much harder penetrating the next market segment of the early majority. Primarily because early adopters and early majority have two vastly different commercial mindsets. It is not a smooth and seamless transition. as the technology adoption curve I showed you earlier from Rogers' theory might suggest. Instead, there is what Jeffrey Moore has famously coined, as a "Chasm". A chasm between early adopters and the early majority. In his book, "Crossing the Chasm", Moore says that, the early majority are pragmatists, share some of the early adopters' ability to relate to technology, but they are driven by a strong sense of practicality. They want to see well-established references before investing substantially.

Notes

Summary

9m 34s

Crossing The Chasm



Technology innovation for sustainable development

But because there are so many people in this segment, roughly one third of the whole adoption life-cycle, winning their business is key to any substantial growth, though. So this is because this early majority of pragmatists care about the company they are buying from, the quality of the product they are buying, the infrastructure of supporting products and system interfaces, and the reliability of the service they are going to get. So the sales-pitch that made you successful with the innovators, and early adopters, will not necessarily work with the pragmatists or early majority. Now to cross this chasm, Moore proposes a whole methodology. But we will not cover it in detail here, but rather encourage you to read the book, which is referenced at the end.

Notes

Summary

10m 52s

Concluding Perspectives

Lean Innovation vs. Crossing the Chasm

ean: Learn & Perfect Product

Technology innovation for sustainable development

The message I essentially wanted to convey is that there are two very distinct phases in launching and adoption of a technology innovation. And that the methods needed to succeed in the second phase tend to be considerably different from the ones required in the first adoption phase. So in other words, the fact that you succeeded in the first phase with the so-called early adopters, does not necessarily guarantee you success in the mass market of early majority. Now to summarize, you might ask yourself the question, Why these two concepts specifically, namely, lean innovation and crossing the chasm? In fact, you will see that, if you have noticed already that these two concepts are actually complimentary. In lean innovation, you identify and build your minimum viable product. And then learn intuitively from its deployment in the market, on how to make the best product. One of the key secrets of success of lean innovation is actually embracing learning. As it has been shown that learning has, by far, the single greatest impact on revenue from new products. Its focus is in the most important product attributes.

Notes

Summary

11m 42s

Concluding Perspectives

And the rapid cycling, via trial and error, helps to accumulate critical knowledge quickly, and ideally, in the real life, competitive environment. In other words, lean innovation is not necessarily a better innovation process, rather it is a more efficient learning process. Whereas in crossing the chasm, once you have defined and validated your best product, you assemble a strategy for its full rollout, which should see it reach hundreds of thousands, and millions of clients.

Notes

Summary

12m 55s

Concluding Perspectives

Lean Innovation vs. Crossing the Chasm
Lean: Learn & Perfect Product
Then: Cross the Chasm

Technology innovation for sustainable development

If you think of this as a game of darts you can think of lean innovation as enabling the efficient implementation of the early adoption phase. Or having to point the small missile correctly. While crossing the chasm methods enables success with the early majority. Or give inertia and direction to your small missile, to get to the Bull's Eye! Goodbye.

Notes

Summary

13m 24s