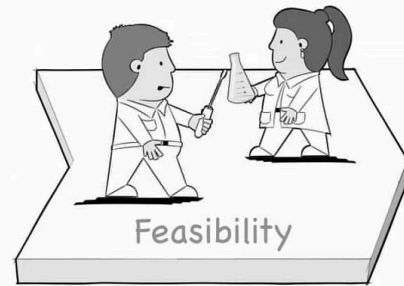




EPFL



- Technology & Business Model
- Test & adjust strategy
- Involve locals & aim for global

Technology Innovation for Sustainable Development

Hello. In this video we will recapitulate the methodology applicable to what we called the feasibility phase. The objective of this phase is to demonstrate the feasibility of our concept. This involves a technology side and a business side as we have seen. This phase is where we need to remove all the unknowns and risks we can. Because the next step is when our concept will be deployed. And, hopefully, scaled-up. The best way to do that is to test our concept and hypothesis with stakeholders. In the previous phase we have identified the stakeholders and we have brought together a project team which includes diverse competences such as engineers, marketers, specialists and key opinion leaders. Very importantly we have also involved local people from the pilot country which we have selected in the previous phase. We also need to keep in mind that we will want to deploy our technology not only in the pilot country, but also in other regions where there is the same unmet need. Let us now look into this phase in more details.

Notes

Summary



0m 10s



- Technical feasibility
- Verifying specifications
- Involving users

Technology Innovation for Sustainable Development

In the first phase we have developed specifications that describe our technology. We now need to verify that this technology is really feasible within those specifications. Demonstrating technological feasibility will generally require that we develop and test some prototypes. When develop those prototypes, we must constantly verify that our choices are compliant with our specifications. This technology development task will need to be properly documented. It is important to write down all the choices we make and why we make those choices. There are chances that we will need to refer to these documents at a later stage. In particular, when we need to make changes. It is also very important that we comply with industrial norms applicable to our technology as we have said multiple times in this MOOC. Technology development is not something that can be done alone. We need to constantly interact with our stakeholders, and especially with the users and key opinion leaders. We can easily see why this is important. There will always have to be tradeoffs and these tradeoffs need to be validated with the key stakeholders. There is a simple memory trick to remember the most frequent tradeoffs we will have to make. We call it the CPD triangle.

Notes

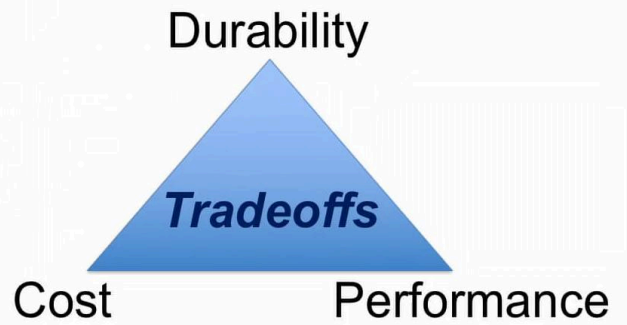
Summary



1m 31s



- Technical feasibility
- Verifying specifications
- Involving users
- CPD triangle:



Technology Innovation for Sustainable Development

For every choice we need to make we will need to balance essentially three things: the functionality or performance of our technology, the cost and the durability. It is generally impossible to maximize all three of these criteria at the same time. So that we will need to find an acceptable compromise. Prototypes are immensely useful in these regards, as they can be used to assure that we have properly understood user needs. Let's look into these with some examples taken from our X-ray project.

Notes

Summary



3m 09s





During the feasibility phase of the X-ray project it was determined that the user interface needed to be tested in details. This user interface involved a touch screen and a software allowing to operate the X-ray system as well as to acquire, store and review the images. The team developed a suitcase-like design which involved the command touchscreen and the diagnostics screen. A first version of the software was developed and integrated into the prototype. The goal was only to test how the user would respond to the architecture of the menus and buttons.

Notes

Summary



3m 52s



Technology Innovation for Sustainable Development

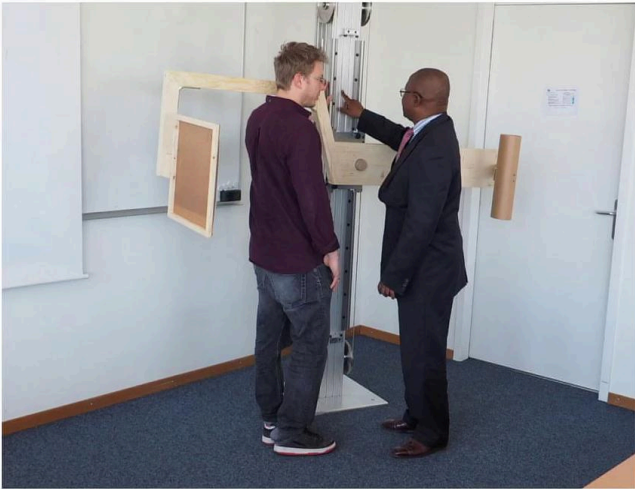
In the second picture you can see the prototype being tested in Cameroon by a local radiographer on the right, under the supervision of the joint project manager Dr. Moulion Tapouh on the left, who is a Cameroonian radiologist. The radiographer is given a classic type of task such as taking a radiography of a limb, and every click is recorded as well as the sequence in which he operates the software. At the end of the test he's questioned for his impressions and comments. In this particular case the team came to realize that the software had many flaws and needed a quite important redesign in order to be more user friendly. This was an important learning for the team.

Notes

Summary



4m 36s



Contribution for Sustainable Development

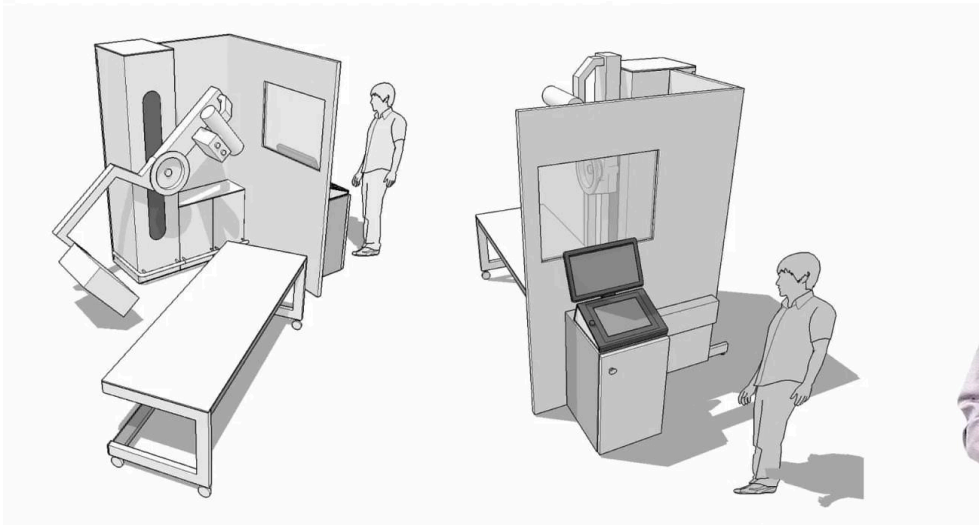
In our second example the question was to determine the best mechanical configuration allowing to position the detector on the X-ray tube with respect to the patient. A swivel arm solution had been chosen by the engineering team. However, it was crucial to determine which were the patient positions that were possible and those that were not with this solution. The problem was solved using a wooden prototype which was presented to Professor NKO'O, who is a widely recognized opinion leader in radiology, and a partner in the project from the beginning. Several additional workshops were realized which allowed to accurately determine the mechanical functions and necessary degrees of freedom for the design. As demonstrated in this example it is not necessary to build sophisticated prototypes to verify specific feasibility aspects. We can use any kind of simple material such as wood or cardboard to assess even complex questions. A second important point I would like to emphasize is that it is generally not advisable to wait until we have a complete prototype before showing it to our stakeholders.

Notes

Summary



5m 27s



inable Development

Building rough-and-ready prototypes in order to test only the specific aspects for which we have doubts is a great way to remove unknowns. Yet another nice way to test our ideas is to make drawings. Here the team wanted to explore ideas related to the configuration of the whole X-ray system including the patient bed, and the lead screen behind which the radiographer will be operating the device. These drawings brought about many discussions with many stakeholders.

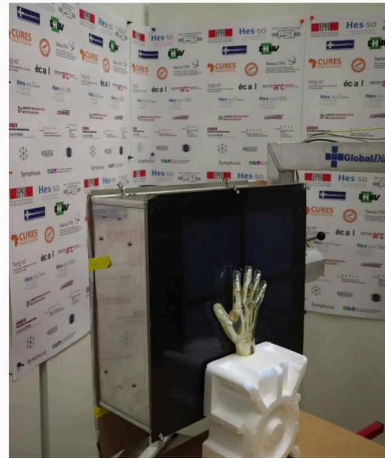
Notes

Summary

6m 53s







First Image



Technology Innovation for Sustainable Development

Here's finally a more advanced prototype of the X-ray system. Note that the industrial design aspects have not been integrated yet and that this is not a final product for which much more work needs to be done. However, this prototype has allowed to conduct many tests including realizing real X-ray images of a human hand. Of course, the human hand was a skeleton hand incapsulated in resin, which allows to mimic a real hand. It would not have been ethically or legally acceptable to make tests on real humans before all the regulatory approvals are obtained. In these slides we have only discussed technical feasibility. And yet we know that the business model is also extremely important. Let us look into this.

Notes

Summary



7m 29s



- Test the value proposition
- Use focus groups, surveys

Technology Innovation for Sustainable Development

The fundamental question we need to answer at this stage is the following. Is our value proposition attractive to potential buyers? As we have seen, the buyers and the beneficiaries may be two different groups. We need to make sure that our value proposition is both attractive and that it allows to fulfill the unmet need. We need to go out and test our value proposition with the very people who will pay for it and those who will benefit from it. This process is extremely important. And will more often than not lead to adjustments and modification to our value proposition. In practice, this may involve presenting a prototype to a group of potential buyers. And carefully recording their reactions. In marketing this is called a focus group. Selecting the right sample of participants can be quite difficult as one has to be careful not to introduce biases such as involving someone from the design team who would skew the discussions. Focus groups can be very useful. For example, to test pricing hypotheses. One can even evaluate the price sensitivity of the buyer which is very important for our economic viability. Of course, there are many other ways to collect quantitative and qualitative user feedbacks.

Notes

Summary



8m 23s



# Business model: test the value proposition



- Test the value proposition
- Use focus groups, surveys
- Try to get pre-orders!

Technology Innovation for Sustainable Development

Such as using well-designed surveys. Whatever the method, what counts is to carefully plan how the value proposition will be tested and later to honestly analyze the results. The trap here is not to fall in love with your solution, but to really listen to what people say even if that means making important changes. Finally, depending on the technology it would be absolutely great to have written preorders. Not only does this prove that the technology is attractive and that the pricing is right, but it will also allow you to demonstrate that you have identified a potentially highly interesting business opportunity. This is absolutely invaluable when you will want to convince investors to finance your project at a later stage. If you're a really good sales person you may even try to obtain a downpayment which may help you finance your development and deployment. This is typically what you're trying to achieve with crowdsourcing websites.

Notes

Summary



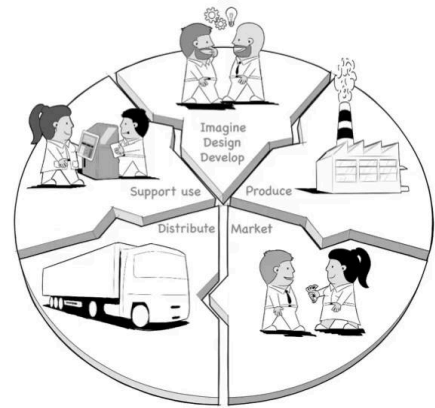
10m 00s



# Business model: test the value chain



- Test key partners
- Get written offers
- Make/buy: Decide!



Another subject that must be carefully tested during the feasibility phase is our product value chain. In particular, we need to test what are the conditions under which our partners will supply a component or provide a service. Typically this is done by requesting written offers from our partners. These offers will allow us to decide if it is more favorable to purchase the component or service, or if it is better to provide it ourselves. This is very important as we need to consolidate our cost targets and to estimate the profitability of the company.

Notes

Summary







- Benchmark

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Finally, once we have confirmed our strategy, we need to go back to the sustainable business model canvas. And balance our triple bottom line. Remember as a principle, all 3 bottom lines should be neutral at the very least. Our initiative is ethically questionable if the social benefit is lower than the social cost. Or if to get a social impact you're destroying the environment. It is assuredly bound to fail if the revenue streams do not allow you to cover the costs. At this stage it is also very important that we think global. This is, of course, not simple. Indeed, as we get better and better at understanding our pilot context, there is a risk that our product and strategy won't be applicable elsewhere. As we have said in the past videos, we should think about how our technology could be made available wherever it is needed, which could be all of low and middle-income countries. In the feasibility phase it is thus very important that we benchmark against other contexts. For example, how attractive would our concept of X-ray machine be in Asia or South America? In order to do that, we can contact local NGOs or local universities and engineering schools to help us.

Notes

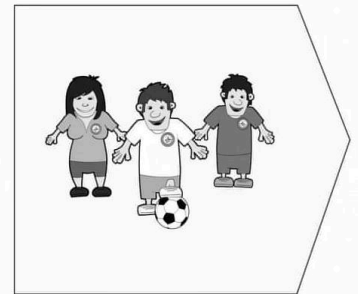
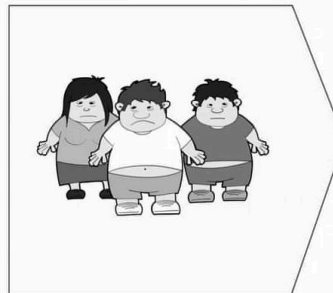
Summary



11m 55s



- Benchmark
- Update impact metrics



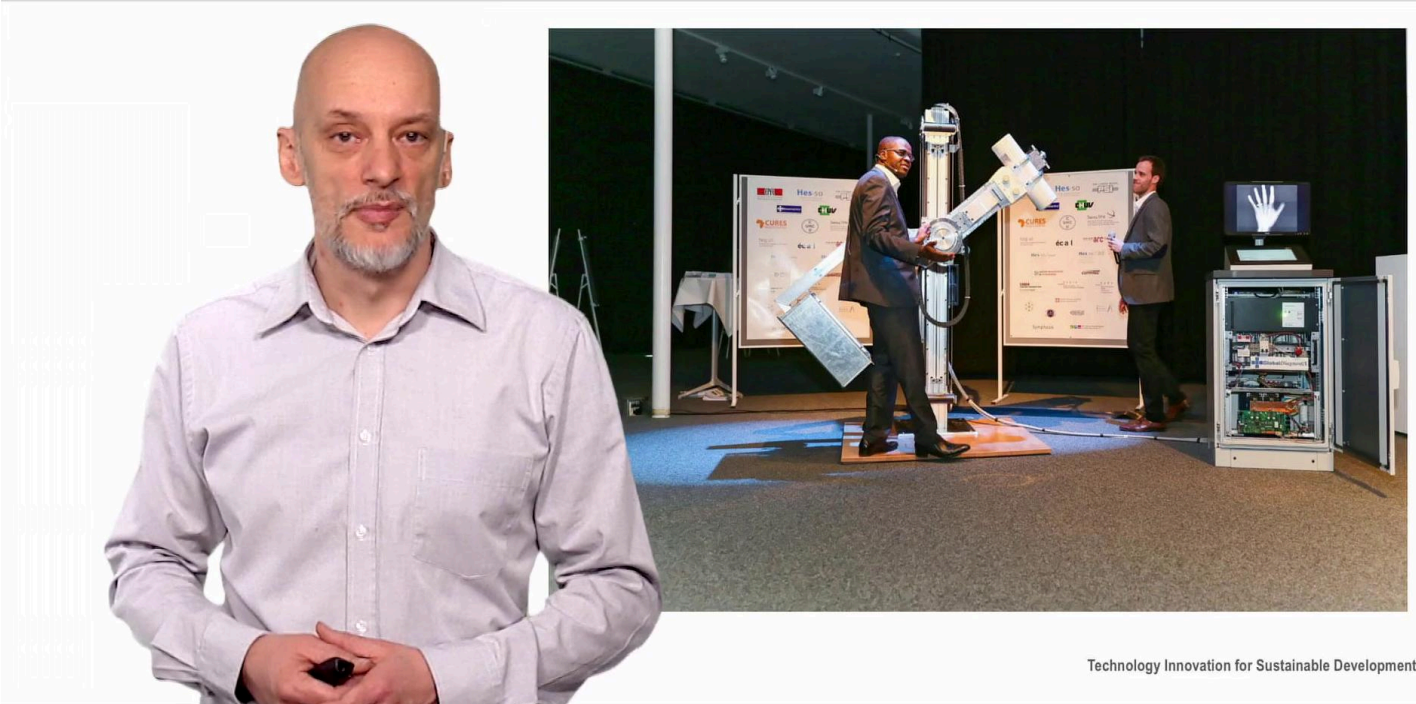
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It would be a pity if failing to introduce a small change at this stage would hinder a large fraction of the world's poor from getting access to our technology. Our three tools, the impact canvas, the product value chain, and the sustainable business model canvas can be a convenient way to communicate our strategy to stakeholders in other contexts. At this stage we also need to update our impact metrics based on the impact canvas.

Notes

Summary





Technology Innovation for Sustainable Development

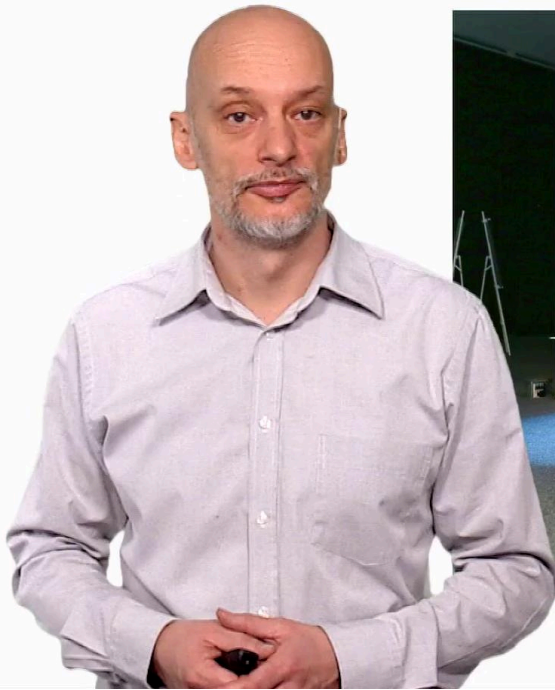
An important aspect that we did not discuss up to now is the communication strategy. By the time we have a reasonably clear concept and strategy, it will become very important to spread the word. Here you can see the two project managers presenting the X-ray prototype in a public show. There are many channels you can use. Such as the internet, social media, radio, TV, etc. Short video pictures are great communication tools which can basically be made with very little resources. Be careful though, that this won't interfere with your patent strategy as we have explained in a previous video. Raising public awareness of the problem you are trying to solve can allow you to attract crucial partners and potentially also investors or other organizations who could be ready to support you financially. The issue of raising adequate funding for your project is always a problem. However, multiple funding sources exist. Ranging from crowdsourcing to international organizations, or foundations. If universities or engineering schools are involved you may be able to convince them to apply for a research grant in collaboration with you. Fundraising can be really frustrating at times.

Notes

Summary



13m 58s



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But that is also where you can demonstrate how strongly you believe in your idea. You need to hang-in there and find creative ways to convince funders to support you. Having a good communication strategy will almost always turn out to be helpful in these regards.

Notes

Summary

15m 29s







- Product specification
- Data proving feasibility
- Finalized functional prototype
- Patent(s) if applicable
- Business plan

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As a summary, here are the main deliverables which must be available at the end of the feasibility phase. First, a detailed and validated product specification. Then data demonstrating that the technology is feasible according to the specifications. A finalized prototype which incorporates all potential changes made in this phase. And a receipt of your patent application if that is applicable. Finally, a complete business plan describing your project and business model. This document doesn't need to be many pages. It should be quite easy to write based on your reflections in this phase. Simply start by summarizing the content of your 3 tools. The impact canvas, the product value chain canvas, and the sustainable business model canvas. However, our advice is: don't lose too much time on this document. Make it crisp and attractive. It will be useful for the next phase. Goodbye.

Notes

Summary



15m 50s